This is How We Do It: An exploratory multiple case study of the contextual factors supporting engagement in the personal learning networks of six 10- to 16-year-olds in England

Omafuvwe Eguara

B.Ed. (Hons), PGCE, MA

March 2023

This thesis is submitted in partial fulfilment of the requirements for the degree of

Doctor of Philosophy

This thesis was completed as part of the Doctoral Programme in

e-Research & Technology Enhanced Learning

Department of Educational Research,

Lancaster University, UK

Omafuvwe Eguara B.Ed. (Hons), PGCE, MA
This is How We Do It: An exploratory multiple case study of the contextual factors supporting engagement in the personal learning networks of six 10- to-16-year-olds in England
Doctor of Philosophy, March 2023

Abstract

Studies report that children's digital technology use tends to increase as they grow older. Other studies indicate that learner engagement tends to decline as children progress through their time in school, notably at the transition from primary to secondary school. This indicates that at the stage when they are susceptible to declining school engagement, they are increasingly engaged with technology and networked activity. This paradox is the focus of this multiple case study which explores six 10- to 16-year-olds' engagement in their personal learning networks, highlighting the contextual factors supporting this self-directed, technology-mediated engagement. This study questions current understandings of networked learning, extending the approach to include under 18-year-olds. It proposes a typology of networked learning for children and young people in line with the trajectories of their psychological development. Undergirded by networked learning and student engagement theory, this study employs 8 methods – a semi-structured questionnaire, semi-structured interview, Draw and Talk, historical online records, field notes and memos, diagrams of participants' networks, emails, as well as Mime and Tell, a child-centred method developed for this study, capturing children's embodied, nonverbal communication. Reflexive thematic analysis has been used to unpack the data. Participants' adolescent psychological needs, chiefly for self-efficacy, connectedness, and autonomy, were seen to influence the construction of, and participation in, their networks. The uniquely structured networked environment was then seen to support participants' psychological needs. This cycle of support is akin to Stage-Environment Fit, known to support engagement. Insights from this study will be of interest to academics and scholars in networked learning and to teachers, school leaders, local education authority leaders, policy makers and all interested in student wellbeing and school engagement.

Table of Contents

List of tables

List of figures

Acknowledgements

I am most grateful to the participants in this study, my co-researchers, and their parents and guardians who gave of their time, effort, and expertise to support this work.

Many thanks to the excellent academic and administrative staff of the Department of Educational Research, most especially to my supervisor, Professor Don Passey who has gone above and beyond the call of duty in his support of this thesis and my growth as a scholar and researcher. Many thanks to my examiners, Professor Jennifer Symonds and Dr Melis Cin, for their contributions to the success of this thesis. Much appreciation to the Lancaster University library staff who were there at all hours of the day and night to answer my questions, find resources and support me in whatever way I required.

I am very grateful to my peers in Cohort 12 who have been very supportive since the beginning of my doctoral journey. Thank you to the many friends and family members who have lent their support in various ways. Thank you to the various doctoral support groups I have been a member of who have been very supportive on this journey, especially PhD OWLs, BAMEWA, WIASN and Black Women PhDs. I could not have come this far without your support.

My deepest thanks to my children who have given me much inspiration, encouragement, patience, and support as I have worked through this programme. My eternal gratitude goes to my parents, Sam and Margaret, who have always inspired me to higher heights and who sowed in me the childhood dream to achieve a doctoral degree someday. Mum, dad, we did it!

Most importantly, my thanks go to Almighty God, without whom none of my achievements would have been possible. *Ọghẹnẹ mẹ, Oruigbunu, mẹ iguẹ!*

Author's declaration: I declare that this thesis is my own work. It has not been submitted for the award of a higher degree or diploma elsewhere. I declare that the word-length of this thesis, 49,659 words, conforms to the permitted maximum.

Signature

Publications derived from work on Doctoral Programmes

The following research papers were submitted as part of the requirements of the e-Research & Technology Enhanced Learning doctoral programme:

- **Module 1 (ED.S821) - Research Methods in Education and Social Science Settings:** Ain't I a teacher? An autoethnography exploring the role of cultural competence in the recruitment and retention of Black teachers in the UK
- **Module 2 (ED.S822) - The Development of Professional Practice:** Are we there yet? Educational technology integration for the 21st Century
- **Module 3 (ED.S823) - Researching Technology Enhanced/Networked Learning, Teaching and Assessment:** A journey to learner autonomy and self-efficacy mediated by Microsoft Word spelling and grammar feedback
- **Module 4 (ED.S824) - Groups and Communities: Researching Technology Enhanced/Networked Learning Communities:** Becoming a networked learner: Unpacking identity development in networked learning communities
- **Module 5 (ED.S825) - Interculturality and Globalisation in Technology Enhanced Learning:** Cultural competence in learning design: What are primary school teachers' conceptions of childhood and how can these influence their technology integration practice?

The research paper developed from Module 1, titled Cultural Competence in the Mentoring, Recruitment and Retention of Black Teachers in the UK, was presented virtually in November 2019 at the 12th International Conference of Education, Research and Innovation and published in the conference proceedings. This paper was also presented in-person at the Doing Autoethnography Conference held in January 2020 at the Dolphin Beach Resort in St. Pete Beach, Florida, USA.

The research paper developed from Module 3, titled A journey to learner autonomy and self-efficacy via technology-mediated scaffolding, was presented

virtually at the 14th International Conference of Education, Research and Innovation in November 2021 and published in the conference proceedings.

The research paper developed from Module 4, titled Becoming a networked learner: Unpacking identity development in networked learning communities was published in Studies in Technology Enhanced Learning, volume 2, issue 3, 2022.

The research paper developed from Module 5, titled Cultural Competence in Learning Design: What are primary school teachers' conceptions of childhood and how can these influence their technology integration practices? was presented virtually at the 13th International Conference of Education, Research and Innovation in June 2020 and published in the conference proceedings.

A short presentation inspired by this doctoral research, titled Changing childhood, new direction, was presented virtually at the International Conference on Student-led Research and Innovation in Arts, Humanities & Social Sciences in June 2021.

Chapter 1: Introduction

In this first chapter, I provide a background to this study with links to the relevant literature. This literature situates the study within the existing body of knowledge, defining the gap in knowledge that this study aims to fill. I present the rationale for this study, along with my professional philosophy and positionality, and their possible impact on this study. The contributions this study makes to theory, practice and policy are outlined. This study's research questions then follow after the literature review in Chapter Two.

Please note that the terms 'children,' 'young people' and 'children and young people' may be used interchangeably as they are referred to by these terms in the literature. They may also be referred to as CYP (Children and Young People), another documented reference in United Kingdom (UK) literature (Department of Education [DoE], 2020; National Health Service UK [NHS], 2013).

1.1 Background

1.1.1 Student engagement

Student engagement has been loosely defined as "the extent of a student's active involvement in a learning activity" (Wellborn, 1991, as cited in Christenson et al., 2013, p.150). This study explores what factors supported the engagement of six participants aged 10 to 16 years, based in England, as they constructed knowledge in their personal learning networks (PLNs). The literature reports the trend of decreasing student engagement as children progress through school, with notable declines occurring at transitions between school phases, i.e., from primary to secondary school, from primary to middle school and from middle to high school (Benner & Graham, 2009; Eccles et al.,1993; Fredricks et al., 2019; Havik & Westergård, 2020; Jindal-Snape & Cantali, 2019; Symonds & Galton, 2014; Symonds & Hargreaves, 2016; Wang & Hofkens, 2020; Wigfield et al., 2015). This trend, however, coincides with

increasing CYP's networked engagement (Burns & Gottschalk, 2019a; Burns & Gottschalk, 2019b; Rideout et al., 2022) as they pursue their own interests in personal learning networks which are largely digital. This paradox of engaging in one learning context while disengaging from another is the basis of this study. I am a UK-based primary and secondary school teacher, working with children before and after transition to secondary school. I therefore seek to understand the contextual factors supporting engagement in informal PLNs at an educational phase where school engagement is at risk of decline (Fredricks et al., 2019; Symonds & Galton, 2014; Symonds & Hargreaves, 2016; Wang & Hofkens, 2020). Consequently, this study focuses on the engagement practices of six 10- to 16-year-olds, the proximal age range of primary and secondary school transitions in England, in their PLNs.

1.1.2 Personal Learning Networks

With the advent of the World Wide Web and mobile technology, connections between people, communities, societies, and information are largely being facilitated through the Internet. Living and learning have also been impacted as many people today live and learn in increasingly networked societies (Levin & Mamlock, 2021; United Nations Children's Fund [UNICEF], 2017a; van Dijk, 2020). While access may not be universally equitable (Rideout et al., 2022; UNICEF, 2017a), more and more people, including children, are making networked connections, building online identities, accessing information, and using this digital empowerment to chart the course of their own learning (Levin & Mamlock, 2021; Rideout et al., 2022; UNICEF, 2017a; van Dijk, 2020). When we build and learn through our own connections, these connections constitute PLNs.

Though it is understood that not all children participate in digital networks (Rideout et al., 2022; UNICEF, 2017a), the PLNs of six digitally active children, aged 10 to 16 years, and how they connected and learned in them, are the focus of this study. Multiple data sources have been used to gather the data from and with the six participants over a 20-month period, drawing out rich descriptions and in-depth insights (Creswell, 2012a; Yin, 2018). My goal for

studying children's PLNs is to understand how they engage with learning on their own terms, without adult direction or agenda. This research aims to tell the story of how these six participants do learning in their PLNs. I propose that these insights will shed light on the conditions that support children's learning engagement in PLNs. With these insights, it can then be explored how and whether these conditions can be designed for other contexts (Jones, 2015), to improve engagement in multiple contexts.

1.2 Context

It is important to note that I have conducted this research from the context of the United Kingdom. Much of the established literature on student engagement (Christenson et al., 2012; Fredricks et al., 2019), networked learning (De Laat & Dohn, 2019; Dirckinck-Holmfeld, Hodgson & McConnell, 2012; Jones, 2015; Networked Learning Editorial Collective [NLEC] , 2020, 2021), childhood (Duschinsky, 2012; James & Prout, 1990, 1997; Locke, 1690; Reynolds, 2014; Rousseau, 1979) and child and human development (Bandura, 1997; Bronfenbrenner, 1979; Eccles & Midgley, 1989; Erikson, 1963, 1997; Piaget, 1934, 1952, 1954, 1955, 1960; Vygotsky, 1986) comes from Western or Global North contexts and perspectives. Its applicability may therefore not be universal. I have not found any evidence in the literature, for instance, that the engagement trends underpinning this study apply similarly outside this Western/Global North context. Contextual features and variables, such as culture, technology access and economic status, may therefore vary in other contexts, resulting in different trends in education. As this is a multi-case study, I have provided rich descriptions of the focal cases and their contexts to allow the reader to determine the transferability of the findings.

1.3 Rationale

This study's significance arises from the high premium placed on student engagement in school systems around the world (Christenson et al., 2012; Fredricks et al., 2019; Havik & Westergård, 2020; Wang & Hofkens, 2020). Engagement is positively linked to academic performance, school completion,

positive youth development and lifelong positive outcomes (Archambault et al., 2009; Christenson et al., 2012; Fredricks et al., 2019; Havik & Westergård, 2020; Rumberger & Lamb, 2003; Wang & Hofkens, 2020). Disengagement, on the other hand, has been associated with increased risk of problem behaviours such as school misbehaviour, school non-completion, drug use and crime (Alexander et al., 1997; Fredricks et al., 2019; Li & Lerner, 2011; Wang & Fredricks, 2014; Wang & Hofkens, 2020). Engagement is therefore seen as a protective factor against educational risk and a predictor of positive academic and life outcomes (Finn & Rock, 1997; Fredricks et al., 2019; Resnick et al. 1997; Steinberg & Avenevoli, 1998; Wang & Hofkens, 2020). With engagement trends predicting a decline as students navigate school transitions, this study aims to contribute to the practice of school transition and engagement support for better outcomes.

1.4 Researcher philosophy and positionality

1.4.1 Philosophy

It is pertinent at this point to introduce my professional philosophy regarding childhood (Angell et al., 2015) as this guides the research design and implicit considerations. I present this, then connect it to the present study.

Conceptions of childhood in the Global North, where I live and work, have evolved over time, from puritanical, childhood innocence, to the errant child in need of chastisement, to the child as ‘tabula rasa’ or ‘blank slate,’ in need of cultural impartation from adults, to the child as an individual with rights, and now, with technological advancement and access, the child as social actor with agency (Duschinsky, 2012; Locke, 1690; Reynolds, 2014; Rousseau, 1979; UNICEF, 2010). The once-clear distinction between childhood and adulthood is increasingly blurring, with traditional childhood gradually disappearing (Prout, 2005).

In an earlier phenomenographic study of primary school teachers’ technology integration, I have classified these disparate conceptions of childhood into medical, social and hybrid models (Eguara, 2020). Medical models view

childhood through a deficit lens, a life stage positioned relational and subordinate to adulthood, with the child in a state of becoming (Leonard, 2016; Morrow, 2011; Mühlbacher & Sutterlüty, 2019; Sonu & Benson, 2016; Woodhead & Faulkner, 2000). Social models regard childhood with social, rather than developmental underpinnings - children as social actors; individuals in a social structure; with agency to construct their own worlds rather than being acted upon; capable of autonomy in the present, rather than in transit to capable adulthood (Corsaro, 2017; Qvortrup, 2009, 2011). Hybrid models are located between medical and social, and regard children as capable of autonomy but with childhood limitations, and therefore requiring adult support (Eguara, 2020).

I position these models on a continuum of increasing agency, from medical to hybrid to social models. Following this, I argue that a teacher's conception (model) of childhood has implications for the level of agency they mediate through their pedagogy. Connecting this argument to the present study and referencing my practice as a teacher in the Global North, I hold the social view of the agentic child, capable of autonomy, of constructing their own worlds and of acting, rather than being acted upon. This philosophy underpins this study and will be evident in its focus on CYP's PLN participation without adult agenda or direction and in their participation in this study as co-researchers.

1.4.2 Positionality

As a researcher and educational practitioner, I am a member of several marginalised communities by way of ethnicity, gender, age bracket and colonial heritage. This means that my everyday reality involves engaging within these power structures. This experience has informed my researcher positionality and subsequent interest in critical and emancipatory theories, pedagogies, movements, and practices. I have approached this study from this positionality, motivated for the inclusion of marginalised or excluded populations, which in this study are CYP effectively excluded from theorisations of Networked Learning (NL) and NL research. Having acknowledged this positionality, I have endeavoured to exercise reflexivity throughout this study and to make plain its

possible impact on my research and the knowledge it produces (Braun & Clarke, 2022; Terry & Hayfield, 2021).

1.5 Gaps and contributions

This study is situated within the fields of engagement and NL. While there is a burgeoning body of knowledge on school engagement, there is a dearth of research on CYP in NL. NL research currently focuses on people over the age of 18 years in higher education and professional development (Jones, 2015), i.e., in formal contexts. I argue that NL is practised by CYP below 18 years of age, albeit largely in informal settings. It is plausible that because this practice tends to occur largely informally, away from the adult gaze, it remains unacknowledged in adult-dominated NL research and theory. Hence, I argue that the current state of knowledge in NL is incomplete as it excludes CYP, their experiences and learning spaces, be these formal or informal. As such, this gap in knowledge exists, with its subsequent gap in practice, meaning that the compulsory education sector (for ages 5 to 16 years) in the UK is not studied by NL researchers or informed by NL research. Therefore, both this education sector and the field of NL continue to miss out on valuable learning and development opportunities. Consequently, this study makes original contributions to knowledge in theory, practice, and policy in the following ways.

1.5.1 To theory

This study provides insights on informal NL among a group of digitally-active 10- to 16-year-olds in England. It contributes a typology of NL and advances the concept of NL ontogenetic development in this demographic based on their trajectories of psychological development. Thereby, this study begins to close the gap created by the paucity of NL research regarding CYP and their informal, personal learning networks. It contributes by extending NL research and knowledge to a demographic it currently does not include.

1.5.2 To practice

In researching with the CYP in this study, I have designed a research method, Mime and Tell (M&T) for eliciting embodied, nonverbal feedback. I found

traditional methods such as interviews, observations, and questionnaires inadequate for working with children who might lack the experience and cognitive, literacy or language capabilities to respond to these traditional methods. However, with M&T, I was able to overcome these challenges. In this study, I present a rationale and theoretical underpinnings for M&T, a systematic process for its application and insights for analysing the data it generates. M&T is therefore my original contribution to research methods, with the hope that it will be developed through further research.

In addition, insights from this study could inform learning engagement and school transition support, pedagogy in the compulsory education sector (ages 5 to 16 years in the UK) and closing the gap between in-school and out-of-school ways of learning.

1.5.3 To policy

The present study's insights regarding the incorporation of learners' Funds of Knowledge and Identity into the National Curriculum and pedagogy are useful for policy on teacher training and development, the National Curriculum, and the contributions of these to the UK's Digital Strategy.

1.6 Relevance

This study's insights will be relevant to:

a. Academics and students working in NL as the study highlights a demographic and perspective not currently addressed by the existing body of NL theory and research.
b. Researchers working with CYP who are interested in child-friendly research methods such as M&T.
c. Schoolteachers, school leaders, local education authority leaders and policy makers whose remit includes school engagement, successful school transitions, digital strategy, academic achievement, student wellbeing and better life outcomes for their students.

1.7 Summary

In this chapter, I have provided a background and rationale for this study, introduced my professional philosophy and positionality, with the possible impact of these on this work, presented the gap that this study addresses and outlined the contributions it makes. Also outlined are those to whom this study will be relevant.

The following literature chapter explores key themes, constructs, issues, and underpinning theory relevant to this study, building its theoretical and conceptual frameworks. This study's research questions follow the literature review in Chapter 2, after the gap has been established, leading on to the research design in Chapter 3. Chapter 4 unpacks this study's findings. Chapter 5 discusses these findings alongside the literature. Chapter 6 draws the study to a close, presenting the study's key findings, elaborating on my original contribution to knowledge, presenting the study's implications, recommendations, and suggestions for further research with a word on the study's limitations.

Chapter 2: Literature review

2.1 Introduction

In this chapter, I review the literature relevant to this study in three parts: (1) theoretical framework, (2) conceptual framework and (3) researching with children. I had initially intended to include a section exploring the nature of learning and knowledge-building, to establish that children do learn in their PLNs rather than merely socialising with peers. However, this specific focus became redundant as I encountered literature from various disciplines establishing that up to 80% of human learning can occur in informal contexts (Latchem, 2014; Livingstone, 2001; Osborne & Dillon, 2007; Rajala et al., 2016) and that learning can occur in personal networks (Kali et al., 2019; Lave & Wenger, 1991), whether these are formal, informal, or non-formal.

Some researchers argue that theoretical and conceptual frameworks are synonymous (Maxwell, 2013; Merriam & Tisdell, 2016; Robson & McCartan, 2016). Others argue that they are separate (Grant & Osanloo, 2014). Still others argue that the theoretical framework is a part of the overarching conceptual framework (Crawford, 2020). In this study, I present the theoretical and conceptual frameworks separately. My theoretical framework explores relevant extant research and findings on two focal subjects (named in Section 2.2), which I have used to conceptualise this study. My conceptual framework consists of theories and concepts which have emerged from the findings as central to this study, and which I have used to make sense of them. The third section in this chapter reviews relevant literature on researching with CYP, the participants in this study. It establishes the theoretical underpinnings for M&T, a research method I have designed and used in this study for researching with the participants.

This literature review is not exhaustive. Rather my aim is to cover a sufficient breadth of both recent and seminal literature to establish the theoretical and conceptual bases for the understanding of this study, its findings, and its

recommendations. The literature in this review has been selected from academic sources, which include empirical studies, literature reviews, peer reviewed published research, established theories and concepts and some conference papers. For context, relevant official websites, databases, and government publications have also been cited. Non-academic and non-official sources such as blogs and social media were read for information, such as following relevant trends. These have, however, not been cited.

2.2 Part 1: Theoretical framework

This study explores the engagement of six 10- to 16-year-olds in PLNs mediated by technology, with the aim of understanding the factors supporting this engagement and how they work. Engagement theory is therefore a key focus. Engagement occurs within a context, which, in this study is social cognition (also referred to interchangeably as social learning) in participants' PLNs. Specifically, this study observes the learning engagement occurring in these PLNs. An additional construct to unpack such learning is therefore necessary to contextualise this study, to make sense of its findings and to adequately position it within the relevant field of research. Three learning approaches focusing on social learning mediated by technology have therefore been considered. These are: connected learning, CL, (Ito et al., 2013, p.7), communities of practice, CoP, (Farnsworth, Kleanthous & Wenger-Trayner, 2016, p.144) and networked learning, NL, (Hodgson, McConnell & Dirckinck-Holmfeld, 2012, p.292). The next section (2.2.1) establishes my selection, which also establishes *what* this study looks *at*. Then, Section 2.2.2 discusses this study's context, which is *where* this study looks. The final section in Part 1, Section 2.2.3, discusses engagement, which is *what* this study looks *for.* Essentially, this study looks *for* engagement *in* participants' PLNs and the additional theoretical framework helps to make sense of *what* is found.

2.2.1 Learning theory: What we are looking at

It is clear that this study involves participants, their interests, connections, networks, relationships, learning artefacts, resources and communities all

mediated by technology. Essentially, the participants made connections for the purpose of gaining and/or sharing knowledge and this learning or knowledge-building was social in nature. Three theoretical lenses for observing social learning were considered: CL, CoP, and NL. A brief overview of each follows, with my selection of the most appropriate for this study.

2.2.1.1 Connected Learning

Ito et al. describe CL as "learning that is socially embedded, interest-driven, and oriented toward expanding educational, economic, or political opportunity" (2020, p.26). They further argue that CL:

> ... is realized when a young person is 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. 2020, p.26).

The support of friends and caring adults is a key component (Ito et al., 2013 & 2020) as is the focus on "success in the wider world" (2020, p.29). CL attempts to connect the various contexts in which young people live and learn, with the assumption that this connection will enrich learning (Clark & Golan, 2019; Davis & Fullerton, 2016). While acknowledging the affordances of CL, Davis and Fullerton contend with this assumption. Their exploratory study of technology's role in the in- and after-school experiences of diverse high school students revealed that some students did not wish to connect their learning contexts for privacy reasons. Others wished to maintain boundaries between contexts, stating that sharing across boundaries was not always beneficial to them. In addition, integral to CL is "the presence of adults and adult institutions that confer legitimacy and resources" (Ito et al. 2020, p.32). Having observed the habits of my focus population, I note that moderation and leadership in their circles are typically exercised by fellow CYP. Adult direction or participation tends to be atypical within their PLNs where they tend more towards self-direction. This study looks especially at self-directed learning and contexts that mediate child agency without adult involvement. CL is therefore not the most suitable lens for this study.

2.2.1.2 Communities of practice

Wenger, Trayner and de Laat advocate similarly for a social model of learning: community of practice (CoP). They define this as a "learning partnership among people who find it useful to learn from and with each other about a particular domain, using each other's experience of practice as a learning resource" (2011, p.9). They argue that CoP have three essential elements: a shared domain of interest; a social aggregation called a community and shared practice or repertoire of resources (2011). While CoP would appear more relevant to this study than CL as it omits the requirement for adult direction, it is however not a close enough fit. CoP must essentially occur within a community mediated by closer ties around a shared domain of interest (Wenger et al., 2011). While this study's focal activity largely occurs within communities, and some of this, around common interests, I have observed that young people's networks also consist of loose, one-to-one, and sometimes temporary connections, and with disparate interests. The CoP lens would therefore not align with such participation and is therefore not a suitable framework.

2.2.1.3 Networked Learning

This "involves processes of collaborative, co-operative and collective inquiry, knowledge-creation and knowledgeable action, underpinned by trusting relationships, motivated by a sense of shared challenge and enabled by convivial technologies" (Networked Learning Editorial Collective [NLEC], 2020 p.9). Notably, connections in NL may be between people, between contexts and situations, between human and non-human actants and enabled by Information and Communications Technology (ICT) infrastructure, facilitating these connections across time, space, and boundaries (De Laat & Dohn, 2019; Dohn et al., 2018). Of the three approaches, I argue that the one that encompasses inter-personal and non-human connections, social learning, networks with groups and individuals, knowledge-creation with technology mediation, permitting the absence of adult control while facilitating CYP's agency, is NL. In addition, NL aligns with my teaching philosophy of the agentic child. I argue that a NL lens will facilitate the study of CYP networking without

an adult agenda and its “critical and emancipatory dispositions” (NLEC, 2020, p.6) are in line with this study’s impact goal as outlined in Sections 1.4 and 1.5. I contend that NL is the most suitable of the three social learning approaches I have considered and subsequently, the learning construct ‘half’ of this study’s two-part theoretical framework. As mentioned in Section 2.2, engagement is the second part, to be discussed in Section 2.3.

2.2.1.4 Paucity of research on NL among children and young people

Ironically and globally, there is very little reporting on NL research at the primary and secondary education levels or among people below the age of 18 years. I have conducted several literature searches (detailed in the following paragraphs) in various databases between March 2021 and January 2023 with this conclusion. The one article I found on SCOPUS was a non-academic publication, reporting positive results of NL implementation but without the related research. At the primary level, no studies on NL among students were found.

Searches in SCOPUS, Google Scholar, Google search engine, Lancaster University’s OneSearch, ResearchGate and ERIC for peer-reviewed articles and conference papers using the terms ‘networked+learning+children,’ ‘networked+learning+teens,’ ‘networked+learning+adolescents,’ ‘networked+learning+primary+school,’ ‘networked+learning+elementary+school,’ ‘networked+learning+high+school,’ and ‘networked+learning+secondary+school’ yielded no relevant results. Searches of Google Scholar using the terms ‘networked+communities+children’ and ‘networked+community+children’ yielded results based on networked communities for teachers, or parents of children. All searches were set between 2017 and 2023 to capture recent studies. Alerts set up for these terms between March 2021 and January 2023 faired similarly.

This gap in the literature on networked learning in CYP people has not gone unnoticed, yet it persists. In critiquing the NLEC 2020 updated definition of NL, Rodríguez-Illera and Barberà (NLEC, 2021) note that it contains:

> no reference to ontogenetic development, as if it does not exist. Perhaps the authors only contemplate adult learning. It is not that they consider children to be 'small adults', but given the changes affecting their education, children and adolescents certainly deserve some mention (NLEC, 2021, p.4).

Ontogenetic development refers to:

> Development that occurs as a function of experience rather than as a function of the genetic make-up of an individual...the portion of physical, cognitive, emotional, and social development that can be attributed to experiences with the environment and the individuals within the environment (Lambert & Johnson, 2011, p.1037).

Regarding NL, and following this definition, Rodríguez-Illera and Barberà's observation suggests that CYP's experience of NL would follow the trajectory of their physical, cognitive, emotional, and social development. Drawing insight from developmental psychology such as Piaget's theory of cognitive development (Piaget, 1952, 1954, 1955 & 1960) and Erickson's stages of psychosocial development (Erikson, 1963; Erikson & Erikson, 1997), explored later in this chapter, this is plausible. It can therefore be argued that CYP may grow into or evolve in their practice of NL, possibly starting out as emerging NLers and developing into more experienced ones.

Returning to the observations of Rodríguez-Illera and Barberà, Jones, a NL authority, simply reports that "... networked learning generally focuses on learning in higher education and in professional development which in both cases are concerned with people largely older than 18" (2015, p.37). In this study, I make my original contribution to knowledge by arguing that people below the age of 18 years do practise NL, and by drawing attention to the possible forms that NL could take in this demographic. This is further discussed in Section 5.3.3 of Chapter 5.

Further searches in the aforementioned databases for the terms 'Personal+learning+network+children,' 'Personal+learning+environment+teens,'

‘Personal+learning+environment+children,’ and ‘Personal+learning+environment+K-12,’ yielded no significant returns. Google Scholar searches for ‘Personal+learning+environments+K-12’ set between 2017 and 2022 returned 17,100 results. However, only one of these, a United States-based study, was relevant. The remainder focused on personalised learning, learning environments in higher education, teacher professional development, learning technology and other divergent themes. The one relevant study, a book chapter by Drexler (2018), explored research on personal learning environments (PLEs) and networked learning in K-12 (aged 5 to 18 years) and adults. Drexler however found similarly that there is little research on networked learning from a student perspective (2018), her K-12 students being children.

While this paucity does not rule out the existence of NL among primary- and secondary-aged children (other descriptors may be in use such as ‘online learning,’ though this does not on its own equate to NL, or erroneously, connected learning), the implementation of NL in primary or secondary pedagogy or the existence of studies in this field, it does suggest that NL is not a term used at these levels of education. The implication of this is that there may exist a gap between NL theory and research, and its practice in the compulsory education sector CES (i.e., primary, and secondary school). CES may therefore not be accessing and benefitting from NL research, and NL scholars may not be researching and learning from CES. Both communities may therefore be missing out on opportunities to learn from and inform each other. In other words, knowledge flow and skill sharing may be blocked between them, possibly facilitating lags in educational and technological development. This study is situated within this gap, with the aim of exploring NL among CYP, and possibly connecting CES practice with the field of NL and vice versa, thereby extending NL theory.

2.2.1.5 Restrictions of NL to formal education

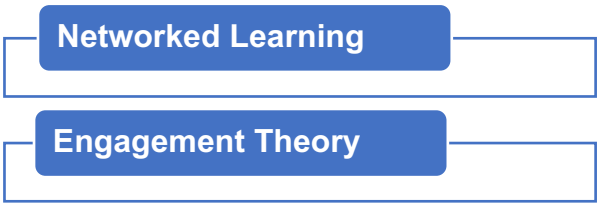
NLEC has more recently critiqued its earlier definition of NL, stating:

> Word choices within the definition also suggest that networked learning is restricted to formal education—in which people have defined roles (as learners and tutors) and in which learning is intentional (rather than incidental). This omission and circumscription are serious deficiencies (NLEC, 2020, p.316).

I concur with this critique as much of CYP's NL is informal and incidental, with fluidity of roles in their NL spaces. In its current state therefore, NL appears to privilege adult NL experiences and NL in formal education while marginalising or omitting those of CYP and informal NL. This study aims to extend what is known about NL by centring the NL experiences of CYP and of NL in informal learning spaces.

Having now established: (1) Networked Learning (NL) and Engagement Theory (ET) as this study's two-part theoretical framework (see Figure 1), (2) the gap this study aims to fill and (3) the original contributions this study makes to NL, I proceed in the following section to make the connection between this theoretical framework and the study's context, i.e., personal learning networks.

Figure 1 *Theoretical framework*



2.2.2 Personal learning networks: Where we are looking

2.2.2.1 Why PLNs?

This study looks at participants' engagement as they connect and learn within their PLNs. This learning is informal in nature and mediated by technology. Informal learning has been defined as "learning that occurs in daily life, in the family, in the workplace, in communities and through the interests and activities of individuals" (Singh, 2015, p.20). This contrasts with formal and non-formal learning, which are outside the scope of this study. Several studies report that 70–80% of learning takes place spontaneously and unintentionally, outside of formal settings (Latchem, 2014; Livingstone, 2001; Osborne & Dillon, 2007; Rajala et al., 2016). Similarly, Jagušt et al. acknowledge informal learning as "the dominant way of knowledge-building" (2018, p.418). This study seeks to explore children engaging in this dominant way of knowledge-building, without, or with as little adult intervention as possible. Hence, the participants' PLNs are the focus.

Haythornthwaite and De Laat describe networks as "patterns of connections between members of a designated set of individuals" (2010, p.185). They emphasise how learning networks create the structure upon which learning can take place (2010), hence the focus in this study. Informal learning contexts have been characterised as those "devised or chosen by individuals or groups that are not set by "a teacher" or for formal purpose" (Radović & Passey, 2016, p.545). Drawing the essence of informal learning and networks together, I define personal learning networks*,* for the purpose of this study, as:

> patterns of connections between members of a group or groups, chosen or devised by them, in which everyday learning takes place around their interests, activities and relationships. Group actors may be human or artificial, and connections may be one-to-one, one-to-few or one-to-many.

The PLNs in this study are out-of-school and without adult direction. Learning is largely incidental, spontaneous, and situated within the networked activity (Kali

et al., 2019; Lave & Wenger, 1991). Networked activity may be between the participants and members of their immediate networks, i.e., ego-centred networks (Newman, 2010), between individual participants and learning artefacts, i.e., networked individualism (Castells, 2000; Jones, 2004; Rainie & Wellman, 2012) or between participants, learning artefacts, and both their immediate networks and extended ones, featuring both strong and weak ties. Understanding informal learning to be the dominant way in which knowledge is built, it is logical that engagement in a group of digitally mediated PLNs, driven by the speed and reach of the Internet, is the focus of this study.

Additional themes discussed by Drexler (2018) that are relevant to this study include:

- The role of students' Personal Learning Environments (PLEs) in pulling together their curated resources to support constructive learning experiences
- The development of students into networked learners i.e., they do not start off as networked learners but develop this skill set, aligned with Rodríguez-Illera and Barberà's observation (NLEC, 2021) on the absence of ontogenetic development in the conceptualisation of NL
- The assumptions of relatively static knowledge underpinning teacher-centred approaches to learning vis-à-vis the dynamic nature of learning in NL environments.

These themes are discussed alongside this study's findings in Chapter 5.

It is pertinent to note the difference between a PLE and a PLN. A PLE is a space curated for personalised learning. It is frequently largely digital and may not involve social interaction and/or social learning, with learners learning as networked individuals. A Personal Learning Network (PLN), on the other hand, is a network (digital and otherwise) with social connections, interactions, and social learning. As this study unfolds, it will be made clearer the role that PLEs may have in the ontogenetic development of networked learners.

2.2.2.2 What is known about young people's digital practices in out-of-school settings and the impact of this on their in-school experiences

Heterogenous participation patterns and experiences

Several studies have found that though digital participation among CYP is on the increase, the experience is not uniform. Ito et al. report several levels of participation (2010, 2013). In the findings of their United States-based, 23-case ethnographic study of young people's use of new media, they describe these levels or genres as "hanging out, messing around and geeking out" (2010, p.63). They use the term 'hanging out' to refer to friendship-driven, recreational participation such as gaming, listening to music and communicating on social media. 'Messing around' describes interest-driven participation which includes searching for information, connecting with more knowledgeable peers on areas of interest and media creation and sharing. 'Geeking out' refers to "an intense commitment or engagement with media or technology, often one particular media property, genre, or a type of technology" (2010, p.63). This includes media fandom (e.g., surrounding Harry Potter, parkour, K-Pop, Anime and massively multi-player online role-playing games, MMORPGs), illegal file acquisition and sharing, and subverting rules to achieve illegal file acquisition and sharing.

Hakkarainen et al. (2015) report similar findings to Ito et al. (2010, 2013). They argue that though most Western young people are intense users of socio-digital technology, only some are adept at technology use. The majority, they contend, fall within Ito et al.'s genre of 'hanging out' to maintain social connections with friends via text and instant messaging, smartphone calls and social media. They report that digitally engaged adolescents appear to be motivated by activities that provide the experience of autonomy and the sense of competence and belonging. Hakkarainen et al. however caution against the generalisation of such findings (2015), noting that not all adolescents have access to sophisticated technology or parental facilitation and guidance. The United Nations reports that though 1 in 3 Internet users around the world is aged below 18 years, "About 29 percent of youth worldwide – around 346

million – are not online" (UNICEF, 2017a, p.2). There is therefore not a single pattern of participation among children and young people, locally or internationally. This study, however, explores the engagement practices of young people who self-describe as digitally connected and frequently active. As is explained further in Chapter 3, this study is therefore not aimed at generalisable findings but at in-depth insights on specific phenomena and the experiences of its participants.

Challenges

Scholarship on out-of-school settings is still emerging (Twining, 2021). In England, this has been linked to "challenges associated with valuing children's funds of knowledge and digital learning practices outside of school as learning resources, as these may not be seen as commensurate with the outcomes the English National Curriculum requires children to achieve" (Twining et al., 2017, p.18). Earlier, Lawson and Lawson reported that "...students' engagement with technology and social media outside of school can lead to their disidentification with school practices and pedagogies when schools do not incorporate students' preferred learning tools and learning modalities" (2013, p.452).

More recently, Hietajärvi et al. conducted a quantitative longitudinal study in Finland, exploring the relations between digital engagement, which they described as "the out-of-school learning component" of their study (2020, p.33), and school engagement. Their study (n = 1,705) was based on the concept of connected learning and extant research which found that: (1) increased time spent engaging with digital media meant that students acquired more digital skills (EU Kids Online, 2014); (2) when opportunities exist to deploy these informally cultivated digital practices in their academic practice, students are likely to flourish academically (Ito et al., 2013); (3) digital technology integration in Finnish schools (at the time of the study) however, was "seldom" and "shallow" (European Commission, 2017; European Parliament, 2015; Hakkarainen et al., 2015; Hietajärvi et al., 2020, p.34). Hietajärvi et al. (2020) therefore hypothesised that a gap existed between the students' digital competencies and the provisions of their academic environment and that this gap could lead to lower engagement in traditional school settings. In their study,

Hietajärvi et al. deployed the constructs of “digital learning preference” and “wish for digital schoolwork” (p.36). The former refers to “a preference for cultivation of adaptive student expertise concerning digital learning and problem-solving” (Hakkarainen et al., 2015; Hietajärvi et al., 2020, p.36). The latter referred to a “wish for connecting this digital learning to the context of school” (Hietajärvi et al., 2020, p.36). Hietajärvi et al. (2020) found that students with a digital learning preference, whose wish for digital schoolwork was accommodated, experienced higher schoolwork engagement. They also found that students with a digital learning preference whose wish for digital schoolwork was not accommodated, experienced decreasing schoolwork engagement.

Widening gap

These reports align with my professional experience with incorporating students’ digital funds of knowledge in the school curriculum, which is that closing the gap between the two can enhance school engagement. However, we do know that young people’s digital practices and competencies outside school are rapidly changing, with an increasingly widening gap between in-school and out-of-school ways of learning (Ito et al., 2013; Twining et al., 2017; UNICEF, 2017a). Reports by the Organisation for Economic Cooperation and Development found that children and young people’s Internet usage has increased over the last decade and that they are starting with it earlier (Burns & Gottschalk, 2019a; Burns & Gottschalk, 2019b). Hooft-Graafland (2018) and Hakkarainen et al. (2015) have reported similarly. In a 2020 UK study, 70% of children aged 12 to 15 years were found to have a social media profile (Office of Communications [Ofcom], 2020). In 2021, a United Kingdom (UK) study of children’s digital technology use outside the home, 44 children (n = 44) were found to use technology for “playing games, finding information, communication, creating or sharing images, videos and music, programming, and for fun” (Twining, 2021, p.469). These reports indicate growing digital competencies exercised outside school but not typically recognised and channelled into formal education (Hietajärvi et al. 2020) as they may not align with national curriculum objectives (Twining et al., 2017). UNICEF (2017a)

reports that the constant emergence of new technologies, the expanding range and reach of digitalisation, along with gaps in knowledge about children's online lives, make it challenging for policy to stay abreast with participation, resulting in policy lag (p.9).

Benefits of PLN participation amidst risks and concerns

The findings on PLN or out-of-school digital participation are however not all negative. Outside school, PLNs have been found to support young people's feelings of connectedness, autonomy, agency, motivation to learn, wellbeing, self-direction, collaboration, communication, identity development, friendship, interests, peer mentoring, recognition, knowledge creation and exchange, digital skills, leadership development, feedback on creative endeavours, civic activity, expansion of social life, citizenship, and political engagement (Burns & Gottschalk, 2019b; Ito et al., 2008; Machackova, 2015; Rideout et al., 2021; Vromen et al., 2014). This is against the backdrop of some young people experiencing disengagement and alienation from traditional school settings when these do not accommodate their digital learning preferences (Hietajärvi et al., 2020). Ito et al. (2008, 2010, 2013, 2020) report that friendship-driven participation often supports youths' painful growing up experiences, such as in romance, friendship, and status. Furthermore, interest-driven participation supports peer-based learning, such as of skills CYP might otherwise not have the opportunity to learn (Ito et al., 2008, 2010, 2013, 2020). This is supported by UNICEF's findings (2017a). Importantly to CYP, their peers in such associations are not defined by academic affiliation or performance but by more intentional criteria which can garner peer recognition (Ito et al., 2008) and "geek cred" (Horst et al., 2009, p.66). Geeking out provides such experiences as agency, autonomy, user-authoring, self-directed learning, expert identity, and peer validation. In these ways, more advanced digital participation can elevate CYP from mere consumers of knowledge created by authoritative sources to authors and creators, conferring upon them rather the status of authoritative sources themselves (Horst et al., 2009; Ito et al., 2008). It is not difficult to comprehend how problematic this experience could be for such young people,

skilled and authoritative sources with ‘geek cred’ in the ‘outside world,’ in traditional, adult-led, more controlling learning environments, especially where they do not see the relevance of content delivered through their school curricula.

Risks have been identified with increasing digital participation such as “negative influences on attitudes and behaviour” (Machackova, 2015, p.62), “worrisome trends” including “addictive use of technology, fragmented processing of information, and ‘digital divides’ between creative and educational use of socio-digital technologies” (Hakkarainen et al., 2015, p.918) and bullying and exposure to inappropriate content (Ofcom, 2020). Concerns have been raised about the impact of increasing technology use on children’s social development and wellbeing (George & Odgers, 2015; Kim et al., 2010; Sisson et al., 2010, Twenge et al., 2018), although these claims are challenged or declared inconclusive by some (Byrne et al., 2016; Ferguson, 2017; Przybylski & Weinstein, 2017, Rideout et al., 2021; UNICEF, 2017a).

Children’s perspectives and their implications

In preparation for its 2017 study, The State of the World’s Children 2017: Children in a Digital World, UNICEF commissioned U-Report to poll children in 24 countries about their digital experiences. Only countries with a minimum of 100 responses were included in the study (UNICEF, 2017a). U-Report is a social messaging tool reportedly used by 4 million young people worldwide to share their views on common concerns (UNICEF, 2017a). When asked how they learned to use the Internet, 42% said they learned on their own and 39% reported learning this from friends or siblings. Regarding what they liked about the Internet, 24% selected, “Learning skills I can’t learn at school” (p.5). This underscores the arguments that (a) many children in our schools today possess digital skills that they have sought and/or taught themselves and (b) it is widely perceived among children that their schools ‘cannot’ teach them or accommodate within their curricula their informally acquired digital skills. This has implications for Hietajärvi et al.’s digital learning preference and wish for digital schoolwork (2020), and as is discussed in Section 2.3.1, the impact of these on school engagement.

Drawing together the concept of NL and young people's informal, technology-mediated personal learning networking, similar values can be seen to underpin the two, such as cooperation and collaboration, group working, dialogue, self-determination, trusting relationships, development of weak and strong ties and the mediating role of technology (Hodgson et al., 2011; NLEC, 2020). Bringing together research and theory on engagement, NL, and PLNs, and drawing upon the fields of psychology and management, some perspectives hold that engagement is influenced by a match between a person's needs and the available opportunities in an environment (Eccles & Rosser, 2009), discussed further in Section 2.3.1. Others cite socio-cultural influences (Balwant, 2018; Wentzel, 2012). This study closely examines the dynamic interplay between these contextual factors within the participants' PLNs, the participants, and their peers, and how these impacted on engagement in these settings.

2.2.3 Engagement: What we are looking for

Bond and Bedenlier define engagement as "The energy and effort that students employ within their learning community, observable via any number of behavioural, cognitive or affective indicators across a continuum" (2019, p.2). The terms 'engagement' and 'student engagement' are used interchangeably in the literature (Christenson et al., 2013; Fredricks et al., 2019). As the focus of this study is informal, out-of-school learning, I will dispense with the term 'student' and henceforth use the term 'engagement.'

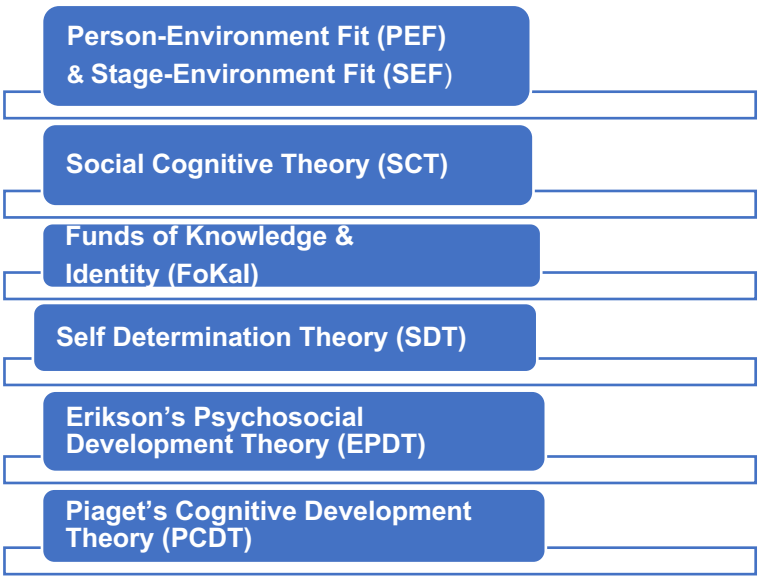
Scholarship around engagement is robust (Christenson et al., 2013; Fredricks et al., 2019; Virtanen et al., 2021). It is generally understood to be a multidimensional construct, though there is no consensus on its number of dimensions (Christenson et al., 2013; Fredricks et al., 2019; Reeve, 2013). It is widely accepted to consist of affective, behavioural, and cognitive engagement (Bond & Bedenlier, 2020; Christenson et al., 2013; Fredricks et al., 2019; Jimerson et al., 2003). However, there are scholars who add a fourth dimension, such as academic (Appleton et al., 2006; Appleton et al., 2008; Christenson et al., 2008), social (Fredricks et al., 2019; Finn & Zimmer, 2012),

or agentic engagement (Reeve, 2013; Reeve & Jang, 2022). I hold the view that these additional dimensions tend to overlap with one or the other of affective, behavioural, or cognitive engagement and as Reeve states, there appears to be a confusion between dimensions and indicators (2013). This study looks out primarily for *affective* (enthusiasm, enjoyment), *behavioural* (participation, attendance, persistence) and *cognitive* engagement (use of deep learning strategies such as goal setting and seeking challenge). I have however remained open to other dimensions mentioned in the literature.

2.3 Part 2: Conceptual framework

From this study's findings I made connections to the following concepts and theories: (a) Person-Environment Fit (PEF) and Stage-Environment Fit (SEF), (b) Social Cognitive Theory (SCT), (c) Funds of Knowledge and Identity (FoKaI), (d) Self Determination Theory (SDT), (e) Erikson's Psychosocial Development Theory (EPDT) and (f) Piaget's Cognitive Development Theory (PCDT) (see Figure 2).

Figure 2 *Conceptual framework*



I have adopted this framework as the underpinning constructs of these theories and perspectives were evident in this study's data. Subsequently, I have used these theories and perspectives as the conceptual framework to unpack the findings in Chapter 5. Another theory considered was Maslow's Humanistic Motivational Theory (MHMT), also known as Maslow's Needs Theory. This is because participant motivation featured in the data. However, MHMT was not selected as the pattern of behaviour it depicts was not evident in the data i.e., though all participants were aspirational, none of them indicated self-actualisation as a goal that they were pursuing. Motivation is therefore addressed under the perspectives of Bandura and Erikson. Following is an overview of issues relevant to the conceptual framework found in the literature.

2.3.1 Person-Environment Fit and Stage-Environment Fit

In 1989, Eccles and Midgley hypothesised the SEF theory based on prior work by Hunt (1975). Before this, Higgins and Parsons (1983) had noted the environmental differences between elementary and junior high school and how these could impact on learning and development. Hunt's work introduced the concept of person-environment fit for improved outcomes, evolving from the ecological systems perspective (discussed further on in this section). Eccles and Midgley extended this work, introducing 'stage' to account for the impacts of adolescents' changing physical, social, and psychological characteristics at this developmental stage (Eccles et al., 1993; Eccles & Midgley, 1989). Reporting on the work of Eccles and Midgley, Symonds and Hargreaves note that:

> early adolescent characteristics were the physical and hormonal changes associated with pubertal development and increased cognitive capacity, desire for autonomy, focus on identity issues, self-focus, self-consciousness, and peer orientation; and the need for a safe environment in which to enact these changes (Symonds & Hargreaves, 2016, p.57).

The present review explores person-environment fit and its offshoot, stage-environment fit, as these concepts have arisen in the findings. In addition, I

refer to complementary fit and supplementary fit as the data also allude to these concepts.

2.3.1.1 PEF and SEF perspectives on engagement

The PEF perspective on engagement derives from Russian psychologist Bronfenbrenner's Ecological Systems Theory (1979). This proposes that development is not the function of a single factor but of a complex system of relationships occurring over time (Conkbayir & Pascal, 2014). A core tenet is that as the environment impacts on the child's development, the child also impacts on their environment. A vital component is the passage of time and the developmental transitions occurring in this time. Relating this to engagement, the PEF perspective proposes that learners engage to the extent that their needs are met by their environment, or to the extent that their skills can be used in their environment (Eccles et al., 1993; Giedd, 2022). If their needs or personal resources are a match with what the environment has to offer, or what the environment needs, there is likely to be a fit, with engagement facilitated (Eisenbach & Greathouse, 2020; Giedd, 2022). An offshoot of PEF is SEF. This asserts that learners engage with their environments to the extent that their trajectory of development synchronises with the features and changes in their environment. This is the chronological development aspect of Bronfenbrenner's theory. Thus, as learners experience developmental changes (such as emerging self-concept, increasing desire for autonomy and self-determination, altruism, or the physical and emotional changes of adolescence), if they perceive that the school environment supports these changes, there is Stage Environment Fit, promoting engagement. If, on the other hand, they do not perceive a match for their needs, or for the personal resources they bring to the environment, there is poor or no SEF, and thus poor or no engagement. We are reminded again of Hietajärvi et al.'s digital learning preference, wish for digital schoolwork (2020) and engagement.

Holmbeck et al. (2008, pp.13-14) shed further light:

> stage-environment fit theory, postulates that the combination of an individual's developmental stage and the surrounding environment

> produces adaptive change within the individual... Synchronizing the trajectory of development to the characteristics and changes in the surrounding environment will encourage positive growth and maturity. According to stage-environment fit theory, adaptation is more likely if changes within the individual are matched with supportive change within the child's three main environments: home, peer, and school.

To be noted for future reference in this study are the concepts 'trajectory of development' and 'synchronising' this trajectory with supportive environmental changes and characteristics.

2.3.1.2 SEF in practice

Salmela-Aro et al. (2016) studied 759 12-13-year-olds in 33 elementary schools in Helsinki, Finland. They aimed to examine profiles of school engagement and burnout among this demographic of young people, reported to be digitally engaged outside school. They found that while more students remained academically engaged over time, 46% displayed some degree of cynicism, boredom with school and showed risk of disengagement. Salmela-Aro et al. reported, in line with Hakkarainen et al. (2015) and later sustained by Hietajärvi et al. (2020), that technology integration in Finnish schools was shallow at the time of their study, with traditional, teacher-led pedagogy prevailing. Further, Salmela-Aro et al. reported feedback from these students, stating, "they would be more academically engaged and hardworking at school if they were able to make more use of ICT at school" (2016, p.704). These findings align with those of Hietajärvi et al. (2020) regarding digital learning preference and wish for digital schoolwork - accommodating this wish encourages engagement and denying it has the opposite effect. These findings are consistent with SEF and Bronfenbrenner's Ecological Systems Theory in that the developmental needs of the participant population (12-13-year-olds) included increasing autonomy and agency, rather than traditional teacher-led pedagogy. Drawing from Holmbeck et al. and again, Bronfenbrenner, alignment between the needs of an individual's developmental stage and features of the environment produces

positive adaptive change within the individual. This adaptation results if changes within the individual occur alongside supportive corresponding changes in the environment (Holmbeck et al., 2008). Not only does this adaptive change occur within individuals but a dynamic relationship also occurs wherein the adaptations between individual and environment are dynamic and mutual, as noted by Bronfenbrenner's theory.

Of PEF, from which SEF is derived, Allen et al. (2021) explain:

> Person-environment fit involves these sets of related dynamics along the action pathway: (a) people self-select into environments that are compatible with aspects of their personality as (b) the environment reinforces them for doing so and (c) may pare away incompatible person-characteristics in a socialization process. These multiple coexisting processes often result over time in a closer match between the characteristics of the person and the environment leading to ... greater satisfaction, retention, and better performance for both person and social group (Dynamic Pathways of Personality section).

Note that such self-selection can be affective (e.g., liking the environment), behavioural (e.g., participating in the environment) and/or cognitive (e.g., learning in the environment) and can manifest in these dimensions of engagement.

The adolescent stage of development is characterised by exploration and questioning of the emerging identity in ways that develop autonomy and connectedness (Erikson, 1963; Erikson & Erikson, 1997; Giedd, 2022; Pfeifer et al. 2018). Adolescents begin to strive for autonomy, which Zimmer-Gembeck et al. define as a feeling of agency and opportunities for, and/or control over, decisions (2006, p.914). Autonomy, however, is just one developmental need of adolescence. Zimmer-Gembeck et al. identify the need for relatedness (connectedness or belonging), self-efficacy (competency), and a structured and predictable environment (2006, p.914-915). Learning environments that support these psychological needs help to create a supportive learning environment,

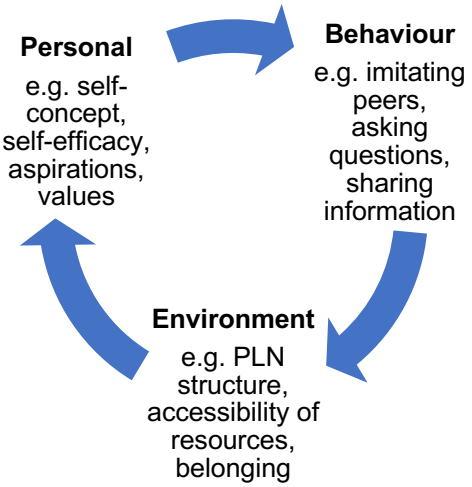
fostering PEF, SEF and thereby, engagement (Eisenbach & Greathouse, 2020; Giedd, 2022). In addition, Symonds and Hargreaves (2016) identify competency, enjoyment, and identity development as developmental needs at school transition. It is also a time when school engagement is at risk of declining and engagement with technology tends to increase. Indeed, Salmela-Aro et al. (2016) found that their digitally active participants who developed cynicism towards school at this stage found a more accommodating fit in their digital worlds.

In addition to PEF and SEF, the literature mentions Supplementary and Complementary Fit (Boon & de Hartog, 2011). Supplementary Fit (SF) occurs when similarities exist between a person and their environment, or between people within the environment. Complementary Fit (CT) occurs when a person perceives that they add to the environment something that is missing, or that they and the environment complement one another by addressing each other's needs. People tend to self-select into or out of an environment based on their perceptions of complementary and/or supplementary fit as will be discussed in Chapter 5.

2.3.2 Social Cognitive Theory

SCT "asserts that much of human learning occurs in a social environment, and the reciprocal relationship between environmental, cognitive, and behavioural factors plays an important role in learning and motivation" (Gonzalez-DeHass & Willems, 2013, p.231). SCT proponent and clinical psychologist Albert Bandura referred to this as reciprocal causation, stating that "people are neither driven by inner forces nor automatically shaped and controlled by external stimuli" (Bandura, 1986, p.18). Rather, Bandura advanced that personal factors, behaviour, and the environment are the reciprocal cause of human functioning (see Figure 3).

Figure 3 *Reciprocal causation*



This was a step forward from psychodynamics (human behaviour originating from dynamic inner forces) and behaviourism (human behaviour originating in external stimuli) which had begun to decline at the time, and Bronfenbrenner's theory which was criticised for not accounting for human agency (Conkbayir & Pascal, 2014). Nevertheless, Bandura's SCT has also been criticised for not accounting for age-related learning changes. Therefore, I have brought both Bronfenbrenner and Bandura together, arguing that to some degree, each theory makes up for the other's limitations in explaining human learning and development. Bronfenbrenner operationalises chronology and trajectories of development and Bandura accounts for human agency. Thus, despite the criticisms, their contributions are still valued today and still applied to human learning, behaviour, and motivation (Conkbayir & Pascal, 2014). I have therefore incorporated both theories into my conceptual framework for the illumination they provide together. It is not possible within the scope of this review to discuss SCT in full. Therefore, I summarise in this section a key element - observational learning - and draw out its connection to this study.

2.3.2.1 Observational learning

This emphasises that we learn by observing others around us, whom SCT describes as models. Examples of observational learning are gender socialisation, language, and cultural norms. Models could be live (living people

we encounter, such as peers, family members or teachers) or symbolic (people we admire but do not encounter, such as historical, political, or religious figures, fictional or television characters and social media influencers). For social learning, a model is any person or character who is or has something we want for ourselves. SCT posits that when children choose models, they are more likely to pay attention to and imitate those whom they perceive as like themselves e.g., of the same gender or like-passioned. Those in their environment will then respond to the imitated behaviour with reward or punishment (consequences). Rewarded behaviours i.e., those with positive consequences by the child's perception, are reinforced and repeated. This means that the reward must meet a need in the child, whatever that need may be. Behaviours with negative consequences (i.e., those that do not meet a perceived need) do not receive reinforcement and are eventually extinguished. Such learning is also vicarious i.e., children learn from the consequences of others. This is known as vicarious motivation.

Again, in SCT we see the dynamic relationship between the individual's inner needs and environmental reinforcement, whether these are Hietajärvi et al.'s digital learning preferences rewarded with digital schoolwork (2020) or Horst et. al.'s "geek cred" reward for digital contributions (2009, p.66). Synergising PEF, SEF, CF, SF, EST and SCT, in choosing learning models who possess the digital skills (and possibly 'geek cred') they desire, digitally active young people are more likely to desire to learn with and from others possessing the same. This could explain the strong pull of, or engagement with, the digital world for digitally active young people, and those desiring to learn socio-digital skills and to participate in the digital world. If, as UNICEF (2017a), and other studies mentioned here suggest, children do not perceive such skills and experiences to be facilitated in their traditional schools, this could proffer an explanation for school cynicism and disengagement. This is especially so in adolescence, at the time of school transitions from primary to secondary school, and from middle school to senior school as the trajectory of development follows the increasing need for autonomy, agency, and self-direction. While this trajectory may have always existed, children no longer need to depend on adults to 'grant'

this agency and autonomy (James & Prout, 1990, 1997) as it is now accessible through Internet-enabled devices and digital skills (Eguara, 2020).

2.3.3 Funds of Knowledge and Identity

Funds of knowledge (FoK) have been defined as “historically-accumulated and culturally-developed bodies of knowledge and skills essential for household or individual functioning and well-being” (Moll et al., 1992, p.133). This concept is based on the understanding that “people are competent, they have knowledge, and their life experiences have given them that knowledge” (Gonzalez, Moll & Amanti, 2005, p.ix). Early research conceptualised a child’s FoK as the knowledge and lived experiences of their family and community. However, opposing views argued that a child’s FoK may be different from those of their family and community (Subero et al., 2017), and that children may derive their FoK from other sources, such as peer groups and popular culture (Moje et al., 2004). The concept of Funds of Identity (FoI) was therefore proffered to make up for this limitation (Esteban-Guitart & Moll, 2014).

FoI is defined by Esteban-Guitart and Moll (2014, p.31) as “historically accumulated, culturally developed and socially distributed resources that are essential for a person’s self-definition, self-expression and self-understanding.” In contrast to FoK, which ascribes to the child the funds of their family and community, FoI are those appropriated by the child and used in self-definition (Esteban-Guitart, 2014). The concept of FoI is more in line with my educational philosophy of the agentic child. However, since much of the literature still refers to FoK when describing the resources a child brings to their learning experiences, from this point onwards, I use the combined term Funds of Knowledge and Identity, FoKaI.

t’ Guilde and Volman conducted a collaborative action research investigating how teachers can use FoKaI in their diverse classrooms (2021). They found that drawing upon students’ FoKaI in this way made the curriculum more meaningful and relevant, with increased engagement resulting. Valuing and

incorporating children's FoKaI in school curricula, especially regarding children's digital funds of knowledge and digital identities, can improve PEF and SEF, and thereby enhance engagement. Rather than the curriculum misalignment reported by Twining et al. (2017), I would argue that national curricula and school policy could benefit from revision to harness children's digital FoKaI, thereby enhancing PEF, SEF and by extension, engagement.

2.3.4 Self-determination Theory

SDT is a 5-part macro theory of motivation. It consists of Basic Needs Theory, Organismic Integration Theory, Goal Contents Theory, Cognitive Evaluation Theory and Causality Orientations Theory (Deci & Ryan, 1985, 2016; Reeve, 2012; Ryan & Deci, 2017). Motivation has been defined as "any force that energises and directs behaviour" (Reeve, 2012, p.150). It is seen as the unobservable force that triggers observable engagement. Therefore, to enhance motivation is to enhance engagement. SDT operates around three basic, innate needs essential for psychological wellbeing: competence - feeling capable and successful or self-efficacious; relatedness - feeling a sense of belonging among or connection with/to things or others, and autonomy - feeling in control, able to make choices in line with one's preferences, or self-determination (Deci et al., 1991; Deci & Ryan, 2016; Ryan & Deci, 2000, 2017). When these 3 basic needs are fulfilled, especially autonomy, people become self-determined, motivation is triggered and in a learning situation, engagement follows. When these needs are not met, the opposite results - demotivation and disengagement. The three basic needs of competence, relatedness, and autonomy (also referred to in this study as self-efficacy, connectedness, and autonomy) have also been found to enhance Stage-Environment Fit (Symonds and Hargreaves, 2016).

2.3.5 Erikson's Psychosocial Development Theory

EPDT proposes that the development of human personality follows 9 predetermined stages (Erikson & Erikson, 1998). Erik Erikson originally proposed 8 stages (1968). However, his long-time collaborator, Joan Erikson,

added a 9th toward the end of his career (Erikson & Erikson, 1998). Each of these stages presents a psychosocial crisis with positive or negative developmental outcomes (Erikson, 1968; Erikson & Erikson, 1998; Gonzalez-DeHass & Willems, 2013; Maree, 2021). According to EPDT, later life satisfaction and sense of completeness depend on successfully resolving earlier psychosocial crises. Poor resolution can result in maladaptive tendencies and behaviours (Butterbaugh & Wood, 2020). Stages 4 and 5 which are relevant to this study are presented in Table 2.1.

Table 2.1 *Erikson's Psychosocial Development Stages*

Stage & age in years	Psychosocial crisis	Description
4. Primary (Elementary) school age	Industry & competence vs Inferiority	Child learns to apply themselves at tasks such as schoolwork, developing competence and efficacy as their efforts and achievements win recognition. In the absence of praise and recognition, and with constant criticism, child is at risk of developing a sense of inferiority. This growing sense of competence and efficacy (or not) contributes to identity development.
5. Adolescence	Identity fidelity vs Identity confusion	Young person (YP) begins to question who they are and what role they will play as they begin to participate in the adult world. YP exercises increasing independence from parents while turning more towards peers. With this task of self-definition comes the challenge of role confusion. Identity development becomes a primary preoccupation.

Implications for this study

From the EPDT perspective, this study's participants fall within Erikson's Stages 4 and 5. Psychosocial development in these two stages pivots around (1) a developing sense of industry as skills and abilities are rewarded and competence and self-efficacy are developed (Stage 4) and (2) a growing sense of autonomy from adult direction and a developing self-identity (Stage 5). Erikson identifies these as the primary concerns or challenges at these stages, even if the individuals are not conscious of this, and their wellbeing depends on how well these challenges are resolved. It is worth noting that autonomy and

identity development are emerging in Stage 4 and further advanced in Stage 5, though not completed. From this perspective, individuals at this point of their developmental trajectories are just beginning to develop their own identities, separate to those of the adults in their lives, and a sense of autonomy, taking independent steps into the adult world. In Chapter 5, this will be discussed in relation to the ontogenetic development of NL.

Criticisms and limitations

Criticism of EPDT highlights its gender and cultural biases as Erikson took a largely male- (Josselson, 1987, 1998, 2017; Marcia, 1987) and Euro-centric approach. While some argue that the developmental trajectory for women may differ to that of men (Butterbaugh & Wood, 2020; Josselson, 1998), it is also argued that the trajectory may indeed be similar for both genders (Butterbaugh & Wood, 2020). Additionally, it is argued that learning trajectories are non-linear and that the timing of transitions between stages may differ on cultural bases. To the former point, Erikson argued that psychosocial development is indeed non-linear and that where the challenges of a stage are not resolved within the corresponding age range, they are carried forward as unresolved psychological challenges, with negative impacts to psychological wellbeing. These stages and challenges may however be revisited and resolved in later life. Regarding cultural bias, it would appear that despite ongoing revisions to EPDT, this has remained unresolved. Even in the later-added 9th stage, Joan Erikson still reflects Western/Eurocentric cultural norms, such as the plight and social position of the elderly in society (Erikson & Erikson, 1998). In their defence, Erik Erikson argued that all cultures address the same issues (Crain, 2011), although this can also be challenged.

Despite the criticisms against EPDT, its theoretical framework is still the basis of discussion in research today, notably on identity and generativity, and in child development and lifespan developmental approaches (Gonzalez-DeHaas & Willems, 2013; Josselson, 2017; Butterbaugh & Wood, 2020). I have referenced EPDT in this study to introduce the concept of developmental

trajectories and how they may influence our experience of, and participation in life. These concepts will be revisited in Chapter 5.

2.3.6 Piaget's Cognitive Development Theory

PCDT asserts that people create knowledge by acting on their environments rather than passively receiving it from others (Gonzalez-DeHass & Willems, 2013). It argues that children's cognitive abilities change as they mature or develop cognitively. This cognitive development occurs in 4 stages (Gonzalez-DeHass & Willems, 2013; Piaget, 1952). The two stages relevant to this study are shown in Table 2.2.

Table 2.2 *Piaget's Cognitive Development Stages*

Stage/Age	Description
Concrete operational 7 to 11 years	Logical thinking develops but is limited to concrete operations; not yet capable of abstract thinking
Formal operational 11 years and older	Abstract thinking and verbal reasoning develop; no longer reliant on concrete objects; develops ability to reason hypothetically, futuristically, and scientifically

Note. The age brackets for each stage are rough estimates and children may transition between stages earlier or later.

Implications for this study

From the PCDT perspective, this study's participants are concrete operational (those aged 10 and 11 years) and formal operational (aged 11 to 16 years). If we are to take this perspective, this study's participants may be at different stages of cognitive development and their experiences of similar learning situations may depend on their level of development. This will be used in Chapter 5 to explore participants' different experiences of NL.

Criticisms and limitations

PCDT, like EPDT, has been introduced to explore its perspective on learning trajectories. It is however not without its limitations. Many of Piaget's studies were carried out on his own 3 children and the experimental tasks set for them were sometimes confusing, resulting in failure (Conkbayir & Pascal, 2014). Some argue that Piaget underestimated young children's capabilities (Casper & Theilheimer, 2010; Miller, 2011). Piaget's studies were essentially case studies and the findings from these cannot be generalised (Creswell et al., 2007; Creswell, 2012a, 2012b; Yin, 2018). This limited sample size (n=3) of family members also implies cultural and researcher bias. PCDT does not account for individual learner differences and presumes that the experience of childhood is universally singular. In addition, critics argue that cognitive development is not linear but iterative (Conkbayir & Pascal, 2014; Miller, 2011). Nevertheless, PCDT is esteemed for its contributions to the understanding of child development and learning (Gonzalez-DeHass & Willems, 2013; Conkbayir & Pascal, 2014). It highlights that there is a difference in the way that children and adults think (different, rather than one being inferior or superior) and that cognitive development progresses in stages (Gonzalez-DeHass & Willems, 2013). These key facts remain undisputed and are of fundamental relevance to this study.

2.3.7 Summary

This section (2.3) has established this study's conceptual framework, which consists of: (a) Person-Environment Fit (PEF) and Stage-Environment Fit (SEF), (b) Social Cognitive Theory (SCT), (c) Funds of Knowledge and Identity (FoKaI), (d) Self-determination Theory (SDT), (e) Erikson's Psychosocial Development Theory (EPDT) and (f) Piaget's Cognitive Development Theory (PCDT). This conceptual framework will be used to unpack this study's findings in Chapter 5.

2.4 Part 3: Researching with children

2.4.1 Introduction

This part (Part 3) of the chapter explores research trends and perspectives on researching with children as is the case with the present study, research methods for and challenges with researching with children, nonverbal communication (NVC) as a research method for working with children, and challenges with and conceptual frameworks for analysing NVC. Armed with these insights and a rationale for collecting NVC data, I conducted a scoping review of the literature in search of an appropriate research method to collect and analyse NVC in response to my research questions.

2.4.2 Trends and perspectives on researching with children

In 1989, the United Nations adopted the United Nations Convention on the Rights of the Child (United Nations Children's Fund [UNICEF], 2010). This came into force in the UK in 1992. Article 12 of this treaty expresses that "Every child has the right to express their views, feelings and wishes in all matters affecting them, and to have their views considered and taken seriously" (UNICEF, 2017b, p.1; UNICEF, 2010, p.5). Legislation followed, such as the 1989 Children Act (Department of Health [DoH], 1989) and the National Service Framework for Children, Young People and Maternity Services (DoH, 2004) expressing concern for children's views in decision-making. This trend gave rise to a change in the public perception of, and services towards children and young people. In the same era, James and Prout's 'new paradigm' of the sociology of childhood (1990, 1997) triggered steady changes in research from the traditional researching on children and young people to include researching with and by them (O'Kane, 2017; Thomas, 2017).

Traditional methods for researching with children have included interviews, observations, and focus groups. Examples of more recent creative arts-based methods are collages (Vaughan, 2005), clay modelling (Bernhaupt et al., 2007), photography (Darbyshire et al., 2005), video (Gauntlett, 2004), acting and

puppetry (Greene & Hill, 2005), Draw and Write (Gauntlett, 2007) and Draw, Write and Tell, DWT (Angell et al., 2015). Newer technology-based methods include gamification (Glover, 2013) and playfication (Campo & Lee, 2019). This paradigm shift reflects the change of perspective from children as passive research subjects to social actors, different but not less than adults, and capable of expressing their own thoughts and feelings with the right to be heard and to influence their own circumstances (Angell et al. 2015; O'Kane, 2017; Thomas, 2017). My professional and research philosophies align with this perspective, hence, my methodological choices to research with my participants as co-researchers. As outlined in Chapter 3, this study foregrounds the participants' perspectives. I have therefore involved my participants as much as possible in this study's design to facilitate their participation as co-researchers.

2.4.3 Are different methods necessary?

This new shift, however, presents several challenges. On the one hand, questions have arisen regarding children's ability to comprehend and respond to research questions (Punch, 2002) and on ethical concerns for their participation (Alderdson & Morrow, 2020). On the other hand, researchers have been critiqued for expressing views of children as deficient and incompetent, and of childhood as a state of becoming rather than being (Alderson et al., 2020; James et al, 1997; Qvortrup, 2005). As a result, some schools of thought maintain that different research methods are necessary to enable child participation. Others hold that traditional methods suffice when explained clearly and taught to children. Angell et al. (2015) are in support of using child-centred methods. They developed DWT, a creative child-centred method also designed to provide consistency in data collection, interpretation, and analysis. They argue that drawing is a familiar activity for children and thus, an enabling method when incorporated into research. Christensen and James, however, argue that children can and do take part in structured and unstructured interviews, questionnaires, case studies and other traditional research methods (2017). They contend that to assume the need for special methods is to assume childhood deficit and thereby essentialism. Further, they argue against

“age-based adult/child distinction” (2017, p.4). Instead, they advocate for a shift in focus to methods appropriate for the participants, whatever their age or life stage, the sociocultural context and the kinds of research questions being asked.

In line with Christensen and James (2017), Alderson et al. argue that accepting “theories of children as people and human beings … can lead to mutually respectful ethical relationships in research” (2020, p.14). They argue that a researcher’s perspective of children and childhood impacts the way that data are elicited and interpreted. Morrow and Richards, concerned about power imbalance between children and adults, suggest that:

> using methods which are non-invasive, non-confrontational and participatory, and which encourage children to interpret their own data, might be one step forward in diminishing the ethical problems of imbalanced power relationships between researcher and researched at the point of data collection and interpretation. (1996, p.100)

Drawing these arguments together, there are benefits to adopting child-centred research methods designed for child participation. However, there are challenges and ethical concerns for both child-centred and traditional methods. I concur that children can and do participate in traditional methods. I also take the position of a child with agency and social actor. However, I disagree with the position of Christensen and James in that traditional methods tend to privilege written and spoken communication and exclude other communication modes which people, and especially children, adopt naturally in everyday life. These include embodied or nonverbal modes of communication which can add richer descriptions to the data. Another possible disadvantage to traditional methods is that they tend to be led by the researcher, who is trained for the role, ‘on’ participants. While child participants can and are being trained to conduct or lead on their own research, this was not feasible within the scope of this doctoral study as such training is time consuming and may require a support team. In addition, recruitment due to the prevailing pandemic and national lockdowns was challenging. Retention for both training and

participation would have been even more so. It would also have been unethical during the global health crisis to exert the young participants to that extent. In this light, I decided to explore the literature in search of methods employing nonverbal or embodied communication which I could lead but also involve the participants as co-researchers.

2.4.4 What is embodied communication?

Human communication is multimodal (Paulmann et al., 2009) including embodied communication, such as movement, stillness, and body language. Ellingson describes the human body as an instrument for both verbal and nonverbal communication (2017). Since the ability to communicate requires resources beyond speaking and writing (Ellingson, 2017; Denham & Onwuegbuzie, 2013; Wachsmuth et al., 2008), human communication is not limited to these. Therefore, by restricting data collection to methods based on the written and spoken word (e.g., interviews and questionnaires), we restrict access to information which may be ineffable and limit children's participation who may lack the requisite communication capabilities (Angell et al., 2015; Prosser & Burke, 2008; Weber, 2008). This goes against the essentialism claims of Christensen and James (2017). However, as a schoolteacher who works daily with children of varying abilities and disabilities, I argue that it is a step towards inclusion. In school tradition, I contend that it is more efficient to prepare with child-centred methods and find that they are not required, than to assume that they are not and find that they are. There is no universally acceptable definition for embodied communication. I therefore define it for the purpose of this study as *nonverbal communication transmitted through the body* and I specifically aimed to elicit nonverbal communication (NVC) from my participants. Other researchers, such as Ellingson (2017) focus more on *nonverbal communication experienced through or perceived by the body* and direct their efforts to communication expressed or experienced by the researcher.

2.4.4.1 Typology and examples

Ellingson (2017) presents the following typology of NVC: *kinesics* (body orientation, posture, 'body language'); *proxemics* (how much space people maintain around each other, or between the interviewer and interviewee); *chronemics* (the use of time, timed speech markers such as silences, hesitations, gaps); *vocalics* (the use of voice to convey meaning e.g., pitch, emoting, articulation); *haptics* (touching e.g. handshakes, hugs, light touch, kissing the cheeks); *physical appearance* (e.g. grooming, tattoos, bodily embellishments such as clothes, hats, jewellery; body shape, such as weight, muscle tone) and *territoriality* (set up and decor of physical environment). The present study makes use of kinesic data as the pandemic necessitated virtual data collection and analysis with the participants.

Examples of embodied communication used in qualitative research include embodied reflexivity - recalling and unpacking sensory experiences and memory work (Ellingson, 2017); recalling and transcribing embodied experiences; proposing sensory questions about how a participant felt, what they saw, smelt, tasted etc., and using photo elicitation or other artefacts to recall sensory memories (Harris & Guillemin, 2012). However, criticism of these methods includes that they ultimately require transcription of the sensory experiences, giving them written elements, and rely on the recall of past occurrences, making room for errors in memory. In contrast, this study captures the participants' embodied communications as data, with the participants and researcher co-creating meaning as the data are collected, rather than accessing prior memories and meanings.

2.4.5 Why embodied communication?

The collection of NVC data can give rise to thicker descriptions and interpretations, yielding deeper understanding (Denham & Onwuegbuzie, 2013; Ellingson, 2017; Harris & Guillemin, 2012). By ignoring this, we leave significant data 'on the table,' along with the shades of meaning they encode. Even so, Denham and Onwuegbuzie (2013) found, in a systematic review of 299

empirical studies from 1990 to 2012, that only 24% evidenced NVC and this was largely underutilised or not utilised at all in the analyses and findings. Denham and Onwuegbuzie (2013) also found that texts dedicated to the teaching of qualitative methods tended to give little or no attention to NVC as data sources, thus perpetuating its non-use.

2.4.6 Analysing embodied/nonverbal communication

There are however challenges associated with analysing embodied/NVC. Angell et al. found that data collection, interpretation and analysis in Draw and Write were inconsistent and often inexplicit (2015). This challenged its rigour and replicability. Chadwick (2017) reports that analytical methods for NVC are absent from the literature. Denham and Onwuegbuzie (2013) suggest that due to this gap, researchers may not learn to analyse it and therefore avoid collecting NVC data altogether. Some researchers have begun to offer suggestions and more established, though complex, analytical methods do exist. Some of these are:

1. Coding and decoding facial and body movements (Lavelle et al., 2015)
2. Finding a theory to explain the embodied subject (Chadwick, 2017)
3. Naturalistic transcription approach retaining the ‘messiness’ of natural “utterances, sounds and idiosyncrasies of speech…as fully as possible” (Chadwick, 2017, p.8)
4. Listening for embodied excess and contradictionals (Chadwick, 2017)
5. Inviting the participants as co-researchers to analyse and interpret their own data (Angell et al., 2015)

Denham and Onwuegbuzie (2013) found that in their 299 reviewed empirical studies, NVC was used for clarification, juxtaposition, discovery, confirmation, emphasis, illustration, elaboration, complementarity, corroboration and verification, and effect. In their study (Denham & Onwuegbuzie, 2017, pp.674-675), they conceptualised a framework for NVC analysis, summarising that

> nonverbal communication could allow qualitative researchers to (a) corroborate speech narrative (i.e., triangulation); (b) capture underlying messages (i.e., complementarity); (c) discover nonverbal behaviors that contradict the verbal communication (i.e., initiation); (d) broaden the scope of the understanding (i.e., expansion); and (e) create new directions based on additional insights (i.e., development). This conceptual framework indicates that qualitative researchers can use nonverbal communication data for one or more of five purposes relative to the verbal communication data collected, either a priori (e.g., looking for contradictions between the nonverbal and verbal data from the onset), a posteriori (i.e., determining how the nonverbal and verbal data relate to each other as the data analysis unfolds), or iteratively (i.e., combining a priori and a posteriori analyses)…The major point regarding our conceptual framework is that collecting, analyzing, and interpreting nonverbal communication data can yield thicker descriptions...and interpretations via the process the researcher will take to make sense of both forms of data simultaneously that would not have been the case if the use of nonverbal communication data had not been incorporated into the study.

We will return to this section in Chapter 3 as this study's data analysis is discussed.

2.4.7 Participation

Participation has been defined as "the process of sharing decisions which affect one's life and the life of the community in which one lives" (Hart 1992, p.5). This has been interpreted as the goal of Articles 12 and 13 of the UNCRC (UNICEF, 2010). Numerous models have been proffered to explain participation and to translate this aspect of the UNCRC into practice (Eguara, 2018). Three models commonly mentioned in the literature are Hart's Ladder of Participation (Hart, 1992), Treseder's Degrees of Participation (Treseder, 1997) and Shier's Pathways (Shier, 2001). For a comparison of these models, including their strengths and limitations, see Eguara (2018).

The common ground between participation models is a pathway of levels or degrees of participation. These range from the tokenistic efforts of adults to be seen as espousing participation, described by Hart as non-participation (1992), to full child autonomy. Models are typically linear (Shier, 2001), hierarchical (Hart, 1992), circular (Treseder, 1997) or pyramidical (Wong et al., 2010). However, there is no 'right' level of participation found in the literature. Rather, individuals are to decide the level of participation they find comfortable, which may vary (UNICEF, 2010). In addition, 'voice' or participation may also be expressed by refusal to participate, not to be confused with the absence of participation (Cook-Sather, 2006) or non-participation (Hart, 1992). With children, their capabilities and willingness must be considered on a case-by-case basis (Hart, 2008; Shier, 2010).

Hart later recognised that the highest level of participation in his model is not necessarily the 'best,' and that it is neither necessary nor practical to aim for it (Hart, 2008). Similarly, the lowest level is not synonymous with failure (Hart, 2008). Rather, 'enough' participation is what suits the child and their best interests (UNICEF, 2010). This study has therefore provided for participants to choose their level of participation (or non-participation) rather than aiming for the highest level on a given participation model. This is further discussed in Chapter 3.

2.4.8 Scoping review

From my professional practice, having worked with children aged 2 to 18 years, of a range of abilities, needs and backgrounds, and having employed various creative teaching and learning strategies in my career, I considered that traditional research methods such as interview, questionnaire, and observation, would not elicit the deep insights I sought. This in part echoes Christensen and James who argue that methods for working with children should be based on the kinds of research questions being asked (2017). My rationale is that the kind of insights I was seeking would require questioning to elicit them, not just self-reporting in interviews and questionnaires. This would require in-depth and

ongoing engagement with the participants to first build rapport and trust, and then to collect data. In addition, questionnaires could be challenging to complete due to literacy and attention challenges, biased self-reporting, Hawthorne Effect, and a lack of support should the participants encounter difficulty. I therefore conducted a scoping review of the literature in search of more suitable methods for researching with children. I especially sought those which involved their child participants as co-researchers. This review was therefore guided by the question:

What methods are being used in educational research with children and young people aged 5 to 18 years?

2.4.8.1 Scoping review procedure

Due to the sheer volume of educational research involving children on databases such as Google Scholar and SCOPUS, and because Lancaster University's OneSearch returned mainly articles in Chinese, I decided to search the British Educational Research Journal (BERJ) from 2019 to 2022. I chose BERJ as it is a reputable journal in the field of education (British Educational Research Association [BERA], 2013; JSTOR, 2022). I chose this date range to access more recent publications, before, during and after the 2020 pandemic lockdowns, to mitigate their possible impact. Inclusion criteria were as follows: papers must be empirical, primary research, involving children and young people up to 18 years of age and in English. All papers published in BERJ are rigorously peer-reviewed. No geographical limits were applied. This search yielded 285 articles, across 23 volumes, of which 45 met the inclusion criteria. I read the abstracts of every one of these articles from 2019 to 2022, continuing while collecting and analysing data. From the abstracts, I selected and read the included 45 studies. The included papers consisted of 26 qualitative, 9 quantitative and 10 mixed methods studies. The studies were conducted in 15 countries: England, Spain, Pakistan, Scotland, Russia, Australia, Israel, Northern Ireland, Republic of Ireland, China, Wales, Kenya, USA, India, and Cyprus. An overview of these search results can be found in Appendix D

(Results of scoping review). I acknowledge that this review is limited to the studies drawn from the search terms, database, and inclusion/exclusion criteria I have used. However, as a scoping review, I believe the findings are adequate for its intended exploratory purpose.

2.4.8.2 Scoping review findings

Of the 45 included studies, 16 acknowledged the need to adapt research methods to the capabilities of children and young people, 14 made such adaptations, 5 used creative methods such as mapping, drawing and visual historic sources, 1 study recruited participants as advisors, and for the remaining 27 studies, it was not evident whether any such child-centred adaptations had been made or not. Of the studies with creative methods, some included data elicitation through drawing. This was already one of my chosen methods. However, I knew intuitively that these methods alone would not elicit the kind of data and analysis required by my research questions, or with my participants. There was also the challenge of implementing drawing methods during the lockdowns. I therefore sought methods that allowed the participants to lead in the elicitation and interpretation of their own data as far as they deemed comfortable.

2.4.8.3 Scoping review conclusion

Of the 45 included studies, 5 were found using creative methods to enhance child participation, which could be described as NVC. One study recruited participants as advisors. I had already chosen to use Angell et al.'s DWT (2015) as one of the present study's methods. I was however looking for a NVC method to give richer insights than traditional methods and DWT could elicit. In addition, I sought a method that involved the participants in interpreting their own data. Having not found a method fulfilling these aims, I set about designing a method for this study. The result of this is Mime and Tell (M&T), which elicits embodied, nonverbal communication and invites the participants to interpret the data they generate. M&T is described in detail in Section 3.5.3.

2.5 Research questions

Returning to the present study, this proceeds with the proposition that if students are at increasing risk of school disengagement as they progress through school and navigate school transitions, and yet display indicators of increased engagement in their PLNs, there are possibly significant insights to gain from studying their engagement in these PLNs. This is based on Jones' (2015) argument that

> learning networks need to be the focus for NL research because of the idea of indirect design, a key theoretical contribution of NL. Indirect design argues that learning cannot be designed directly and that it can only be designed for. The significance of this is that actual learning networks can be investigated and analysed so that they can inform the future designs of those elements (tasks, spaces, tools, and organisations) open to design activity. (p.12)

As a case study, this present study does not seek to generalise to other populations. However, case studies can generalise to theory and to similar contexts (Yin, 2018). Also, case studies can be used as the basis for larger studies (Yin, 2018). This present study therefore inquires:

RQ: What contextual factors support the engagement of 10- to 16-year-olds in personal learning networks in England and how?

RQ1: How are participants connecting in their personal networks?

- *RQ1.1 With whom/what are they connecting and for what purpose?*
- *RQ1.2 What technologies and platforms are participants using to connect?*
- *RQ1.3 What is the nature of the connection(s) - individual/collaborative/weak/strong- and why?*
- *RQ1.4 What indicators of engagement/disengagement are evident in participants' participation/non-participation?*

RQ2: How do participants describe their experiences in their personal learning networks?

- *RQ2.1 What are their perceptions of their connections and networks?*
- *RQ2.2 What level(s) of participation do participants display – active/passive/peripheral/regular/infrequent/one-off*

RQ3: How do participants compare their experiences of formal school-based learning and personal network learning?

- *RQ3.1 In what ways, if any, is it similar?*
- *RQ3.2 In what ways, if any, is it different?*

RQ4: To what extent do participants' activities display elements of NL?

- *RQ4.1 To what extent do participants' PLNs display elements of NL?*
- *RQ4.2 To what extent do participants' activities display elements of NL?*

2.6 Summary

This review chapter establishes the position of the present study within the literature, its theoretical and conceptual frameworks and departure points. It also gives a rationale for M&T, the method I designed to elicit rich and triangulated data for this study. Network Learning and Engagement Theory have been used to conceptualise this study and will be operationalised to make my original contribution. Person-Environment Fit, Stage Environment Fit, Social Cognitive Theory, Funds of Knowledge and Identity and Self-Determination Theory will be used to unpack the findings in Chapter 5, with insights from Erikson's Psychosocial Development Theory and Piaget's Cognitive Development Theory. The next chapter outlines this study's design.

Chapter 3: Methodology

This chapter presents the design for this study. Here, I unpack the study's philosophical orientation, addressing my ontological and epistemological considerations. I discuss my research approach and the methods I have used to collect and analyse the data. I also discuss this study's limitations and ethical considerations.

3.1 Philosophy

3.1.1 Ontology

This study seeks to understand from the participants' perspectives what contextual factors in their PLNs support their engagement therein, and how. It is therefore conducted from the interpretive paradigm or researcher worldview. From this perspective, reality is socially constructed, subjective, imperfect, and unique to the meaning maker (Cohen et al., 2017; Darby et al., 2019; Kivunja & Kuyini, 2017; Leavy, 2017). Interpretivism argues that there is no objective truth or reality to be discovered. Rather, there are multiple realities, understandings, or experiences of a single event since people differ and make their own subjective meanings of social events and actions (Cohen et al., 2017). Interpretive research therefore seeks in-depth understanding of phenomena within their cultural contexts through the meanings that people assign to them (Cohen et al., 2017). It is naturalistic, avoiding manipulation and obtrusion, and begins without predetermined constraints on outcomes (Cohen et al., 2017). The more shades of meaning that interpretive research uncovers, the richer the understanding it generates. Interpretive research may therefore contribute rich insight, deeper understanding, and diversified shades of subjective meaning (Cohen et al., 2017; Darby et al., 2019; Kivunja et al., 2017). For these reasons, my ontological perspective for this study is interpretivist.

3.1.2 Epistemology

Humans construct and communicate meaning through words, actions, and social situations. This study gathers interpretations of meanings through evidence collected in these ways. This study is therefore qualitative in design

(Cohen et al., 2017). Qualitative research is used to investigate social phenomena such as people's experiences, perceptions, and understandings. As Leavy argues, in qualitative research "Attention is drawn to people's patterns of interaction and the interpretivist processes by which they assign meanings in the research process" (2017, p.129). Thus, qualitative data are non-numerical, in contrast with numerical quantitative data. Similarly, this study explores a social phenomenon – participant engagement in PLNs – entering the participants' worlds without influencing them, seeking understanding with sensitivity and without judgement. Hence, in-depth conversations were undertaken with the participants, exploring their experiences, perceptions, and understandings. Engagement was prolonged and data sources varied. Rather than seeking some absolute truth or testing a hypothesis, this interpretive study values and privileges the perspectives of the participants, representing their experiences of the focal phenomena. Studies such as this can therefore have emancipatory potential (Cohen et al., 2017). The knowledge-building process of this study involved collecting empirical evidence in the form of participants' words and the researcher's observations, aligned with the qualitative paradigm. This echoes the position of Bryson and Hand who argue that engagement, the focus of this research, is best unpacked through in-depth qualitative study (2008).

3.1.3 Axiology

Axiology refers to researcher values and beliefs (Cohen et al., 2017). These shape the researcher's worldview, research practice and knowledge creation. In this section, I reiterate my axiological positioning based on Section 1.4 in Chapter 1 where I outlined my educational philosophy and researcher positioning. I explained my social view of the agentic child, capable of autonomy, of constructing their own worlds and of acting, rather than being acted upon. This contrasts with the traditional view of the child as incapable, adult-dependent and in a state of becoming. I explained my interest in emancipatory research and in foregrounding the participants' experiences and meaning-making. This positioning aligns with the interpretive paradigm in that this study recognises the capability of its child participants to construct their

own worlds, make meaning of their experiences in these worlds and to represent these varied and subjective experiences through various modalities. The interpretive approach is well aligned with this study's emancipatory agenda as it generates rich insight about often neglected demographics and under-researched phenomena such as those in the present study. This study is guided by the goal of achieving empathic understanding of the participants' experiences, thereby generating meaning with which to elaborate on existing theory (Darby et al., 2019).

In the following sections, I expand further on this study's design, showing how my philosophical orientation has influenced its methodology, along with ethical concerns and limitations.

3.2 Methodology

As explained in Section 3.1, this study's design aligns with the interpretivist, qualitative approach. Methodologies in this paradigm include ethnography, phenomenography, and case study which all seek in-depth understanding of socially constructed realities. The following section details my methodology selection.

3.2.1 Methodology selection

Methodologies considered were survey, ethnography, phenomenography, and case study. Surveys for this study's target population would require adult administration. They therefore tend not to be child-centred as the requisite adult involvement would detract from the study's participant-centred approach. Surveys would be more applicable to one-off data gathering and closed questions for an overview of a wider population (Cohen et al., 2017) rather than in-depth understanding of a smaller sample size. Ethnography was not selected as my embedded presence in participants' PLNs would not only risk activating the Hawthorne Effect (Cohen et al., 2017) but it would also run contrary to the goal of unobtrusive participant engagement and breach PLN members' privacy. Phenomenography was eliminated as the goal is not understanding participants' group understandings of engagement (Given, 2008; Wilson et al.,

2018), but the contextual factors supporting it. Case study was selected as it affords in-depth investigation of a phenomenon in its real-world context (Cohen et al., 2017; Creswell et al., 2007; Creswell 2012a, 2012b; Yin, 2018), and can accommodate an interpretive perspective as well as my emancipatory agenda (Cohen et al., 2017, Yin, 2018).

3.2.2 Case study

Case study methodology is suitable for understanding a real-world case when such understanding "is likely to involve important contextual conditions pertinent to your case (Yin, 2018, p.15)." It is useful for achieving "extensive and 'in-depth' description of some social phenomenon" (Yin, 2018, p.4). This is the aim of the present study, which explores contextual factors supporting engagement in a real-world context (participants' PLNs), yielding extensive and in-depth descriptions of this phenomenon.

Various definitions of case study research exist, with each expressing the differing methodological approaches of its originator. This could be positivist or postpositivist (Cohen et al., 2017; Harrison et al., 2017; Yin, 2018). Creswell et al. (2007, p.245) define case study research 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 collection involving multiple sources of information (e.g., observations, interviews, audiovisual materials, and documents and reports), and reports a case description and case-bound themes.

Harrison et al. define case study as "the detailed inquiry of a unit of analysis as a bounded system (the case), over time, within its context" (2017, p.15). Stake defines it as "the study of the particularity and complexity of a single case, coming to understand its activity within important circumstances" (1995, p.xi). Merriam explains it as "an in-depth description and analysis of a bounded system" (2009, p.40). From these definitions and multiple perspectives, the key features of a case study can be identified as (Harrison et al. 2017):
(a) the case, i.e., the object of study or unit of analysis

(b) the bounded system, i.e., a system of connections, bounded by time, space and activity
(c) the context, i.e., the real life setting or natural environment
(d) in-depth study for intensive analysis
(e) case selection
(f) multiple evidence sources for rich description and to examine the many variables typically in operation and
(g) case study design.

In the present study, each participant is an object of study or unit of analysis. Individual participants' PLNs and the activities occurring within them constitute the bounded cases. Participants' engagement within their PLNs constitutes the real-life setting or natural environment i.e., the context. Just as Harrison et al. (2017) and Yin (2018) state, the boundaries between case (individual participants) and context (their networked participation within their PLNs) is at times not immediately evident. The in-depth study, case selection, multiple evidence sources and case study design are discussed in Section 3.3.

The literature acknowledges several types of case study. In terms of outcomes, Yin identifies exploratory (pilot), descriptive (narrative) and explanatory (theory testing) case studies (Cohen et al., 2017; Yin, 2018). Merriam (1988) identifies descriptive, interpretive, and evaluative types. Stake (1994) identifies intrinsic, instrumental, and collective studies. Regarding design, Yin identifies four types: (a) the single-case design, (b) the embedded, single case design, (c) the multiple case design and (d) the embedded multiple case design (Cohen et al., 2017, Yin, 2018). As will be explained in further detail in the following sections, this study adopts the exploratory multiple case design.

3.2.3 Exploratory multiple case study

Exploratory case study (ECS) is used when there are no predetermined outcomes and the study seeks answers to 'what' and 'how' questions (Yin, 2003, 2009, 2018). ECS may also be used as pilots, to identify situations for further research (Yin, 2008). As the aim of the present study is in-depth

understanding of a ‘what’ (contextual factors supporting engagement) and a ‘how’ nature, and the sample size has been kept small with a view to making recommendations for wider studies, the ECS type has been adopted. For a richer understanding of the factors supporting engagement within participants’ PLNs, I have chosen to study a range of participants, making this a multiple case study. This will allow the collection of rich descriptions and understandings from a range of participants’ perspectives, using multiple sources of data and providing contextual understanding of each case (Creswell et al., 2007; Creswell, 2012a, 2012b; Yin, 2003, 2004, 2018), as well as deeper understanding from comparing cases (Cohen et al., 2017; Creswell, 2012a) in a cross-case analysis (Miles et al., 2020). Section 3.5 discusses the research tools or methods adopted for this study.

Each participant has been purposively selected to illustrate the issue of engagement within their own PLN (Creswell et al., 2007; Creswell, 2012a, 2012b; Yin, 2003, 2004, 2018). Participants have not been drawn from the same context and are of different ages, attitudes towards school, ethnicities, and school year groups, resulting in different contextual understandings of engagement in PLNs (Creswell et al., 2007; Yin, 2003, 2004, 2018).

3.3 Sampling

3.3.1 Inclusion criteria

Respondents were eligible for participation if they satisfied the following inclusion criteria:

- Aged 10- to 16-years-old
- Living in England
- Have daily access to a computing device and the Internet
- Connecting several times a week with peers online for the purpose of finding and/or sharing information

I chose to study 10- to 16-year-olds as this age range spans two pertinent school transitions which are relevant to this study. These are the primary to secondary transition at 11 years of age and the secondary to college transition

at 16 years of age. I had initially planned to study just the primary to secondary transition. However, my previous experience with children in the school year groups just before and after this transition (10- to 12-year-olds) revealed that they had significant concerns about the looming secondary to college transition and that it was another possible season for disengagement. This was confirmed in conversation with the study's participants, one of whom suggested extending the study to 16-year-olds. I therefore expanded the study to explore engagement in the PLNs of 10- to 16-year-olds. Interview participants' ages were confirmed with their responsible adults through whom they were recruited. Questionnaire participants confirmed their ages through self-reporting in the questionnaire.

Similarly, my initial location of study was London, United Kingdom (UK). I chose this location based on available data for Internet access to homes in London at the time this study commenced. The UK broadband comparison site, thinkbroadband, reports that as of April 2021, London Superfast broadband coverage was at 97.7% and Fibre coverage at 98.5% (thinkbroadband, 2021). These figures are reported as relating to both business and residential premises. Coverage is defined by thinkbroadband as "the percentage of premises able to get a certain speed" (2021, Cover notes). They provide both the European Union definition of Superfast broadband as 30Mbps and the Westminster definition of over 24 Mbps. These figures suggested that there was sufficient broadband coverage across London at the start of this study to imply that recruiting from within London would grant me access to children and young people with regular at-home Internet access (note that my target population was home-based at this time due to the pandemic). However, as discussed in Section 3.3.3, the response to my London-only recruitment drive was poor. I therefore expanded the study location to the rest of England where, as of May, 2021, thinkbroadband reported Superfast broadband coverage at 96.7% and Full fibre at 98.8% (thinkbroadband, 2021). These England-wide figures continued to support my estimation of sufficient broadband coverage in England to enable access to children and young people with regular at-home broadband access. Another reason for restricting participation to England-based prospects was the common school system, with school transitions at 11-

and 16-years of age. Participants were screened location-wise via the questionnaire which was set up to show participants' locations (i.e., the country from where they responded). Some US-based respondents were thereby identified and immediately removed from the study.

Recruitment was restricted to those who self-identified as having daily access to computing devices and the Internet to ensure that the findings were not impacted by differing levels of accessibility. It was also restricted to those who self-identified as connecting several times a week with peers online to find and/or share information. This was aimed at recruiting participants with regular participation in PLNs. Access and participation were self-reported.

3.3.2 Exclusion criteria

3.3.2.1 Location

As explained in Section 3.3.1, non-England-based participants were screened out via the questionnaire.

3.3.2.2 Failure to provide consent

To participate in the study, both the participant and their responsible adult were required to confirm fully-informed consent on the first page of the questionnaire. Without this, respondents were unable to access the questionnaire and therefore unable to opt in for the interviews (see Appendix B2, Online questionnaire).

3.3.3 Covid-19 impact

As data collection took place in 2021, during the Covid-19 pandemic, with mandatory lockdowns, social distancing, and self-isolations, my first choice of data collection sites i.e., schools, was not feasible. My next available option, for safeguarding purposes, was to reach out to parents, guardians, adult family members and friends of, and those working with eligible children and young people via digital means, inviting them to pass on my recruitment information to eligible persons. Response to this recruitment method yielded poor results,

possibly due in part to the public's preoccupation with pandemic-related concerns at the time and partly because this required two-step recruitment – first, of a responsible adult, and then, the adult needed to recruit their child/ward. Indeed, some adults did respond that they were interested in participation but that their child/ward was not. Still others responded that their child was only interested in questionnaire participation. Each recruitment push (in total, 11 via Facebook, Twitter, LinkedIn, WhatsApp, my professional blog, and my Department's cross-cohort web site, plus an interview for a local newspaper, a notice in a professional electronic newsletter and telephone calls to personal contacts) resulted in a few more questionnaire responses. I attempted recruitment of participants by snowballing. This yielded some questionnaire responses and one for interview. However, due to this interview participant's special needs, they eventually stopped on completion of the questionnaire. I then launched a purposive sampling campaign for the interviews, reaching out to parents and guardians of eligible young people. Again, this was slow but resulted in the recruitment of six interview participants between May and September 2021. By this point, as outlined in Section 3.4 (Recruitment), data collection had yielded a large volume of qualitative data.

3.3.4 Purposive sampling

In purposive sampling,

> Researchers hand-pick the cases to be included in the sample on the basis of their judgement of their typicality or possession of the particular characteristics being sought. In this way, they build up a sample that is satisfactory to their specific needs (Cohen et al., 2017, p.156).

Purposive sampling is used to access "knowledgeable people" (Cohen et al., 2017, p.157) with experience in the focal phenomenon. Other sampling methods, such as random, systematic, snowball or convenience sampling would either not yield a suitable case study sample or were tried, with unfavourable results, as previously explained. Through this purposive sampling, I approached adults with responsibility for eligible young people aged 10- to 16-years and of as many gender orientations, ethnicities, ability levels, faiths, and

locations as I could reach. My intent was to achieve as wide a variety of experiences and perspectives as possible, for richness and comparison. I specifically approached Participants 2 and 3 as critical cases (Tripp, 2012), further discussed in Chapter 4. Teddlie and Yu refer to this as critical case sampling, a category of purposive sampling (2007). Altogether, this resulted in six interview participants, henceforth referred to as Participants 1 to 6, or P1-P6, and 17 questionnaire-only participants (Participants 7 to 23, or P7–P23) with the following characteristics for P1-P6 at the time of data collection (see Table 3.1).

Table 3.1 *Interview participant characteristics*

	P1	**P2**	**P3**	**P4**	**P5**	**P6**
Age in years	13	10	15	16	16	12
School Year Group (Y) & Key Stage (KS)	Y9 (KS3)	Y6 (KS2)	Y11 (KS4)	Y12 (KS5)	Y12 (KS5)	Y8 (KS3)
Ethnicity	White East European	Black British	Black African British	British Caribbean	Black African British	White British
Self-identified gender orientation	Female	Female	Female	Female	Male	Male

Further details on P1-P6 are provided in the case descriptions in Chapter 4. Table 3.2 shows the age range of P7-P23 who were questionnaire-only participants. Without the opportunity to collect in-depth data via the questionnaire, data on personal characteristics for P7-23 are limited.

Table 3.2 *Questionnaire-only participant characteristics*

Partici-pant	**P 7**	**P 8**	**P 9**	**P 10**	**P 11**	**P 12**	**P 13**	**P 14**	**P 15**	**P 16**	**P 17**	**P 18**	**P 19**	**P 20**	**P 21**	**P 22**	**P 23**
Age In years	13	16	16	16	15	16	15	14	11	15	10	16	11	16	16	16	15

Each interview participant was purposively selected to illustrate the issue of engagement within their own PLN (Creswell et al., 2007; Creswell, 2012a; Yin, 2003, 2004, 2018). Participants were not drawn from the same context and are of different ages and year groups, resulting in different contextual

understandings of engagement in PLNs (Creswell et al., 2007; Yin, 2003, 2004, 2018). It is worth noting that purposive sampling yielded a wide spread of interview participants from primary- to college-aged, from 10- to 16-year-olds of varied ethnicities and as will be evident in Chapter 4, with varying experiences of school and PLNs, and varying interests and motivations. However, purposive sampling has limitations, which will be discussed in Section 3.8.

3.4 Recruitment

3.4.1 Initial plan

A sequential design was adopted for data collection. Initially, the recruitment protocol was as follows.

3.4.1.1 Phase 1

This consisted of sending out invitations to participate in the questionnaire plus collecting the responses. To recruit participants, I posted an announcement on my social media and professional platforms – Facebook, Twitter, LinkedIn, my blog, and WhatsApp, and emailed copies to personal contacts. This consisted of a flyer with a link to a slideshow hosted on Canva explaining the study, what participation involved, participant rights and how to enrol in the study. As this was sent out to adults, it was worded and designed for adults, encouraging interested parents to pass on the invitation to their children. The intention behind the slideshow was to make the content more accessible, especially for those who might struggle with reading long explanations, since research method design is typically created around adult and neurotypical capabilities and can involve considerable literacy and processing challenges. At the end of Phase 1, participants were invited to Phase 2, the interview stage. Continued participation was optional; however, participants were offered a £10 Amazon gift voucher as a thank-you for completing the interviews. These were sent out at the end of each participant's interview(s). The questionnaire settings were amended to identify respondents' country of residence to exclude non-England resident responses.

3.4.1.2 Phase 2

When interested prospects clicked the link in the slideshow, they were taken to a cover page, hosted at Qualtrics.com, eliciting fully informed consent, and then onto the questionnaire (Appendix B2, Online questionnaire). Participants who opted out after the questionnaire received a thank-you message, and their participation ended there. Those who opted to continue to Phase 2 were required to provide the email address of their responsible adult. A follow-up email was then sent to the adult, arranging the interview dates and times. The next step was five 20-minute interviews, spaced no closer than one week apart. These are detailed in Section 3.5.2.

3.4.2 Amended plan

After interviewing P1-3, I determined that five interviews were challenging for some. I then amended the protocol to involve a 22-question questionnaire, moving some of the interview questions to the questionnaire (see Appendix B2), followed by one 30-minute (or less) interview. The interview protocol is discussed further in Section 3.5.2. In total, there were 23 questionnaire respondents, with 7 opting onto Phase 2, the interviews. However, one of the 7, a child with special needs, opted out as their parent explained that they were unable to understand and respond to the questions. In addition, during the pilot stage, one of the adults suggested providing one slide show for the adults and a simpler, shorter one for interested children. This I did, sharing links to both on the recruitment flyer. However, respondent feedback indicated that this made the process cumbersome. I therefore amended the flyer again, linking to just the children's slideshow.

3.4.2.1 Phase 3

It became clear after reviewing P1 data, and after taking some time away from it to reflect, that I would need to contact the participants again to further clarify my understanding of their data. This became Phase 3. Data obtained in this phase were in the form of field notes, printed email responses and annotations

on these as the participants communicated through their responsible adults. This phase took place between one and six months after Phase 2.

3.4.2.2 Phase 4

This phase was to elicit member reflections on my analysis of their data. This took place between six and eighteen months after Phase 3. This length of time elapsed as the participants had end-of-term, end-of-year, and national examinations in the interim, plus summer holidays. I was also working at a slower pace due to personal commitments. I sent a summary of the findings as drawn from their data analyses and asked for their thoughts. Two participants responded, providing reflections. These are shown in Appendix C11 (Participant reflections).

3.5 Methods

Research methods are the tools used in data collection. Tools used for qualitative case studies such as this include document analysis, archival records, interviews, observations, and physical artifacts (Yin, 2018). For the purposes of in-depth exploration, triangulation, and construct validity, I used multiple data sources i.e., data triangulation. In addition, I used multiple modalities for data collection, collected data on several separate occasions with each participant and analysed the data through several iterations. Yin describes this as developing “converging lines of inquiry” for more convincing conclusions (Yin, 2018, p.127). This resulted in triangulation which strengthens construct validity (Cohen et al., 2017; Yin, 2018) and “presents a more accurate, comprehensive, and objective representation of the data (Brink, 2018, p.233). Methods or data sources used in this study are (a) semi-structured questionnaire, (b) semi-structured interview, (c) Draw and Talk (D&T), (d) M&T, (e) historical online records – participants’ Internet histories, and metadata sources (f) my field notes and memos (g) diagrams of participants’ networks and (h) emails to participants’ responsible adults. These are discussed in detail in the following sections.

3.5.1 Semi-structured questionnaire

An initial exploratory questionnaire was created and piloted with two adults, one of these a researcher colleague and the other, a parent of a child in the study's target population. A young person in the study's target population also piloted the questionnaire. As this took place in 2021 during the Covid-19 pandemic, the questionnaire was administered electronically. Following the pilot stage, the questionnaire was restructured for ease of administration and design flow. This change allowed participants to click a button to opt out at any point, or to opt either to stop participation with the end of Phase 1 (the questionnaire) or to click a button and continue to Phase 2 (the interview).

The questionnaire consists of a mix of open-ended, single- and multiple-choice questions, with the later addition of Likert-scale questions when the first iteration left some RQs unanswered (see Appendix B2). While questionnaires are not designed to elicit rich descriptions and in-depth understanding, this served several purposes:

- To gain an initial overview of the nature of participants' networked activities, such as how they were connecting and engaging, with whom, why and where.
- To explore to what extent what was previously known about the target population's PLN activities coincided with this study's findings. This is discussed further in Chapter 4.
- To recruit interview participants and provide a starting point for the interview conversations.
- To facilitate replication. Though interviews were semi-structured, the questionnaire helped to ensure that the same basic information was gathered for all participants while allowing participant freedom to provide further information.

The questionnaire was open from May to September 2021. I closed it at the point when responses began to return similar answers, all RQs were adequately addressed, and I had recruited 23 questionnaire participants and six

interview participants. I had proposed to recruit 20 to 30 questionnaire participants and 3 or more for interviews. At 23 and 6 respectively, I decided to close recruitment. Moreso, I had obtained permission from all six interview participants to return to them should further data be required. It therefore began to be evident that the six interviews and follow-up conversations would generate a large volume of data and beyond this, the volume would become unwieldy. Data elicited from the questionnaire were analysed with the rest of the data.

3.5.2 Semi-structured interviews

In keeping with the interpretive paradigm, interviews were adopted to gather in-depth qualitative data through social interaction with the participants. The semi-structured interview format was chosen, affording the benefits of both structure and flexibility. These were administered as Phase 2 of data collection which was to consist initially of 5 interviews, each lasting 20 minutes, spread at least one week apart so as not to fatigue the young participants. Interview 1 was for familiarisation, rapport-building and to probe further on the questionnaire responses. Interview 2 was for D&T, described in Section 3.5.4. Interview 3 was for M&T, described in Section 3.5.3. Interview 4 was to explore participants' PLN relationships and Interview 5 was for member reflection. Interviews were scheduled for times and dates convenient to the participants. P2 and P3 opted to combine two meetings, bringing their total number to 3. P1 attended all 5 interviews. After the first 2 interviews with P1, I realised that the existing interview protocol was not eliciting adequate responses to address the RQs. I then created 10 Likert-scale questions which became part of Interview 3.

For P4-7, the protocol was shortened to the questionnaire plus one 30-minute interview. The 10 Likert-scale questions were added to the questionnaire and revisited in the interview for in-depth probing. D&T was eliminated as it was difficult to administer and collect remotely. M&T remained a part of the interview. All participants granted me permission to contact them again if further information was needed. After an initial round of analysis, I did contact P1-6 by email to their responsible adults, with additional questions to fill any remaining

gaps in information. One instance of this was to request Internet history data, as described in Section 3.5.5. As much as possible, procedures were replicated for P1-3, and then P4-6, to achieve systematisation and replicability across cases (Cohen et al., 2011; Harrison et al., 2017). The interview protocols can be seen in Appendix B1 (Semi-structured interview questions). Data elicited from these tools were coded and analysed along with the rest of the data.

3.5.3 Mime and Tell

M&T is a data collection method I have developed which includes the NVC component. It is based on the understanding that the written and spoken word are not the only means by which humans communicate. I used M&T in this study where written (questionnaire) and verbal communication (interview) did not elicit the information I sought. M&T was therefore used at the later stages of data collection to 'fill' any information gaps that remained. The NVC component was used to scaffold participants' communication (Haruehansawasin & Kiattikomol, 2018; Muhonen et al., 2016; Sun et al., 2021; Wood et al., 1976). I piloted M&T for this study with an individual known to have literacy difficulties. In this pilot, significantly more data, with richer descriptions were obtained than with traditional written and spoken methods. I therefore decided to develop M&T further in this study.

3.5.3.1 Initial thoughts

My original plan was to ask all participants the same questions using M&T. After the first participant, I soon realised that the process would become redundant if a participant had already satisfactorily answered the scheduled question(s) in the preceding data collection activities. It became clear that the best use of this tool would be to standardise the process and then to use it to elicit only whatever information was still missing i.e., different questions for different participants. This turned out to be information that participants may not have known that they know, or information not in their immediate consciousness. Hence, I have referred to scaffolding (Haruehansawasin & Kiattikomol, 2018; Muhonen et al., 2016; Sun et al., 2021; Wood et al., 1976). I noted the missing information (that I had not yet succeeded in obtaining),

drafted open questions to elicit this through miming, then drew up a series of steps for the process (see Figure 4). Step 1 introduces the session, Steps 2-6 are for the data collection, then, Step 7 wraps up the session. Due to the participants being minors, and due to the rigour of my data collection process, I kept M&T to between 20 and 30 minutes and only asked participants one question (the central question, CQ), though this had sub-questions (SQs). This process is illustrated in Figure 4 and explained in detail in the next section.

3.5.3.2 M&T process

1. Familiarisation – The researcher explains the process and its rationale – to help participants communicate what may not be easily conveyed in words. The researcher gives a demonstration, answers any questions the participant may have and conducts a test run with the participant until they are comfortable proceeding. In my recruitment flyer and slideshow, I mentioned this activity, with a brief explanation of the process and rationale. It was therefore not a surprise and participants had the option to decline or withdraw from participation. No participant declined or withdrew. However, if anyone had, we would have continued with whichever of the methods they found comfortable or ended data collection.

2. Central question and mimed response – The researcher poses the CQ. The participant mimes a response. This is the non-verbal step in the process where the participant communicates using kinesics, proxemics, chronemics, haptics and even territoriality (see Section 2.4.4.1). Vocalics may be used if they are not words or verbalisations. In trying to understand the nature of the participants' peer relationships in this study, I asked whom they were most likely to go to with questions on their topics of interest (see Appendix C10, Example coded M&T data). In their interviews, they had each given me the initials of the peers in their PLNs. In this activity, they were to mime a response to each peer's initial as I called them out. Some responses were eye rolls, waved hands, shrugs, wide smiles, and thumbs-ups. Some responses were immediate; others came after a pause.

Figure 4 *The Mime and Tell process*

3. Participant meaning making – The researcher invites participants to interpret their non-verbally communicated data. Owing to the virtual nature of these sessions, I invited participants to explain what they had just communicated verbally. As no video or audio recordings were made, I made field notes capturing these explanations. These notes were later typed up, added to the data corpus, coded, and analysed as discussed in Section 3.6. Appendix C10 shows an example of coded M&T data. Some questions I asked were: "What does the shrug mean? What was happening when you paused? You shrugged for X and for Y. What does this mean? I noticed that you leaned forward. What was happening there?" Typically, by this point, the participants were more freely providing information about their peer relationships which they had not provided through the interviews or questionnaire. When I mentioned this, the participants explained that their mimed responses gave them time to think, which they felt writing or speaking did not, and that it helped to concretise what they were thinking, so that they could then talk more about it. Further details of participants' M&T experiences are provided in Chapter 5.

4. *Researcher-facilitated exploration* – The researcher asks further clarifying questions as needed. Some participant responses from Step 3 may open further questions. For example, a participant expressed that one friend was “not good for” any of the academic subjects the participant was interested in, so they never went to them with academic questions. I asked what they did together in their PLN. The participant responded that this friend played a more social role as the group’s “chat reviver.” This led to a conversation about what a chat reviver is and their role in the PLN.

5. Participant meaning making – The researcher pulls the collected data together and invites further participant meaning-making. For example, I asked participants, given all that they had shared, what their PLN meant to them, and what they would miss if they lost access to it. This helped them to articulate the value they placed on their PLNs and what they got out of them. All efforts previously had failed to elicit this level of detail.

6. Researcher clarification – The researcher shares with the participants their understanding of what has been communicated. Participants clarify any misconceptions and meaning is agreed together. In this stage, I read back to the participants the answers I had gleaned from their responses to my CQ (see Section 3.5.3.1). Participants clarified my misconceptions, and we agreed on the meanings we had jointly made.

7. Member reflection – Together, the co-researchers (i.e., the participant and researcher) reflect on the session – anything more that the participants have to say, their thoughts on the session, how it could have been better, how they would like their contributions to be used and to what ends, making space for whatever they wish to express. Then, the researcher wraps up the session.

This was not easy to complete in 20-30 minutes, as I learned with my first session. It was therefore important thereafter to have my CQ to hand and my SQs semi-structured. It was also a challenge balancing my curiosity with time constraints. I had to keep within 30 minutes, remain mindful of the ethics of

working with children (watching that they were comfortable with the process) and avoid getting lost in interesting details. This was how I determined that not all questions could be answered in this session, or with any of the methods, the first time. I therefore had to choose which questions were relevant to my RQs, which could be addressed in the sessions, which would need following up later, either with the other methods or in a later phase, and which would need to become the subject of future research.

3.5.4 Draw and Talk (D&T)

I adapted D&T from Draw, Write and Tell (Angell et al., 2015) which is a creative qualitative method used to elicit data when researching with children. The difference between D&T and Draw, Write and Tell is that I replaced 'Write' with 'annotate.' In D&T, I wanted the focus to be on non-traditional methods of research communication as I had already deployed a questionnaire and held interviews. I also wanted a more inclusive method that did not pose a barrier to participants not in favour of writing.

I invited the participants to illustrate their responses to open-ended questions as drawings, providing as much or as little detail as they wished. Again, information about this was made available at recruitment and this activity was not a surprise. Participants had the option to opt out, but no one did. Further conversation about their drawings was elicited through researcher prompts. Participants were then invited to annotate the drawing with any additional information interpreting their picture. They had the option to decline annotation, but none did. An example of such a drawing, with participant annotations can be seen in Figure 5 in Chapter 4. In this example, the participant was asked to visualise what they considered an ideal learning situation. They were then asked to illustrate this graphically, involving as many senses as they chose, and to send their drawing to me digitally. On receipt of the drawing, I invited the participant to 'talk me through it.' As they did so, I made field notes. These, along with the drawings and annotations were coded and analysed with the rest of the data corpus. Note that D&T was used during interviews with P1-3. It was not used with P4-7 (as explained in Section 3.5.2).

3.5.5 Historical online records

Data collected via the preceding methods are all based on participant self-reporting. Indeed, the semi-structured questionnaire falls under “Self-administered questionnaires without the presence of the researcher” (Cohen et al., 2017, p.404). While this has its advantages, such as affording participants privacy, low pressure and permitting response in their own familiar surroundings (Cohen et al., 2017), it also has its downsides, such as the researcher not being present to address any queries or participants wrongly interpreting questionnaire items.

To mitigate the limitations of self-reporting, 7 data collection methods have been used for triangulation, including collecting information from participants’ Internet history (i.e., historical online records). For ethical reasons, this was also collected via self-reporting – participants were given the option to provide these data or not and were sent instructions for accessing and reporting their Internet history. They were to look up two of their most visited websites or online platforms in the preceding ten days and report how many visits they had made in this time-frame. Only 4 participants were able to provide these data, one of which was only an estimation. The limitations of this were immediately evident. For example, P2 reported having used a range of devices and not being able to access their Internet history for all of these. Some participants were unable to follow the instructions. However, the exercise was still beneficial for comparing questionnaire response figures to Internet history figures for those able to complete this. In one instance, the discrepancy was so large that it became evident that the questionnaire estimates were not reliable figures. This is further discussed in Chapter 4.

3.5.6 Field notes and memos

During M&T, video and audio recording were switched off for ethical reasons regarding safeguarding minors. Data were therefore collected in the form of field notes as I observed participants miming and made notes of their interpretations. Memos were also made as I read through participants’

transcripts and listened to their audio recorded interviews. These field notes and memos were typed up, coded, and analysed along with the rest of the data. Appendix C9 shows an example of field notes.

3.5.7 Diagrams of participants' networks

One set of memos took the form of diagrams I drew representing the structure of P1-3's PLNs as they described them to me in their interviews. This exercise was not performed with P4-6 as their schedule had been reduced to just one interview (explained in Section 3.3.3). An example diagram can be seen in Appendix C8 (Example diagram of participant's network). Though simplistic, these diagrams were shown to the participants in their next interview and used to confirm my understanding of their data from the previous interview, and to elicit further data regarding their PLN participation and relationships. Data thus elicited were coded and analysed along with the rest of the data.

3.5.8 Emails

These were used to contact the participants' responsible adults in Phases 3 and 4 for clarifying details and for participant reflection (Braun & Clarke, 2022) in Phase 4.

3.5.9 Reflections on methods

I have found it valuable to reflect on the process all through this study. This has helped me to remain true to my research philosophy, to my co-researchers in the promises I have made to them (regarding their role in this study), to my own values of integrity and inclusivity and to question how my values, positionality and assumptions have impacted on my findings. I initially had internal struggles because the lockdowns prevented me from giving my participants (as co-researchers) as much of a role as I had planned. The nature of this study as a doctoral thesis requires that this work is solely conceived, conducted, and authored by me. I, however, intended for the participants, as many as would be willing, to have more of a say in the methods used. One participant was especially eager, and I had planned that we analyse their data together in

person. Not only did the lockdowns prevent this in-person meeting, but due to the psychological chaos at the time I decided that such a meeting would be unethical. I therefore included as much member reflection as possible in the data collection and afterwards, with a view to facilitating 'more' CYP voice.

Referring to Section 2.4.7 in the literature review, I pondered at various parts of this study over models and levels of child participation, what constitutes participation and what, if anything, is 'enough' participation. As explained in Section 2.4.7, I drew from the literature that 'enough' is that which best suits the child and is in their best interests. Indeed, I found that some of my co-researchers were happy with more and others with less, and the prevailing circumstances sometimes dictated less. As Hart (2008) later submitted, the highest level on his participation ladder was not always the best, necessary, or even practical. My unease at not being able to facilitate 'higher' levels of participation for my co-researchers was thereby dispelled.

3.6 Data analysis

This study focuses on participants in PLNs, characterised by the participants and their resources (nodes) and the relationships and interactions (ties) connecting them. I therefore initially considered using Social Network Analysis (SNA) to design the study, collect the data and to explore and make meaning of it. SNA is the process of investigating social structures using networks and graph theory (Osse & Rousseau, 2002). It lends itself to both qualitative and quantitative research (Marin & Wellman, 2014). SNA views social networks as "the building blocks of the social world" (Marin & Wellman, 2014, p.11). Therefore, to understand aspects of the social world, SNA proponents study social networks, of which PLNs can be seen as a part since the learning therein is mediated by social interactions. However, as the initial conceptualisation progressed, it became clear that my RQs could not be addressed by an investigation of the social structures of my participants' PLNs. Moreover, SNA adopts networks as units of analysis rather than individuals (Marin & Wellman, 2014). It therefore became evident that my RQs required a focus on individual network participants and their understandings of their networked relationships

plus the affordances these networks provided them. For this purpose, I found Thematic Analysis more appropriate and specifically, Reflexive Thematic Analysis. This is discussed in the following sections.

3.6.1 Thematic analysis

Thematic analysis (TA) is a qualitative analytic method which identifies, analyses, and interprets patterns of meaning, also known as themes, within qualitative data (Braun & Clarke, 2006, 2022; Braun et al., 2023; Terry & Hayfield, 2021; Xu & Zammit, 2020). I found this a fit for my RQs which focus on making meaning of the participant data.

Braun and Clarke outline two TA approaches:

- *Small q approaches* - These are aligned with qualitative positivism which uses qualitative tools within a quantitative paradigm. These qualitative studies seek to explain or understand a singular objective truth while emphasising coding reliability, objectivity and the elimination or control of researcher subjectivity as a threat to reliability. Proponents favour the use of structured code books, multiple, independent coders for inter-rater reliability and larger, representative samples for generalisability (Braun & Clarke, 2006, 2013, 2022; Braun et al., 2023; Terry & Hayfield, 2021).

- *Big Q approaches* – These are qualitative studies using qualitative tools within a qualitative paradigm. They value smaller samples to achieve rich, in-depth, situated understanding, recognise multiple truths and value researcher subjectivity as integral to the analytical process (Braun & Clarke, 2006, 2013, 2022; Braun et al., 2023; Terry & Hayfield, 2021).

These two approaches reflect different philosophical assumptions (Braun & Clarke, 2019, 2022; Braun et al., 2023; Terry & Hayfield, 2021). It is therefore pertinent to note that this study adopts the Big Q approach and as such, it does not seek to achieve positivist goals such as researcher impartiality, the elimination of researcher bias, generalisability, and representative samples.

Case study methodology aligns with this philosophical paradigm and analytical approach (see Section 3.2.2).

3.6.2 Reflexive thematic analysis and rationale

Within the Big Q approach, Braun and Clarke further identify various iterations of thematic analysis (2019, 2022). It is not my aim to outline these varied iterations here, rather to identify the one adopted by the present study. This is Reflexive Thematic Analysis (RTA) which Braun and Clarke define as "a method for developing, analysing and interpreting patterns across a qualitative dataset, which involves systematic processes of data coding to develop themes" (2022, p.4). RTA reflects "the values of a qualitative paradigm, centring researcher subjectivity, organic and recursive coding processes, and the importance of deep reflection on, and engagement with, data" (Braun & Clarke, 2019 p.593). Some pertinent features of RTA are the researcher's role in knowledge production and their continuous questioning about how their values, positioning, and the assumptions they make impact the knowledge they produce (Braun & Clarke, 2022; Braun et al., 2023; Terry & Hayfield, 2021). This is the reflexive element of RTA.

I adopted TA and RTA for the following reasons:

1. Unlike SNA, TA can be used to study individuals as units of analysis (Braun & Clarke, 2022; Braun et al., 2023).

2. RTA aligns with the qualitative paradigm of this study in that it facilitates the exploration of participants' perspectives, experiences, and meaning-making (Braun & Clarke, 2006, 2013, 2022; Braun et al., 2023; Terry & Hayfield, 2021; Xu & Zammit, 2020). As I aimed to qualitatively explore six bounded cases within a multiple case study, RTA's patterned meaning-making across the entire data set proved suitable.

3. RTA offers methodological and theoretical flexibility (Braun & Clarke, 2013, 2022; Braun et al., 2023; Terry & Hayfield, 2021). At the design

stage of this study, I was unsure whether my data would require inductive, deductive, or abductive analysis, or whether my initial theoretical framework choice was suitable. I therefore required a method that would be flexible and accommodate my final choices. Rather than imposing a theoretical framework without flexibility, I had the room to amend my framework should the need arise, and it did.

4. I agree with Braun and Clarke's position that research takes on the values of the researcher and cannot be value neutral (2006, 2013, 2019, 2022). RTA acknowledges this and privileges researcher subjectivity as a valuable tool for knowledge generation (Braun & Clarke, 2019, 2022; Braun et al., 2023; Terry & Hayfield, 2021). This is especially useful in making an original contribution to knowledge.

5. RTA aligns with my personal perspective on knowledge and its generation. I have come to see the world as a pluriverse with multiple and situated realities. This is reflected in my research and the knowledge it produces.

6. The results of thematic analyses are accessible to the public and by being transparently reflexive, readers will be better able to evaluate the study for their own use (Braun & Clarke, 2022; Braun et al., 2023).

3.6.3 Reflexive thematic analysis process

3.6.3.1 Preparing the data

As the completed questionnaires arrived, I printed them out and assigned each participant a code, from P1-P23. I created folders for each participant to hold all their data. On completion of each interview, I transcribed the data verbatim using the Microsoft Teams transcription feature. I then read through each transcript while listening to the audio recording. There were parts where the transcription omitted punctuation, transcribed words incorrectly or there were sentence fillers, such as 'uhm' and 'err.' I removed the sentence fillers, added

the missing punctuation as verbalised in the recordings and edited the incorrect transcriptions. Later, I repeated this reading and listening to check that the transcription aligned with the recording. Where this appeared not to be the case, I amended the transcript accordingly. The finalised interview transcriptions were added to the participants' folders. All field notes taken during the interviews and written during initial readings of the transcripts were typed up and added to the folders. This included data from participants' historical online records as described in Section 3.5.5, field notes and memos as described in Section 3.5.6 and diagrams of participants' networks as described in Section 3.5.7. I then put all files for P7-P23 into one folder. This way, I created 7 folders, one each for P1-P6 and one for P7-P23.

After the completion of the initial round of data collection and during the familiarisation stage of data analysis (see Section 3.6.3.2, following), I contacted the participants through their responsible adults, with their prior permission, to obtain further clarifying information. Examples of this were historical online data to address discrepancies in participants' accounts of their online participation, and background information for case description such as participants' experiences of school, self-identified gender orientation and ethnicity. This additional information was optional though all obliged.

3.6.3.2 Analysing the data

With the data prepared, I followed Braun and Clarke's six steps for RTA (Braun & Clarke, 2006, 2013, 2022; Braun et al., 2023; Xu & Zammit, 2020) as discussed in the rest of this section. This path was iterative rather than linear, as they recommend (Braun & Clarke, 2006, 2013, 2022). The six-step procedure went as follows:

(*1) Familiarising with the data*

I began with the folder for P1, reading through each of their 10 data sets which consisted of one completed questionnaire, 5 interview transcripts and 4 sets of field notes. I annotated each as I read with initial thoughts and initial coding ideas (see Appendix C1). These initial codings were both semantic (descriptive)

and latent (interpretive). I adopted this strategy rather than choosing one coding form or the other as this helped me to make the best sense of the data. I created a Familiarisation Sheet (see Appendix C2) and made notes in it as I read through P1's data again. This was to create an overview. By this time, I had begun to identify patterns across P1's data and to make notes of these patterns. I repeated this process separately for P2-P6 as there were more data and more sense-making to do than with P7-P23. I repeated this process for P7-P23 altogether.

(2) Generating codes

I chose to code the data manually as the physical handling, annotating, and highlighting of hard copy transcripts, plus being able to view them spread out, side-by-side enabled me to think and make meaning clearly. I revisited P1's data, initially open coding both inductively and deductively. I coded inductively for patterns of meaning in the data related to the RQs, using my initial coding ideas (see Appendix C1, Initial thoughts, and Appendix C3, Example coded data extracts). I coded deductively using key concepts in this study's theoretical framework. At this point, I did not want to impose one choice or the other, preferring to see how this might work in addressing my RQs. In conceptualising this study, the theoretical framework had been useful for designing the study and the methods (i.e., RQs, questionnaire and interview questions, case study methodology). It was useful to ensure that I looked at different kinds of engagement (affective, behavioural, and cognitive, see Section 2.2.3) rather than just the more obvious behavioural engagement. It also helped to identify what to look at (NL), where to look (PLNs) and what to look for (engagement). However, I did not find this deductive approach useful to interpret what I was seeing in the data as it did not help me make sense of participants' perspectives. I therefore decided to continue inductively, to foreground the participants' perspectives and to position them as knowledge producers.

I completed inductive open coding for P1 and repeated the same process for P2. Next, I compared the codes for P1 and P2. This was an attempt to identify any similar or different patterns and to check that any similar codes had similar

meanings in both sets of data. By the end of this, I had 73 granular emergent code labels for P1 data and 85 for P2 (see Appendix C4, Example codes). I read through each set of code labels, sorting those for P1 into 23 candidate codes and those for P2 into 22. I then read again through the data sets for P1 and P2 to check that the candidate codes aligned with the story the data were telling. In this process, I merged some codes and created new ones. However, most of the codes were common to both data sets. By the end of this stage, I had 28 candidate codes applicable to P1 and P2 data sets and a few codes unique to each participant. The candidate codes became the 'code heads,' and the granular emergent code labels became the 'code tails' (see Appendix C4, where, for example, 'Network value' is a code head and 'interesting perspectives' is a code tail; the column headings are also 'code heads' and the lists below them, 'code tails'). In this way, all the code tails for each code head illustrated variations of meaning under the central idea behind each code head. It was thereby possible to see the different participant experiences and perceptions conceptualised by each code.

Next, I created a coding scheme with the codes and their definitions (see Appendix C5, Coding scheme) to help with coding the remaining data for P3-P6. I generated some additional candidate codes and added these to the coding scheme. The total candidate codes came to 38. I re-read the data sets for P1 to P6, checking the alignment of the 38 candidate codes across the data corpus. Some codes were split or merged (see Appendix C12, Code reduction), resulting in 33 codes. The final splitting and merging resulted in the 19 codes used in this study's analysis (see Table 4.1).

The Phase 1 data from the questionnaires were thin compared to the Phase 2 data from the interviews. This was expected as the questionnaire data were self-reported, without the opportunity to elicit rich detail. For this reason, these data were not coded. Rather, the summaries generated from them via the Familiarisation Sheet provided background information to the study and an initial overview of the participants' activity within their PLNs. This aligned with the findings of extant studies as discussed in Chapter 4.

(3) Constructing themes

Braun and Clarke define a theme in RTA as “a pattern of shared meaning organised around a central theme” (2022, p.77). The 33, and then 19 codes were explored for such patterns of meaning and central organising concepts. Four of such concepts were identified and defined. These became 4 candidate themes: (1) Identity affirmation, (2) Personal motivations, (3), Network resources and (4) Learning preferences (see Table 4.1, Thematic map).

(4) Reviewing potential themes

The 4 themes were reviewed, interrogating their fit with the data, the overarching theoretical perspective and the RQs (Braun & Clarke, 2022; Braun et al., 2023). I achieved this by compiling relevant coded data extracts under each theme and checking alignment. I then read through the entire data corpus once more, reviewing alignment of the coded data extracts, codes, and themes with the theoretical framework and RQs. All was found to be aligned. On further exploring the themes, I found that they could be reduced further into 2 overarching categories to make deeper sense of the data. These 2 categories are: (1) Internal drivers - factors from within the participants, brought to their PLNs or developed within them while participating there, and (2) Environmental drivers – factors participants have built into their PLNs to facilitate their internal drivers. Participant reflections were sought and used to further achieve alignment.

(5) Defining and naming themes

Definitions for the themes and categories were checked for alignment and found to be aligned (see Table 4.1). Rival explanations were explored and addressed (Yin, 2018).

(6) Producing the report

This thesis presents a report of the findings (Brown & Clarke, 2022).

3.7 Ethical concerns

3.7.1 Ethical approval

Ethical approval for this study was obtained from the Lancaster University Research Ethics Committee prior to commencement. Throughout this study, the Lancaster University's Research Ethics Code of Practice (LU, 2009), the British Educational Research Association's Ethical Guidelines for Educational Research (BERA, 2018) and the Association of Internet Researchers Ethical Guidelines 3.0 (Franzke et al., 2020) were adhered to.

3.7.2 Informed consent

As this study's participants are below the age of 18 years, fully informed consent was provided to themselves and their responsible adults prior to participation. Full information regarding the aims of the study, what participation entails, how their data will be stored, used, and for how long, were provided during recruitment and prior to participation (Franzke et al., 2020; BERA, 2018; LU, 2009); see Appendices A1, A2 and B2. This included the use of participants' anonymised data in future publications and presentations. I did not recruit participants directly. They were recruited via their responsible adults and then required to confirm their understanding and consent. In the absence of this, access to participate was denied.

3.7.3 Confidentiality, privacy, and information security

Participants were assured of and provided confidentiality and privacy (Franzke et al., 2020; BERA, 2018; LU, 2009). Both participants and their responsible adults were instructed not to provide their names or any identifying data in any format during participation. I also refrained from mentioning participants' names in audio recordings. Participants and their data were anonymised using codes (P1-P23) rather than their names. All data were stored in the University's password-protected cloud storage, on my password-protected computing devices or in my locked storage facilities. In line with the University's policy, participants and their responsible adults were informed that their data would be

stored for ten years (LU, 2009). Only my supervisor and I had access to the data, which were anonymised when shared. Interviews were conducted, transcribed and the transcripts stored securely, using the University's data recording, transcribing, and processing applications and cloud storage.

3.7.4 Working with children

I gave strict regard to the provisions regarding working with children laid out in the Lancaster University's Research Ethics Code of Practice (LU, 2009), the British Educational Research Association's Ethical Guidelines for Educational Research (BERA, 2018) and the Association of Internet Researchers Ethical Guidelines 3.0 (Franzke et al., 2020). Research methods and schedules were modified in the best interests of the participants as the study progressed.

3.7.5 Voluntary participation with option to withdraw, incentive

Participants and their responsible adults were fully informed of their right to withdraw from the study at any time and were informed how to do so (BERA, 2018; Franzke et al., 2020; LU, 2009). They were made aware of the timeframe within which their data could be withdrawn from the study (up to 2 weeks after data collection) and that beyond this time, their data would be anonymised and therefore unretrievable (see Appendices A1 and B2). All gave informed consent to this. They were not coerced to accept or participate, and one participant declined their gift voucher.

3.7.6 Questions and concerns

Along with fully informed consent and at recruitment, I provided prospects with contact details for myself, my supervisor, and my head of department (see Appendix B2) should they have any questions or concerns about the study or their participation (BERA, 2018; Franzke et al., 2020; LU, 2009).

3.7.7 Duty of care

Consent forms contained notification that any information communicated during the study suggesting that participants or someone else might be at risk of harm

would be shared with my supervisor and/or relevant safeguarding bodies (BERA, 2018; Franzke et al., 2020; LU, 2009); see Appendix B2. This would be followed by due notification to the participant and their responsible adult.

3.8 Limitations

3.8.1 Self-reporting and estimation

This study seeks to understand participants' perspectives and meaning making of their experiences. The way I chose to elicit this, with special regard to pandemic protocol and the privacy of their PLNs, was through self-reporting via questionnaire and interview. In some instances, participants were found to be under-reporting the frequency of their engagement or misrepresenting the nature of their participation (Cohen et al., 2017). Some responses were too sparse to offer deep insight and others suggested that the participant could have benefitted from researcher clarification. Under-reporting and misrepresentation were discovered and mitigated using multiple data collection methods. When discrepancies were identified between a participant's questionnaire and interview responses, or responses were sparse, this was further investigated through follow-up interviews, D&T and M&T. The responsible adults of two participants passed on estimated figures regarding the frequency of their visits to their most-visited websites. Some lacked the know-how to collect Internet history data, and some could not gather this information across multiple devices. These estimations were weighed against the data from other sources and only used to create an approximate picture of the participants' PLN participation.

3.8.2 Hawthorne Effect and social desirability bias

I anticipated that my presence as a researcher could trigger the Hawthorne Effect – participants modifying their behaviour in response to being researched (Cohen et al., 2017). I attempted to mitigate this by informing participants that there were no right or wrong answers, that all responses were valuable and by explaining their role as co-meaning makers. Social desirability bias (SDB) was another consideration with self-reporting (Cohen et al., 2017). This is the

tendency to position oneself favourably rather than factually in response to research. This was addressed the same way as the Hawthorne Effect. From P1's favourable feedback, I felt that this was achieved to some degree. However, in my experience, the Hawthorne Effect and SDB cannot be completely removed as it is human nature to want to present one's 'best self.'

3.8.3 Purposive sampling

While purposive sampling yielded a variety of perspectives and greater depth of understanding from those knowledgeable about the focal phenomena, the trade-off is lesser breadth (Cohen et al., 2017). The study's sample is therefore not representative, and the participants' experiences are not generalisable. However, this is not the study's aim. Rather, the aim is to obtain in-depth information (Yin, 2018) from those with the knowledge and experience to provide it (Cohen et al., 2017). Consequently, I engaged deeply, over several months with the participants, for rich description and in-depth understanding, returning in this time for member reflection and further clarification. Purposive sampling, combined with qualitative case study methodology, therefore supported this study's aims.

3.9 Summary

This chapter has outlined the philosophical underpinnings of this study and the rationale behind its methodology and methods. Data collection and analysis have been discussed as well as ethical considerations and limitations. In the next chapter, I present this study's findings, including six individual case descriptions and a cross-case analysis.

Chapter 4: Findings

4.1 Introduction

This chapter discusses this study's findings resulting from the data analysis outlined in Chapter 3. The data were inductively coded to foreground the participants' perspectives. A final 19 codes were identified across the entire data set reflecting the nuanced meaning the participants made of their experiences. These codes were sorted into 4 themes, or "patterns of shared meaning organised around a central theme" (Braun & Clarke, 2022, p.77). The 4 themes were further sorted into 2 categories, making deeper sense of the data in response to the RQs (see Table 4.1).

The following sections present: (a) this study's six case descriptions, providing relevant background information for each case, (b) a thematic map showing the relationships between the identified codes, themes, and categories, in relation to the overarching RQ and (c) a cross-case analysis of all six cases.

Though a within-case analysis was conducted for each case, I have chosen to discuss only the cross-case analysis for two reasons: (1) the same codes apply across all six cases, which would result in unnecessary repetition and use of word count, and (2) a cross-case analysis will allow me sufficient word count to delve deeper into the thematic map with its codes, themes, and categories.

The next section explores the six case descriptions.

4.2 Case descriptions

4.2.1 Participant 1 (P1)

P1's interviews took place in May and June 2021. At the time, she was 13 years old and in Year 9 (9th year of compulsory education). She is of White East European ethnicity and speaks three languages – a first language, a second language and English. She is a recent learner of the English language and though she appears to speak it proficiently, she says that she struggles at times

with academic English in school. P1 reported that she enjoys school and that her school friends help her when she struggles with English. She connects mainly in a friendship group (consisting largely of these school friends) for schoolwork, entertainment, and challenge. She reported one occasion, however, of having responded to a question online from someone she did not previously know. She reported connecting online using a laptop, a mobile telephone, or an iPad. P1 had daily Internet access at the time of this study. Her preferred online platforms were YouTube, British Broadcasting Corporation (BBC) Bitesize, Kerboodle and WhatsApp, though she also reported using Discord and Snapchat. P1's interests were engineering, science and design technology and watching YouTube videos about how things are made. When asked whether she considered herself a content consumer, content sharer, helper, social user, a private user, or a joiner or starter of online activities, P1 said she considered herself a helper. Her PLN consisted of herself, five friends, the websites they visited for information or entertainment and the online resources they shared. P1 was recruited purposively for her views about her desire to learn autonomously, and how she was achieving this in her PLN. During the pandemic, it was helpful that I knew her parent. This made the 2-step recruitment process easier as I was a trusted person and P1's parent was aware of my doctoral studies. I recruited P1 because I was interested in how she was using her out-of-school learning to support her in-school learning and for her views on the need for more learner autonomy in schools. Data collection with P1 consisted of one questionnaire, 4 interviews each lasting approximately 20 minutes, and one follow up conversation lasting approximately 15 minutes for participant reflection. Of her school experience, P1 reported:

> I feel like I am doing well in school so far. I feel like I am where I should be. With English, sometimes there are phrases that don't translate exactly between English and [her first language]. It can sometimes be a bit difficult. It doesn't affect my learning that much as the teachers ask if I understand.

4.2.2 Participant 2 (P2)

P2 was interviewed in May and June 2021 when she was 10 years old, in Year 6 (6th year of compulsory education) and preparing for her Statutory Assessment Tests (SATs). She is of Black British ethnicity and speaks only English as her first language. P2 was known to me prior to the study as I knew her parents and she was once a pupil of mine. P2 reported disliking school and struggled to engage with it. I knew her to be a pupil who sat quietly enough to 'blend in with the furniture' while at school. However, at home she came alive. While she may have been struggling with schoolwork, she was an enthusiastic music maker, spending time online learning "beats making and music recording" (P2). During the period of this study, she wrote a rap song, created the music for it and recorded a video for the song. She reported connecting with the friends in her PLN to ask questions about homework, for personal organisation (checking in with each other about arranged meet ups), for gaming and with various websites to find information about schoolwork and making music. She said she received encouragement from her PLN regarding her musical endeavours. P2 accessed the Internet via mobile telephone, laptop computer, desktop computer and iPad. She had daily Internet access, visiting mainly YouTube and various websites for information about music making, and WhatsApp, where she set up and ran a WhatsApp group for her peers. She also visited Roblox, an online gaming community and used Swiggle, a child-friendly search engine. When asked whether she considered herself a content consumer, content sharer, helper, social user, a private user, or a joiner or starter of online activities, P2 said she considered herself a consumer, creator, a starter, and private user (only connecting with a few friends approved by her parents). P2's PLN consisted of herself, five friends, the websites she visited for information or entertainment and the online resources they shared. I recruited P2 as I was intrigued by a student who disengaged from learning in school yet directed her own learning and managed a PLN outside of school, fuelled by her passion for making music. Data collection with P2 consisted of one questionnaire, 3 interviews each lasting approximately 20 minutes, and one follow-up conversation lasting approximately 15 minutes for participant reflection.

4.2.3 Participant 3 (P3)

P3 was interviewed in May and June 2021. At the time, she was 15 years old, in Year 11 (11th year of compulsory education) and preparing to sit her General Certificate of Secondary Education (GCSE) examination. P3 is Black African British and speaks only English as her first language. She and her parents were known to me before this study. I purposively recruited P3 because of her unique educational experience. Since her earliest school days, P3 has been a top student, excelling in academics and extra-curricular activities. From primary to secondary school, she has been a vocal member of her school council. Her parents and teachers describe her as a gifted child. However, at the time of data collection, P3 reported that she no longer enjoyed school. She reported that over the years, the fun and creativity of primary school had given way to rigidity and adult control in secondary school. She reported that she often disengaged in lessons due to boredom and dislike for the way adults ran her school. She said that she preferred the freedom and autonomy she had while pursuing her own interests outside school, which included her PLN. P3's PLN consisted of herself, her 5 friends, the websites, and platforms they visited and the resources and information they shared. Her most frequented online platforms were Discord, WhatsApp, Google, YouTube, various blogs, public forums and servers, and Instagram. She accessed these using a mobile telephone, laptop computer, and a smart television, and had daily Internet access. When asked whether she considered herself a content consumer, content sharer, helper, social user, a private user, or a joiner or starter of online activities, P3 described herself as a consumer, sharer, and joiner. I recruited P3 as I was interested in the paradox of a high-performing student who disliked school and preferred her own way of learning outside of school, and for her views on the need for more learner autonomy in schools. Data collection with P3 consisted of one questionnaire, 3 interviews (she requested merging two of them, bringing the number from 4 to 3) each lasting approximately 20 minutes, and one follow-up conversation lasting approximately 15 minutes for participant reflection.

4.2.4 Participant 4 (P4)

P4 completed her questionnaire and was interviewed in August 2021. Data collection consisted of one questionnaire, one interview lasting about 30 minutes and follow-up emails through her parent for further details and participant reflection. At the time, P4 was 16 years old and beginning the second year of college (the second year of post-16 education). I knew P4's parent before this study. P4 identifies as British Caribbean. Her PLN consisted of herself, her 5 friends, the websites, and platforms they visited and the information and resources they shared. P4 connected with her 5 friends about their shared interests. These included research for her proposed business, driving tips, looking at real estate and "for my knowledge" (P4). P4's devices for participation included a mobile telephone, a laptop computer, and a smart television. She had daily Internet access and her frequently visited websites included TikTok, YouTube, Snapchat and "a lot of social media platforms" (P4). When asked whether she considered herself a content consumer, content sharer, helper, social user, a private user, a joiner, or a starter of online activities, P4 described herself as a consumer, sharer, social and private, connecting only with a few friends approved by her parents. I purposively recruited P4 for her insights having made two school transitions between the ages of 10 and 16 years. I was also interested in her comparison between her in-school and at-home learning, where she described the former as frustrating and restricted by teachers, and the latter as connecting with peers who 'speak the same language' and share similar goals.

4.2.5 Participant 5 (P5)

Data were collected from P5 in August 2021. At the time, P5 was 16 years old and in Year 12 (second year of post-16 education). P5 is Black African British and speaks English as his first language. I knew P5's parent before this study. Data collection consisted of one questionnaire, one interview of approximately 30 minutes' duration and one follow-up text message to a number provided by P5's parent for further information. P5 mentioned 5 friends as members of his PLN. His frequently-visited online platforms included YouTube, WhatsApp, and Snapchat. He listed his devices for participation as a mobile telephone, iPad,

and a PlayStation console. He described his participation as playing games, sharing, and finding information and following and discussing current affairs. When asked whether he considered himself a content consumer, content sharer, helper, social user, a private user or a joiner or starter of online activities, P5 described himself as a consumer who “mainly just watch[ed] others” (P5) and did not “go out of my way to post and share content but to find information” (P5). I purposively recruited P5 as I was interested in a male perspective and because of P5’s school experiences, further described later in this chapter.

4.2.6 Participant 6 (P6)

Data were collected from P6 in October 2021. At the time, P6 was 12 years old and in Year 8 (eighth year of compulsory education). P6 is White British and speaks English as his first language. P6 is dyslexic. I knew P6’s parent before this study. Data collection consisted of one questionnaire, one interview of approximately 30 minutes’ duration, and one follow-up email via P6’s parent for further information. P6 mentioned six friends as members of his PLN, all of whom he met at school. His frequently-visited online platforms included YouTube, TikTok, Google, WhatsApp, email, Minecraft forums, servers and groups about Minecraft, Discord, and various wikis. He listed his devices for participation as a mobile telephone and a laptop computer. P6 had daily Internet access. He described his participation as getting information from forums, connecting with friends, and learning about computers. When asked whether he considered himself a content consumer, content sharer, helper, social user, a private user or a joiner or starter of online activities, P6 described himself as a consumer, helper, social, private and a joiner of things others have started. He indicated on his questionnaire that he was very active in his PLN and posted and interacted “a lot” (P6). I purposively recruited P6 as I was interested in a male perspective and because of P6’s school experiences. His parent reported that he did not like school and was “happier messing about at home” (P6’s parent, 2021).

4.3 Unpacking the data - Thematic map

A thematic map is a visual or figurative representation of the themes and sub-themes generated from within the data, and the relationships between them (Braun & Clarke, 2022). A theme is "a pattern of shared meaning organised around a central concept" (Braun & Clarke, 2022, p.77). A sub-theme falls under a theme, focusing on one aspect of it. Together, the themes, sub-themes, and the relationships between them tell the story of the data. In place of Braun and Clarke's themes and sub-themes, I have used categories and themes respectively. This is because these descriptors make more sense to me, making clear distinctions between two similarly sounding words (themes and sub-themes). I have therefore clustered codes into themes, and themes into categories. Table 4.1 presents the final results of this analysis, this study's thematic map. In the sections following, I unpack the categories and themes that address my RQ. I begin each category with an overview, followed by its underpinning themes, codes and relevant data extracts.

Table 4.1 *Thematic map*

RQ	**Categories** Braun & Clarke's Themes (2022)	**Themes** Braun & Clarke's Subthemes (2022)	**Codes**
What contextual factors support the engagement of 10- to 16-year-olds in personal learning networks in England and how?	**1. INTERNAL DRIVERS** – Factors from within participants that motivated their PLN construction and participation	**A. IDENTITY AFFIRMATIONS** - Factors within participants that affirmed who they perceived themselves to be and who they aspired to become. Self-affirming activities, spaces, and experiences support engagement (Eccles & Midgley,1989; Eccles et al., 1993). Relevance of subject matter is self-affirming and engaging.	1. Personal interests 2. Identity 3. Relationships 4. Perceptions of relevance 5. Feelings of belonging/connectedness 6. Trust 7. Sameness/similarity 8. Funds of knowledge 9. Feeling the fit
		B. PERSONAL MOTIVATIONS - Participants' reasons for pursuing their interests. Intrinsic motivation supports engagement (Bandura, 1986, 2001)	1. Interest 2. Funds of knowledge 3. Values and goals

	Categories Braun & Clarke's Themes (2022)	Themes Braun & Clarke's Subthemes (2022)	Codes
	2.ENVIRONMENTAL DRIVERS – Factors participants had built into their PLNs that supported their needs. Autonomy facilitates engagement (Eccles & Midgley,1989; Eccles et al., 1993). Agentically engaged learners create supportive learning environments (Bandura, 2001; Reeve, 2013; Reeve & Jang, 2022).	**A. NETWORK RESOURCES** – Assets participants accessed, created, shared and/or facilitated to support their needs.	1. Web resources 2. Relevance 3. Access/Accessibility 4. Equality 5. Positive community experiences
		B. LEARNING PREFERENCES – Ways participants preferred to learn in pursuance of their needs.	1. Social learning 2. Agency and autonomy 3. Interactivity

I spent several weeks thinking about the final codes. Each time, what stood out was that some of the codes were 'within,' or characteristic of the participants while others were 'without,' or characteristic of their PLN environments. I then noticed a relationship between the participant-characteristic codes and the environment-characteristic ones. The former drove the latter, while the latter facilitated the former. I named the participant-characteristic codes internal drivers and the environment-characteristic ones the environmental drivers.

4.4 Internal drivers (IDs)

These were found to be factors within participants that motivated their PLN construction and participation. They included: (a) Identity affirmations and (b) Personal motivations (see Table 4.2).

Table 4.2 *Internal drivers*

Categories	Themes	Codes
1. INTERNAL DRIVERS Factors from within participants that motivated their PLN construction and participation	**A. IDENTITY AFFIRMATIONS** Factors within participants that affirmed who they perceived themselves to be and who they aspired to become. Self-affirming activities, spaces, and experiences support engagement. Relevance of subject matter is self-affirming and engaging (Eccles & Midgley,1989; Eccles et al., 1993)	1. Personal interests 2. Identity 3. Relationships 4. Perceptions of relevance 5. Feelings of belonging/connectedness 6. Trust 7. Sameness/similarity 8. Funds of knowledge 9. Feeling the fit
	B. PERSONAL MOTIVATIONS Participants' reasons for pursuing their interests. Intrinsic motivation supports engagement (Bandura, 1986, 2001)	1. Interest 2. Funds of knowledge 3. Values and goals

4.4.1 Identity affirmations

This theme encompasses factors within the participants that affirmed who they perceived themselves to be (i.e., the kind of learner they are and thus their self-concept or identity) and who they wanted to become (i.e., their goals, aspirations and how they believed they could achieve them). Clustered under this theme were the following codes: Personal interests, Identity, Relationships, Perceptions of relevance, Feelings of belonging/connectedness, Trust, Sameness/similarity, Funds of knowledge and Feeling the fit. As much of the data extracts can be grouped under more than one code (e.g., data for similarity/sameness were also coded under belonging/connectedness), I found it more appropriate to group such codes together in presenting the findings to avoid unnecessary repetition of the data extracts. Several codes are therefore presented together in the following sections, and some are repeated across sections.

4.4.1.1 Personal interests and Identity

Participants listed their personal interests as reasons for constructing and engaging in their PLNs. The data suggested that they chose peers, platforms, forms of participation and resources that were connected to these interests. In this section, I highlight the connections between: (a) participants' engagement around personal interests, (b) how this experience was self-affirming for the participants and (c) how the combination of relevant content (i.e., to personal interests) and self-affirming experiences promoted participants' continued engagement.

On personal interests, P3 explained:

> I like meeting people that have similar interests to me. In school it's not guaranteed that the people in my class are going to know about some of my interests. So, it's nice going online, knowing that there are people out there that have the same interests as you, and want to hear what you have to say about topics and things like that.

P3 described her PLN this way:

> My friends are similar to me. We have the same interests; we like the same things [...] D is good for talking about art and non-academics. P is the chat reviver. They provide comic relief and don't really know about the topics we discuss. Not good for talking about any of my 3 [academic] interests but good for non-academic things. We talk about personal friend things. V is good for talking about philosophy and non-academic things. I is good for computer science and non-academic things. A is good for art and non-academics. V, I and A are my real-life friends from school. We have similar interests and so we became close friends. I met D on Discord. We go to similar schools, study similar things, started talking and became friends.

P3 described herself as a helper in her PLN and reported enjoying being able to help her peers. I asked, "When you're sharing information, you're able to answer people's questions in your groups online. How does that make you feel?" P3 responded, "I like the fact that I can help people learn in ways that suit them. Similar to how I learn. Learning in ways that help them." In this way,

P3 indicated congruence between the way she enjoyed learning and the affordances of her PLN. The conversation continued:

> OE (myself): How does it feel when you're able to help people?
> P3: Oh, it feels nice knowing that I helped somebody learn something that maybe they wouldn't otherwise know about or would have a harder time learning about.
> OE: What do your friends think of you being able to help?
> P3: My friends know me as a type of person who's always reading something or watching some bit of information. So, I have a lot of general knowledge when it comes to things that they like as well.

On how she felt about the opportunity to pursue her interests independently in her PLN, she explained:

> I feel good in the sense that I can be independent. I can research things independently, like without the help of somebody else and still find material that is helpful to me [...] I like feeling independent because it gives me a chance to explore things in a way that I would not be able to explore if I was dependent on somebody else. For example, being able to find resources by myself, this means I can like, venture off into branches of information or branches of topics that, on my own, I wouldn't be able to do if I was dependent on somebody else.

Data from P3 suggested that her experience of engaging with peers on mutually relevant subjects, of being known as a helpful resource and of being able to direct her own independent learning was satisfying and self-affirming and encouraged her to keep returning to and participating in the network she had built.

Other participants' data suggested similarly. P4 reported:

> Two of my friends are very interested in fashion and we are all in photography. So, we're quite creative and we've had conversations about, you know, starting businesses and what we want to do in the future. And we all have quite similar, you know, goals and we can kind of

> relate to each other in this sense that it's like, OK, we kinda wanna join businesses.

P4 explained that being able to pursue her interests made her feel "free," "empowered" and "in control enough to independently find my own information." She explained that she continued to engage in her circle of peers and resources because "it's very useful," "...quick, simple, easy, if I'm thinking, oh, how do I do this, I know I can just go straight to my phone, or my laptop and it will be there [...] Whatever you want to do, it's out there. There's a way that you can find it."

P1 reported:

> I'm very interested in engineering and science and design and technology. So, often, I would go on websites, or go on YouTube and see YouTube channels where they build, like, a safe, or, like a catapult or something along those lines.

On how she felt about having the digital skills to pursue her interests, P1 commented, "It just makes you feel like you can really just figure out anything that's really interesting. You just feel very free to explore the world."

Through her PLN participation, P2 followed her interests in "Beats making and recording [music]," "singing and rapping" and "making a music video." She subsequently wrote a rap song, made accompanying beats and both starred in, and recorded a video for the song. On how these accomplishments made her feel, P2 responded that she felt "Proud." She stated:

> Being able to search for things online, find information and make beats makes me have courage because if the teacher calls me to do something, I know I can do it [...] I feel excited and happy because I get to explore more stuff than I already know. So, I can be better at making music. I taught myself the skills. When I go online and learn, I use it to make music.

On the role of her network, she reported," My friends compliment me. I call or text them if I need help and they help me."

P5 expressed that the agency and autonomy “gives you a sense of freedom, that you have the capability to utilise your skills to help in your everyday life.” P6 said he felt “Great” about having the digital skills to pursue his interests and that it was “quite cool” that his peers were listening to him and following his advice. The participants all reported that having their digital skills and being able to use them in their own pursuits were self-affirming.

4.4.1.2 Relationships based on similarity/sameness, belonging/connectedness, and trust

All participants reported forming their PLN relationships on the grounds of feeling similar to, or the same as their peers, as has been discussed in Section 4.4.1.1. They reported that this similarity, or sameness led to feelings of belonging and connectedness with their peers. Participants mentioned several benefits to this sense of belonging and connectedness which encouraged continued participation. These benefits included developing trust, freedom, a shared language for easier communication, mutual understanding, support, and accelerated learning. These are discussed in the following sub-sections.

Trust, freedom and understanding

Regarding asking questions or asking for help, P4 compared her school and PLN experiences stating, “Personal group [i.e., PLN] would be more understanding and we can say what we need to say. I would filter with the class but be freer with my small group.” On the value of similar others in her peer network, P3 reported, “Feels good to have someone like me. Makes me feel understood. Gives me someone to share opinions with. It can be frustrating when you have an opinion but no one to share it with.” P1 reported of her PLN,

> It makes you feel comfortable because when you are similar with a person then you just have an easier time talking to them. You feel like you can really, you know, ask them any questions without them thinking that you’re not smart or something. So, you feel very open. Some people sometimes don’t ask questions in front of the class or to a teacher because they don’t want to seem like they weren’t listening or that they have difficulties learning. So, it’s easier to ask a friend.

Shared language for easier communication and mutual understanding

With the trust and freedom experienced in her PLN, P1 reported developing a shared language with her peers which helped her as a learner of English.

> When you're learning together, not by yourself, you tend to develop some sort of communication with the people that you're around. You just kind of develop your own language that almost just works like you might not even have to say words. You might just look at them and they point at a picture until they are just able to explain it to you right away. So, when you're with your network, you sometimes don't have to say anything. They just immediately understand what's going on (P1).

P3 also reported engagement supported by mutual understanding. During her M&T session, she was asked, "Who would you go to, to ask about art-related things?" To respond, she was invited to mime a reaction to the mention of each of her 5 peers' initials (see Appendix C10). To 'Friend D,' she nodded vigorously, smiled broadly and enthusiastically put two thumbs up. At the interpretation stage, she explained, "They study art, so it's easy to talk to them about art. They are also an artist." She described 'Friend V' as knowledgeable and offering new perspectives on their shared interest of Philosophy.

P4 reported a sense of mutual understanding that facilitated learning.

> When it's your more personal group of friends, you kind of have a different dynamic to when it's a classroom setting. OK, so if it's my personal friends, it's OK that we know how each other works. But when it's a classroom setting, it's more like, you know you still have respect for the person and what they're saying, but it's like you have to get used to what they think and how they work and how they are going to contribute to what you have to do (P4).

Support and accelerated learning

P1 reported not feeling alone, feeling part of a helpful group and being able to progress faster with her learning.

> When you're together, you feel like you share information, and you feel like you're a part of a group and you just feel like you have people around you. You don't feel alone [...] You get social interactions, which are always good, and it just benefits you in a lot of ways. A very common benefit is that you make friends with new people, and it will just be easier for you to learn in the future. You will be able to progress faster because you have people around you that you just know you can ask. It's not like you have to go on a website, or like three different websites because you can't find the information you're looking for (P1).

P1 added that learning by herself felt empowering, however, in a way that felt "outside" and "shut off from society." In contrast, she reported that learning in her PLN made her feel empowered in a way that felt "inside."

> Well, there was that kind of empowerment because sometimes when you're on your own you tend to feel more independent and when you figure out something you just feel very empowered, but in in a different sense.
>
> OE: What's the difference between having access to resources by yourself, or having access to resources along with people who can share the journey with you?
>
> P1: So, when you're all by yourself and do research all by yourself…you feel empowered, but in a way that shuts you off from society. Like, you feel empowered, but a little bit more separate from society.
>
> OE: Am I correct in understanding that you feel it's a benefit when you have people around you and you're not feeling alone.
>
> P1: Yes.

P1 continued, on the support she received from her network:

> P1: There is a difference because when you're on your own, learning by yourself, then it's a lot more difficult. At least I feel it's a lot more difficult. You tend to have more questions pop up in your head that you can't answer and that sometimes prevents you from reaching levels that you would like to reach. When you have a big network, you just have a lot of people and resources that you can go to if you don't understand something. When you're in a friendship group, you usually study together

and you decide together on what you want to learn, and that is typically things that you're not exactly sure about. So, then you just get to fill in the gaps [...] Typically, people become friends with people that they have things in common with because they can discuss it with them. So, you get to learn more information. So, when you don't really use your skills with other people, you tend to not become good friends with them. You would feel, kind of outside. And then, you just go to a different friendship group.
OE: Does this mean you feel 'inside' with your network?
P1: Yes.

Taking together this section's data, participants expressed that their PLN participation led to feeling belonging and connected which engendered trust, freedom, a shared language for easier communication, mutual understanding, support, and accelerated learning. They expressed that these all helped them to learn what they wanted to learn, the way they wanted to learn it, and to learn what they perceived relevant to their goals and aspirations. In this way, their PLN participation was relevant to them and self-affirming – it supported the kind of learners they believed themselves to be and was directed towards their goals. Consequently, it elicited continuing engagement.

4.4.1.3 Perceptions of relevance

To gain a deeper understanding of their PLN participation, I questioned participants to elicit a comparison between their school and PLN engagement. I considered that they would be better able to describe something more abstract (i.e., their virtually-experienced PLN) if they could compare it to something more concrete (i.e., their physically-experienced school engagement). For this task, D&T, M&T and the Likert-scale questions were helpful in eliciting participants' experiences.

I sought to understand the participants' perceptions of relevance regarding their in-school and PLN learning, and how each was perceived in relation to their goals and aspirations. Participants were therefore presented with the following

statement: *The topics and skills I learn on my own online are useful for my everyday life.* They were asked to respond with Strongly agree, Agree, Neither agree nor disagree, Disagree or Strongly disagree. P1, P2 and P5 responded with Strongly agree. P3, P4 and P6 responded with Agree. They were also asked to respond to '*The topics and skills I learn in school are useful for my everyday life.'* P2 responded, Agree. P1, P3, P4 and P6 responded, Neither agree nor disagree. P5 responded, Disagree.

P1 neither agreed nor disagreed on the relevance of her school learning. She explained:

> Not everything that you learn [in school] you would use in your daily life. Like maths, a lot of it you would use, but some of it you wouldn't use. Like Pythagoras theorem, for example. That's not exactly something that you would use in everyday life. And so, it just varies from person to person. But for me, it's really a question of the situation and what we learn. Because some of the things I do use. But that's mostly maths or sometimes, science.

On how she felt about not everything being relevant to her everyday life, P1 continued, "It feels interesting because it makes me realize how big the world is and how many things there are to explore and learn about [...] It broadens your vision. You feel like you just got bigger." On how this might affect her attention regarding such topics, she responded, "My friends and I pay a lot of attention to things we wouldn't always use." Regarding the relevance of her self-directed PLN learning, P1 strongly agreed. She explained:

> When I go online, I search for a resource for something that I don't know, and that's typically something in everyday life [for example], if somebody doesn't know how to calculate how much money you spend in a supermarket when it says 25% off.

P2 selected 'Agree' on the relevance of her school learning, explaining however that, "I'm not old enough to use them in everyday life. But for English, it helps me in my song writing because I know better words." She appeared to further contradict her earlier agreement, stating, "School learning is helpful stuff but not

things I will use in my own life." She strongly agreed on the relevance of her PLN learning, stating, "When I go online and learn, I use it to make music."

P3 neither agreed nor disagreed on the relevance of her school learning. She explained:

> One thing that school teaches you is to take a piece of information and interpret that information in a way that you can apply it to a problem. For example, if you learn Pythagoras theorem and you're given a diagram and you have to use the Pythagoras theorem to find the length of side A, school teaches you to take information and use that information to solve problems. But the actual topics in school aren't that useful, to be honest.

On how P3 felt about learning content they perceived 'not that useful,' she responded:

> It makes me question how much effort I'm putting into school because if I'm not going to need this in the future, what is the point in working so hard to understand it? So, I don't really engage in lessons I feel as though I'm not going to use this information later on in life.

Regarding her PLN pursuits, she strongly agreed on their relevance, explaining:

> It makes me feel more passionate about learning than if I were to stick to a strict format because then I get to explore different topics in ways that make me engage more, or I find more interest in, so it makes me more enthusiastic about learning than if I were to follow a strict format.

P4 neither agreed nor disagreed on the relevance of her school learning, stating, "When I say I agree, it's that what you learn in school, you take with you in life. But when I disagree, I think that you should be able to learn a lot more life skills in school." She then added regarding schoolwork, "I know I'm learning these things, but what do I want to do with it?" Regarding her PLN learning, she explained, "I think that by learning online I get good, like, information from that, and I get a lot of value from it, and I think it does help me in everyday life." On learning things she did not consider useful for her everyday life, P4 described this as "less convenient."

P5's perspective was:

> I feel like learning in school is useful to find a career path. But other than that, I feel like there's a lot more in life than necessarily a career path that school doesn't always teach you. So, then you may find that certain topics or certain lessons, you might find quite useless.

On how he felt about learning things he considered "quite useless," P5 responded, "I don't really enjoy that much having to learn something that I'm not going to use in my future life." Regarding his PLN learning, P5 strongly agreed on its relevance to his daily life and aspirations, explaining further, "It gives you a sense of freedom, that you have the capability to utilise your skills to help in your everyday life."

P6 neither agreed nor disagreed on the relevance of his school learning. He explained:

> In school, only some of the subjects are useful for everyday life. Like, only some bits in Maths. I guess English can be useful in everyday life and more core subjects like that because subjects like Latin, history, and things like that, you can't really use them in everyday life unless what you're doing at home, let's say you're working, and it revolves around it. I don't think it would come up randomly in the middle of your day unless you're focusing on it.

His response to learning things he did not consider relevant to everyday life was:

> I'm gonna listen. I'm gonna do what the teacher tells me to do. I'm gonna learn the stuff. But when I'm in the lesson, I almost feel like it's a bit of a waste of time because if I'm never gonna use what I'm doing in the lesson, I feel in a way, why am I learning it? What's the use of it? Why should I do this? [...] I'm listening and I'm doing the work but I'm not gonna go out of my way to get to the top in the class.

P6's parent, who sat in on his interview, added:

> He finds subjects like Latin challenging due to dyslexia and wonders if there is any applicability. I once asked him what he thought was better to study and he came up with, we all have toilets in our house. Why don't

> we get taught how to fix those? We all have to eat. Why don't we learn to cook? We all have to buy houses. Why not learn about that? In essence, I don't think he really gets the point of school.

Regarding his PLN learning, P6 agreed on its relevance, explaining:

> I quite like it because it means, let's say I'm in my room and my computer is glitched out. I feel like with the knowledge I've learned online with my YouTube videos, I should be able to fix it on my own and I won't have to waste any time spending hours on a phone call with some tech company, or reading websites and things, or maybe talking to my mum or dad. I'll fix it myself.

Perceptions of relevance also referred to how relevant participants felt their skills and capabilities were in their PLNs. Where they felt these were relevant and appreciated by their peers, they tended to engage more. P3 expressed feeling that her peers valued her contributions and that this made her engage more with them, as the following conversation illustrates:

> OE: How does it make you feel that your contributions are valued in your friendship groups?
>
> P3: It makes me a lot happier to engage in these friendship groups. It makes me want to engage more...I like the fact that my friends are just as passionate as me about certain subjects, so I feel as though my efforts are appreciated when I do give them...when I do share information with them, which is a nice thing to have, and it motivates me to do it more.

Taking these data together, regardless of their persuasions on the relevance or irrelevance of school learning, the participants indicated in their comparisons between school and PLN learning that they engaged when they found learning relevant to their everyday lives and aspirations and tended to engage less, or to disengage when they perceived learning irrelevant. They also engaged more when they perceived that their contributions were valued by their peers. The participants all agreed or strongly agreed on the relevance of their PLN learning

to their goals and aspirations, and on feeling that their PLN contributions were valued. The data suggested that this motivated continuing PLN engagement.

4.4.1.4 Funds of knowledge

Funds of knowledge (FoK) have been defined and elaborated on in Chapter 2 and linked to this study in Chapter 5. With regards to this study, FoK are the digital skills and capabilities the participants have developed and accumulated, with which they navigate their digital spaces and meet their needs. When asked how she learned to seek, find, sort through, curate and share information and connect with peers online, P3 explained, “Usually, it just comes with experience. Also, things like e-safety being taught in schools or school projects where I would have to research things. But it mostly just comes with experience.”

To elicit their perceptions of their own digital skills, participants were posed the following Likert-scale question:

1. I have developed the skills to find the information that interests me and to create and share new information on these interests (e.g., writing posts or articles, creating videos, pictures, music, podcasts etc.).

They were to select a response from Strongly agree, Agree, Neither agree nor disagree, Disagree and Strongly disagree. P2, P3 and P4 strongly agreed, while P1, P5 and P6 agreed.

To elicit their perceptions of their teachers’ accommodations of these skills in their school learning, participants were asked the following question with the same range of response as in Question 1 above.

2. In school, I feel that these skills are accommodated by my teacher(s).

P1 strongly agreed, P2 and P6 disagreed, and P3, P4 and P5 neither agreed nor disagreed.

For those who agreed/strongly agreed that they had developed the digital capabilities they needed to meet their own needs, but disagreed, or neither agreed nor disagreed that these skills had a place in their school curricula, they

were asked how they felt about this. P2 responded, “I would have liked it to be so, so I can extend my knowledge about making music.” P3 explained:

> It makes the lessons a lot less enjoyable. Like, a lot of the time, for the subjects that I have to do this in, it’s like, when is the lesson going to end? Constantly looking at the clock because I can’t really engage in the lesson because of how it’s set out [...] It’s a bit frustrating because I know that I would be able to understand something better, or I would have more interest in something if I was able to do it in the way that suits me best. By having to do it in...like reading from a textbook or physically writing, while a teacher stands at the front of the class, it’s very boring and draining energetically.

Asked how she responded to such situations, she replied, “Sometimes, I lose focus, [I do] things like daydreaming or fiddling with objects.”

P5’s view was:

> I don’t really feel like I use those skills that I learn from home in school, really. I feel like sometimes school and what you do at home are just two different things. What you do at school is more helpful for future careers whereas what we learn at home is more useful for everyday life.

P6 replied:

> It feels like it’s not valued by the teacher because you couldn’t show your knowledge in the lesson or anything [...] I get out of school, and I do spend a lot of my time on computers and stuff. So, it would be quite cool if I could show off my knowledge at school in a way and get some recognition for it [...] In school, I feel like I can’t really use my abilities as much because my abilities are much more online and much more tech. You can’t really use, like tech, and go online and stuff. In things like ICT, I can use it but not in other things.

P1, who strongly agreed that her digital skills were accommodated in her school learning, explained that even so, “it’s a little bit more closed in school” as she still had to operate within the boundaries of her lessons.

While all participants expressed confidence that they had the digital capabilities to pursue their own learning and sharing of information, not all agreed that their school curricula drew upon or recognised these skills. Responses to this ranged from expressing that their digital capabilities were somewhat accommodated in school, to wishing that it were so, to frustration that it was not.

4.4.1.5 Feeling the fit

When participants perceived that their identity and needs matched those of their peers, or that their contributions were valued by them, they tended to engage more. All participants responded Agree (P5) or Strongly Agree (P1, P2, P3, P4, P6) to the statement '*In my online friendship groups where we share information about what interests us, I feel that my friends value what I share.'* P2 evidenced this with peer feedback: "Strongly Agree because they always say, "Good job," "Carry on the work," I feel happy about that because I feel that I've done a good job." In Section 4.4.1.3, I discussed P3's feeling shared passions with her peers, that they appreciated her contributions and that this motivated her to "do more." P4 reported similarly on feeling that friends valued what she shared: "It makes you feel very listened to and heard, and that's a good feeling." P5 explained that "It makes you feel important, that at least, people care about what I'm sharing."

All participants responded Agree (P6) or Strongly Agree (P1 - P5) to the statement '*In my online friendship groups, I feel that I can fully use my abilities.'* P1 stated that this made her feel "Very helpful" and "inside" her peer group. P3 expressed that this "makes me feel good because it reminds me that my skills aren't […] going to waste. I get to use them in real life experiences." P4 reported that using her abilities in her PLN, along with experiencing the "similar but different" abilities of her peers made the experience "more dynamic." In comparing school learning with "at home" (i.e., PLN) learning, P6 reported, "I think I prefer at home where I can use all my abilities [...] If I spend my time learning them, I feel like I want to be able to use them [...] to show them off."

The participants' responses indicated both a needs match (appreciation was "a nice thing to have," as were feeling "listened to," "good," "helpful," "inside," "heard" and that "skills aren't [...] going to waste") and an identity match (participant's perceptions of the way they learned, also perceived similar to their peers' – "interactiveness *(sic),*" "dynamic"). This contributed to the experience of positive fit between participants and their PLNs.

In summarising this section on Identity Affirmations, participants revealed the tendency to engage more where experiences were perceived to affirm their identities, goals, and aspirations, and/or meet their needs. They were seen to engage less, or to disengage, where they did not perceive this fit.

4.4.2 Personal motivations

This theme, still under Internal drivers, consists of participants' reasons for pursuing the interests they enumerated in their PLNs. Codes in this category were: Interest, Funds of knowledge and Participants' values and goals. 'Interest' here refers to personal motivation, different to 'interests' in the preceding section which refers to participants' activities or pursuits.

4.4.2.1 Interest

When asked why she went online to learn about coding, philosophy, and science, P3 described them as "just topics that I'm interested in." She explained, "I generally just like the topics and I like that I can seek out parts of it that I otherwise wouldn't be able to in school." P1 described engineering, science and design and technology as subjects she was "interested in." P5 said he engaged in his PLN because he was interested in "current affairs, hearing others' opinions and gaining new perspectives." In all these instances, intrinsic interest was a reason for engagement.

4.4.2.2 Funds of knowledge

In Section 4.4.1.4, I discussed FoK as assets brought by the participants to be used in their PLNs. In this section, FoK are one of the reasons why participants create and/or participate in PLNs. P6 expressed dissatisfaction with not being

able to “show off” his digital skills in school. He was excited, however, that he could use them to help himself and others in his PLN. He explained, “Usually, I give advice. It’s more to my friends, like how to do stuff because I’m better than them at Minecraft and stuff. And I’m better with computers in general. So, sometimes, I help my friends.” On how this made him feel, he replied:

> I think it’s quite cool, teaching them things about what I know and they’re actually taking it in and valuing it and learning it. It’s cool because my friends are listening to me and properly trying to do what I’m saying because they’re trying to complete tasks that maybe I know how to do, but they don’t.

Similarly, P3 described herself as a “helper” and “sharer” and, “my friends know me as a type of person who’s always reading something or some bit of information. So, I have a lot of general knowledge.” She expressed enjoyment of helping others learn in ways that suited them because this was something she also struggled with:

> I like the fact that I can help people learn in ways that suit them. Similar to how I learn […] it feels nice knowing that I helped somebody learn something that maybe they wouldn’t otherwise know about or would have a harder time learning about. It makes me a lot happier to engage in these friendship groups […] It makes me want to engage more.

Both P3 and P6 expressed enjoyment of being able to contribute their FoK to their PLNs. Their motivation went beyond helping themselves with their digital capabilities (Supplementary Fit). They were motivated to continue engaging through giving of what they had (Complementary Fit).

4.4.2.3 Values and goals

P1, P2 and P4 mentioned goals they were working towards via their PLN participation. P1 aimed to pass school tests (“…in tests, Light often comes up in questions. And when I don’t understand something, I want to learn it”). P2 set out to “make music” and achieved this by the end of the study. P4 was motivated by the desire to “start a business.”

Other participants, such as P3, were vocal about their values. P3 made strong assertions about her desire to learn in her own way.

> When it comes to learning something, I don't like having to stick to strict criteria set by somebody else. I like to research things in my personal way, because then I gain an understanding or liking of the topic I would not be able to get if I was to do it on somebody else's terms.

P2 expressed a preference for group learning, stating, "when I'm doing something with a group, we can all share our answers."

In addition, all participants expressed the value of equality in their PLNs. P1 stated that she "would prefer to learn things in a group of friends or just classmates because we're all on the same level […] there isn't this one person that would just be at the top." P2 expressed that it "wouldn't be fair" to appoint a leader in her WhatsApp group, preferring that all should be "equal" instead. P4 said of her Snapchat group, "Everyone listens to each other equally. And we're adding each other's information, and we value each other as people. So, when someone's saying something, you say, OK, yeah, tell me more." Of the equality he enjoyed in his PLN, P5 stated,

> It just feels like everyone is valued and there is no hierarchy, or like who's more important, or whose say is more important than any others' […] if it's equal, then no matter what I say, I will always know that my opinion is valued, or people would take my opinion in a good way. Whereas, in a hierarchy, then depending on if I'm at the top or the bottom, then people will take it in different ways. If I'm at the bottom, then people won't care what I have to say.

P3's sentiment matched P5's, reporting, "It's nice because there isn't a power dynamic. Everybody being equal means that there isn't somebody who dominates or is talking over people or is not listening to what somebody is saying."

Similar to Identity affirmations, Personal motivations were seen to be strong, intrinsic drivers of participants' engagement.

4.5 Environmental drivers (EDs)

These were found to be features that the participants, consciously or unconsciously, had built into their PLNs that supported their needs. The data suggested that because of their negotiated (and continually negotiating) identities and personal motivations, the participants built (and continued to build) these features into their PLNs to support who they perceived themselves to be (identity) and what they aspired to achieve (aspirations).

Table 4.3 *Environmental drivers*

Categories	Themes	Codes
2.ENVIRONMENTAL DRIVERS Factors participants had built into their PLNs that supported their needs therein. Autonomy facilitates engagement (Eccles & Midgley,1989; Eccles et al., 1993). Agentically engaged learners create supportive learning environments (Bandura, 2001; Reeve, 2013; Reeve & Jang, 2022).	**A. NETWORK RESOURCES** Assets participants accessed, created, shared and/or facilitated to support their needs.	1. Web resources 2. Relevance 3. Access/accessibility 4. Equality 5. Positive community experiences 6. Trust and security
	B. LEARNING PREFERENCES – Ways participants preferred to learn in pursuance of their needs.	1. Social learning 2. Autonomy 3. Interactivity

In other words, while engagement was found to be driven by factors from within the participants themselves (IDs), it was also found to be facilitated by these environmental drivers (EDs). Based on the two separate patterns of meaning I identified within the data, I have grouped these (EDs) into Network resources (NRs, features supporting participants' needs in the network) and Learning preferences (LPs, ways participants prefer to learn). Table 4.3 shows the relationship between NRs and LPs which both make up EDs. These are unpacked in the following sections.

4.5.1 Network resources

4.5.1.1 Web resources

These were found to be assets that participants accessed, created, shared and/or facilitated to support their needs, whether these were participants' own needs or the needs of their peers. These assets included websites, web files and pages, wiki pages (wikis), web applications (apps), supportive peers and their relationships with them, online communities and platforms, and the affordances these provided, all mediated by the Internet.

P1 reported:

> I'm very interested in engineering and science and design and technology. So, often, I would go on websites, or go on YouTube and see YouTube channels where they build a safe, or a catapult or something along those lines [...] The other day, I hadn't understood how light works, how light travels and how it casts shadows. My friends weren't exactly sure how to explain it, so they said it was on BBC Bitesize. I went there and read it and I now understand it.

P1 mentioned enjoying social learning with her peers, pointing out that they helped her to understand academic English.

> So, if you're using a scientific term that I don't understand because English is my third language, then I could ask one of my friends. Or if there's something about the science that I don't understand, I have friends that I watch videos with that would help. If one of us is stuck on something, then we can ask each other.

Besides visiting websites, apps, and online resources, P1 mentioned sharing information with peers via text messaging, stating, "I asked one of my friends in a text." P1 not only received help from her peers, she also gave it. From a selection of roles - content consumer, content sharer, helper, social user, private user, joiner, or starter of online activities - P1 self-described as 'helper.' P1's PLN included 5 peers. She mentioned sharing "similar interests on similar topics" and sharing "different interests on same topics." Describing the peer support she received, P1 used words such as, "Yes, her (Friend L)! She knows

perfectly!" "I look up to her (Friend S)! She's really smart." "Someone to go to (Friend I), the person for answers. If she doesn't know, she will signpost. Always has an answer." "Would say it all, pull out the dictionary. I wouldn't have any further questions (Friend I)"

P2 gained validation from her WhatsApp peers ("Good job...Carry on the work") and used YouTube videos to learn "beats making." P5 reported using Snapchat to build community around discussing current affairs, sharing opinions, and gaining new perspectives. He stated, "In different groups, its different things. My main group is mostly what's big on social media or what's big happening in the world." He mentioned finding it "Helpful to hear others' opinions. Might hear something I've never heard of before, new knowledge."

4.5.1.2 Relevance

In Section 4.4.1.3, I discussed Perceptions of relevance as an Internal driver for engagement. Participants were seen to engage when they could perceive relevance. Then, as they engaged in relevant pursuits, they contributed to maintain the relevance. As each participant contributed relevant content, the PLN fulfilled its function. In other words, they came in search of relevance, they found and enjoyed relevance and they continued contributing relevance, so that the PLN stayed relevant, promoting continued engagement. This is illustrated in the following conversation extracts between P3 and me.

> OE: What do you do on Discord?
> P3: I join servers that offer specific interests. Or I have friends on Discord that share my interests. So, we discuss them if it's not a specific server for that interest.
> OE: So, what draws you to keep going back to them?
> P3: I like the interactiveness (sic) with it. I like the fact that I get to speak to other people, hear what other people have to say, but at the same time learn information in a way that suits me more than, say, reading from a textbook at school or written down information.
> OE: Do you ever contribute information to any of these platforms?

P3: Yes, when my friends are interested in something that I know about, I usually tell them about it. I will also send links to articles or books they can read.

OE: So, you don't only go to receive information, you also contribute. Is that correct?

P3: Yes

In addition, P3 reported creating and uploading examination preparation resources to the platforms where she participated to support others who liked to learn as she did. She began with a need to learn autonomously, and she made this happen for similar others by contributing to the PLN.

4.5.1.3 Access/accessibility

This is the means or ability to reach and utilise people and resources and/or how easy it is to reach and utilise them. By creating, curating, and sharing their FoK within their PLNs, the participants built access and accessibility into its architecture. Even when participants accessed platforms and resources outside their ego-centred networks, then shared them within these networks, they helped to make these external resources accessible or more accessible to their peers within their PLNs. This included choosing to host their PLNs on the Internet, thereby granting and gaining access to peers and resources.

P2 remarked:

> The Internet is helpful because it knows everything. You can search what it knows. Being able to search for things online, find information and make beats makes me have courage because if the teacher calls me to do something, I know I can do it.

P4 stated:

> When it comes to social media or the Internet, we have a lot of access to a lot of things that can be very useful to us. It's very quick, simple, easy, if I'm thinking, oh, how do I do this, I know I can just go straight to my phone, or my laptop and it will be there Whatever you want to do, it's just out there. There's a way that you can find it.

P2 was the creator and administrator of her WhatsApp group, reporting that she "added or removed people." At the time of data collection, she mentioned removing one member due to inactivity, thereby exercising control over access to the group.

4.5.1.4 Equality

The participants talked about equality in their PLNs which indicated perceptions of members being the same or different in status, rights, or opportunity. Participants appeared to value this highly. For some, it was a prerequisite for joining or engaging in a PLN.

In creating and administering her WhatsApp group, P2 set it up such that "all members are equal" rather than allowing anyone to be a leader. She expressed that

> Everyone is treated good. They won't choose someone to do something just because they think you're better than everyone else. I feel happy because no one will feel upset. If someone did that [i.e., appoint a leader], it wouldn't be fair.

On whether she could ever be the leader of her own WhatsApp group, she replied, "No, it wouldn't be fair. They are all older than me. I only add or remove people."

P1 reported that she "would prefer to learn things in a group of friends or just classmates because we're all on the same level…there isn't this one person that would just, like, be at the top." P4 said of her Snapchat group, "Everyone kind of listens to each other equally. And we're kind of adding each other's information, and I said we value each other as people. So, when someone's saying something, you say, OK, yeah, tell me more." Of the equality he enjoyed in his PLN, P5 stated (see Section 4.4.2.3) that it was important to feel equally valued, with the same status, rights, and opportunities as other members, and without a hierarchy that could possibly marginalise some.

All participants valued equality and expressed dislike for a power structure in their PLNs. Those in a position to enforce it, such as P2, did so.

4.5.1.5 Positive community experiences

Participants were seen curating the kinds of experiences they wanted in their PLNs in 'for us, by us,' fashion. These included interactivity and social learning, subject leadership, agency and autonomy, reliability, and trust and security. These findings are presented in the rest of this section.

Interactivity and social learning

Participants enjoyed the interactivity afforded by their chosen platforms. Therefore, rather than solely static platforms and sources of information, they made use of interactive ones where they could learn socially with their peers, the way they liked to learn and in keeping with their self-identity, as discussed in Section 4.4.1.

P1 stated,

> Whenever one of my friends or I share something, we comment on it as soon as we can, and we ask questions. They usually reply immediately. Or if not, then, like, soon. And they ask questions. Or they comment on it, like, "Yeah, I agree," or, "Yeah, that's interesting." And then, there's, like, a 30-minute discussion.

P2 reported "When I'm in a group, it helps me learn because, well, I'm doing something with a group, so we can all share our answers." On how group learning helped her learn, she explained, "Because people talk back. They ask how you did it and tell you what to do to improve." In addition, she reported benefiting from the metacognition that social learning afforded her: "When I'm explaining, I can see the steps. When I do it myself, I don't think about it." P3 noted, "I like the interactiveness (sic) with it [...] more than, say, reading from a textbook at school or written down information." Recognising their need for interactivity and social learning, participants built this feature into their PLNs. They achieved this by incorporating platforms such as WhatsApp, Discord, YouTube, Instagram, Snapchat, TikTok and various online servers and wikis.

These afforded the agency and opportunity to ask questions and receive responses, and to connect with others to create, curate and share information.

Subject leadership

While all participants wanted equality in their PLNs, some accommodated leadership roles in which peers who were stronger in an aspect of learning took the lead in discussing and curating content around it. P1 reported,

> There are people that we would go to when we need help. Either for a specific interest, or leader for a specific person [...] because they look up to them or they know each other better [...] It feels like everything is kind of balanced. Everyone in my friendship group, including me, has one or two specific areas where they are really good. So, in a way, we're all kind of leaders.

P3 had a similar experience, reporting, "If somebody knows more about a topic than another person, obviously, they'll take a kind of leader role and explain it to everybody else...but otherwise, yes, everyone is equal."

Agency and autonomy

Describing her PLN experience, P2 reported,

> I get to do all the computer work. I decide to click this button or that button [...] I get to do stuff that I like. In school, I am doing stuff that I like but the teachers get to decide what they want us to do.

All participants expressed the importance of and their need for having the agency and autonomy to pursue their personal interests and to learn in ways they considered suitable to themselves.

Reliability

P2 reported of her peer, Friend A, "I know I'll ask her, and she'll answer me the correct way. I feel happy about this because I know she'll be there, and she'll answer the correct thing." On the other hand, P2 removed another friend from her WhatsApp group because she "never says anything. She won't even notice that I've removed her."

Trust and security

Trust (and the resulting sense of security) was discussed in Section 4.4.1.2 as an identity affirming factor (characteristic of participants) that supported participants' engagement. Here, under Network Resources, it is a feature that participants have built into their PLN operations and architecture (characteristic of the environment) because of their personal need for it. In other words, the participants expressed their value of trust and security, therefore, they built trust and security features into their PLN operations and architecture. For example, this was indicated in some participants' responses to Question 6 in the questionnaire (see Appendix B2) where they selected 'I'm private – I only connect with a few friends online that my parents/guardians approve of (P2, P4 and P6). It was also evident in the aspects of their ego-centred network participation that occurred within private members-only groups e.g., on WhatsApp, Discord and Snapchat.

As a result of these security features, participants were able to interact in trust-based relationships and spaces in ways that affirmed their identities and supported their needs. In addition, P6 mentioned being careful to avoid computer malware so as not to jeopardise the security of his computing devices, reporting visiting, "only really specific channels, not any video that looks like it's gonna just trick me into ruining my computer." P1 reported that "everybody I talked to online is somebody that I know personally." When asked her reason for this, she explained:

> On a computer, you can't really see the person and you don't know whether they speak the truth or not. So, it's just easier to trust somebody you know. You don't know what the person's intentions are.

These Network resources, consisting of Web resources, Relevance, Access/accessibility, Equality, Positive community experiences, and Trust and security, all served to support the participants' needs in their PLNs. Where these needs were supported, participants continued to engage. Where it appeared that they were not supported, participants engaged less or disengaged.

4.5.2 Learning preferences

These were found to be ways in which participants preferred to learn in pursuance of their needs. They included social learning, autonomy, and interactivity. As discussed in the preceding sections, all participants expressed a preference for social and interactive learning.

P5 and P6 reported the resulting enjoyment of diverse perspectives, new knowledge, re-evaluation, and growth, as illustrated in the following text and drawing extracts. P5 expressed interest in “current affairs, hearing others’ opinions and gaining new perspectives,” describing the experience as “Helpful to hear others’ opinions. Might hear something I’ve never heard of before, new knowledge.”

Regarding autonomy, P3 explained:

> It makes me feel more passionate about learning than if I were to stick to a strict format [imposed by someone else] because then I get to explore different topics in ways that make me engage more, or I find more interest in. So, it makes me more enthusiastic about learning than if I were to follow [someone else’s] strict format.

During her D&T session, P3 provided the following drawing (Figure 5), illustrating what she considered to be her optimum learning conditions. An excerpt of our ensuing conversation follows.

Figure 5 P3's annotated drawing of an enjoyable learning experience

Key provided by P3: **Green** [in thought bubbles] = Feelings, **Brown** [with arrows] = Actions, **Black** (in quotation marks) = Thoughts/ Words, **Red** = [stick figures, laptop] Illustrations of me, **Purple** = [along bottom of picture] Platforms visited

OE: What does "happier" (in the picture) mean?

P3: [Explains] I tend to be more interested when listening to people speak on their perspectives or listening to a podcast or things like that.

OE: What does "Challenging views" mean?

P3: Being introduced to information that challenges previous views or ideas or assumptions I had before.

OE: When your ideas and assumptions are challenged, what does it do for you? What happens?

P3: I usually re-evaluate my ideas. So, I either come up with ways of saying, this is wrong because..., or I don't agree with this because. Or I may even end up changing my views.

OE: When you change your views, what does that lead to?

> P3: I usually just gain a new perspective. I might take a different approach. For example, what I read and where I read from, it might change my focus on what I'm reading.

Affective engagement is indicated in P3's description of "happier." "Challenging views," "focused," "re-evaluate" and "gain a new perspective" indicate cognitive engagement. Her participation implies behavioural engagement. The contextual conditions perceived by P3 to promote this engagement are mentioned in her extracts - social learning, autonomy, and interactivity.

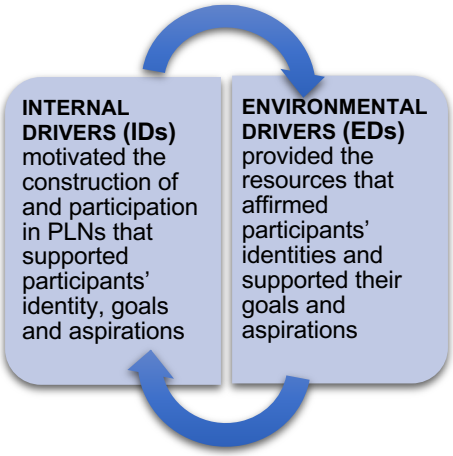
While participants expressed desire for equality among PLN peers, they were happy for some to take the lead on the subjects they knew best (see Section 4.5.1.5).

Drawing together Sections 4.4 (Internal Drivers, IDs) and 4.5 (Environmental Drivers, EDs), the data illustrate a cycle of support which facilitated participant engagement. This is discussed in the following section, 4.6.

4.6 Cycle of support (CoS)

As has been presented in Sections 4.5 and 4.6, and is now illustrated in Figure 6, participant engagement was seen to flourish when participants' IDs were supported by their EDs and vice versa.

Figure 6 *Cycle of support between IDs and EDs*



Participants presented as self-aware of these IDs, even though they may not have identified them as such. With this self-awareness, they built these specific EDs into their PLNs to enable them to continue to engage in the learning environments they desired (see Appendix C11, Example participant reflexions). For as long as the EDs facilitated the IDs, the CoS continued, and engagement flourished. However, at various points during data collection P2 and P3 each removed a friend from their PLNs as they perceived these friends (whose relationships had once constituted network resources) to no longer be a fit (a form of disengagement). In this way, P2 and P3 both acted to restore the CoS.

4.7 Other findings of interest

All participants expressed to some degree the opinion that their digital skills were not fully utilised, valued or accommodated at school but could be put to fuller use in their out-of-school (i.e., PLN) learning. P1 explained that while she felt she could use her digital skills at school, “It’s a little bit more closed” as she still had to operate within the teacher’s schedule. P6 reported that “Digital skills matter less at school and more at home.” P4 reported being unable to “use the abilities that I am more passionate about…in school in the way that I would like.” Of this situation, P3 commented, “I’ve adjusted to the system...even though I might not enjoy it.” This apparent mismatch between the participants’ digital FoK and their school curricula has been explored in Chapter 2 and is discussed further in Chapter 5.

While participants were seen to value equality, they were happy to have subject leaders who remained equal in status, rights, and opportunities. In comparing the impact of such a power differential in their PLNs (peer to peer) and in their school settings (teacher to student), P5 expressed that in the school setting, he was happy to learn in a teacher-directed environment if he felt that he had some autonomy and that his opinions and contributions were regarded by the teacher. P1 explored both merits and demerits of having more knowledgeable others (MKOs) in her PLN. She expressed that MKOs could contribute much needed support and information however, they could be alienated from those they are supporting. She stated:

> It can be helpful because that would be the person you would go to when you need help. But it may be hard for them to explain to you because when you're on the same level, you understand more easily how the other person thinks. So, if somebody's above your level, they might not explain it in a way that you would understand.

On such power differentials, P3 expressed dislike for what she described as feeling "dominated" by others in her learning spaces. Power differential and its impact on engagement have been explored in Chapter 2 and will be discussed in Chapter 5.

4.8 Summary

PLNs are both structured by participants and structuring of them. Internal Drivers led participants to structure their PLNs to fit their needs. The PLN, thus structured, supported and structured participants (via Environmental Drivers) as they participated in the PLN, hence it became a Cycle of Support (CoS). If the PLN (environment) matched participants' needs (Internal Drivers), i.e., there was a fit between the participant and their PLN and they continued to engage in it. All participants described their PLNs as spaces that supported their identities, goals, and aspirations, maintaining the CoS.

Chapter 5: Discussion

5.1 Introduction

This study seeks to identify the contextual factors supporting engagement in the personal learning networks of six 10- to 16-year-olds in England and to understand how these factors supported their engagement. In Chapter 4, I presented this inquiry's findings. This chapter unpacks these findings using the theoretical and conceptual lenses discussed in Chapter 2 to present this study's central argument, with its implication discussed in Chapter 6.

I begin this discussion by responding to the study's research questions in Section 5.2. In Section 5.3, I discuss further insights arising from the data alongside relevant theory and literature.

5.2 Response to the research questions

I respond to the sub-RQs first. I then conclude this section by drawing together the findings from the sub-RQs to respond to the overarching RQ.

5.2.1 How are participants connecting in their PLNs? (RQ1)

All participants reported that they were connecting with friends they knew offline, such as schoolmates, neighbours, and friends of older siblings. Some participants (P1 and P3) reported sometimes communicating with people they had not known before, whom they met on online platforms. Other participants (P2 and P4) reported connecting only with people they already knew and those their parents or guardians approved of.

The reasons participants gave for connecting with others online were: seeking help with schoolwork, for entertainment and for challenge (P1); to ask questions about homework when they needed help (P2); to learn a hobby, to gather information about interests and to socialise (P3); to conduct business research, for driving tips and to look at real estate (P4); to play games, share information and to follow and discuss current affairs (P5); and to get information from

forums (P6). Participants' connections were a mix of individual and collaborative (i.e., individuals learning by themselves vis-à-vis collaborating to learn), and weak and strong (i.e., one-off, or infrequent connections with people they do not know or barely know vis-à-vis frequent connections and/or with people they have formed friendships with). The reasons given for participation align somewhat with Ito et al.'s "hanging out, messing around and geeking out" (2010, p.63) in which participation ranged from recreational to knowledge creation and knowledge action to intense engagement with technology. They differ from the findings of Hakkarainen et al. (2015) who argue that most Western young people fall within 'hanging out' for social connection. This could, however, be attributed to this study's recruitment criteria which specified that participants must be those who use technology to connect for learning purposes.

Regarding Eccles and Midgley's findings of adolescents' changing physical, social, and psychological characteristics at this developmental stage (1989), I explored whether participants' ages might influence their participation. In some ways, it could be argued that it did. For example, P4, who was 16 years old, engaged in conducting business research, looking for driving tips and looking at real estate. P5, also 16 years of age, engaged in gaming, sharing information, and following and discussing current affairs. P2 (10 years old), sought help with homework and hobbies. This is further unpacked in Section 5.3.3.

Participants connected using a range of devices. They reported using laptops, mobile telephones, iPads, desktop computers, a smart television, and games consoles. Platforms visited were YouTube, BBC Bitesize, Kerboodle, WhatsApp, Google search engine, Roblox, Swiggle, Discord, Instagram, various blogs, and wikis, TikTok, Snapchat and Minecraft servers. Participants connected with individuals, groups, platforms, and resources. This diversity aligns with the findings of the Organisation for Economic Co-operation and Development (Burns & Gottschalk, 2019b) which reported that children and young people connected on a range of devices and platforms.

The platforms visited indicated that participation was mainly for educational, recreational, organisational and social purposes. Participants selected the following questionnaire options indicating the roles they played in their networking experience: helper - I help others online, e.g., I answer questions or give advice (2 of 6); consumer - I read, watch, listen to or join activities online (5 of 6); creator - I make things and share them online, e.g. a photo I took, something I wrote or a video I made (1 of 6); private - I only connect with a few friends online that my parents/guardians approve of (3 of 6); starter - I start things and others join me or read/watch/look at/listen to what I post (1 of 6); sharer - I share things I find with others (2 of 6); joiner - I join things that others have started (2 of 6); and social - I like to meet up with others online (2 of 6). This range again aligns with Ito et al.'s "hanging out, messing about and geeking out" (2010, p.63). Interestingly, even though P3 created and shared study resources that had helped her during her examinations, wanting to help others who learned as she perceived herself to do, she did not describe herself as a creator, helper, or starter. Also, P2, who wrote a rap song, created the music and an accompanying music video, and shared this on YouTube, described herself as a creator but not as a sharer. All but P1 indicated that they were consumers, even though P1 frequented several platforms to gather information about topics that interested her.

All participants reported having digital skills and were happy to have them. They reported using these skills to learn as they wanted to and that this made them feel independent, empowered, abreast with their peers and equipped for life. This sense of autonomy, connectedness and self-efficacy aligns with the satisfaction of stage-specific developmental needs as highlighted by Eccles and Midgley (1989) and Zimmer-Gembeck et al. (2006). This also represents a match between the participants' FoKaI and their PLNs (t'Guilde & Volman, 2021), supporting Stage Environment Fit and further engagement (Eccles & Midgley,1989; Eccles et al., 1993; Symonds & Galton, 2014; Symonds & Hargreaves, 2016).

Participants reported that they were encouraged to connect and engage in their PLNs as they were among others like themselves, who shared their interests and personal characteristics. P1 reported that this similarity resulted in a shared language, which facilitated shared understandings. She especially found this helpful as a learner of English, studying in English, her third language. P1's experience reflects connectedness and a sense of belonging, which can lead to SEF (Eccles & Midgley,1989; Eccles et al., 1993; Symonds & Galton, 2014; Symonds & Hargreaves, 2016) and contribute to self-determination (Deci & Ryan, 1985, 2016; Reeve, 2012). Her learning with and from similar peers aligns with Bandura's peer modelling (1986, 2001; Schunk & Usher, 2012), part of the social cognitive learning process found naturally in informal learning. Following Bandura's perspective, P1's peer models, who are more proficient English speakers, were able to decode the learning from its original source (e.g., a teacher or a text), then encode it in their shared language for P1's consumption. A person without this shared language would not be able to facilitate this decoding and encoding. This underscores the importance of trust-based relationships and peer-to-peer support in social learning.

Interestingly, as has been established in Chapter 1, informal learning is "the dominant way of knowledge-building" (Jagušt et al., 2018, p.418) and 70–80% of learning takes place spontaneously, unintentionally, and informally (Latchem, 2014; Livingstone, 2001; Osborne & Dillon, 2007; Rajala et al., 2016). I would therefore argue that learning from and among similar others is part of the natural, informal learning that humans do. Therefore, this would facilitate engagement and learning in an informal setting such as the participants' PLNs.

P2 and P3 reported a parting of ways with peers in their networks who later developed different interests and values or failed to reciprocate their friendship. This suggested irreparable breakdown in the peer modelling relationship and in reciprocal causation (Gonzalez-DeHass & Willems, 2013), leading to disengagement.

5.2.2 How do participants describe their PLN experiences? (RQ2)

Participants reported feeling a sense of empowerment, independence, freedom, and autonomy with their digital skills and being able to help themselves with these. Again, this sense of autonomy and competence feeds self-determination (Deci & Ryan, 1985, 2016; Reeve, 2012). Participants expressed feelings of belonging and connectedness with peers who shared the same or similar interests, in line with Bandura (1986, 2001; Schunk & Usher, 2012), Eccles and Midgley (1989) and Symonds and Galton (2014). Some peers were described as helpful, reliable, dependable, supportive, and knowledgeable. Others provided social benefits, such as being a "chat reviver" (P3) or being "good to talk to" (P1 and P3). P4 felt "valued," "listened to" and "heard" amongst her peers. Participants expressed appreciation for the differences in interests and experiences among their PLN peers, stating that these could be helpful for the learning value they provided. This aligns with Hodgson and Reynolds (2005), Hodgson et al. (2011), Jones (2015) and Ozturk and Hodgson (2017) who highlight the learning opportunities that can result from difference.

The participants described the Internet as a vast source of information and helpful learning resources. Participants were able to search for and find information and experiences they considered relevant to their present and future lives. P4 described using the Internet to find information as "Quick, simple, easy. If I'm thinking, oh, how do I do this? I know I can just go straight to my phone, or my laptop and it will be there." P2 said of the Internet, "The Internet is helpful because it knows everything. You can search what it knows." Online platforms were recognised as places to extend knowledge through interaction and shared resources. These align with the mediating role of the Internet as put forward by EU Kids Online (2014) and Jones (2015). It also aligns with Burns & Gottschalk's (2019b) and Ito et al.'s findings (2010) regarding how children and young people are using the Internet.

Online interactions provided validation for some as their peers celebrated their successes with them and valued their skills and expertise in the digital world. This was especially so for those who had a less satisfying school experience,

such as P2. P2 expressed that her peers often responded to her contributions with “Good job” and “Carry on the work,” which made her feel happy that she had done a good job and encouraged her to contribute more. This reinforcement of rewarded behaviours aligns with Bandura’s reciprocal causation (1986, 2001; Gonzalez-DeHass & Willems, 2013; Schunk & Usher, 2012) and Ito et al.’s peer validation resulting in “geek cred” (2008, 2010, 2013). All participants mentioned feeling increased self-efficacy because of having the autonomy and agency to help themselves with their digital skills and competencies. For example, P1 explained regarding her digital skills, “It just makes you feel like you can really figure out anything that’s really interesting.” Self-efficacy was further boosted by peer affirmation as participants achieved goals that they had set for themselves (such as P2 whose peers responded with “Good job” and “Carry on the work”). These findings align with Bandura’s (1986, 2001; Schunk & Usher, 2012) reasoning that self-efficacy leads to motivation, and increased motivation can lead to increased engagement.

Participants reported valuing the sense of equality that they felt in their PLNs. Some enjoyed feeling that everyone was ‘equal’. Others enjoyed having more knowledgeable peers serving as ‘subject leaders’ in their areas of expertise and that everyone got to be such a subject leader. A sense of equality is noted in the literature as both a feature of successful NLCs and a driver of NL (Hodgson et al., 2011; Jones, 2015). The opportunity to share one’s expertise in a NLC, where such contributions are appreciated, can foster Complementary Fit (Boon & de Hartog, 2011). Both factors (sense of equality and experience of CF) are possible drivers of engagement.

Overall, the participants described positive PLN experiences, with several features which are noted in the literature to drive PEF, SEF, CF, SF, self-determination and thereby, engagement.

5.2.3 How do participants compare their experiences of formal school-based and PLN learning? (RQ3)

P1 reported enjoying school as much as learning in her PLN. However, she expressed that her digital competencies were accommodated in "closed" ways, or with limitations, in school. Other participants reported that they did not feel that their digital skills and competencies were accommodated in their school learning (P2-P6) or that this accommodation was "not as much as at home" (P2). P5 reported that this made him feel "limited". On the other hand, they all expressed that they were able to use these skills and competencies in their PLNs in ways that made them feel free, empowered, independent, autonomous, and validated. This echoes the findings of Ito et al. (2010, 2013), Samela-Aro et al. (2016) and Hietajärvi et al. (2020) who all agree that accommodating digitally engaged young people's digital competencies in learning environments can foster SEF, and thus, learning engagement, and that denying them can hinder SEF and foster disengagement.

Participants reported that school learning was mostly teacher-led, while their PLN learning was self-directed. They reported that, as a result, they perceived much of school learning as irrelevant to their present and future needs (see Sections 4.4.1.3 and 4.5.1.2). In contrast, they decided what to learn and how in their PLNs based on their interests, learning preferences, goals, and aspirations. This made them perceive their PLN learning as relevant (see Section 4.5.2).

Engagement literature notes that autonomy and the perception of relevance and relatedness foster engagement, just as the lack of autonomy and the perception of irrelevance and unrelatedness foster disengagement (Symonds & Galton, 2014; Symonds & Hargreaves, 2016). Where relevance/relatedness and autonomy are experienced, PEF and SEF are facilitated as individuals self-select into such self-validating and empowering environments (Allen et al., 2021; Eisenbach & Greathouse, 2020) and the developmental needs of adolescents are met (Eccles & Midgley, 1989; Eccles et al., 1993). Taken together, this offers a plausible explanation for the participants' feelings that

much of school learning was irrelevant to their present and future needs but that their PLNs met these needs. It also provides insight on why an adolescent might begin to disengage from school learning at this developmental stage when the agentic self is emerging and find better SEF in digital communities and PLNs where autonomy and self-determination are facilitated.

Participants reported that they chose similar others as learning partners in their PLNs but did not have the option to choose who they learned with in school. Drawing on Bandura (1986, 2001; Schunk & Usher, 2012), social cognition is facilitated by modelling on similar others. It therefore follows that the participants' PLNs supported their natural ways of learning with peer models (see Section 2.3.2.1). Participants reported that the similarities they shared in their PLNs engendered feelings of trust and safety, a sense of belonging and connectedness, shared language which facilitated communication and a dynamic and interactive learning experience. These are all hallmarks of effective NLCs that foster NL. The participants expressed that these PLN features caused them to engage further in their PLNs while the absence of these features caused them to be guarded in, or frustrated with, in-school learning.

P3 expressed feeling bored and frustrated in school as she perceived that she was not allowed to learn according to her "learning style." This is similar to Salmela-Aro et al.'s school cynicism and boredom (2016) and Hietajärvi et al.'s (2020) denial of 'digital learning preference' and 'wish for digital schoolwork.' It also suggests the non-acknowledgement of P3's FoKaI (t'Guilde & Volman, 2021). P3 described the experience of being hurried to follow her teachers' agenda and not being allowed to "dally" into her own interests. Again, this illustrates the importance of self-direction, or self-determination, to adolescent engagement (Deci & Ryan, 2016; Ryan & Deci, 2017; Eccles & Midgley, 1989; Eccles et al., 1993; Symonds & Galton, 2014). When it is lacking, engagement declines. On the other hand, P3 expressed that she was able to follow her own "learning style" in her out-of-school PLN, to learn at her own pace and with people of similar interests. This illustrates the opportunity for SEF (Eccles &

Midgley, 1989; Symonds & Hargreaves, 2016) and Bandura's peer modelling (1986, 2001; Schunk & Usher, 2012).

Other participants expressed similarly. P5 compared his school and PLN settings, explaining that in his view, school and home learning were "two different things." He expressed that school learning was helpful for one's career, while his autonomous learning at home was "more useful for everyday life." He concluded that he did not have the opportunity to use his out-of-school learning in school and that he disengaged from school learning that he did not consider relevant. P6 reported that his digital competencies were not given much expression in school and expressed a preference for out-of-school learning where he could use his digital abilities. These findings align with those of t'Guilde and Volman (2021) on the relevance of incorporating CYP FoKaI in school curricula, thereby improving SEF, which enhances engagement (Eccles & Midgley, 1989; Symonds & Hargreaves, 2016). As found by Hakkarainen et al. (2015) and Hietajärvi et al. (2020), and as established by Deci et al. (1991) and Ryan and Deci (2000), without such a connection between FoKaI and school learning, engagement is threatened, and the risk of disengagement increases.

Overall, most participants (P2-P6) did not compare their school learning favourably to their PLN learning. They reported a preference for the autonomy, relevance, self-efficacy, and connectedness they experienced in their PLNs over the restrictions of teacher-led instruction and school curricula where they did not feel that their digital competencies were accommodated. It could be argued that the participants' PLN engagement was driven solely by their academic interests. While some participants did mention these as motivations, others (P2, P3 and P6), expressed varying degrees of disillusionment with school and P5 indicated more social interests. Overall, when asked what kept them returning to their PLNs, participants mentioned the factors enumerated in Section 5.2.5.1. Also, see participant reflections in Appendix C11. When analysed thematically, these factors constitute the supportive factors named in Section 5.2.5.2, which are shown in Section 5.2.5.3 to be underpinned by SEF.

5.2.4 To what extent do participants' activities display elements of NL? (RQ4)

While NL definitions may vary, there is consensus on its essential characteristics. These are: discussion and dialogue; cooperation and collaboration; trusting relationships; group working; learner self-determination; difference; and reflexivity and learner investment, along with the connecting and mediating role of technology (Hodgson et al., 2011; Jones, 2015). As the previous chapters and sections of this study have shown, the participants' activities displayed all these characteristics.

5.2.4.1 Discussion and dialogue

P2 described a reliable and knowledgeable PLN friend whom she could count on to answer her questions (see Section 4.5.1.5). P3 reported the benefits she derived from dialogue with peers in her PLN which included exposure to new perspectives, the opportunity to challenge others' views and have hers challenged, to use her information gathering and presentation skills and to defend her perspective in conversations (see Section 4.5). P5 reported the benefits he derived from participating in online discussions. When asked why he kept returning to these, he explained his enjoyment of hearing others' opinions and the chance to learn something new (see Section 4.5).

In these ways, the participants engaged in discussion and dialogue in their PLNs. Koole and Stack (2016) argue that relational dialogue such as this facilitates the deep learning that is characteristic of NLCs. Toole (2019) highlights the opportunities NLCs provide for questioning thinking and practice as P3 and P5 had begun to do as they assessed their own views, negotiating new knowledge. While this level of collaborative and reflexive inquiry may not be seen in the NL practices of the younger participants (e.g., P2 who was 10 years old at the time), it is evident in the practices of P1 and P3 who were 13 and 15 years old respectively. This will be discussed further in Section 5.3.3 in relation to ontogenetic development and trajectories of development.

5.2.4.2 Cooperation, collaboration, group working and trusting relationships

P1 described her social learning experiences and the benefits she derived from having “a big network” of people she could trust (see Section 4.4.1.2). Similarly, P2 described learning in a group as helpful, with peers sharing their learning and encouraging each other (see Section 4.5.1.5). P3 described her collaborative relationships with Friends D and V (see Section 4.4.1.2). Church et al. (2002) and Haythornthwaite and de Laat (2010) argue that this collaborative inquiry in NLCs is undergirded by the strength of trusting relationships between actors in the network. Indeed, P1 reported feeling safer to share her learning challenges among her close circle of PLN friends than in her school classroom where she did not share such close relationships with classmates (see Section 4.4.1.2). Cooperation, collaboration, group working and trusting relationships are all marks of an effective NLC. These were evident in the participants’ learning practices and ego-centred networks.

5.2.4.3 Learner self-determination

All participants reported striving for and enjoying the freedom of self-determination, autonomy, and independence (see P3 in Sections 4.4.1.1 and 4.4.2.3 and P2 in Section 4.4.1.1). P5 explained that being able to help himself online meant being in control, independent and equipped for the future. He explained that without his digital capabilities and the autonomy they facilitated, he would feel as if “I’m just not growing up fast enough. I’d feel like all my peers would be able to do things independently. I would be falling behind...I would still need a lot of help”.

The participants all exhibited behaviour in line with the literature regarding adolescent pursuit of autonomy and self-determination (Deci & Ryan, 1985, 2016; Eccles & Midgley, 1989; Reeve, 2012 & 2013; Symonds & Galton, 2014; Symonds & Hargreaves, 2016). These behaviours are characteristic of NL and these preferences were supported in their self-constructed NLCs.

5.2.4.4 Difference

While participants built their peer relationships based on similarity and sameness, they acknowledged the existence of difference among themselves. This was seen as 'good'. P4 reported that her peers complemented each other with their differences, which made their interactions "dynamic." She explained that they had "different parts to each other that we make as one... even though we're quite similar, we have different...qualities. So, when they come together, it's a lot more dynamic." P1 explained that she had different interests on the same topic with friends R and S and that they each had different areas of specialisation, making them subject leaders in those areas. Projecting on what it could be like to have a peer in her group who was more knowledgeable, she stated, "I think it would be OK. It doesn't make a bad difference."

Difference or diversity among learners is acknowledged in NL as a possible source of added value through the learning opportunities it can provide (Hodgson & Reynolds, 2005; Hodgson et al., 2011; Jones, 2015; Ozturk & Hodgson, 2017). This is evidenced in P4 and her friends' "different parts to each other that we make as one" and in the complementary specialisms of P1 and her peers.

5.2.4.5 Reflexivity and learner investment

This was evident to varying degrees among the participants. P1 reflected on the faster progress she felt that her PLN helped her to achieve (see P1 in Support and accelerated learning, Section 4.4.1.2). P3 reported re-evaluating her ideas and gaining new perspectives because of her peer interactions (see P3 in Section 4.5.2). Similarly, P5 reported returning to his peer network to hear the opinions of others and to share in conversations because he found this helpful and anticipated new learning (see P5 in Section 4.4.1.2). These activities align with knowledge creation and knowledge action which are characteristic of NL (NLEC, 2020).

5.2.4.6 Connecting and mediating role of technology

These features of the participants' activity (i.e., discussion and dialogue; cooperation and collaboration; trusting relationships; group working; learner self-determination; difference; reflexivity and learner investment) were all mediated by the Internet and participants' "convivial technologies" (NLEC, 2020, p.8). On the role of the Internet in her PLN participation, P1 described it as helpful because "You can get in connection with your friends more easily and you can get resources online about learning." P2 ascribed omniscience to the Internet and reported tapping into its bountiful knowledge store (see Section 4.5.1.3). P4 had a similar experience, reporting of the Internet, "whatever you want to do, it's out there. There's a way you can find it." The Internet was indeed found to mediate the participants' connection and PLN engagement. NLEC lists the following as characteristics of NL: "processes of collaborative, co-operative and collective inquiry, knowledge-creation, and knowledgeable action, underpinned by trusting relationships, motivated by a sense of shared challenge, and enabled by convivial technologies" (2020, p.8). It continues, "By implication, human activities that share these characteristics can be defined as examples of networked learning" (NLEC, 2020, p.8). In response to RQ4, I therefore argue that the participants' PLN activities fully demonstrated the aforementioned NL characteristics and qualify as NL.

So far, there has been a dearth of research on NL in learners below the age of 18 years. Their participation has largely been aligned with CL (Jones, 2015, p.7) rather than NL. It is not clear from the literature why NL research tends to remain silent on the networked activities and experiences of CYP. It is my aim, however, through this study, to facilitate the understanding in professionals working with CYP and in NL scholars, that participation such as that found in this study's six cases can be defined as NL. It therefore follows that where the nature of participation among the CYP whom they work with resembles the cases in this study, that participation can be defined as NL.

5.2.5 What contextual factors support engagement in the personal learning networks of 10-to-16-year-olds in England and how? (Main RQ)

Several factors worked together to support engagement in the six participants' PLNs. These can be viewed from a granular level, a thematic level and from a big picture perspective.

5.2.5.1 Granular level

This study's findings indicate that the PLNs had the following characteristics:

1. Participants' personal interests drove participation, maintaining relevance, meaning and motivation.
2. Participants' Funds of Knowledge and Identity also drove participation - these included participants' digital skills and competencies, values, aspirations, and goals. PLNs were identity affirming - they supported whom participants believed themselves to be and what they aspired to become; they aligned with participants' self-concept.
3. PLNs gave participants a sense of belonging and connectedness.
4. PLN relationships (with both human and non-human actants) were built and operated on trust, which fostered a sense of security.
5. Participants were drawn to sameness and similarity, which fostered connectedness, belonging and social learning.
6. PLNs facilitated accessibility of web and learning resources.
7. PLNs were underpinned by the equality of all members while also allowing for non-threatening subject leadership.
8. PLNs facilitated positive community experiences.
9. Learning in PLNs was largely social and interactive - socially constructed meaning through participant interactions was commonplace.
10. PLNs fostered participants' agency and autonomy; this appeared non-negotiable and high among participants' priorities.

These 10 characteristics can therefore be seen as the factors that supported engagement in the participants' PLNs.

5.2.5.2 Thematic level

The 10 PLN characteristics can be grouped into 4 supportive factors:

1. Identity affirmations - the PLNs supported whom the participants perceived themselves to be and what they aspired to achieve.
2. Personal motivations - participants' intrinsic motivations drove their engagement in their PLNs.
3. Network resources - participants built into their PLNs the resources they needed to achieve their goals and aspirations.
4. Learning preferences - participants built their PLNs to support their own learning preferences, i.e., they were built to support the way the participants liked to learn.

Points 1 and 2 are factors characterising the participants at their developmental stages (internal drivers). Points 3 and 4 are factors characterising the PLN environments they built to serve their needs (environmental drivers).

5.2.5.3 Big picture perspective

Overall, engagement was driven in the participants' PLNs by Stage Environment Fit. Their internal drivers were supported by their environmental drivers, and their environmental drivers supported their internal drivers in a cycle of support. Participants' internal drivers represented their stage-specific needs which developed along the trajectories of their psychological development (Eccles & Midgley,1989; Eccles et al., 1993; Symonds & Hargreaves, 2016). Their environmental drivers represented what their PLNs had to offer that matched their needs and drew upon their Funds of Knowledge and Identity. The cycle of support is Stage Environment Fit - 'Stage' influences 'Environment' so that 'Environment' continues supporting 'Stage' in a manner that maintains 'Fit' between the two. As 'Stage' changes, 'Environment' is modified accordingly, to sustain 'Fit.' The CoS can be likened to Bandura's reciprocal causation (1986, 2001; Schunk & Usher, 2012) and Bronfenbrenner's ecological systems (1979). This study's findings therefore suggest that Stage Environment Fit supported the six participants' engagement within their personal learning networks by establishing a fit between the trajectory of their developing psychological needs and their environment, which evolved in

response to these changing needs. Interestingly, having remained in contact with some of the participants for one year (from the start of the study to the time of participant reflection), having observed them become one year older and having observed some of them transition to new school phases, I observed that some of their PLNs are no longer in existence; the members having moved on, possibly driven by new developmental needs. In these cases, the participants moved on to create new PLNs - new stage, new supportive environment, new fit. In other cases, nodes were replaced, with patterns of participation changed accordingly

In the remaining section of this chapter, I discuss other matters of interest that have arisen from this study.

5.3 Further insights

In this section, I present further insights from participants' data. The implications of these are discussed in Chapter 6.

5.3.1 Equality in diversity

All participants expressed a preference for equality and the absence of a power hierarchy in their PLNs. P1 preferred a group where all members were "on the same level" (see Section 4.5.1.4). P2 insisted that there be no leaders in her WhatsApp group, suggesting that to have a leader would upset other members and would not be fair (Section 4.5.1.4). P5 wanted to know that he would always be heard, and that his opinion would be valued. He expressed that this would be more likely where there was no power dynamic or hierarchy (Section 4.4.2.3). However, both P1 and P3 reported having subject leaders in their PLNs who led in the areas of their expertise, that they were subject leaders themselves, that it could be beneficial to have more knowledgeable others (Section 4.7) and that otherwise, everyone was 'equal' (Section 4.5.1.4). This quest for equality, autonomy and focus on identity issues (e.g., power dynamics determining one's relevance, as with P5) are in line with Eccles and Midgley (1989), Eccles et al. (1993), Erikson (1963), Erikson and Erikson (1997) and Symonds and Hargreaves (2016) with regards to CYP priorities at this

developmental stage. Participants did not object to subject leadership, which was seen more as democratic and beneficial, or with diversity of roles. What they objected to was leadership that marginalised (expressed by P5), "dominated" (P3), appeared unfair (P2) or put some people "up there" (P1). Leadership that felt 'equal' encouraged SEF, suggesting that leadership perceived as unfair, marginalising, or dominating would discourage it.

5.3.2 "Can't use them in school in the way that you would like"

Several participants expressed what Hietajärvi et al. (2020, p.36) described as an unfulfilled "wish for digital schoolwork" (see Section 2.2.2.2). P4 expressed that she could not use the abilities that she was passionate about in school as she would have liked, referring to her digital competencies. P3 lamented, "I've adjusted to the system... even though I might not enjoy it." She explained that this unfulfilled wish made school less enjoyable, even though she continued to achieve high grades in school (see Section 4.2.3). All participants reported having and using digital skills and competencies outside school, but that these were not accommodated in school. Without the agency and autonomy to learn as they did in the 'real world,' and in a school system that they did not find relatable, the participants' basic needs for autonomy, self-efficacy and connectedness went unmet (see Section 2.3.4). The literature indicates that digitally engaged adolescents appear to be motivated by activities that provide the experience of these needs (Hakkarainen et al. (2015). The reverse occurs, as in the case of this study's participants, when these needs are not met (Deci et al., 1991; Ryan & Deci, 2000, 2017). It is widely believed among children today that their schools cannot teach them, or accommodate, their informally acquired digital skills (see Section 2.2.2.2). It is therefore no wonder that digitally engaged youth begin to disengage from school as SEF starts to wane and engage more in the digital world that teaches and accommodates 'real world' digital competencies.

5.3.3 Ontogenetic development of networked learners vis-à-vis trajectories of psychological development

In Chapter 2, Section 2.2.1.4, I cited Rodríguez-Illera and Barberà (NLEC, 2021) whose criticism of the NLEC 2020 definition of NL pointed out that neither did it consider ontogenetic development, nor did it refer to children and adolescents. The reference to ontogenetic development echoes Drexler (2018) who discusses the development of K-12 students into NLers. Symonds and Hargreaves mention early adolescent characteristics which include "the physical and hormonal changes associated with pubertal development and increased cognitive capacity, desire for autonomy, focus on identity issues, self-focus, self-consciousness, and peer orientation, and the need for a safe environment in which to enact these changes" (Symonds & Hargreaves, 2016, p.57). This trajectory of psychological development (increased, or increasing, cognitive capacity) is supported by the seminal work of Eccles and Midgley (1989), Eccles et al. (1993), Piaget (1952, 1954, 1955, 1960), and Piaget and Inhelder (1969) and it continues to underpin educational policy and practice around the world. While there are criticisms of the cultural and sociological biases inherent in these theoretical perspectives, cognitive maturation remains relevant to lifespan development theory (Feldman, 2021; Sharma et al., 2021). It is therefore plausible that such differences in cognitive maturation and pubertal development may result in differing patterns of participation among CYP.

5.3.3.1 Differences in patterns of participation

While causation has not been established, there did appear to be some difference in participation patterns in ways that suggested a developmental trajectory. For example, while all participants strove for autonomy, P2, the youngest, aged 10 years and the only participant in primary school at the time, exhibited outlier patterns. Participants were asked to respond to the statement: *I feel that as children get older, my school allows them to make more decisions about what they learn.* Response options were 'Strongly agree', 'Agree', 'Neither agree nor disagree', 'Disagree' and 'Strongly disagree'. P2 chose

‘Disagree,’ explaining, “I wouldn’t want to have a say.” When invited to elaborate she expressed that she was not bothered about participating in decision making. In addition, while the other participants were evidently networking with other peers, platforms, and resources, P2, who ran a WhatsApp group, appeared to practice a mix of NL and networked individualism (NI). She curated more of a PLE than a PLN. Her PLN had a large offline component while the other participants, aged 13 to 16 years, described a more digital component to their PLNs.

P2 created a WhatsApp group which served as a meeting point for her PLN peers. Here, they checked in with each other regarding shared interests, sent each other reminders about scheduled offline events that they were attending, asked for help, gave help, and sent each other feedback and encouragement regarding personal projects. These peers were all known to P2 offline and known to and approved of by her parents. Their activities were also known to and approved of by their parents, and their families all attended the same church, where they met in-person weekly. In pursuance of her music making interests, P2 searched for information online and received training and support from a local youth centre offline. She saved information and the music she was making online. This indicated that she had both a PLE where she worked alone (NI) and a PLN where she collaborated with peers (NL). The other participants did the same. However, they described more of a digital component and more of NL than a PLE and NI.

5.3.3.2 Alternative explanations

There are several possible explanations for this difference in participation patterns. It could have been that P2’s family’s religious ethos restricted her level of online participation. It could have been that P2’s online participation was limited by age-restrictions (for most social networking platforms, participants must be 13 years old to participate) and safeguarding limitations (such as parental controls). It could also have been that as a 10-year-old, P2 was at a stage in her trajectory of psychological development where the concepts of a network and networking as we know them in NL terms were beyond the scope of her cognitive capabilities.

5.3.3.3 A cognitive developmental perspective

Returning to developmental psychology perspectives, Piaget's stages of cognitive development place P2 at the Concrete Operations stage (see Table 2.2 in Section 2.3.6) where it is suggested that reasoning is limited to concrete operations and children are not yet capable of handling abstraction. The other participants, aged 13 to 16 years, fall within Piaget's Formal Operations stage (see Table 2.2 in Section 2.3.6) where it is suggested that CYP are capable of abstraction and hypothetical reasoning (Gonzalez-DeHass & Willems, 2013; Piaget, 1952). It is plausible from this perspective that concrete operational children may participate in online connections showing all the characteristics of NL but without fully conceptualising and engaging with the abstraction of a 'network' or 'networking.' By the same reasoning, a more concrete PLE may be within closer grasp. This could have implications for the different ways in which concrete and formal operational CYP engage in virtual networks vis-à-vis the NL practice of adults. As PCDT emphasises, children think differently, not inferiorly to adults. For this reason, I argue that CYP may engage differently in NL to adults, not inferiorly. Wider research is therefore necessary to study this difference for the development of NL theory, especially due to this study's small sample size.

Of PCDT's Formal Operations stage, researchers and theorists describe a period of adolescent ego-centredness which has been linked to risk-taking behaviour (Alberts, Elkind & Ginsberg, 2007; Arnett, 2004; Giedd, 2022; Gonzalez-DeHass & Willem, 2013; Landicho et al., 2014). Such risk-taking tendencies could be reflected in formal operational young people feeling comfortable to befriend and collaborate with 'strangers' online, a practice some participants avoided but which others embraced. Again, this could have implications for the ways in which CYP engage in virtual networks (e.g., NI or NL) and calls for balanced consideration between the limitations of PCDT (see Section 2.3.6) and cognitive maturation upheld by lifespan development theory (Symonds & Hargreaves, 2016; Eccles & Midgley, 1989; Eccles et al., 1993; Feldman, 2021; Piaget, 1952, 1954, 1955, 1960; Piaget & Inhelder, 1969; Erikson, 1963; Erikson & Erikson, 1997).

5.3.4 My central argument

Following my reasoning in Section 5.3.3, I argue that:

1. While all six participants exhibited the characteristics of networked learning, some characteristics (e.g., cooperation, collaboration and group working) were more evident in some participants' PLNs and practices than in others'. While there may have been extraneous factors impacting on participation, such as age restrictions and parental control, it is necessary to consider the possible impact of cognitive maturation.

2. In this light, NL in CYP may not appear as it does in adults, whose participation is without age restriction, parental control and most likely beyond the limitations of concrete or formal operational thinking. As such, NL scholars may not recognise NL among CYP and assume they do not practise it. Referring to my definition of PLNs in Chapter 2, Section 2.2.2.1, I reiterate that connections in PLNs, and NL, may be one-to-one, one-to-few or one-to-many, and therefore, one-to-many NL connection patterns should not be privileged over the one-to-few or one-to-one.

3. Considering cognitive maturation, or developmental trajectories across the lifespan, it is possible that CYP may begin their first forays into NL as networked individuals, building PLEs rather than PLNs as P2 appeared to do. P2's participation showed more of an offline component than an online one, and more NI than NL. Nevertheless, it did display the characteristics of NL as discussed in Section 5.2.4, and as argued in Section 5.3.3. The other participants talked more of an online networking component than offline, and more NL was reflected in their data than NI.

Overall, all participants exhibited NL characteristics with participation appearing to range between NI in PLEs, emergent NL in PLEs and PLNs, and NL in PLNs (see Figure 7). Participation appeared to develop along the continuum (towards NL in PLNs), however, not in linear fashion. I noted that participation tended to slide up and down the continuum.

Figure 7 *Variations in participation from NI in PLEs to NL in PLNs*

5.3.5 Participants' M&T experiences

At the end of each participant's M&T session, I asked, "What were your experiences with miming?" Their responses were as follows:

P1: I understood the questions better. Actions were easier to convey. Most people think before they do something, just to make sure it's accurate. Miming gave me more time to think. It's easier to express myself with actions.

P2: Miming is easier than writing. Writing makes my hand tired, but miming uses your body. Miming is easier because I don't know how to spell some words.

P3: It gave me a better idea of my opinions on each person. My physical [i.e., embodied] reaction gave me an idea of what to say. It helped me identify my feelings about this person and then elaborate. Miming would be easier than writing because it's easier to act it out than forming it into words. You have to write it in a way that is understandable and methodical. But when acting it out, you can just do it.

P4: Not sure. Writing would give me more time to think. But miming makes my expressions clearer. If I were writing, you wouldn't know what I'm thinking.

P5: I'm not the best at communicating. Asking questions about the miming got more out of me.

P6: Writing/telling is easier for me.

Five out of six participants expressed that miming their responses, then verbally unpacking them helped to facilitate their communication. In this sense, it helped to scaffold communication. The outlier was P6 who expressed that he felt more confident with writing than miming as he did not consider himself a 'good actor.' However, throughout the interview, the only time he explicitly described himself as more engaged and gave reasons why (which is what I was trying to elicit - when are you more engaged and why? In your virtual or in-school learning?), was when he explained what he had mimed. I gathered that though a participant may not think they are 'good' at miming', as long as they are comfortable to proceed, the subsequent verbal unpacking may still yield rich descriptions and in-depth insights. At this point in the interview, P6 moved to the edge of his seat as he spoke and began to lean towards the camera as he described an enjoyable learning experience he had had. I asked about these kinesic and proxemic expressions (see Section 2.4.4.1) and he explained that he was engaged in the experience he had just described.

P6's interpretation was akin to Ellingson's embodied reflexivity (2017) - recalling and unpacking sensory experiences and memory work. It supported the literature that NVC methods may help participants express themselves where traditional methods have proved unsatisfactory. These findings also align with Denham and Onwuegbuzie (2017) that NVC data collection methods can be used for triangulation, complementarity, initiation, expansion, and development, and for thicker descriptions and interpretations. M&T has served these purposes in this study.

5.4 Summary

In this chapter, I have responded to this study's sub-RQs and main RQ, unpacking how the participants connected in their PLNs, their PLN experiences, comparing their experiences of formal school-based and informal PLN-based learning and exploring the extent to which their participation displayed the characteristics of NL. The data suggest that participants' PLN engagement was

driven by Stage Environment Fit, with participants expressing strong preferences for autonomy and equality. Differences in participants' engagement patterns were explored to highlight the possible roles of cognitive maturation and developmental trajectories in their varying manifestations of NL. The implications of these findings for theory, practice and policy are discussed in Chapter 6.

Chapter 6: Conclusion

In this final chapter, I provide an overview of this study, its findings, and my original contribution to knowledge. In addition, I present implications and recommendations for theory, practice, and policy, and suggestions for further research. An outline of this study's limitations is also presented; details can be found in Chapter 3.

6.1 Overview

This qualitative multi-case study has investigated the contextual factors supporting engagement in the personal learning networks of six 10- to 16-year-olds in England and examined how these factors supported this engagement. Eight data sources have been used to collect extensive data with the participants, yielding rich descriptions and deep insights.

My interest in this subject stems from my work as a primary and secondary school teacher supporting children before and after school transitions. The vast literature on engagement indicates that as children progress through school, especially at school transitions, their engagement with school tends to decline (Benner & Graham, 2009; Eccles et al.,1993; Fredricks et al., 2019; Havik & Westergård, 2020; Jindal-Snape & Cantali, 2019; Wang & Hofkens, 2020; Wigfield et al. 2015). At the same time, research reports that their engagement with technology tends to increase (Burns & Gottschalk, 2019a, 2019b). I sought to understand this paradox - of decreasing engagement with school alongside increasing engagement with technology - as I observed that this disengagement was not from learning. Rather, it was from schooling. I observed that this demographic continued learning informally and autonomously in the personal learning networks they created, even as they disengaged from schooling. This study has elicited and thematically analysed rich, in-depth descriptions from six case study participants, using 8 data collection methods, to understand how they connected in their PLNs, their experiences of these PLNs, how they compared school to PLN learning and to what extent their activities displayed elements of networked learning. The findings were unpacked using an original theoretical and conceptual framework designed for this study. From

these elicitations, this study reports the contextual factors found to be supporting the participants' engagement.

The findings from this multiple case study are not intended for generalisation to populations as they provide particularised, context-specific knowledge of unique cases. However, case study findings may be transferred to similar contexts and may be considered in relation to existing theory (Yin, 2018).

6.2 Findings

This investigation finds that the participants each built PLNs based on their internal drivers (IDs), which coincided with their developmental needs as adolescents. In line with extant research, these needs included autonomy, connectedness, and self-efficacy (Eccles & Midgley, 1989; Eccles et al.,1993; Erikson, 1963; Erikson & Erikson, 1997; Giedd, 2022). Participants therefore structured their PLNs to provide for these needs. For example, they included peers with shared interests, a 'shared language,' similar goals and an enjoyment of autonomous, interactive social learning like themselves. They used members-only platforms to ensure privacy and feelings of safety. There were no adults overtly present and no hierarchies of power, only 'subject leaders' who shared their expertise with the group.

The participants expressed that in their PLNs they could freely use their digital competencies to access whatever help and resources they needed and that their digital competencies were respected by their peers. This FoKaI accommodation caused feelings of empowerment, freedom, accomplishment, and self-efficacy. The participants expressed that they therefore felt free to enact the identities they had chosen for themselves. They indicated that their PLNs supported the persons they believed themselves to be and the persons they aspired to become, in line with Giedd (2022). Thus, their PLNs, structured by these IDs, became environmental drivers (EDs), functioning in a cycle of support (CoS) - the IDs created the environment (EDs), which in turn nurtured the IDs. This aligns with Stage-Environment Fit (Eccles et al., 1993; Eccles & Midgley, 1989; Holmbeck et al., 2008) in which learners engage to the extent that their needs are met by their environment, or to the extent that their skills can be used in their environment. The findings, as

well as extant research, indicate that SEF supports engagement (Eccles et al., 1993; Eisenbach & Greathouse, 2020; Giedd, 2022; Symonds & Hargreaves, 2016). This study, therefore, finds that SEF supported engagement within the participants' PLNs. In addition, this study's findings align with theory and extant research which establish that digitally engaged adolescents tend to be motivated by activities providing the experience of autonomy and the sense of self-efficacy and connectedness (Eccles & Midgley, 1989; Eccles et al.,1993; Giedd, 2022; Hakkarainen et al., 2015; Salmela-Aro et al., 2016). The findings also align with extant research reporting that in learning environments where such adolescents' *"digital learning preference"* results in a *"wish for digital schoolwork"* and this wish is accommodated, learning engagement results (Hietajärvi et al., 2020, p.36). Conversely, where this wish is not accommodated, cynicism and boredom with schoolwork result in risk of disengagement. This present study's findings may therefore be considered for application to similar contexts (i.e., adolescent learners in PLNs), to see how they may relate to and support NL and engagement theory.

6.3 Original contribution to knowledge

This thesis presents findings of original research into the contextual factors supporting engagement in the personal learning networks of six 10-16-year-olds in England. Taking together the findings and evidence from extant research, this study makes the following original contributions to knowledge in the areas of networked learning, learner engagement and research methods.

6.3.1 Networked Learning

The informal engagement of this study's participants in their PLNs displayed evidence of NL concepts and practices. The findings therefore suggest that CYP (i.e., under-18-year-olds) do practise networked learning, though further research is required to generalise these findings. Furthermore, the findings suggest a typology of NL practice among the participants ranging from (a) Networked Individualism in Personal Learning Environments to (b) emergent Networked Learning in Personal Learning Environments and Personal Learning Networks (i.e., a 'limited, child-friendly version' of NL) to (c) Networked Learning in Personal Learning Networks (or 'full-fledged' NL). Considered alongside developmental psychology theory and

research, namely Erikson's Psychosocial Development Theory (Erikson, 1968; Erikson & Erikson, 1998), Piaget's Cognitive Development Theory (Piaget, 1952, 1954, 1955, 1960; Piaget & Inhelder, 1969), Stage Environment Fit (Eccles et al., 1993, Giedd, 2022; Holmbeck et al., 2008; Symonds & Hargreaves, 2016) and Bronfenbrenner's Ecological Systems Theory (Bronfenbrenner, 1979), this typology could be linked to CYPs trajectories of psychological development wherein their cognitive maturation follows a path of development to maturity, and their cognitive abilities increase with this maturation. As they mature, CYP may then become increasingly capable of comprehending abstractions such as networks and networking and to participate in networked spaces. CYP may also be limited by parental controls and online safeguarding measures which limit their networked access and participation until they reach adulthood at the age of 18 years. CYP may therefore exhibit networked engagement in line with their developmental stage and level of access.

Subsequently, the aforementioned factors may result in a different presentation of NL in CYP to that of adults. Nevertheless, this study's findings indicate that this 'limited, child-friendly version' of NL in CYP may still demonstrate the established characteristics of NL (Hodgson et al., 2011; Jones, 2015). Due to these trajectories of psychological development in CYP, their NL practice may develop ontogenetically; they may develop from Networked Individualism in Personal Learning Environments to Networked Learning in Personal Learning Networks and Communities. Expanding these insights, CYP, who typically begin life desiring adult protection and proximity, may therefore begin their networked engagement as Networked Individuals curating safe Personal Learning Environments. Lifespan Developmental theory holds that children's psychosocial development progresses with the increasing experience of their environment and the people in it. Subsequently, as CYP mature along their developmental trajectories, towards autonomy, independence, and the company of peers, and away from adult control, they may begin their exploration into networked society, from the relative safety of Networked Individualism and PLEs to the unfamiliar abstraction of Networked Learning and PLNs (or NLCs). This typology (from NI in PLEs, to emergent NL in PLEs and PLNs, to NL in PLNs or 'full-fledged'

NL) may therefore serve as a guide for those aiming to support the development of CYP's NL. It may also serve as a guide for developing NL in adults.

I argue that these insights contribute to the gap in knowledge regarding NL identified by Rodríguez-Illera and Barberà (NLEC, 2021) who argue that current conceptions of NL do not address its possible ontogenetic development. Further research is required, however, to generalise these findings.

6.3.2 Engagement

This study's participants all reported dissatisfaction that their digital competencies and FoKaI developed outside of school were not accommodated or given as much expression as they would have liked in their school experiences. The participants indicated that they engaged more with learning when they perceived it to be relevant to their needs and to their future aspirations. They reported disengaging from learning which they did not perceive to meet these needs. These findings were linked to Stage Environment Fit, the synchronisation between their changing school environment and their developmental trajectories as argued by Holmbeck et al. (2008) and Symonds and Hargreaves (2016). This synchronisation achieves SEF. Enhancing SEF improves engagement (Bandura, 1986, 2001; Bronfenbrenner, 1979; Holmbeck et al., 2008; Symonds & Galton, 2014; Symonds & Hargreaves, 2016). The findings suggest that CYP find SEF in their informal personal learning networks. Hence, as their access to digital technology and networked spaces increases, so does their participation, at the same point where SEF with school declines. The data and literature suggest that this Stage Environment Fit in CYP's networked communities exerts a pull - possibly towards the resolution of Erikson's psychosocial crises (1968; Erikson & Erikson, 1998) - which keeps them engaged and engaging in these spaces (see Section 2.3.5).

This study seeks to explain the paradox of CYP's disengagement from school at the same time as engaging more with technology and networked spaces with SEF. The findings suggest that CYP may be disengaging from traditional schooling at the point where it ceases to meet their developmental needs and begin engaging with technology where this does. The implications of this are that if SEF can be achieved,

maintained, and enhanced throughout learners' time in school, school engagement can also be achieved, maintained, and enhanced at school transition points. However, further research is required to establish this generalisation.

6.3.3 Research methods

This study makes an original contribution to research methods through Mime and Tell, designed for this study to research with its child participants. While numerous creative and child-centred research methods exist, one challenge has been a lack of consistency in their data collection, interpretation, and analysis (Angell et al., 2015; Chadwick, 2017; Dunham & Onwuegbuzie, 2013). To address these gaps, M&T provides an explicit 7-step process for collecting embodied/NVC data and involving its participants in the interpretation of this (see Section 3.5.3.2). It includes explicit steps for joint meaning-making between the researcher and the participants and for member reflection (Braun & Clarke, 2022). With these steps in-built, privileging the participants' perspectives is facilitated. This 7-step process is original to this study. It can be used alongside thematic analysis or an appropriate tool for the analysis of qualitative data. M&T has been developed for both in-person and remote/online data collection in contrast to those child-centred, creative methods that require the physical presence and proximity of researchers and participants. M&T was developed during the COVID-19 lockdown to overcome social distancing challenges in research. Where it became a challenge to collect graphic data created through Draw and Tell, M&T became a handy replacement.

M&T involves its participants as co-researchers in the interpretation of their data as they are collected, in contrast with numerous child-centred methods which facilitate child expression but impose researcher interpretation (Angell et al., 2015). Interpretation during data collection reduces the chance of data contamination due to fading memory which could occur when interpretation is performed retrospectively. Thus, M&T does not access participants' prior meanings but facilitates the co-creation of new meaning (Ellingson, 2017) with the researcher (see Section 3.5.3.2).

Child participation is further facilitated with M&T by its elimination of the requirement for participants to write, as in Angell et al.'s Draw, Write and Tell (2015). CYP who

find writing challenging, such as P2, are therefore able to avoid this obstacle. Furthermore, M&T collects data using nonverbal or embodied communication which removes the requirement to compose a written or verbal response. This study's participants reported that M&T facilitated understanding of the interview questions, gave more time to think, clarified thinking, thereby making expression easier, helped to avoid hand strain in writing and spelling concerns, helped to make abstract thinking become more concrete and easier to articulate and helped to "get more out of" them (P5). Further research is required, however, in different contexts to test the M&T process and to develop this child-friendly research method.

6.4 Implications and recommendations

In the following sub-sections, I outline this study's implications and recommendations for practice and policy. These will be of interest to scholars, researchers, and practitioners in the fields of networked learning and school engagement, as well as those interested in researching with children. The findings will also interest educators and social care practitioners working with children and young people below the age of 18 years, as well as educational administrators and policy makers with a remit for school engagement.

6.4.1 Implications and recommendations for practice

6.4.1.1 SEF in working with children and young people

This study's participants pursued autonomy, self-determination, equality, and the avoidance of power dynamics in their personal learning experiences. However, they indicated acceptance of leadership, both peer and teacher, that was supportive of their autonomy and self-concept, i.e., autonomy-supportive, and identity-affirming leadership. It is therefore plausible that practitioners working with CYP at a similar developmental stage to this study's participants, especially those experiencing challenges with authority figures and leadership, may have better success by establishing Stage-Environment Fit in their practice and programmes (Eccles et al., 1993; Eccles & Midgley, 1989; Holmbeck et al., 2008). This may be achieved through leadership, processes, policies, and procedures that support CYP autonomy and identity development rather than authoritarian approaches that deny these.

Where perceptions of difference exist through unavoidable hierarchies (such as between teacher and student or young person and adult), this can be positioned as 'positive difference' where adult support and leadership are experienced by CYP as autonomy supportive and identity affirming, rather than that which engenders feelings of marginalisation, domination or being undermined (see Sections 4.7 and 5.3.1).

6.4.1.2 Closing the gap

To close the ever-widening gap between in-school and out-of-school ways of learning, it is vital that practitioners working with children and young people are upskilled to identify and incorporate their Funds of Knowledge and Identity within the school curriculum and pedagogy. Practitioners also need to upskill their own digital competencies to deliver education and services relevant to the needs of a digital era. This has implications for teacher training and continuing professional development, as well as school improvement. CYP's digital competencies exercised outside school are vital tools in the learning partnership between home and school and in the connection between school and 'the real world'. The 'tabula rasa' child is an outdated concept as all children bring Funds of Knowledge and Identity to their learning contexts, with these increasingly becoming more digital. Where these funds may not align with required National Curriculum outcomes, it is feasible to suggest that such a curriculum requires change to align with the prevailing times and stakeholder needs.

6.4.1.3 School transition support

This study's findings align with extant research indicating that learning environments that support children and young people's developmental needs foster Stage-Environment Fit and thereby, engagement (Eccles & Wang, 2012; Symonds & Galton, 2014; Symonds & Hargreaves, 2014). Through adolescence, and especially at school transition points, it therefore behoves practitioners to adopt pedagogy and practice that support learners' autonomy, self-efficacy, connectedness, and identity development, thereby achieving Stage-Environment Fit and facilitating engagement. I do not refer here to the mere use of technology in classrooms in an attempt to 'fix' disengaging CYP or to prevent disengagement (i.e. a medical model of intervention).

Rather, I advocate a fundamental redesign of school curricula and schoolwide practices and processes to inculcate CYP FoKaI (a social model of intervention, 'fixing' the learning environment).

6.4.1.4 Pedagogical development

This study reiterates the growing body of knowledge on children's Funds of Knowledge and Funds of Identity (Esteban-Guitart, 2014; Moje et al., 2004; Moll et al., 1992; Subero et al., 2017; t'Guilde & Volman, 2021). Where these are harnessed within the school curriculum and provision, engagement and learning are enhanced (t'Guilde & Volman, 2021). It is therefore necessary for educators to become skilled in this regard, to sustain the engagement of today's largely digitally active CYP.

6.4.2 Implications and recommendations for policy

The 2016 House of Commons Digital Skills Crisis report found that digital skills, as well as the confidence to integrate Information and Communications Technology across the school curriculum, were lacking among the UK teaching force (HoC, 2016, pp.26-27). The wider literature continues to support this trend (Discovery Research, 2022; Wallace et al., 2022). Teachers cannot harness and facilitate skills and competencies which they do not possess. It is plausible to consider this a possible reason that children and young people's digital skills and competencies are not harnessed in formal school settings, contributing to school disengagement. To remedy this situation, I recommend the digital upskilling of all teachers, not just a special crop of computing teachers as is currently recommended by the 2022 Digital Strategy, an approach which has so far remained unsuccessful (HoC, 2016, pp.26-28) for the reason it documents. If digital skills are to be embedded across the curriculum and the Digital Strategy achieved, all teachers and learning support professionals need to be capable of harnessing children's digital FoKaI to enhance SEF, engagement, and future positive learner outcomes. This should extend beyond the acquisition of ICT skills and competencies to include training in digital pedagogies which are located within a different teaching and learning paradigm to traditional teacher-centred, knowledge transmission pedagogies.

6.4.3 So what? Now, what?

Through this thesis, I have argued that CYP are capable of, and indeed do practise, NL. I have argued in favour of extending NL practice and research to educational settings for CYP because NL has the potential to transform their learning and outcomes in the following ways:

a. *The transformative potential of networked learning pedagogy*
   The co-construction of knowledge through social learning (Bandura, 1986, 2001; Schunk & Usher, 2012), language and the support of more knowledgeable others (Vygotsky, 1986), i.e. socio-constructivism, and identity development (Erikson, 1963; Erikson & Erikson, 1997) are all features of NL. Socio-constructivism and identity development can be used to enhance learning. It therefore follows that NL has the potential to enhance learning beyond the limits of individual cognition. This study's participants relished opportunities to give and receive feedback, to give and receive subject leadership, to access new information and ideas, as well as challenging their own and others' thinking, resulting in new perspectives and ways of working. NL thus has the potential to facilitate self-directed learning and higher order thinking. Another bonus is that much of this happens organically, as demonstrated by this study's participants.

b. *A tool for identity development and wellbeing in schools*
   Developmental psychology establishes identity development as one of the main tasks of adolescence (Erikson, 1963; Erikson & Erikson, 1997; Eccles et al., 1993; Symonds & Hargreaves, 2016). It is predicted to influence satisfaction and productivity in later life (Rich & Schachter, 2012; Verhoeven et al., 2019). Identity development is therefore a key component in school wellbeing programmes and related curriculum areas such as Personal, Social, Health and Economic Education (PSHE) in the UK. Identity development featured prominently in this study with participants organically negotiating and developing self-concept and self-efficacy as part of their engagement. Identity development is also a key feature of NL and well-managed NLCs. NL pedagogy can therefore support school wellness programmes and cross-

curricular activities geared towards student wellbeing. This can be seen in existing online communities such as Togetherall, formerly Big White Wall, which offers peer support for mental health and wellbeing.

c. *Development of digital competencies and learning skills in schools*
In line with Section 6.4.1.2, NL can be used to cultivate CYP's digital competencies and incorporate those obtained from out-of-school learning into the school curriculum. This study's participants revealed their use and development of these Funds of Knowledge and Identity and the benefits of self-efficacy, connectedness, and autonomy, all of which are documented to enhance engagement. Learning skills and competencies such as critical thinking, creativity, collaboration, and communication were evident in the participants' out-of-school activities as well as in the literature (Ito et al., 2010, 2013). Incorporating these through NL pedagogy would not only accommodate "digital learning preference" and "wish for digital schoolwork" (Hietajärvi et al., 2020, p.36) but it could also help to incorporate what have become known as the 21st Century Learning Skills (Partnership for 21st Century Skills, 2019) required for the digital age and contribute to the Digital Strategy as discussed in Section 6.4.2. Another valuable learning skill that can be facilitated by NL is metacognition, essential for self-directed learning. Participants were seen making explicit reflections on their learning in this study, again, organically. With this skill, they were able to continue directing their own learning. Metacognition is a higher order skill with implications for lifelong learning that can be facilitated through NL pedagogy.

These are the key reasons I argue that NL research and practice should be extended to learners below 18 years of age. I argue that NL pedagogy could be transformational in the compulsory education sector and in programmes supporting the wellbeing and development of CYP.

6.5 Suggestions for further research

Building on the in-depth insights from this study's small sample size, I recommend repeating this research with a methodology other than case study, involving a larger

sample for wider reach, representation and generalisable findings. I recommend adopting a different sampling strategy other than convenience, to reduce the risk of bias. Additionally, I recommend the use of data collection methods designed for researching with children in any future studies, including further development of the M&T method. I suggest further research into ways to adapt and apply NL pedagogy in the compulsory education sector. Action research could be conducted to find suitable adaptations. Furthermore, in the interests of involving children and young people in making decisions on matters concerning them, I recommend that further research on under 18-year-olds in networked learning should involve them as co-researchers.

6.6 Limitations

This study presents findings specific to its context. These findings are therefore not generalisable to populations. However, the aim has been for in-depth knowledge and understanding which may be considered and applied to theory and to similar contexts. Other limitations, discussed in Chapter 3, are self-reporting and estimation by participants, this study's 2-step recruitment and feedback process, the possible impacts of Hawthorne Effect and social desirability bias, pandemic-related constraints, and purposive sampling. Details of how these limitations have been mitigated in this study can be found in Chapter 3.

6.7 Conclusion

Through this research, I have pursued my interests in networked learning, learning engagement and autonomy-supportive pedagogy. These interests have arisen from my teacher practice and my social justice and emancipatory inclinations which lead me to seek ways to facilitate learner empowerment. This study has also deepened my experience in and appreciation for qualitative research which again serves my emancipatory interests by giving voice to multiple perspectives and exploring multiple realities.

Through this study, I make my original contribution to knowledge by:

1. Extending the body of knowledge on networked learning to include networked learning in children and young people below the age of 18 years, drawing

attention to the possible impacts of children's developmental trajectories on their experience and practice of networked learning and exploring the ontogeny of networked learning in children and young people.

2. Contributing to what is known about school disengagement at periods of school transition vis-à-vis increasing CYP digital engagement, advancing the role of SEF and digital pedagogy in this.
3. Proffering a new child-centred research method, Mime and Tell, which I have developed to help child participants overcome literacy and language difficulties, to communicate beyond the spoken and written word, to facilitate e-research and overcome the challenge of distance, and to facilitate the participation of children as co-meaning makers and co-researchers.

Having responded to this study's research questions, having discussed this study's limitations with suggestions for mitigation, and having presented implications of the findings and recommendations for further research, I now bring this study to a close. It has indeed been a very insightful journey.

Appendices

Appendix A1: *Ethics - Participant Information Sheet*

Participant information sheet

Title: This is How We Do It: An Exploratory Multiple Case Study of the Contextual Factors Enabling the Engagement of 10 to 16 Year Olds in Informal Learning Networks in London, UK

For further information about how Lancaster University processes personal data for research purposes and your data rights please visit our webpage: www.lancaster.ac.uk/research/data-protection.

I am a PhD student at Lancaster University researching ways to support young people's learning. I would like to invite you to partner with me in this research by joining as a participant. Please take time to read the following information carefully and then decide whether or not you wish to take part.

What is the study about?
This study aims to understand what it is in young people's out-of-school online networks that keeps them actively involved and learning with each other at a time that many are losing interest in formal schooling. I am thinking that perhaps we teachers could learn something from young people about how to keep learning fun and engaging. This research invites young people to tell us how they do it.

Why have I been invited?
You have been invited because you (or your child/ward) are aged between 10 and 16 years, you live in London, UK and you are active online, learning in your own time about things that interest you, like following a hobby or creating and sharing things. I therefore believe you have a lot of helpful information to share that adults would like to learn. I would be very grateful if you would agree to take part in this study.

What will I be asked to do if I take part?
If you decided to take part, this is what will happen:

First, you will be invited to answer 11 questions on a webpage online about your experiences online, looking for and sharing information. There are no right or wrong answers and anything you say will be helpful. I will not ask for your name or any information identifying you. And you can stop and withdraw if you change your mind. I won't mind if you do. I understand that sometimes, people change their minds. This is Part 1 of the research.

If you like, you can also join me for Part 2. In Part 2, I will invite you to talk with me two more times online. We will see each other through video but like the first time, I will not record your name. I will however record what you say, in writing and through audio recording. And once the research is over, the recordings will be destroyed. In the first meet up, I will ask you to

draw pictures in answer to some questions. Then we will talk about what you have drawn. In the second meet up, I will ask you to mime (act out) your answers to some questions and then we will talk about what you have mimed. Each meet up could take about 20 to 30 minutes and it will take place online at a date and time suitable to you. I will, however, need a responsible adult's email address to arrange the meetings and invite you to them. If you change your mind before or during these meet ups, you can say so or you can just stop talking. I'll get the message and stop. That will be OK because everyone is allowed to change their mind. Only a small number of participants are required for Part 2. I will select these based on how you say you use the internet and how this relates to the research. Those selected will receive a £10 gift voucher at the end of Part 2 in appreciation of their contributions.

What are the possible benefits from taking part?
Taking part in this research will be a chance to share your experiences about the ways you like to learn. What you share will help teachers learn better ways to support your learning. This is because after the research is over, I will be sharing what I find out with other teachers.

Do I have to take part?
No. It's completely up to you to decide whether or not you take part. Your participation is voluntary and I won't mind at all if you decide not to.

What if I change my mind?
If you change your mind, you are free to stop (**withdraw**) **at any time** before or during the meet ups**. If you want to withdraw, please let me know, and I will** delete **any ideas or information you contributed to the study and destroy them.** It will not be possible, however, to withdraw after answering the first 11 questions (questionnaire) and pressing the 'submit' button because your name won't be on it and I won't know which responses are yours. It also won't be possible to withdraw after 2 weeks from the meet ups because your information will by then be stored with other participants' information and become a part of the findings.

What are the possible disadvantages and risks of taking part?
It is unlikely that there will be any major disadvantages to taking part. The questionnaire could take up to 15 minutes to complete and the meet ups could each take 20 to 30 minutes. I will, however, space them well apart and they are just questions about how you interact online.

Will my data be identifiable?
After the questionnaire and meet ups (interviews), only I, the researcher conducting this study and my supervisors will see the ideas you share with me. I will keep all personal information that you share with me, confidential, such as your name or information that can be used to identify you.

I will keep all personal information about you (e.g. your name and other information about you that can identify you) confidential, that is, I will not share it with others. I will remove any personal information from the written records and all reasonable steps will be taken to keep your contributions anonymous.

How will I use the information you have shared with me and what will happen to the results of the research study?
I will use the information you have shared with me only for research. This will include publishing my PhD thesis, journal articles and conference presentations for those interested in teaching and learning. I may also tell policy makers about what I find out. These are the people who make rules and take decisions about education. When writing up what I find out,

Appendix A2: *Ethics - Participant Consent Form*

Lancaster University

Thank you for considering taking part in this project.

CONSENT FORM

Project Title: This is How We Do It: An Exploratory Multiple Case Study of the Contextual Factors Enabling the Engagement of 10 to 16 Year Olds in Informal Learning Networks in London, UK

Name of Researcher: Oma Eguara

Researcher's Email: o.eguara@lancaster.ac.uk

Please tick each box

1. I confirm that I have read and understand the information sheet for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily.	☐
2. I understand that my participation is voluntary and that I am free to withdraw at any time during my participation in this study and within 2 weeks after I took part in the study, without giving any reason. If I withdraw within 2 weeks of taking part in the study my data will be removed.	☐
3. I understand that any information given by me may be used in future reports, academic articles, publications or presentations by the researcher, but my personal information will not be included and all reasonable steps will be taken to protect the anonymity of the participants involved in this project.	☐
4. I understand that my name will not appear in any reports, articles or presentations.	☐
5. I understand that any interviews will be audio-recorded and transcribed and that data will be protected on encrypted devices and kept secure.	☐
6. I understand that data will be kept according to University guidelines for a minimum of 10 years after the end of the study.	☐
7. I agree to take part in the above study.	☐

_____	_____	_____
Name of Participant	Date	Signature
_____	_____	_____
Name of Responsible Adult	Date	Signature

I confirm that the responsible adult and participant were given an opportunity to ask questions about the study, and all the questions asked have been answered correctly and to the best of my ability. I confirm that the individual has not been coerced into giving consent, and the consent has been given freely and voluntarily.

Signature of Researcher/person taking the consent_____ **Date** _____ Day/month/year

One copy of this form will be given to the participant and the original kept in the files of the researcher at Lancaster University

Appendix B1: *Data collection - Semi-structured interview questions*

Semi-structured Interview #1 Guide (questions may vary)

Remember that there are no right or wrong answers. Every answer is valuable information and I value your contributions as my co-researcher.

1. Researcher will ask a few questions about the questionnaire responses to clarify any points necessary.

2. To participant: Think about a time when you were enjoying learning something or sharing something you learned or made online. Draw a picture about that time, showing what you did and how you felt.

3. Researcher and participant talk about the picture and what it means to the participant: What would you like to tell me about this picture?

   (Researcher to elicit the following:
   Was there anyone else involved? What were they doing? How would you describe your friendship with them? How many times did you need to go online to learn/share? What websites/platforms did you visit in order to learn? How did you decide to get involved on the platform? Researcher aims to sketch a map of the ILN supporting this activity).

Thank you.

Semi-structured Interview #2 Guide (questions may vary)

Remember that there are no right or wrong answers. Every answer is valuable information and I value your contributions as my co-researcher.

1. Researcher to ask questions about Interview 1 responses to clarify any points necessary.

2. Researcher and participant have a go at miming things, like:
   * What a lovely day it is! I'm going outside to play.
   * I'm at the cinema watching a scary movie!
   Researcher and participant have a turn each playing charades.

   not school-related? What were you looking for? How did it go? Using mime like we did just now, tell me how it went. Researcher to elicit participant's interpretations of the mimes and probe for deeper understanding of their engagement habits. Look out for indicators of engagement/disengagement. Find out what participant feels helps them to share/learn/participate online (contextual factors).

4. Re-visit Questionnaire Q3 a & b.

Thank you

Appendix B2: *Data collection - Online questionnaire*

Lancaster University

Introduction:

Welcome to this research study and thank you for your interest.

If you decide for your child/ward to participate, they will be doing so as a valued co-researcher.

This study is a PhD project looking into what is in young people's out-of-school, online networks that keeps them actively involved and learning with each other at a time when many are losing interest in formal schooling. The questions ask about your (child's) out-of-school interests. The findings will be used to make recommendations for improving school engagement and academic achievement. Adult guidance may be needed to understand the questions.

This questionnaire is made up of 22 short questions. Participants can stop and withdraw at any point. However, once you click to submit, your responses cannot be withdrawn as your responses will not be identifiable. This questionnaire should take 5 to 10 minutes to complete and your participation is voluntary (i.e. you do not have to do this; you can decide not to). There are no right or wrong responses. All responses will be valuable.

Will my data be identifiable? Will anyone know it's me?

Only I (Oma Eguara), the researcher, and my supervisors will see the ideas you share with me. I will keep all details you provide confidential and take all reasonable steps to keep your contributions anonymous. I recommend that you do not provide your name as it is not necessary for this study.

How will you use the information I have shared with you and what will happen to the results of the research study?

I will use the information only for research. This will include publishing my PhD thesis, journal articles and conference presentations. I may also tell policy makers about what I find out. When writing up the findings, I would like to use some of the views and ideas you have shared with me. I will only use quotes from what you've said, so that although I use your exact words, there will be no names attached.

Note to responsible adult (i.e. parent or guardian of prospective participants):

If anything the participant tells me in the questionnaire suggests that they or somebody else might be at risk of harm, I will be obliged to share this information with my supervisor.

How will my data be stored?

Your data will be stored in encrypted files and on password-protected computers. I will store hard copies of any data securely in locked cabinets. In accordance with the university guidelines, I will keep the data securely for a minimum of ten years.

What if I have a question or concern?

Please contact myself, Oma Eguara at o.eguara@lancaster.ac.uk

Or my supervisor: Professor Don Passey, d.passey@lancaster.ac.uk

For any concerns or complaints you might wish to discuss with a person not directly involved in the research, please contact my Head of Department, Professor Paul Ashwin at paul.ashwin@lancaster.ac.uk

Sources of support:

* For information on supporting children's online safety, please visit: https://www.nspcc.org.uk/keeping-children-safe/online-safety

* If you are worried about something that you or a young person may have experienced online, please contact the NSPCC helpline for free support and advice. Call 0808 800 5000 or contact NSPCC online at https://www.nspcc.org.uk/keeping-children-safe/reporting-abuse/what-if-suspect-abuse/

* Children can contact Childline any time at https://www.childline.org.uk/

By clicking the button below, you show that you understand that:

* Your (child's/ward's) participation in this research is voluntary.

* You have read and understand the information above, have had the opportunity to ask questions and have them answered satisfactorily.

* You may choose to terminate your participation at any time, without explanation, up until you submit your responses.

* After submission, your information cannot be retrieved or deleted but will be handled confidentially.

- ◯ I consent. Let's begin the study!
- ◯ I do not consent. I do not wish to participate.

Lancaster University

Q1. What is your favourite activity to do when you go online?

Q2. How do you like to do this favourite activity?

- ◯ I like to do this by myself.
- ◯ I like to do this with others.
- ◯ I like to do this by myself as well as with others.

Q3. How many times would you say you go online to do this favourite activity in a week?

- ◯ 1 - 3 times
- ◯ 4 - 6 times
- ◯ 7 - 10 times
- ◯ More than 10 times

Q4. Where do you go online to do this favourite activity? Please name all the online places you go to for this.

Q5. How active are you there (how much do you do)? Select one option.

- ◯ I am very active. I post, interact and do a lot.
- ◯ I am a bit active. I don't post, interact or do much.
- ◯ I am not very active. I don't do much and I mainly just watch others.

Q6. Which of these is/are true about you? Select all that describe you.

- ☐ I'm a consumer - I read, watch, listen to or join activities online.
- ☐ I'm a sharer - I share things I find with others.
- ☐ I'm a creator - I make things and share them online e.g. a photo I took, something I wrote or a video I made.
- ☐ I'm a helper - I help others online e.g. I answer questions or give advice.
- ☐ I'm social - I like to meet up with others online.
- ☐ I'm private - I only connect with a few friends online that my parents/guardians approve of.
- ☐ I'm a joiner - I join things that others have started.
- ☐ I'm a starter - I start things and others join me or read/watch/look at/listen to what I post.

Q7. What is one thing that you have learnt about, or that you have learnt to do, online recently?

Q8. How did you learn it? Select all the ways you learned.

- [ ] I asked someone I know.
- [ ] I asked someone I don't know.
- [ ] I watched a video.
- [ ] I listened to a recording e.g. podcast, radio show, video or voice message.
- [ ] I searched online e.g. Google, YouTube or Instagram.
- [ ] I asked in a group e.g. Whatsapp, Discord or Snapchat.
- [ ] I got information from a website.
- [ ] Other

Q9. Why did you want to learn it?

Q10. Which of these best describes you? Choose one option.

- ◯ I prefer learning in school with a teacher teaching me.
- ◯ I prefer learning things by myself, searching for answers online.
- ◯ I like learning in school with a teacher and also learning the things I am interested in on the internet, by myself.
- ◯ I like learning things with others in a group online.

Q11. What devices do you use to go online? Select all that apply.

- [ ] Mobile phone
- [ ] Laptop computer
- [ ] Desktop computer
- [ ] iPad
- [ ] Tablet
- [ ] Games console
- [ ] Smart TV
- [ ] Other

Q12. Which of these describes you? I am ...

- ◯ 10 years old
- ◯ 11 years old
- ◯ 12 years old
- ◯ 13 years old
- ◯ 14 years old
- ◯ 15 years old
- ◯ 16 years old

.. For the next 10 questions, please look at the statement and choose the option below it that best describes how you feel about it:

Q13. I have learnt the skills to find the information that interests me and to create and share new information on these interests (e.g. writing posts or articles, creating videos, pictures, music, podcasts, etc.).

- ◯ I strongly agree.
- ◯ I agree.
- ◯ I neither agree nor disagree.
- ◯ I disagree.
- ◯ I strongly disagree.

Q14. In school, I feel that these skills are valued by the teacher.

- ◯ I strongly agree.
- ◯ I agree.
- ◯ I neither agree nor disagree.
- ◯ I disagree.
- ◯ I strongly disagree.

Q15. In school, I have opportunities to find information and to create and share new information (e.g. writing posts or articles, creating videos, pictures, music, podcasts, etc.).

- ◯ I strongly agree.
- ◯ I agree.
- ◯ I neither agree nor disagree.

- ◯ I disagree,
- ◯ I strongly disagree.

Q16. I feel that, as children get older, my school allows them to make more decisions about what they learn and how they learn it.

- ◯ I strongly agree.
- ◯ I agree.
- ◯ I neither agree nor disagree.
- ◯ I disagree.
- ◯ I strongly disagree.

Q17. In my online friendship groups, where we share information about what interests us, I feel that my friends value what I share.

- ◯ I strongly agree.
- ◯ I agree.
- ◯ I neither agree nor disagree,
- ◯ I disagree.
- ◯ I strongly disagree.

Q18. In my online friendship groups, everyone is equal. There are no leaders or teachers.

- ◯ I strongly agree.
- ◯ I agree.
- ◯ I neither agree nor disagree.
- ◯ I disagree.
- ◯ I strongly disagree.

Q19. In my online friendship groups, I feel that I can fully use my digital abilities (I get the chance to use all the technological skills I have developed to find and do what I want to do online, with my friends or by myself).

- ◯ I strongly agree,
- ◯ I agree.
- ◯ I neither agree nor disagree.
- ◯ I disagree.
- ◯ I strongly disagree.

Q20. In my school activities, I feel that I can fully use my digital abilities (I get the chance to use all the technological skills I have developed to help myself at school).

- ◯ I strongly agree.
- ◯ I agree,

- ◯ I neither agree nor disagree,
- ◯ I disagree.
- ◯ I strongly disagree.

Q21. The topics and skills I learn in school are useful for my everyday life.

- ◯ I strongly agree.
- ◯ I agree.
- ◯ I neither agree nor disagree.
- ◯ I disagree,
- ◯ I strongly disagree.

Q22. The topics and skills I learn on my own, online, are useful for my everyday life.

- ◯ I strongly agree.
- ◯ I agree
- ◯ I neither agree nor disagree.
- ◯ I disagree.
- ◯ I strongly disagree.

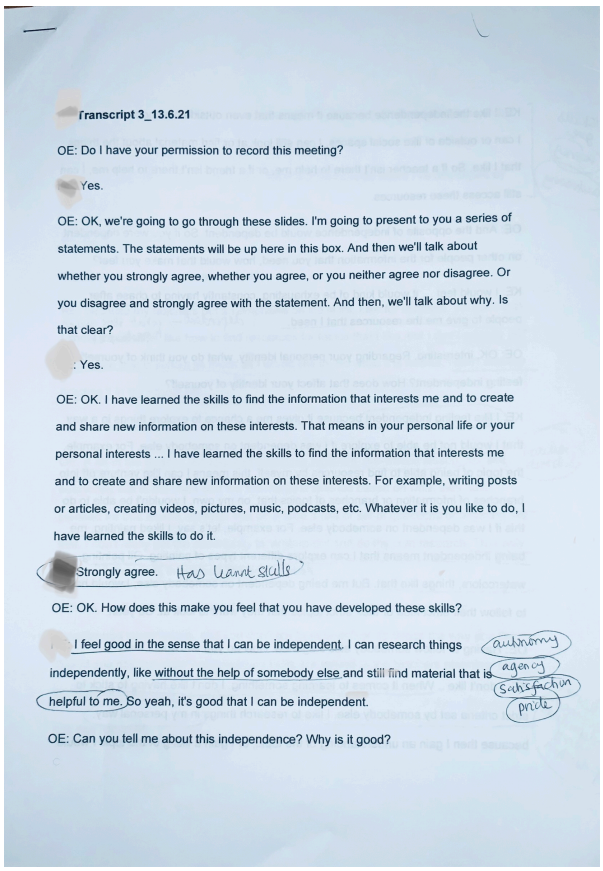
Q23. Optional: Do you have any other comments that you would like to share about what makes you spend time online outside school, learning the things that interest you? If you do, please share them in the box below. If not, please click on the two arrows at bottom, right to exit this questionnaire. Thank you!

Thank you for completing this questionnaire. I appreciate the time you have taken.

Kind regards,

Oma Eguara

Appendix C1: *Data analysis - Initial thoughts on P3 interview transcript*



Transcript 3_13.6.21

OE: Do I have your permission to record this meeting?

Yes.

OE: OK, we're going to go through these slides. I'm going to present to you a series of statements. The statements will be up here in this box. And then we'll talk about whether you strongly agree, whether you agree, or you neither agree nor disagree. Or you disagree and strongly agree with the statement. And then, we'll talk about why. Is that clear?

: Yes.

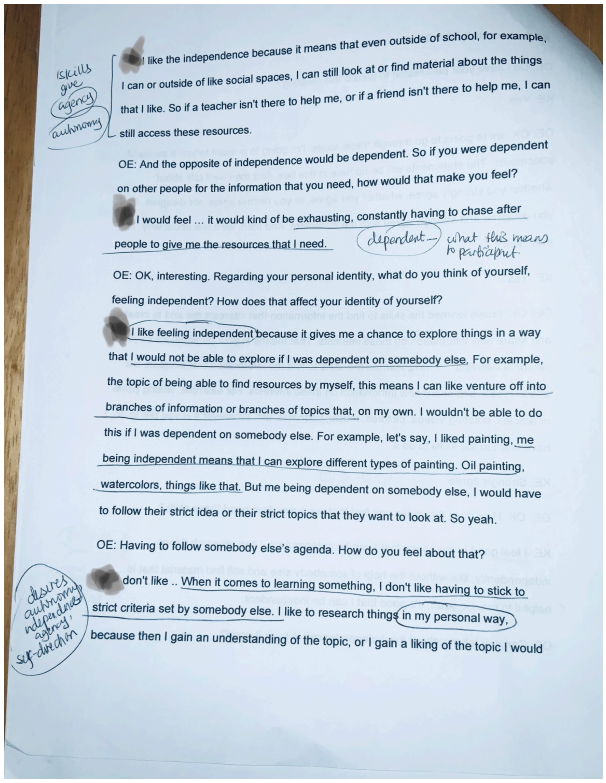
OE: OK. I have learned the skills to find the information that interests me and to create and share new information on these interests. That means in your personal life or your personal interests ... I have learned the skills to find the information that interests me and to create and share new information on these interests. For example, writing posts or articles, creating videos, pictures, music, podcasts, etc. Whatever it is you like to do, I have learned the skills to do it.

Strongly agree. Has learnt skills

OE: OK. How does this make you feel that you have developed these skills?

I feel good in the sense that I can be independent. I can research things independently, like without the help of somebody else and still find material that is helpful to me. So yeah, it's good that I can be independent. autonomy agency Sachsfachen pride

OE: Can you tell me about this independence? Why is it good?



I like the independence because it means that even outside of school, for example, I can or outside of like social spaces, I can still look at or find material about the things that I like. So if a teacher isn't there to help me, or if a friend isn't there to help me, I can still access these resources. (S)Skills give agency autonomy

OE: And the opposite of independence would be dependent. So if you were dependent on other people for the information that you need, how would that make you feel?

I would feel ... it would kind of be exhausting, constantly having to chase after people to give me the resources that I need. dependent — what this means to participant

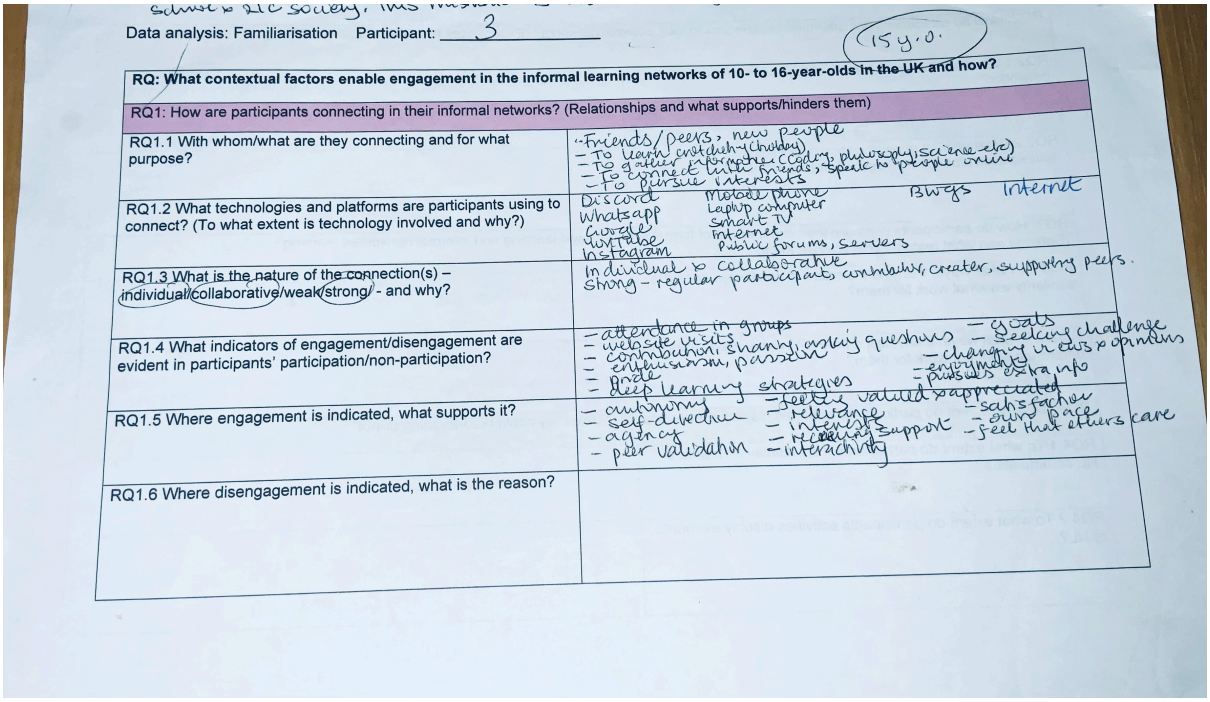
OE: OK, interesting. Regarding your personal identity, what do you think of yourself, feeling independent? How does that affect your identity of yourself?

I like feeling independent because it gives me a chance to explore things in a way that I would not be able to explore if I was dependent on somebody else. For example, the topic of being able to find resources by myself, this means I can like venture off into branches of information or branches of topics that, on my own. I wouldn't be able to do this if I was dependent on somebody else. For example, let's say, I liked painting, me being independent means that I can explore different types of painting. Oil painting, watercolors, things like that. But me being dependent on somebody else, I would have to follow their strict idea or their strict topics that they want to look at. So yeah.

OE: Having to follow somebody else's agenda. How do you feel about that?

don't like .. When it comes to learning something, I don't like having to stick to strict criteria set by somebody else. I like to research things in my personal way, because then I gain an understanding of the topic, or I gain a liking of the topic I would desires autonomy independency agency self-direction

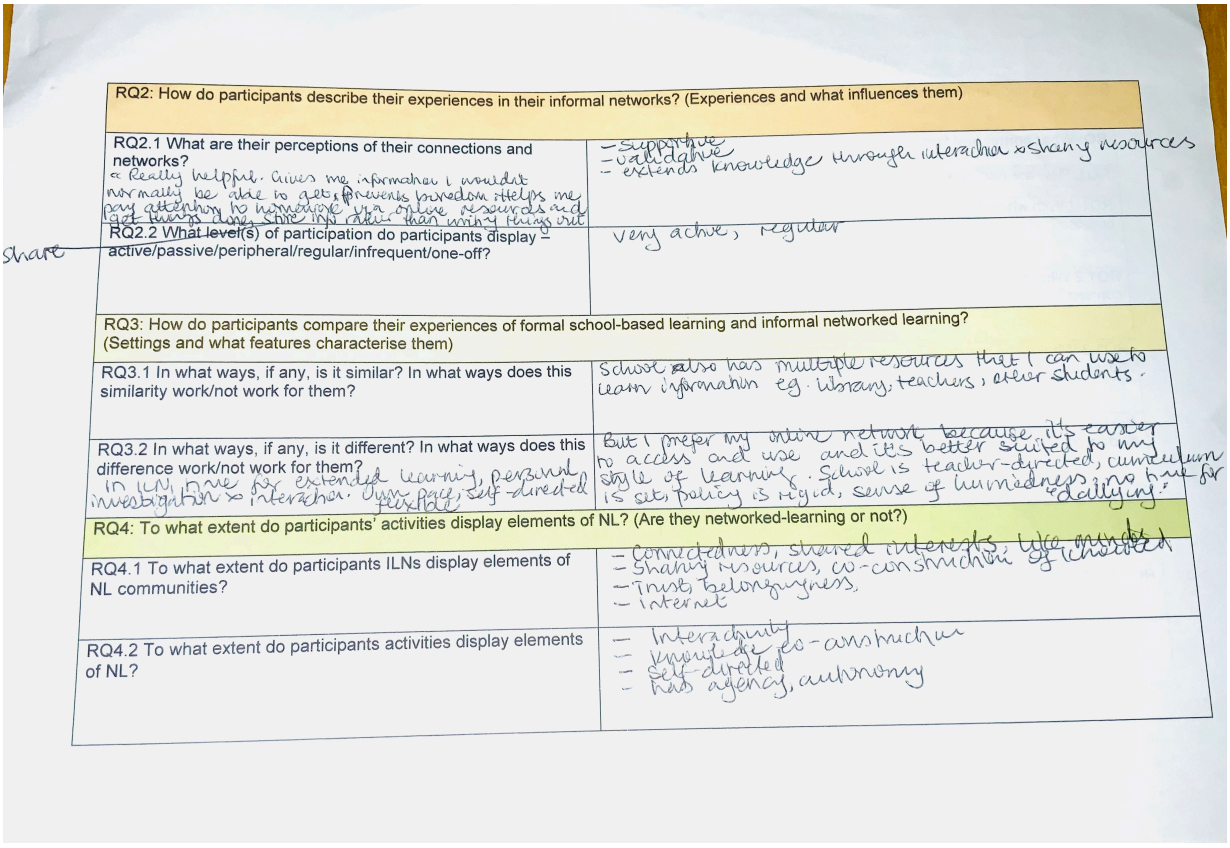
Appendix C2: *Data analysis – P3 Familiarisation sheet*



Data analysis: Familiarisation Participant: 3

15 y.o.

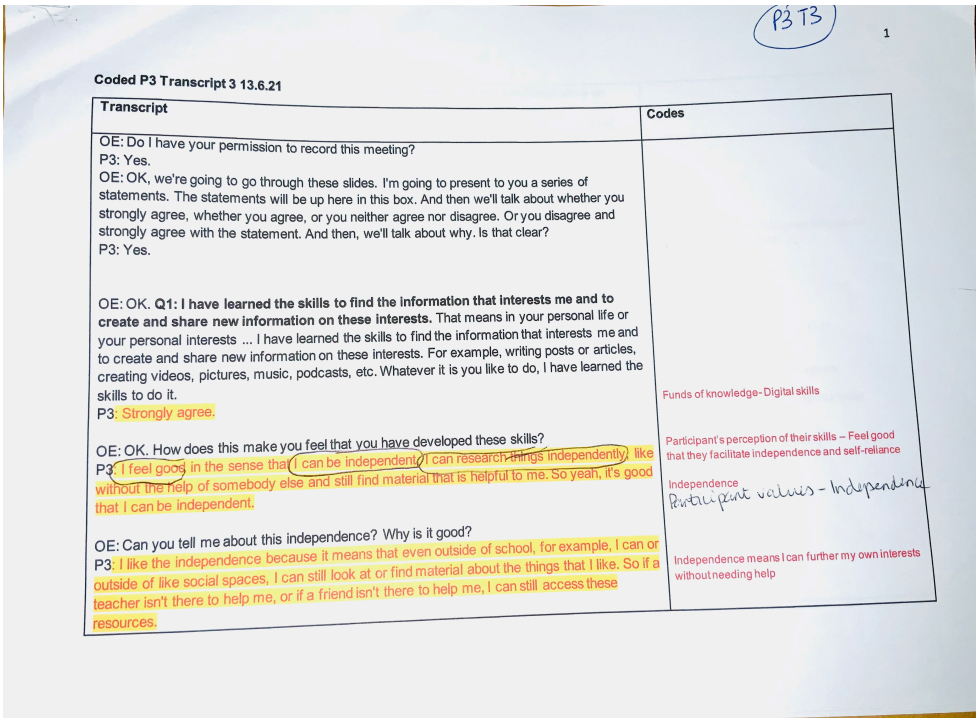
RQ: What contextual factors enable engagement in the informal learning networks of 10- to 16-year-olds in the UK and how?	
RQ1: How are participants connecting in their informal networks? (Relationships and what supports/hinders them)	
RQ1.1 With whom/what are they connecting and for what purpose?	"Friends/peers, new people – To learn creativity (hobby) – To gather information (coding, philosophy, science etc) – To connect with friends, speak to people online – To pursue interests
RQ1.2 What technologies and platforms are participants using to connect? (To what extent is technology involved and why?)	Discord, Whatsapp, Google, YouTube, Instagram, Mobile phone, Laptop computer, Smart TV, Internet, Public forums, servers, Blogs, Internet
RQ1.3 What is the nature of the connection(s) – individual/collaborative/weak/strong/ - and why?	Individual > collaborative strong – regular participant, contributor, creator, supporting peers.
RQ1.4 What indicators of engagement/disengagement are evident in participants' participation/non-participation?	– attendance in groups – website visits, sharing, asking questions – conversation, passion – enthusiasm, passion – Drive – Deep learning strategies – goals – seeking challenge – changing views/opinions – enjoyment – passion, extra info
RQ1.5 Where engagement is indicated, what supports it?	– autonomy – self-direction – agency – peer validation – feeling valued/appreciated – relevance – interests – mentoring support – interactivity – school/teacher – sense of belonging – feel that others care
RQ1.6 Where disengagement is indicated, what is the reason?	



RQ2: How do participants describe their experiences in their informal networks? (Experiences and what influences them)	
RQ2.1 What are their perceptions of their connections and networks? « Really helpful. Gives me information I wouldn't normally be able to get, prevents boredom, helps me pay attention to homework via online resources and I get things done since I'm able to then enjoy things out	– supportive – validating – extends knowledge through interaction > sharing resources
RQ2.2 What level(s) of participation do participants display – active/passive/peripheral/regular/infrequent/one-off?	very active, regular
RQ3: How do participants compare their experiences of formal school-based learning and informal networked learning? (Settings and what features characterise them)	
RQ3.1 In what ways, if any, is it similar? In what ways does this similarity work/not work for them?	School also has multiple resources that I can use to learn information eg. library, teachers, other students.
RQ3.2 In what ways, if any, is it different? In what ways does this difference work/not work for them? In ILN, more for extended learning, personal investigation > interaction. Open, flexible, self-directed	But I prefer my online network because it's easier to access and use and it's better suited to my style of learning. School is teacher-directed, curriculum is set, policy is rigid, sense of hurriedness, no link for dallying?
RQ4: To what extent do participants' activities display elements of NL? (Are they networked-learning or not?)	
RQ4.1 To what extent do participants ILNs display elements of NL communities?	– Connectedness, shared interests, like minded – Sharing resources, co-construction eg (checked) – Trust, belongingness, – Internet
RQ4.2 To what extent do participants activities display elements of NL?	– Interactivity – knowledge co-construction – self-directed – has agency, autonomy

Share

Appendix C3: *Data analysis – Example coded data extracts*

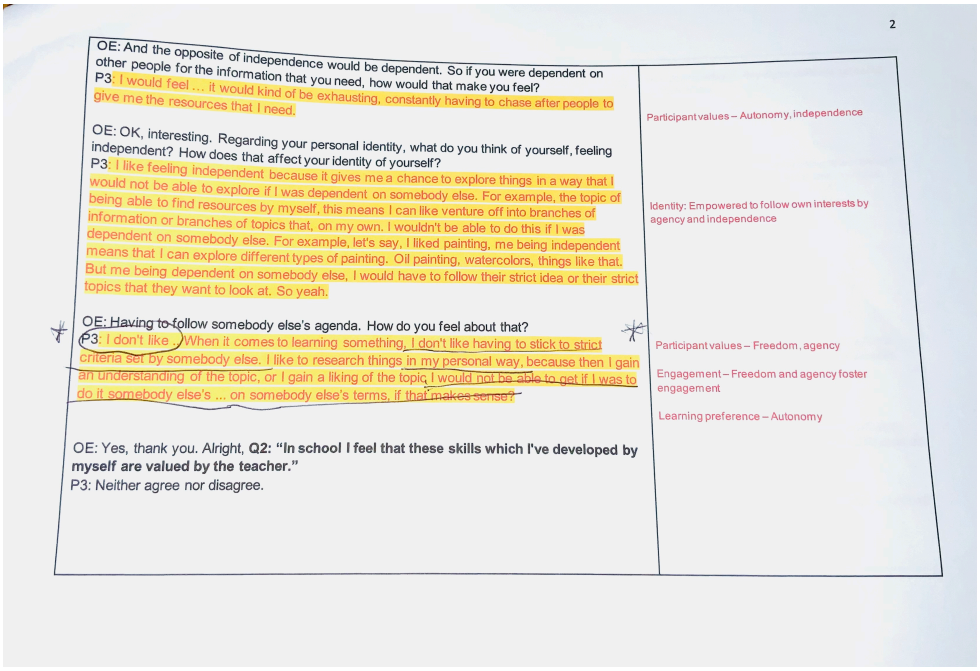


P3 T3

1

Coded P3 Transcript 3 13.6.21

Transcript	Codes
OE: Do I have your permission to record this meeting? P3: Yes. OE: OK, we're going to go through these slides. I'm going to present to you a series of statements. The statements will be up here in this box. And then we'll talk about whether you strongly agree, whether you agree, or you neither agree nor disagree. Or you disagree and strongly agree with the statement. And then, we'll talk about why. Is that clear? P3: Yes.	
OE: OK. **Q1: I have learned the skills to find the information that interests me and to create and share new information on these interests.** That means in your personal life or your personal interests ... I have learned the skills to find the information that interests me and to create and share new information on these interests. For example, writing posts or articles, creating videos, pictures, music, podcasts, etc. Whatever it is you like to do, I have learned the skills to do it. P3: Strongly agree.	Funds of knowledge- Digital skills
OE: OK. How does this make you feel that you have developed these skills? P3: I feel good in the sense that I can be independent, I can research things independently, like without the help of somebody else and still find material that is helpful to me. So yeah, it's good that I can be independent.	Participant's perception of their skills – Feel good that they facilitate independence and self-reliance Independence Participant values - Independence
OE: Can you tell me about this independence? Why is it good? P3: I like the independence because it means that even outside of school, for example, I can or outside of like social spaces, I can still look at or find material about the things that I like. So if a teacher isn't there to help me, or if a friend isn't there to help me, I can still access these resources.	Independence means I can further my own interests without needing help



2

OE: And the opposite of independence would be dependent. So if you were dependent on other people for the information that you need, how would that make you feel? P3: I would feel ... it would kind of be exhausting, constantly having to chase after people to give me the resources that I need.	Participant values – Autonomy, independence
OE: OK, interesting. Regarding your personal identity, what do you think of yourself, feeling independent? How does that affect your identity of yourself? P3: I like feeling independent because it gives me a chance to explore things in a way that I would not be able to explore if I was dependent on somebody else. For example, the topic of being able to find resources by myself, this means I can like venture off into branches of information or branches of topics that, on my own. I wouldn't be able to do this if I was dependent on somebody else. For example, let's say, I liked painting, me being independent means that I can explore different types of painting. Oil painting, watercolors, things like that. But me being dependent on somebody else, I would have to follow their strict idea or their strict topics that they want to look at. So yeah.	Identity: Empowered to follow own interests by agency and independence
OE: Having to follow somebody else's agenda. How do you feel about that? P3: I don't like ... When it comes to learning something, I don't like having to stick to strict criteria set by somebody else. I like to research things in my personal way, because then I gain an understanding of the topic, or I gain a liking of the topic I would not be able to get if I was to do it somebody else's ... on somebody else's terms, if that makes sense?	Participant values – Freedom, agency Engagement – Freedom and agency foster engagement Learning preference – Autonomy
OE: Yes, thank you. Alright, **Q2: "In school I feel that these skills which I've developed by myself are valued by the teacher."** P3: Neither agree nor disagree.	

Appendix C4: *Data analysis – Example P3 codes*

P3 Codes

1. Network value - interesting perspectives
2. Network value - Interesting opinions
3. Network value - Knowledgeable peers
4. Network value - Good for talking with on similar interests
5. Network value - Chat reviver, comic relief
6. Network value - Connection, feeling understood
7. Network value - Use peer for inspiration
8. Network value - Giving each other advice
9. Network value - Knowledgeable peer
10. Relationships - Weak ties
11. Relationships - Virtual friend
12. Relationships - Real life close friend from school
13. Relationships - Connection facilitated by similar interests
14. Relationships - Enthusiastic about this relationship
15. Similar interests
16. Similar circumstances
17. Participation - Talking to/with
18. Participation - Discuss school work
19. Participation - Discuss non-academic things
20. Interests
21. Motivation - Participant likes the topic, further exploration
22. Learning preference – self and with others
23. Participation – With people I know and people I don't
24. Participation – Talking about common interests
25. Platforms – Discord, WhatsApp and public forums
26. Interest – Philosophy
27. Platforms – YouTube
28. Participation – Watching videos on YouTube
29. Participation – Sharing info on Discord
30. Participation – Join servers on Discord for specific interests
31. Participation – Discuss specific interests with friends
32. Participation – With known and unknown people
33. Participation motivated by similar interests
34. Participation – Talking or discussing
35. Motivation – Interest, I just like it
36. Participation – Visiting YouTube, blogs, talking with friends, reading online
37. Platforms – WhatsApp, Discord
38. Relationships – Friends on Discord, only close friends on WhatsApp
39. Participation – Talking about readings, asking for suggestions, getting information
40. Resources – People, websites, books, blogs
41. Participation – Contributing links to articles or books of interest
42. Participation – In speaking forums
43. Participation – Finding and contributing information
44. Engagement – More active with close friends, less active with non-friends
45. Participation – Consumer, sharer, helper, social
46. Participation – Joiner
47. Participation – Asking someone I know
48. Participation – With known and unknown people
49. Participation – One-off expressing interest in a topic, receiving recommendations
50. Participation – Watch video, listening to resources, searching for info, reading books
51. Learning preference – Prefer own learning
52. Learning preference – Learning at own pace, focusing on things of interest
53. Funds of knowledge – Digital skills acquired from participation and taught in school *
54. Comparing settings – Don't get to use digital skills in school as schoolwork isn't digital (analogue?)
55. Comparing settings – School learning a bit frustrating, not the way that suits me best.
56. Comparing settings – Boring and draining energetically
57. Engagement – Would engage more if able to learn in the way that suits me best
58. Disengagement – I lose focus when made to learn in ways that do not suit me
59. Own learning – I do not get bored or lose focus
60. Comparing settings – School learning requires a lot more concentration and focus
61. Comparing settings – With own learning, I work at my own pace and do not lose focus, or get back on track easily
62. Comparing settings – I preferred home learning in the pandemic
63. Comparing settings – I learned at my own pace and in my preferred conditions with home learning
64. Comparing settings – I had more autonomy with home learning

---

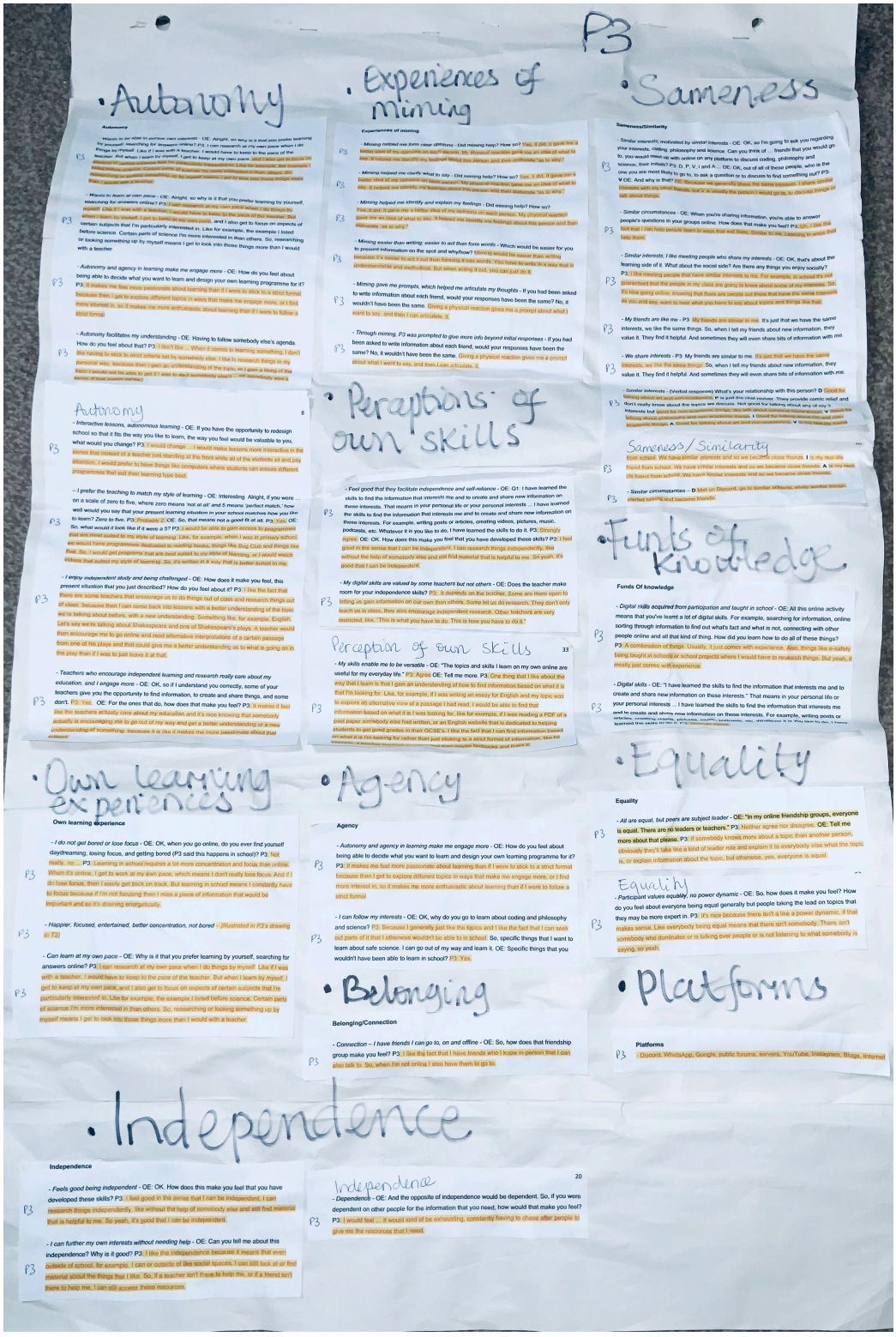
1. Relationships	**2. Learning Preference**	**3. Sameness/Similarity**	**4a. Comparing settings**	**4b. Comparing settings contd.**
- Weak ties - Virtual friend - Real life close friend from school - Connection facilitated by similar interests - Enthusiastic about this relationship - Friends on Discord, only close friends on WhatsApp	- Self and with others - Prefer own learning - Learning at own pace, focusing on things of interest - Engagement - I can portray my thoughts clearer when I type them - Online, I can disconnect from conversations after they happen if I'm exhausted or tired. - I prefer to watch videos than talking to people, but I still like talking to people - Challenging perspectives Autonomy - Interactive lessons, autonomous learning - I prefer the teaching to match my style of - I enjoy independent study and being challenged - Teachers who encourage independent learning and research really care about my education, and I engage more.	- Similar interests - Similar circumstances - Similar interests - I like meeting people who share my interests - My friends are like me. - We share interests.	- Don't get to use digital skills in school as schoolwork isn't digital (analogue?) - School learning a bit frustrating, not the way that suits me best. - Boring and draining energetically - School learning requires a lot more concentration and focus - With own learning, I work at my own pace and do not lose focus, or get back on track easily - I preferred home learning in the pandemic - I learned at my own pace and in my preferred conditions with home learning - I had more autonomy with home learning - I learned at my own pace and in my preferred conditions with home learning - In school, classmates may not share my interests - In own learning, people with similar interests want to hear what you have to say - Easier to communicate online than in-person - My digital skills are not called upon in school - School learning is teacher-led - I don't get to use my digital skills in school - In my peer group, sharing info, challenging each other's views means I get to fully use my abilities - School structures inhibit my engagement. - School learning not that useful - My versatile skills make me an agile learner. Being restricted by teacher directives inhibits my engagement and learning.	- In school, lessons are teacher-led and restrictive - School learning is a poor match for the way I like to learn - Primary education was a better match for my learning style - Primary school lessons were more engaging because they were interactive - Secondary school lessons are like an office job, just something you have to do. - Some teachers and subjects encourage autonomy and extending learning beyond the class. Some don't. - School has become increasingly more restrictive from primary to secondary school - Primary school was more interactive, with some autonomy. Secondary school is rigid. - Worker mentality in secondary school. Do as the boss says, without opinion. - I have adjusted to a system I do not like - I feel my contributions are not valued in my classroom setting - In school, we are in a hurry to complete tasks. - In own learning with friends, no rush; I can go into detail and extend my learning - When teachers encourage autonomy and creativity, it feels more equal. - Teachers who do not encourage autonomy and creativity are domineering - Teacher dominance distracts me from learning because I am trying to keep their rules
5. Interests - Interests - Philosophy - Computer Science/Coding - Art	**6. Resources** - People, websites, books, blogs - Static resources can be limiting. The internet can be freeing.	**7. Network value** - Interesting perspectives - Interesting opinions - Knowledgeable peers - Good for talking with on similar interests - Chat reviver, comic relief - Connection, feeling understood - Use peer for inspiration - Giving each other advice - Knowledgeable peer **8. Independence** - Independence - Independence means I can further my own interests without needing help		

Appendix C5: *Data analysis – Coding scheme extract*

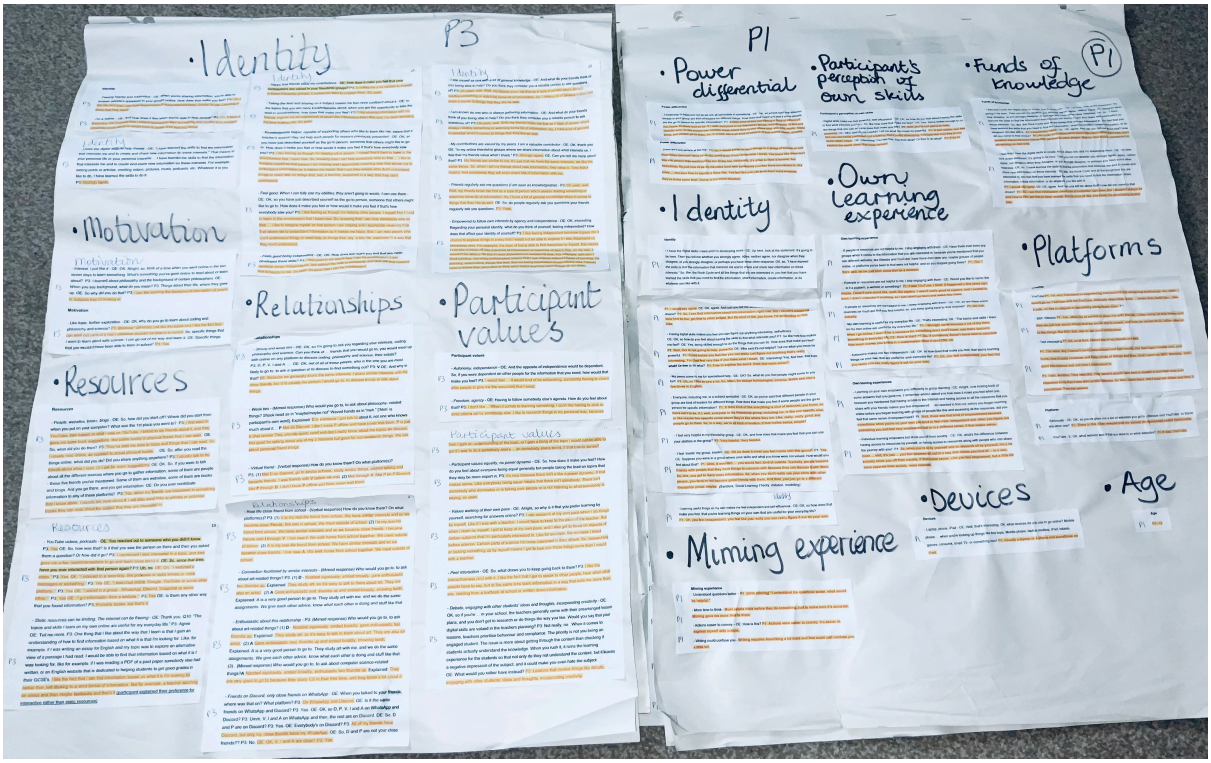
Code scheme

Codes	**Meanings**
1. Interests	Things that participants are interested in, that form the basis of their own autonomous learning
2. Relevance	What participants deem important, how important something is, what makes something important to them
3. Support	Help participants get from the people and resources in their Personal Learning Networks, PLNs
4. Resources	Means or items that support participants' interests
5. Trust	Belief in the goodness or ability of others in the PLs
6. Relationships	The way participants are connected to others in their PLNs, the nature of this connection
7. Learning preference	The ways in which participants prefer to learn
8. Sameness/Similarity	The ways in which participants are, or view themselves as, like their PLN peers; what this means to them
9. Comparing settings	Expressing how school learning and participants' own learning are the same or different
10. Motivation	Participants' reasons for pursuing their interests in their PLNs
11. Access/ Accessibility	Means or ability to reach and utilise people and resources/ how easy it is to reach and utilise them
12. Security	The state of being safe or free from danger, feeling safe, actions taken to be safe and free from danger
13. Role of internet	The part played by the internet in participants' autonomous learning
14. Facilitation	What makes things easier
15. Participation/ Activity	What participant does, how they participate

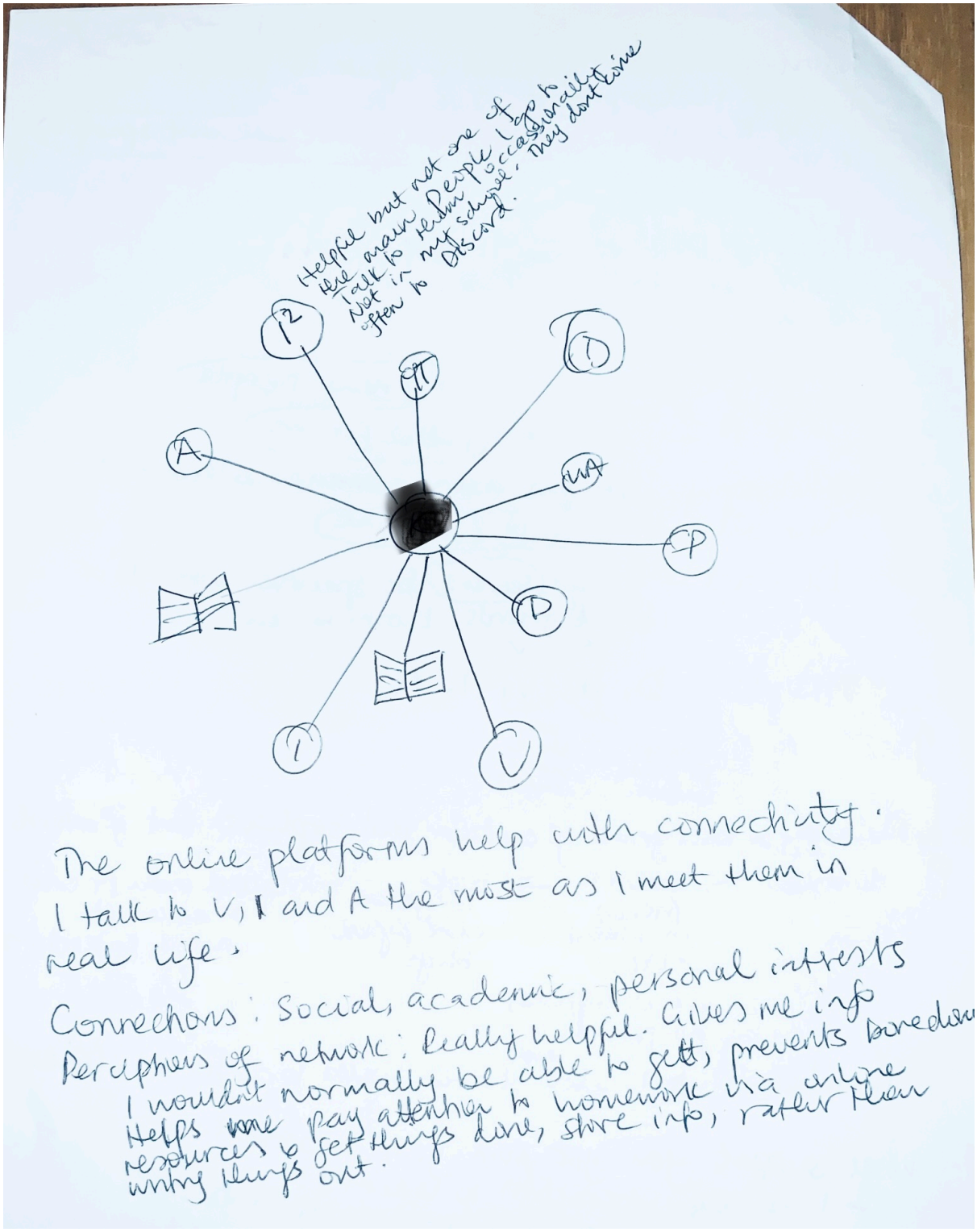
Appendix C6: *Data analysis – Example within-case analysis (P3)*



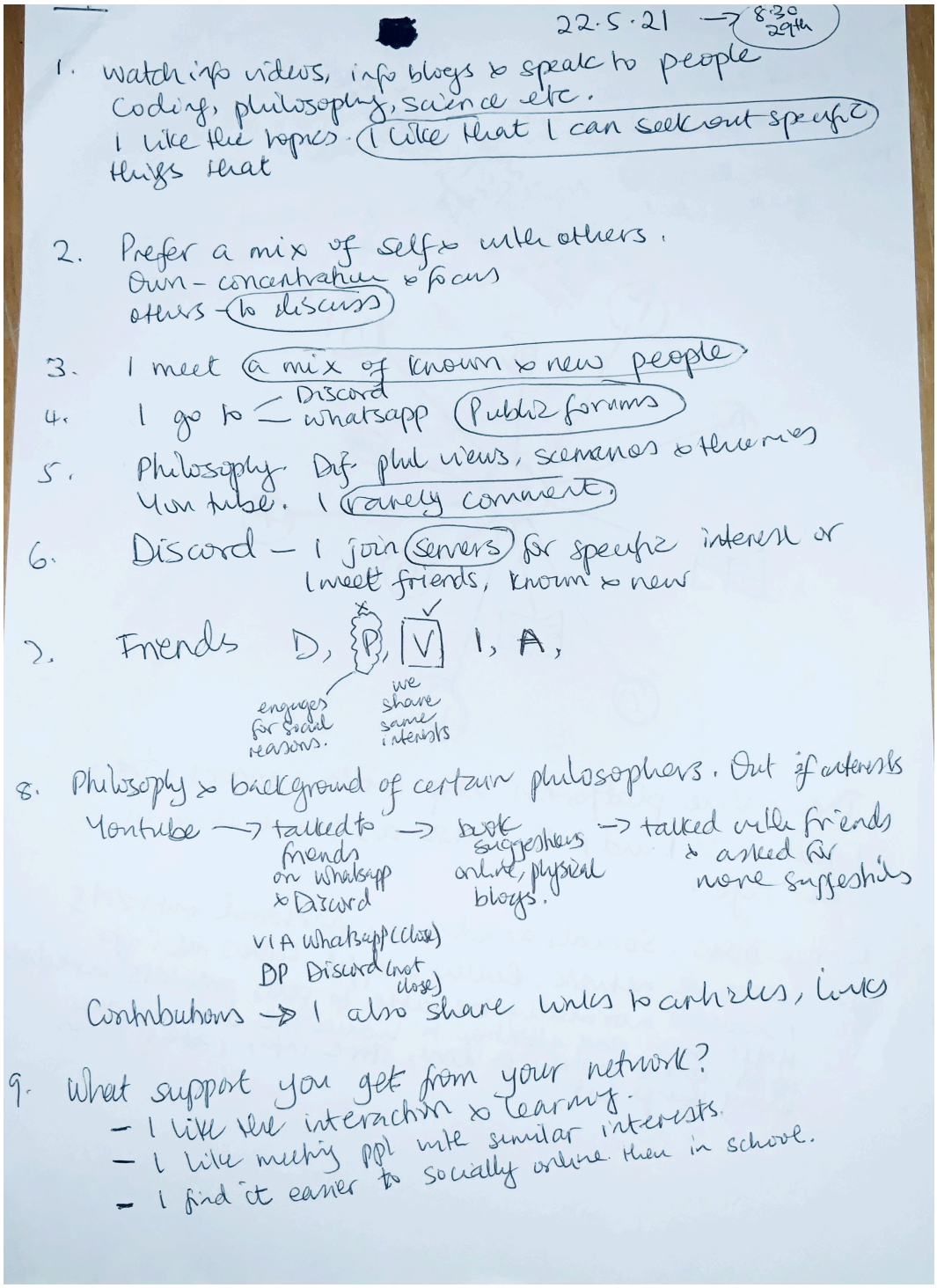
Appendix C7: *Data analysis – Example cross-case analysis (P1 and P3)*



Appendix C8: *Data analysis – Example diagram of participant's network*



Appendix C9: *Data analysis – Example field notes*



22.5.21 → 8:30 29th

1. Watch info videos, info blogs & speak to people
Coding, philosophy, science etc.
I like the topics. I like that I can seek out specific things that

2. Prefer a mix of self & with others.
Own – concentration & focus
others – to discuss

3. I meet a mix of known & new people

4. I go to – Discord / whatsapp / Public forums

5. Philosophy. Dif. phil views, scenarios & theories
Youtube. I rarely comment.

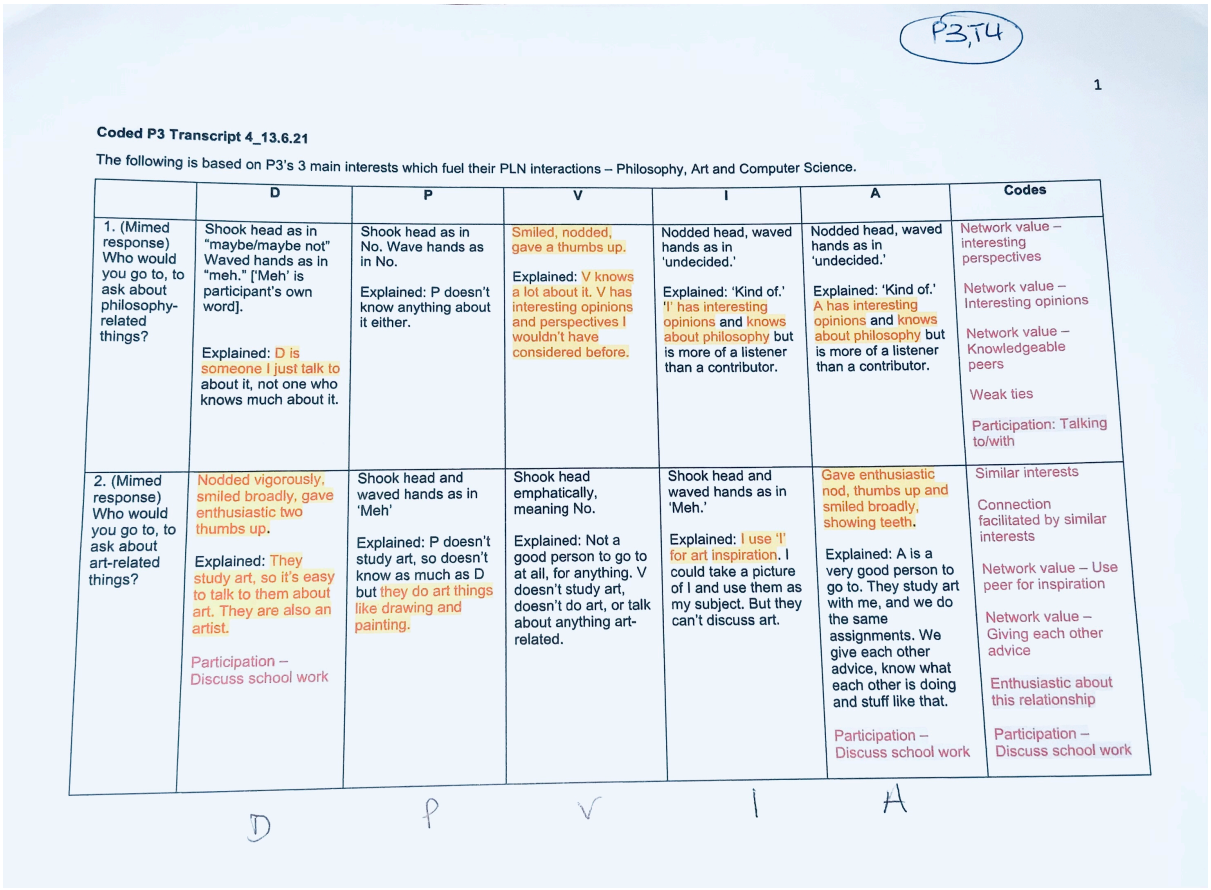
6. Discord – I join servers for specific interest or I meet friends, known & new

7. Friends D, P, V, I, A,
P – engages for social reasons.
V – we share same interests

8. Philosophy & background of certain philosophers. Out of interests
Youtube → talked to friends on whatsapp & Discord → book suggestions online, physical blogs. → talked with friends & asked for more suggestions
VIA whatsapp (close)
DP Discord (not close)
Contributions → I also share links to articles, links

9. What support you get from your network?
– I like the interaction & learning.
– I like meeting ppl with similar interests.
– I find it easier to socially online than in school.

Appendix C10*: Data analysis – Example coded M&T data*



P3,T4

Coded P3 Transcript 4_13.6.21

The following is based on P3's 3 main interests which fuel their PLN interactions – Philosophy, Art and Computer Science.

	D	P	V	I	A	Codes
1. (Mimed response) Who would you go to, to ask about philosophy-related things?	Shook head as in "maybe/maybe not" Waved hands as in "meh." ['Meh' is participant's own word]. Explained: D is someone I just talk to about it, not one who knows much about it.	Shook head as in No. Wave hands as in No. Explained: P doesn't know anything about it either.	Smiled, nodded, gave a thumbs up. Explained: V knows a lot about it. V has interesting opinions and perspectives I wouldn't have considered before.	Nodded head, waved hands as in 'undecided.' Explained: 'Kind of.' 'I' has interesting opinions and knows about philosophy but is more of a listener than a contributor.	Nodded head, waved hands as in 'undecided.' Explained: 'Kind of.' A has interesting opinions and knows about philosophy but is more of a listener than a contributor.	Network value – interesting perspectives Network value – Interesting opinions Network value – Knowledgeable peers Weak ties Participation: Talking to/with
2. (Mimed response) Who would you go to, to ask about art-related things?	Nodded vigorously, smiled broadly, gave enthusiastic two thumbs up. Explained: They study art, so it's easy to talk to them about art. They are also an artist. Participation – Discuss school work	Shook head and waved hands as in 'Meh' Explained: P doesn't study art, so doesn't know as much as D but they do art things like drawing and painting.	Shook head emphatically, meaning No. Explained: Not a good person to go to at all, for anything. V doesn't study art, doesn't do art, or talk about anything art-related.	Shook head and waved hands as in 'Meh.' Explained: I use 'I' for art inspiration. I could take a picture of I and use them as my subject. But they can't discuss art.	Gave enthusiastic nod, thumbs up and smiled broadly, showing teeth. Explained: A is a very good person to go to. They study art with me, and we do the same assignments. We give each other advice, know what each other is doing and stuff like that. Participation – Discuss school work	Similar interests Connection facilitated by similar interests Network value – Use peer for inspiration Network value – Giving each other advice Enthusiastic about this relationship Participation – Discuss school work

D P V I A

Appendix C11*: Data analysis – Participant reflections*

"I think that you have accurately represented what is going on in my friendship group. My friends are similar to me in the way that we incorporate our interests in wider learning. This creates a more friendly learning environment than conventional school lessons, which makes me less intimidated by new concepts and information and aligns more with the way I learn." (P3)

"In general, adults might think that friends distract you. However, in my experience my friends helped keep me on the right path and pushed me to achieve better." (P1)

Appendix C12*: Data analysis - Code reduction*

Initial codes	Final codes relevant to RQs after splitting and merging
1. Power differential	1. Equality
2. Equality	
3. Identity	2. Identity
4. Access/accessibility	3. Access/Accessibility
5. Web resources	4. Web resources
6. Values and goals	5. Values and goals
7. Engagement	Not a code but an observational focus (OF)
8. Disengagement	
9. Participation	
10. Positive community experiences	6. Positive community experiences
11. Difference	
12. Social learning	7. Social learning
13. Learning preferences	
14. Interactivity	8. Interactivity
15. Motivation	9. Interest
16. Interest	
17. Belonging/connectedness	10. Belonging/connectedness
18. Shared interests	11. Sameness/similarity
19. Sameness/similarity	
20. Relationships	12. Relationships
21. Funds of knowledge	13. Funds of knowledge
22. Personal interests	14. Personal interests
23. Relevance	15. Perceptions of relevance
	16. Relevance
24. Feeling the fit	17. Feeling the fit
25. Trust	18. Trust & security
26. Security	
27. Network value	OF
28. Role of Internet	OF
29. Autonomy	19. Agency & autonomy
30. Agency	
31. Miming experience	OF
32. Platforms	OF
33. Devices	OF

Appendix D: *Literature - Results of scoping review*

Authors	BERJ vol, issue	Methodology	Acknowledged need to work with children/made adjustments for their agentic participation	Country
1. Coates & Pimlott-Wilson (2019)	Feb 2019 vol 45, no. 1	Qual, phenomenology, semi-structured interviews	Non-evident	England
2. Moreno-Morilla, Guzman-Simon & Garcia-Jimenez (2019)	Feb 2019 vol 45, no. 1	Qual survey, self-report questionnaire	Non-evident	Spain
3. Trotman, Enow & Tucker (2019)	Apr 2019 Vol 45, no. 2	Qual, Case study, semi-structured interviews, focus groups	Recognised that the research topic could be difficult for the participants and required "particular sensitivity from the research team in the conduct of the research project" (p. 221).	England
4. Hoskins &Barker (2019)	Apr 2019 Vol 45, no. 2	Qual, Case study, interviews	Non-evident	England
5. Qazi & Shah (2019)	Jun 2019 Vol 45, no. 3	Qual, Focus groups	Participatory tools - mapping, drawing, problem tree	Pakistan
6. Dalziell, Booth, Boyle & Mutrie (2019)	Jun 2019 Vol 45, no. 3	Quant. Battery tests	Non-evident	Scotland
7. Kuzmina, Ivanova & Kaiky (2019)	Jun 2019 Vol 45, no. 3	Quant, Computerised test	Non-evident	Russia
8. Jones, Bisson, Gilmore & Inglis (2019)	Jun 2019 Vol 45, no. 2	Mixed methods, Standardised testing, written worksheet activity	Used comparative judgement "to assess student outputs for which traditional marking procedures are unreliable" p. 664.	England
9. Rawlings (2019)	Aug 2019 Vol 45, no. 4	Qual, Focus groups, interviews	Non-evident	Australia
10. Warren, Mason-Apps, Hoskins, Devonshire & Chanvin (2019)	Aug 2019 Vol 45, no. 4	Mixed Methods, Standardised test, questionnaire	Non-evident	England
11. Branigan & Donalds (2019)	Aug 2019 Vol 45, no. 4	Qual. Case study, participant observation, interview	Non-evident	Scotland

12. Addi-Raccah (2019)	Oct 2019 Vol 45, no. 5	Quant, online questionnaire	Non-evident	Israel
13. Jindal-Snape & Cantali (2019).	Dec 2019 Vol 45, no. 6	Mixed methods, online questionnaire	Non-evident	Scotland
14.Barker (2019).	Dec 2019 Vol 45, no. 6	Qual, interviews, informal ethnographic observations	Non-evident	England
15.McLay & Renshaw (2020)	Feb 2020 Vol 46 no. 1	Qual, micro-ethnography, group & individual interviews	Deployed "Membership Categorisation Analysis (MCA) to analyse the relationship between digital technology and young people's developing selves and their collective sense of identity" p.44.	Australia
16. Billingsley, Abedin & Nassaji (2020).	Feb 2020 Vol 46 no. 1	Quant, questionnaire, focus groups, survey	Questionnaire adapted for students' capabilities,	England
17. Haward (2020).	Apr 2020 Vol 46, no. 2	Qual, Grounded Theory, visual historic sources (VHS), semi-structured interviews, focus groups, lesson observations	Article suggests that VHS is used to make participation accessible to students	England
18. Brown & Dixon (2020).	Apr 2020 Vol 46, no. 2	Qual, photo elicitation, focus groups, questionnaire	"An innovative visual methodology was used to focus on student perspectives of mental health interventions in school" p. 379.	England
19. Moir, Boyle & Woolfson (2020).	Apr 2020 Vol 46, no. 2	Mixed methods, quasi-experiment, standardised test	Non-evident	Scotland
20. Hajar (2020)	Jun 2020 Vol 46, no. 3	Qual, semi-structured interview, individual & focus group semi-structured interviews, pupils' drawings	Pupils' drawings	England
21. McGillicuddy & Devine (2020)	Jun 2020 Vol 46, no. 3	Mixed methods, case study, questionnaire, focus group, sociometric analysis	Non-evident	Ireland
22. Chen, Zhang, Chan, Michaels, Resnick, Huang (2020).	Jun 2020 Vol 46, no. 3	Quant, standardised test	Non-evident	China

23. Jones (2020).	Aug. 2020 Vol 46, no. 4	Mixed methods - Questionnaire, participant observations, focus groups, semi-structured interviews	“Each question was read aloud to ensure all participants were able to access the language” p. 898.	Wales
24. McElwee & Fox (2020).	Oct. 2020 Vol 46, no. 5	Mixed methods pragmatic, focus groups, online survey	“A mixed methods approach was utilised to give a voice to respondents’ perspectives and experiences...” p. 1029.	England
25. Moore, Anthony, Hawkins, Van Godwin, Murphy, Hewitt & Melendez-Torres (2020).	Oct. 2020 Vol 46, no. 5	Quant, standardise survey		Wales
26. Henderson (2020)	Oct. 2020 Vol 46, no. 5	Mixed methods - Document analysis, online survey	Non-evident	Northern Ireland
27. Barrance (2020)	Dec. 2020 Vol 46, no. 6	Mixed methods - surveys, focus groups, participants as advisors	Participants as advisors	Northern Ireland & Wales
28. Cunninghame, Vernon & Pitman (2020).	Dec. 2020 Vol 46, no. 6	Quant, longitudinal survey	Non-evident	Australia
29. Scholes, Spina, Comber (2021).	Feb. 2021 Vol 47, no. 1	Qual - semi-structured interviews	Non-evident	Australia
30. Bellino (2020).	Aug. 2021 Vol 47 no. 4	Qual - semi-structured interviews, observations	Non-evident	Kenya
31. Dávila (2021)	Aug. 2021 Vol 47, no. 4			USA
32. Qazi & Taysum (2021)	Aug. 2021 Vol 47, no. 4	Mixed methods interviews, questionnaires	Participatory data - participants labelling and annotating assigning numbers to pictures	India
33. Hanna (2021)	Oct. 2021 Vol 47, no. 5	Qual - Group discussion, interviews	Non-evident	Wales
34. Dunlop, Atkinson, McKeown & Turkenburg-van Diepen	Dec. 2021 Vol. 47, no 6	Qual - focus groups	Non-evident	Northern Ireland & England
35. Xu & Knijnik (2021)	Dec. 2021 Vol. 47, no 6	Qual - Focus group interviews	Non-evident	Australia
36. York, MacKenzie & Purdy (2021)	Dec. 2021 Vol. 47, no 6	Qual, focus groups, semi-structured interviews	Non-evident	Northern Ireland

37. Hurry, Fridkin & Holliman	Feb. 2022 Vol. 48, no. 1	Quant, Quasi-experimental, standardised tests	Non-evident	England
38. Hajisoteriou, Panaou & Angelides	Apr. 2022 Vol. 48 no. 2	Qual. - Observation, interview, collaborative storytelling	Collaborative Storytelling	Cyprus
39. Scholes, Wallace, Walker, Brownlee & Lawson (2022)	Apr. 2022 Vol. 48 no. 2	Qual - Drawings, Interviews	Drawings and reflections, adapted for children “a newly developed protocol which involved pictorial and interview methodology designed to capture children’s reasoning in realistic situations involving a variety of perspectives” pp. 275-276.	Australia
40. Scholes & McDonald (2022)	Apr. 2022 Vol. 48 no. 2	Qual survey	Literacy support if participants struggled to complete the survey	Australia
41. Papadopoulou & Sidorenko (2022)	Apr. 2022 Vol. 48 no. 2	Qual, Questionnaires, interviews, observations	Acknowledged The New Sociology of Childhood and children’s rights Aimed to facilitate research-by-children, participatory research	England
42. Mariguddi & Cain (2022)	Jun 2022 Vol. 48 no.3	Qual Case study, observation, interview, document sources	Non-evident	England
43. Dillon, Craven, Guo, Yeung, Mooney, Franklin & Brockman (2022)	Aug 2022 Vol. 48 no. 4	Quant survey	Non-evident	Australia
44. Burrell & Beard (2022)	Oct 2022 Vol. 48 no. 5	Qual Standardised task	Non-evident	England
45. Wilkinson & Penney (2022)	Oct 2022 Vol. 48 no. 5	Qual Case study, semi-structured focus group	Non-evident	England

References

Alberts, A., Elkind, D., & Ginsberg, S. (2007). The personal fable and risk-taking in early adolescence. *Journal of Youth Adolescence, 36,* 71 - 76.

Alderson, P. & Morrow, V. (2020). *The Ethics of Research with Children and Young People: A Practical Handbook*. Sage Publications.

Alexander, K.L., Entwistle, D. R., & Horsey, C.S. (1997). From first grade forward: Early foundations of high school dropout. *Sociology of Education, 70*, 87-107.

Allen, J. L., Sylaska, K., & Mayer, J. D. (2021). Dynamic pathways of personality: A further development of the personality systems framework. In J. F. Rauthmann (Ed.), *The handbook of personality dynamics and processes* (pp. 689–707). Elsevier Academic Press. https://doi.org/10.1016/B978-0-12-813995-0.00026-1

Allwood, J. (2008). Dimensions of embodied communication: Towards a typology of embodied communication. In I. Wachsmuth, M. Lenzen, G. Knoblich (Eds.), *Embodied Communication in Humans and Machines (pp. 257-284).* Oxford University Press.

Angell, C., Alexander, J., & Hunt, J.A. (2015). Draw, write and tell: A literature review and methodological development on the 'draw and write' research method, *Journal of Early Childhood Research, 13(1*), 17 – 28.

Appleton, J. J., Christenson, S. L., Kim, D., & Reschly, A. L. (2006). Measuring cognitive and psychological engagement: Validation of the student engagement instrument. *Journal of School Psychology, 44,* 427–445.

Appleton, J. J., Christenson, S. L., & Furlong, M. J. (2008). Student engagement with school: Critical conceptual and methodological issues of the construct. *Psychology in the Schools, 45,* 369–386.

Archambault, I., Janosz, M., Fallu, J.-S., & Pagani, L. S. (2009). Student engagement and its relationship with early high school dropout. *Journal of Adolescence, 32*(3), 651-670.

Arnett, J.J. (2004). *Adolescence and emerging adulthood: A cultural* approach (2nd ed.). Pearson.

Balwant, P.T. (2018). The meaning of student engagement and disengagement in the classroom context: Lessons from organisational behaviour. *Journal of Further and Higher Education, 42*(3), 389-401. https://doi.org/10.1080/0309877X.2017.1281887

Bandura, A. (1986). *Solid foundations for thought and action: A social cognitive theory.* Prentice Hall.

Bandura, A. (1997). *Self-efficacy: The exercise of self-control.* W. H. Freeman.

Bandura, A. (2001). Social cognitive theory: An agentic perspective. *Annual Review of Psychology, 52,* 1–26.

Benner, A. D., & Graham, S. (2009). The transition to high school as a developmental process among multi-ethnic urban youth. *Child Development, 80,* 356–376. https://doi.org/10.1111/j.1467-8624.2009.01265.x

Bernhaupt, R., Weiss, A., Obrist, M., & Tscheligi, M. (2007). Playful probing: Making probing more fun. In C. Baranauskas, P. Palanque, & J. Abascal J, et al., (Eds.), *Human-Computer Interaction – INTERACT 2007 (pp. 606-619).* Springer.

Bond, M., & Bedenlier, S. (2019). Facilitating student engagement through educational technology: Towards a conceptual framework. *Journal of Interactive Media in Education, (1)*11, 1–14.

Boon, C., & den Hartog, D.N. (2011). Human resource management, person environment fit and trust. In R.H. Searle, & D.S. Skinner (Eds.), *Trust and Human Resource Management* (pp. 109– 21). Edward Elgar Publishing.

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

Braun, V., & Clarke, V. (2013). *Successful qualitative research: A practical guide for beginners*. Sage Publications, Inc.

Braun, V., & Clarke, V. (2019). Reflecting on reflexive thematic analysis, *Qualitative Research in Sport, Exercise and Health, 11*(4), 589 – 597. https://doi.org/10.1080/2159676X.2019.1628806

Braun, V., & Clarke, V. (2022). *Thematic analysis: A practical guide.* Sage Publications, Inc.

Braun, V., Clarke, V., Hayfield, N., Davey, L., & Jenkinson, E. (2023). Doing reflexive analysis. In S. Bager-Charleson & A. McBeath (Eds.), *Supporting Research in Counselling and Psychotherapy* (pp.19-38). Palgrave. https://doi.org/10.1007/978-3-031-13942-0

Brink, R. (2018). A multiple case design for the investigation of information management processes for work-integrated learning. *International Journal of Work-Integrated Learning, Special Issue, 19*(3), 223-235.

British Educational Research Association. (2013). *British Educational Research Journal.* Retrieved September 20, 2022, from https://www.bera.ac.uk/publication/british-education-research-journal

British Educational Research Association. (2018). *Ethical Guidelines for Educational Research.* Retrieved September 20, 2022, from https://www.bera.ac.uk/researchers-resources/publications/ethical- guidelines-for-educational-research-2018

Bronfenbrenner, U. (1979). *The ecology of human development: Experiments by nature and design.* Harvard University Press.

Bryson, C., & Hand, L. (2008). An introduction to student engagement. In L. Hand & C. Bryson (Eds.), SEDA special 22: *Aspects of student engagement* (pp. 5-13). Staff and Educational Development Association.

Burns, T., & Gottschalk, F. (Eds). (2019a). *Educating 21st century children: Emotional well-being in the digital age*, Educational Research and Innovation, OECD Publishing. https://doi.org/10.1787/b7f33425-en

Burns, T., & Gottschalk, F. (Eds). (2019b). What do we know about children and technology? OECD Publishing. https://www.oecd.org/education/ceri/Booklet-21st-century-children.pdf

Butterbaugh, S.M., & Wood, N.D. (2020). Developmental trajectories of women's identity development. *Journal of Family Theory & Review, 12,* 398-10. https://doi.org/10.1111/jftr.12390

Byrne, J., Kardefelt, W., Daniel, L., & Sonia, S. M. (2016). Global kids online research synthesis, 2015-2016, *UNICEF and London School of Economics and Political Science* www.unicef-irc.org/publications/869-global-kids-online-research-synthesis-2015-2016.html

Campo, R., Baldassarre, F., & Lee, R. A. (2019). Play-based Methodology for Studying Children: Playfication. *Systemic Practice and Action Research, 32,* 113–123. https://doi.org/10.1007/s11213-018-9455-x

Casper, V. & Thelheimer, R. (2010). *Early childhood education: Learning together.* McGraw-Hill.

Castells, M. (2000). *The rise of the network society* (2nd ed.). Wiley.

Chadwick, R. (2017). Embodied methodologies: Challenges, reflections and strategies. *Qualitative Research*, *17*(1), 54-74, https://doi.org/10.1177/1468794116656035

Christenson, S., Reschly, A. L., Wylie, C., & ProQuest. (2012). *Handbook of research on student engagement.* Springer.

Clark, L. S., & Golan, O. (2019). From designed to spontaneous technology-enhanced learning communities: An introduction. In Y. Kali, A. Baram-Tsabari & A.M. Schejter. *Learning in a networked society: Spontaneous and designed technology enhanced learning communities* (pp.139-144). Springer International Publishing.

Cohen, L., Manion, L., & Morrison, K. (2017). *Research Methods in Education.* Routledge.

Conkbayir, M., & Pascal, C. (2014). *Early childhood theories and contemporary issues: An introduction.* Bloomsbury.

Cook-Sather, A. (2006). Sound, presence and power: Student voice in educational research and reform. *Curriculum Inquiry, 36*(4), 359-390.

Corsaro, W.A. (2017). *The sociology of childhood (Sociology for a New Century series).* Sage Publications.

Crain, W.C. (2011). *Theories of development: Concepts and applications* (6th ed.). Prentice Hall.

Crawford, L. M., (2020). Conceptual and theoretical frameworks in research. In G.J. Burkholder, K. A. Cox, L.M. Crawford & J.H. Hitchcook (Eds.), *Research design and methods* (pp. 35-48). Sage Publications Inc.

Creswell, J.W., Hanson, W.E., Clark Plano, V. L. & Morales, A., (2007). Qualitative research designs: Selection and implementation. *The Counselling Psychologist, 35*(2), 236-264.

Creswell, J. W. (2012a). *Educational Research: Planning, Conducting, and Evaluating Quantitative and Qualitative Research* (4th ed.). Pearson Publications.

Creswell, J. W. (2012b). *Qualitative inquiry and research design: Choosing among five approaches.* Sage.

Darby, J.L., Fugate, B.S., & Murray, J.B. (2019). Interpretive research: A complementary approach to seeking knowledge in supply chain management, *The International Journal of Logistics Management*, *30*(2), 395-413. https://doi.org/10.1108/IJLM-07-2018-0187

Darbyshire, P., MacDougall, C., & Schiller, W. (2005). Multiple methods in qualitative research with children, more insight or just more? *Qualitative Research 5*, 417–436.

Davis, K. & Fullerton, S. (2016). Connected learning in and after school: Exploring technology's role in the learning experiences of diverse high school students, *The Information Society, 32*(2), 98-116. https://doi.org/10.1080/01972243.2016.1130498

Deci, E. L. & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behavior.* Plenum.

Deci, E. L., & Ryan, R. M. (2016). Optimizing students' motivation in the era of testing and pressure: A self-determination theory perspective. In W. Liu, J. Wang, & R. Ryan, (Eds.), *Building autonomous learners* (pp.9-29). Springer. https://doi.org/10.1007/978-981-287-630-0_2

Deci, E. L., Vallerand, R. J., Pelletier, L. G., & Ryan, R. M. (1991). Motivation and education: The self-determination perspective. *Educational Psychologist, 26*(3-4), 325–346. https://doi.org/10.1207/s15326985ep2603&4_6

De Laat, M., & Dohn, N. B. (2019). Is networked learning post digital education? *Postdigital Science and Education, 1*(1), 17–20. https://doi.org/10.1007/s42438-019-00034-1

Denham, M.A. & Onwuegbuzie, A. J. (2013). Beyond words: Using nonverbal communication in research to enhance thick description and interpretation. *International Journal of Qualitative Research, 12,* 670-696.

Department for Digital, Culture, Media & Sport. (2022). *UK digital strategy.* https://www.gov.uk/government/publications/uks-digital-strategy/uk-digital-strategy#annex

Department of Education. (2020). *Children and young people,* https://www.education-l.gov.uk/articles/children-and-young-people

Department of Health (1989). *The Children Act 1989: Guidance and Regulations*, https://www.legislation.gov.uk/ukpga/1989/41/contents

Department of Health (2004). *National Service Framework for Children, Young People and Maternity Services. Standard 9. The mental health and psychological wellbeing of children and young people*. Department of Health.

Dirckinck-Holmfeld, L., Hodgson, V., & McConnell, D. (Eds.). (2012). *Exploring the theory, pedagogy and practice of networked learning.* Springer Verlag.

Discovery Research. (2022). Micro:bit primary school evaluation, Development (Phase 1): Summary Report January 2022.

Dohn, N. B., Sime, J.-A., Cranmer, S., Ryberg, T., & De Laat, M. (2018). Reflections and challenges in networked learning. In N. Dohn, S. Cranmer, J.-A. M. Sime, M. de Laat & T. Ryberg, *Networked learning: Reflections and challenges* (pp. 187–212). Cham: Springer.

Drexler, W. (2018). Personal learning environments in K-12. In K. Kennedy & R.E. Ferdig (Eds.), *Handbook of research on K-12 online and blended learning* (2nd ed., pp151-162). Carnegie Mellon University.

Duschinsky, R. (2012). Tabula Rasa and Human Nature. *Philosophy, 87*, 509-529.

Eccles, J. S., & Midgley, C. (1989). Stage/environment fit: Developmentally appropriate classrooms for early adolescents. In R. E. Ames & C. Ames (Eds.), *Research on motivation in education (pp.*139-186). Academic Press.

Eccles, J. S., Midgley, C., Wigfield, A., Buchanan, C. M., Reuman, D., Flanagan, C., & Iver, D. M. (1993). Development during adolescence. The impact of stage-environment fit on young adolescents' experiences in schools and in families. *The American Psychologist, 48*(2), 90-101. https://doi.org/10.1037//0003-066x.48.2.90

Eccles, J. S., & Roeser, R. W. (2009). Schools, academic motivation, and stage-environment fit. In R. M. Lerner & L. Steinberg (Eds.), *Handbook of Adolescent Psychology* (3rd ed., pp. 404-434), John Wiley & Sons.

Eccles, J., & Wang, M. -T. (2012). Part 1 commentary: So what is student engagement anyway? In S. L. Christenson, A. L. Reschly, & C. Wylie (Eds.), Handbook of research on student engagement (pp.133-145). Springer. https://doi.org/10.1007/978-1-4614-2018-7_6

Eguara, O. (2018). *Pupil Voice in Literacy Intervention: How is pupil voice used and how can this be developed?* [Master's thesis, University of East London]. Repository of Academic Research. https://repository.uel.ac.uk/item/846x6

Eguara, O. (2020). Cultural competence in learning design: What are primary school teachers' conceptions of childhood and how can these influence their technology integration practices? *ICERI2020 Proceedings,* 8240-8247. https://doi.org/10.21125/iceri.2020.1836

Eisenbach, B. B. & Greathouse, P. (2020). Stage-environment fit and middle level virtual learners: A phenomenological case study. *RMLE Online, (43)*7, 1-12. https://doi.org/10.1080/19404476.2020.1777808

Ellingson, L.L. (2017). *Embodiment in qualitative research.* Routledge.

Erikson, E. H. (1963). *Childhood and society* (2nd ed.). Norton.

Erikson, E. H., & Erikson, J. M. (1997). *The life cycle completed.* Norton.

Esteban-Guitart, M., & Moll, L. (2014). Funds of identity: A new concept based on funds of knowledge approach. *Culture & Psychology, 20*, 31–48.

Esteban-Guitart, M. (2014). Funds of identity. In T. Teo (Ed.), *Encyclopaedia of critical psychology* (pp. 752–757). Springer.

EU Kids Online (2014). *EU Kids Online: Findings, methods, recommendations* (deliverable D1.6). EU Kids Online, London School of Economics.

European Commission. (2017). *The Digital Competence Framework 2.0.* https://ec.europa.eu/jrc/en/digcomp/digital-competence-framework/

European Parliament. (2015). *Innovative schools: Teaching and learning in the digital era - workshop documentation*. European Parliament.

Farnsworth, V., Kleanthous, I., & Wenger-Trayner, E. (2016). Communities of practice as a social theory of learning: A conversation with Etienne Wenger. *British Journal of Educational Studies, 64*(2), 139-160 https://doi.org/10.1080/00071005.2015.1133799

Feldman, R.S. (2021). *Discovering the lifespan* (5th ed.). Pearson.

Ferguson, C. (2017). Everything in moderation: Moderate use of screens unassociated with child behavior problems, *Psychiatric Quarterly*, *88*(4), 797-805. http://dx.doi.org/10.1007/s11126-016-9486-3

Finn, J.D., & Rock, D.A. (1997). Academic success among students at risk for school failure. *Journal of Applied Psychology, 82* (2), 221–234.

Finn, J. D. & Zimmer, K. (2012). Student engagement: What is it? Why does it matter? In S. L. Christenson, A. L. Reschly, & C. Wylie (Eds.), *Handbook of research on student engagement* (pp. 97 - 131). Springer.

Franzke, A. S., Bechmann, A., Zimmer, M, Ess, C. M. & the Association of Internet Researchers. (2020). *Internet Research: Ethical Guidelines 3.0*. Retrieved September 20, 2022, from https://aoir.org/reports/ethics3.pdf

Fredricks, J. A., Reschly, A. L., & Christenson, S. L. (2019). *Handbook of student engagement interventions: Working with disengaged students.* Elsevier.

Gauntlett, D. (2004, July 25-30). Using new creative visual research methods to understand the place of popular media in people's lives. [Conference presentation]. IAMCR 2004, Porto Alegre, Brazil. http://artlab.org.uk/iamcr2004.pdf

Gauntlett, D. (2007). *Creative Explorations.* Routledge.

George, M. J., & Odgers, C. L. (2015). Seven fears and the science of how mobile technologies may be influencing adolescents in the digital age. *Perspectives on psychological science: A Journal of the Association for Psychological Science*, *10*(6), 832–851. https://doi.org/10.1177/1745691615596788

Giedd, J.N. (2022). Adolescent brain and the natural allure of digital media. *Dialogues in Clinical Neuroscience, 22*(2), 127–133. https://doi.org/10.31887/DCNS.2020.22.2/jgiedd

Given, L. M. (2008). Phenomenography. In *The SAGE encyclopedia of qualitative research methods.* Sage Publications, Inc.

Glover, I. (2013). Play as you learn: Gamification as a technique for motivating learners. *World Conference on Educational Multimedia proceedings,* Hypermedia and Telecommunications, 1999–2008.

González, N., Moll, L. C., & Amanti, C. (2005). Introduction: Theorizing Practices. In N. González, L. C. Moll, & C. Amanti (Eds.), *Funds of Knowledge: Theorizing Practices in Households, Communities and Classrooms,* (pp. 1–24). Lawrence Erlbaum.

Grant, C., & Osanloo, A. (2014). Understanding, selecting, and integrating a theoretical framework in dissertation research: Creating the blueprint for your "house." *Administrative Issues Journal: Connecting Education, Practice, and Research*, *4*(2), 12-26.

Greene, S., & Hill, M. (2005). Researching children's experiences: Methods and methodological issues. In S. Greene & D. Hogan (Eds.), *Researching Children's Experience (pp. 1-21).* Sage.

Hakkarainen, K., Hietajärvi, L., Alho, K., Lonka, K., & Salmela-Aro, K. (2015). Sociodigital revolution: Digital natives vs digital immigrants. In J. D. Wright (Ed.), *International Encyclopedia of the Social & Behavioral Sciences*, *Second edition, Volume 22*, (pp. 918-923). Elsevier Scientific Publications Co. https://doi.org/10.1016/B978-0-08-097086-8.26094-7

Harris, A., & Guillemin, M. (2012). Qualitative interviewing: A portal into the otherwise unexplored. *Qualitative Health Research, 22*(5), 689-699.

Harrison, H., Birks, M., Franklin, R., & Mills, J. (2017). Case study research: Foundations and methodological orientations. *Forum Qualitative Social Research, 18*(1), 1-17.

Hart, R.A. (1992). *Children's Participation, from Tokenism to Citizenship.* UNICEF.

Hart, R.A. (2008) Stepping back from the ladder: Reflections on a model of participatory work with children. In A. Reid, B. B. Jensen, J. Nikel, & V. Somovska, (Eds.), *Participation and learning: Perspectives on education and the environment, health and sustainability* (19-31). Springer.

Haruehansawasin, S., & Kiattikomol, P. (2018). Scaffolding in problem-based learning for low-achieving learners. *The Journal of Educational Research, 111*(3), 363–370. https://doi.org/10.1080/00220671.2017.1287045

Havik, T., & Westergård, E. (2020). Do teachers matter? Students' perceptions of classroom interactions and student engagement, *Scandinavian Journal of Educational Research, 64*(4), 488-507. https://doi.org/10.1080/00313831.2019.1577754

Haythornthwaite, C., & de Laat, M. F. (2010). Social networks and learning networks: Using social network perspectives to understand social learning. *Proceedings of the 7th International Conference on Networked Learning*, Denmark, 183-190.

Hietajärvi, L., Lonka, K., Hakkarainen, K., Alho, K., & Salmela-Aro, K. (2020). Are schools alienating digitally engaged students? Longitudinal relations between digital engagement and school engagement. *Frontline Learning Research, 8*(1), 33-55.

Higgins, D. E., & Parsons, J. E. (1983). Social cognition and the social life of the child: Stages as subcultures. In E. T. Higgins, D. N. Ruble & W. W. Hartup (Eds.), *Social cognition and social development* (pp. 15-62). Cambridge University Press.

Hodgson, V., & Reynolds, M. (2005). Consensus, difference and "multiple communities" in networked learning. *Studies in Higher Education, 30*(1), 11-24.

Hodgson, V., McConnell, D., & Dirckinck-Holmfeld, L. (2012). The theory, practice and pedagogy of networked learning. In L. Dirckinck-Holmfeld, V. Hodgson & D. McConnell (Eds.), *Exploring the Theory, Pedagogy and Practice of Networked Learning* (pp. 291-305). Springer. https://doi.org/10.1007/978-1-4614-0496-5_17

Holmbeck, G.N., Jandasek, B., Sparks, C., Zukerman, J., & Zurenda, L. (2008). Theoretical foundations of developmental-behavioral pediatrics. In M. L. Wolraich, D.D. Drotar, P.H. Dworkin, & E.C. Perrin (Eds.), *Developmental-Behavioral Pedriatics* (pp. 13 - 45). Mosby. https://doi.org/10.1016/B978-0-323-04025-9.50005-2

Hooft-Graafland, J. (2018). *New technologies and 21st century children: Recent trends and outcomes* (OECD Education Working Papers, No. 179). OECD Publishing, http://dx.doi.org/10.1787/e071a505-en

Horst, H.A., Herr-Stephenson, B., & Robinson, L. (2010). Media ecologies In M. Ito et al. (Eds). *Hanging out, messing around and geeking out: Kids living and learning with new media* (pp. 29-78). The MIT Press.

House of Commons. (2016). *Digital skills crisis* (Second Report of Session 2016-17). Science and Technology Committee. https://publications.parliament.uk/pa/cm201617/cmselect/cmsctech/270/270.pdf

Hunt, D. E. (1975). Person environment interaction: A challenge found wanting before it was tried. *Review of Educational Research, 45,* 209-230.

Ito, M., Horst, H., Bittanti, M., Boyd, D., Herr-Stephenson, B., Lange, P.G., Pascoe, C.J., & Robinson, L. (2008). *Living and learning with new media: Summary of findings from the digital youth project.* The MacArthur Foundation, MIT Press.

Ito, M., Baumer, S., Bittanti, M., Cody, R., boyd, d., Herr-Stephenson, B., Horst, H. A., Lange, P. G., Mahendran, D., Katynka, Z., Martínez, C., Pascoe, C. J., Perkel, D., Robinson, L., Sims, C. & Tripp, L. (2010). *Hanging Out, Messing Around, and Geeking Out*. The MIT Press.

Ito, M., Gutiérrez, K., Livingstone, S., Penuel, B., Rhodes, J., Salen, K., Schor, J., Sefton-Green, J., & Watkins, S. C. (2013). *Connected Learning: An Agenda for Research and Design.* Digital Media and Learning Research Hub.

Ito, M., Arum, R., Conley, D., Gutierrez, K. D., Kirshner, B., Livingstone, S., Michalchik, V., Penuel, B., Peppler, K., Pinkard, N., Rhodes, J.E., Salen, K., Schor, J., Sefton-Green, J., & Watkins, S.C. (2020). *The connected learning research network: Reflections on a decade of engaged scholarship*. Connected Learning Alliance.

Jagušt, T., Botički I, So H-J. (2018). A review of research on bridging the gap between formal and informal learning with technology in primary school contexts. *Journal of Computer Assisted Learning, 3,* 417–428. https://doi-org.ezproxy.lancs.ac.uk/10.1111/jcal.12252

James, A., & Prout, A. (1990). *Constructing and reconstructing childhood: Contemporary issues in the sociological study of childhood*. Falmer Press.

James, A., & Prout, A. (1997). *Constructing and reconstructing childhood: Contemporary issues in the sociological study of childhood.* Routledge.

James, A., Jenks, C., & Prout, A. (1998). *Theorizing childhood.* Polity Press.

Jindal-Snape, D., & Cantali, D. (2019). A four-stage longitudinal study exploring pupils' experiences, preparation, and support systems during primary–secondary school transitions. *British Educational Research Journal*, *45*, 1255-1278. https://doi.org/10.1002/berj.3561

Jones, C. (2004). Networks and learning: Communities, practices and the metaphor of networks. *The Association for Learning Technology Journal, 12*(1), 82-93.

Jones, C. (2015). *Networked Learning: An Educational Paradigm for the Age of Digital Networks*. Springer International Publishing AG.

Josselson, R. (1987). *Finding herself: Pathways to identity development in women*. Morrow.

Josselson, R. (1998). *Revising herself: The story of women's identity from college to midlife.* Oxford University Press.

Josselson, R. (2017). *Paths to fulfillment: Women's search for meaning and identity.* Oxford University Press.

JSTOR. (2022). *British Educational Research Journal.* https://www.jstor.org/journal/briteducresej

Kali, Y., Baram-Tsabari, A. & Schejter, A.M. (2019). *Learning in a networked society: Spontaneous and designed technology enhanced learning communities.* Springer International Publishing.

Kim, J. H., Lau, C. H., Cheuk, K-K., Kan, P., Hui, H. L. C., & Griffiths, S.M. (2010). Brief report: Predictors of heavy Internet use and associations with health-promoting and health risk behaviors among Hong Kong university students, *Journal of Adolescence*, *(33)*1, 215-220. http://dx.doi.org/10.1016/j.adolescence.2009.03.012

Kivunja, C., & Kuyini, A. B. (2017). Understanding and applying research paradigms in educational contexts. *International Journal of Higher Education, 6*(5), 26-41.

Lambert, M.C., & Johnson, L.E. (2011). Ontogenetic development. In S. Goldstein & J.A. Naglieri (Eds.), *Encyclopedia of child behaviour and development.* Springer. https://doi.org/10.1007/978-0-387-79061-9_2018

Lancaster University (2009). *Research ethics code of practice*. Retrieved September 20, 2022, from https://www.lancaster.ac.uk/media/lancaster-university/content-assets/documents/lums/research/Ethics-code-of-practice.pdf

Landicho, L. C., Cabanig, M. C. A., Cortes, M. S. F., & Villamor, B. J. B. (2014). Egocentrism and risk-taking among adolescents. *Asia Pacific Journal of Multidisciplinary Research, 2*(3), 132-142.

Latchem, C. (2014). BJET Editorial: Opening up the educational technology research agenda. *British Journal of Educational Technology, 45*(1), 3–11. https://doi.org/10.1111/bjet.12122

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

Lavelle, M., Dimic, S., Wildgrube, C., McCabe, R. & Priebe, S. (2015). Non-verbal communication in meetings of psychiatrists and patients with schizophrenia. *Acta Psychiatrically Scandinavia, 131*,197-205.

Lawson, M. A., & Lawson, H. A. (2013). New conceptual frameworks for student engagement research, policy and practice. *Review of Educational Research, 83*(3). 432-479. https://doi.org/10.3102/0034654313480891

Leavy, P. (2017). *Research design: Quantitative, qualitative, mixed methods, arts-based, and community-based participatory research approaches.* Guildford Publications.

Leonard, M. (2016). *The sociology of children, childhood and generation.* Sage Publications

Levin, I. & Mamlok, D. (2021). Culture and Society in the Digital Age. *Information*, 12(2), 1-13 https://doi.org/10.3390/info12020068

Locke. J. (1690). *An essay concerning human understanding.* Thomas Basset.

Maree J.G. (2021). The psychosocial development theory of Erik Erikson: Critical overview. *Early Child Development and Care, 191*(7-8), 1107-1121. https://doi.org/10.1080/03004430.2020.1845163

Marcia, J.E. (1987). The identity status approach to the study of ego identity. In T. Honess & K. Yardley (Eds.), *Self and identity: Perspectives across the lifespan* (pp. 161-171). Routledge & Kegan Paul

Marin, A., & Wellman, B. (2014). Social network analysis: An introduction. Sage Publications Ltd. https://dx.doi.org/10.4135/9781446294413

Maxwell, J. (2013). *Qualitative research design: An interactive approach* (3rd ed.). Sage Publications.

Merriam, S. B. (2009). *Qualitative research: A guide to design and implementation* (2nd ed.). Jossey-Bass.

Merriam, S. B., & Tisdell, E.J. (2016). *Qualitative research: A guide to design and implementation* (4th ed.). Jossey-Bass.

Miles, M.B., Huberman, A.M., & Saldana, J. (2020). *Qualitative data analysis: A methods sourcebook.* Sage Publications, Inc.

Miller, P.H. (2011). *Theories of developmental psychology* (5th ed.). Worth.

Moje, E. B., Ciechanowski, K. M., Kramer, K., Ellis, L., Carrillo, R., & Collazo, T. (2004). Working toward third space in content area literacy: An examination of everyday funds of knowledge and discourse. *Reading Research Quarterly, 39*(1), 38–70.

Moll, L., Amanti, C., Neff, D., & González, N. (1992). Funds of knowledge for teaching: Using a qualitative approach to connect homes and classrooms. *Theory into Practice, 31,* 132-141. https://doi.org/10.1080/00405849209543534

Morrow, V., & Richards, M. (1996). The ethics of social research with children: An overview. *Children and Society, 10*(2), 90-105.

Mühlbacher, S., & Sutterlüty, F. (2019). The principle of child autonomy: A rationale for the normative agenda of childhood studies. *Global Studies of Childhood, 9*(3), 249–260.

Muhonen, H., Rasku-Puttonen, H., Pakarinen E., & Poikkeus, A.-M. (2016). Scaffolding through dialogic teaching in early school classrooms. *Teaching and Teacher Education, 55*, 143–154.

National Health Service UK. (2013). *Children and young people.* https://www.England.NHS.uk/get-involved/cyp

Networked Learning Editorial Collective (2020). Networked Learning: Inviting Redefinition. *Postdigital Science Education*, *3,* 312–325. https://doi.org/10.1007/s42438-020-00167-8

Networked Learning Editorial Collective. (2021). Networked Learning in 2021: A Community Definition. *Postdigital Science Education*, 1-44. https://doi.org/10.1007/s42438-021-00222-y

Newman, M. E. J. (2010). *Networks: An introduction*. Oxford University Press.

Office of Communications, The (2020). *Children and parents: Media use and attitudes report.* The Office of Communications.

O'Kane, C. (2017). Participatory research on kinship care in East Anglia. In P. Christensen & A. James (Eds.), *Research with children: Perspectives and practices.* (pp. 180-202). Routledge.

Osse, E., & Rousseau, R. (2002). Social network analysis: A powerful strategy, also for the information sciences. *Journal of Information Science*, *28*(6), 441-453.

Ozturk, T.H., & Hodgson, V. (2017). Developing a model of conflict in virtual learning communities in the context of a democratic pedagogy. *British Journal of Educational Technology, 48*(1), pp 23-42.

Partnership for 21st Century Skills. (2019). *Framework for 21st Century Learning.* https://static.battelleforkids.org/documents/p21/P21_Framework_Brief.pdf

Paulmann, S., Jessen, S., & Kotz, S. A. (2009). Investigating the multimodal nature of human communication: Insights from ERPs. *Journal of Psychophysiology, 23*(2), 63–76. https://doi-org.ezproxy.lancs.ac.uk/10.1027/0269-8803.23.2.63

Piaget, J. (1934). *The moral judgement of the child* (trans. M. Gabain). Free Press.

Piaget, J. (1952). *The origins of intelligence in children.* International Universities Press.

Piaget, J. (1954). *The construction of reality in the child.* (trans. M. Cook). Ballantine.

Piaget, J. (1955). *The language and thought of the child.* (trans. M. Gabain) Meridian.

Piaget, J. (1960). *The child's conception of the world.* (trans. J. Tomlinson & A. Tomlinson). Littlefield Adams.

Piaget, J. & Inhelder, B. (1969). *The psychology of the child.* Basic Books.

Pfeifer, J. H., & Berkman, E. T. (2018). The development of self and identity in adolescence: Neural evidence and implications for a value-based choice perspective on motivated behavior. *Child development perspectives*, *12*(3), 158 - 164. https://doi.org/10.1111/cdep.12279

Prosser, J., & Burke, C. (2008). Image-based educational research: Childlike perspectives. In J. G. Knowles & A. L. Cole (Eds.), *Handbook of the arts in qualitative research: Perspectives, methodologies, examples, and issues* (pp. 407–420). Sage.

Prout, A. (2005). *The future of childhood: Towards the interdisciplinary study of children.* Routledge.

Przybylski, A., & Weinstein, N. (2017). A large-scale test of the Goldilocks Hypothesis, *Psychological Science*, *28*(2), 204-215. http://dx.doi.org/10.1177/0956797616678438

Punch, S. (2002). Research with children: The same or different from research with adults? *Childhood, 9*(3), 321-341.

Qvortrup, J. (2005) *Studies in modern childhood.* Palgrave.

Qvortrup, J. (2009). Are children human beings or human becomings? A critical assessment of outcome thinking. *Rivista Internazionale Di Scienze Sociali,117*(3/4), 631-653.

Qvortrup, J. (2011). Childhood as Structural form. In J. Qvortrup, W. A. Corsaro & M. S. Honig (Eds.), *Palgrave handbook of childhood studies* (pp. 21-33). Palgrave.

Radović, S., & Passey, D. (2016). Digital resource developments for mathematics education involving homework across formal, non-formal and informal settings. *The Curriculum Journal, 27*(4), 538–559.

Rainie, L., & Wellman, B. (2012). *Networked: The new social operating system.* MIT Press.

Reeve, J. (2012). A self-determination perspective on student engagement. In S. L. Christenson, A. L. Reschly & C. Wylie (Eds.), *Handbook of research on student engagement* (pp.149-172). Springer.

Reeve, J. (2013). How students create motivationally supportive learning environments for themselves: The concept of agentic engagement. *Journal of Educational Psychology, 105(*3), 579-595. https://doi.org/10.1037/a0032690

Reeve, J., & Jang, H. (2022). Agentic engagement. In A. L . Reschly & S. L. Christenson (Eds.), Handbook of Research on Student Engagement (pp.95-197). Springer. https://doi.org/10.1007/978-3-031-07853-8_5

Resnick, M. D., Bearman, P. S., Blum, R. W., Bauman, K. E., Harris, K. M., Jones, J., et al. (1997). Protecting adolescents from harm: Findings from the National Longitudinal Study on Adolescent Health. *Journal of the American Medical Association, 278,* 823–832.

Reynolds, K. (2014). *Perceptions of childhood.* Discovering literature: Romantics & Victorians. https://www.bl.uk/romantics-and-victorians/articles/perceptions-of-childhood

Rich, Y., & Schachter, E. (2012). High school climate and student identity development. *Contemporary Educational Psychology, 37*(3), 218–228.

Rideout, V., Fox, S., Peebles, A., & Robb, M. B. (2021). *Coping with COVID-19: How young people use digital media to manage their mental health.* Common Sense and Hopelab.

Rideout, V., Peebles, A., Mann, S., & Robb, M. B. (2022). *Common Sense census: Media use by tweens and teens, 2021.* Common Sense.

Robson, C., & McCartan, K. (2016). *Real world research* (4th ed.). Wiley.

Rousseau, J. (1979). *Emile, or On Education*. Trans. Allan Bloom. Basic Books.

Rumberger, R. W., & Lamb, S. P. (2003). The early employment and further education experiences of high school dropouts: A comparative study of the United States and Australia. *Economics of Education Review, 22*(4), 353 – 366.

Ryan, R. M. & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist, 55*(1), 68-78.

Ryan, R. M., & Deci, E. L. (2017). *Self-determination theory: Basic psychological needs in motivation, development, and wellness.* The Guilford Press. https://doi.org/10.1521/978.14625/28806

Sage Publications (2021). Conceptual frameworks in research. In *Sage* (Ed.)*, Qualitative Research* (pp. 32-61), Sage Publications.

Salmela-Aro, K., Muotka, J., Alho, K., Hakkarainen, K., & Lonka, K. (2016). School burnout and engagement profiles among digital natives in Finland: A person-oriented approach. *European Journal of Developmental Psychology, 13*(6), 704-718. https://doi-org.ezproxy.lancs.ac.uk/10.1080/17405629.2015.1107542

Schunk, D. H., & Usher, E. L. (2012). Social cognitive theory and motivation. In R. M. Ryan (Ed.), *The Oxford handbook of human motivation* (pp.13-27). Oxford University Press.

Sharma, A., Cockerill, H., & Sanctuary, L. (2021). *Mary Sheridan's from birth to five years: Children's developmental progress.* Routledge.

Shier, H. (2001). Pathways to participation in decision-making in line with Article 12.1 of the United Nations Convention on the Rights of the Child. *Children & Society, 15,* 107-117.

Shier, H. (2010). Pathways to participation' revisited. In B. Percy-Smith & N. Thomas (Eds.), *A handbook for children and young people's participation: Perspectives from theory and practice (pp. 215-229).* Routledge.

Singh, M. (2015). *Global perspectives on recognising non-formal and informal learning: Why recognition matters.* Springer International Publishing.

Sisson, S.B., Broyles, S.T., Baker, B.L., & Katzmarzyk, P.T. (2010). Screen time, physical activity, and overweight in U.S. Youth: National survey of children's health 2003. *Journal of Adolescent Health*, *47*(3), 309-311. http://dx.doi.org/10.1016/j.jadohealth.2010.02.016

Sonu, D., & Benson, J. (2016). The quasi-human child: How normative concepts of childhood enabled neoliberal reform in the United States. *Curriculum Inquiry, 46*(3), 230-247.

Stake, Robert E. (1995). *The art of case study research*. Sage Publications, Inc.

Steinberg, L., & Avenevoli, S. (1998). Disengagement from school and problem behavior in adolescence: A developmental-contextual analysis of the influences of family and part-time work. In R. Jessor (Ed.), *New perspectives in adolescent risk behavior* (pp. 392-424), Cambridge University Press.

Subero, D., Vujasinović, E., & Esteban-Guitart, M. (2017). Mobilising funds of identity in and out of school. *Cambridge Journal of Education, 47*(2), 247-263.

Sun, L., Ruokamo, H., Siklander, P., Li, B., & Devlin, K. (2021). Primary school students' perceptions of scaffolding in digital game-based learning in Mathematics. *Learning, Culture and Social Interaction, 28,* 1-11.

Symonds, J., & Galton, M. (2014). Moving to the next school at age 10-14 years: An international review of psychological development at school transition. *Review of Education, 2*(1), 1-27. https://doi.org/10.1002/rev3.3021

Symonds, J., & Hargreaves, L. (2016). Emotional and motivational engagement at school transition: A qualitative stage-environment fit study. *Journal of Early Adolescence, 36*(1), 54–85.

Teddlie, C. & Yu, F. (2007). Mixed methods sampling: A typology with examples. *Journal of Mixed Methods Research, 1*(1), 77-100.

Terry, G., & Hayfield, N. (2021). *Essentials of thematic analysis.* American Psychological Association.

't Gilde, J., & Volman, M. (2021) Finding and using students' funds of knowledge and identity in superdiverse primary schools: A collaborative action research project. *Cambridge Journal of Education, 51*(6), 673-692. https://doi.org/10.1080/0305764X.2021.1906845

thinkbroadband. (2021, April 21). *Local broadband information.* https://labs.thinkbroadband.com/local/england

Thomas, N. (2017). Turning the tables: Children as researchers. In P. Christensen & A. James (Eds.), *Research with children: Perspectives and practices* (pp. 160-179). Routledge.

Treseder, P. (1997). *Empowering children and young people: promoting involvement in decision-making.* Save the Children and Children's Rights Office.

Tripp, D. (2012). *Critical incidents in teaching: Developing professional judgement.* Routledge.

Twenge, J. M., Joiner, T. E., Rogers, M. L., & Martin, G. N. (2018). Increases in depressive symptoms, suicide-related outcomes, and suicide rates among US adolescents after 2010 and links to increased new media screen time. *Clinical Psychological Science, 6*(1), 3–17. https://doi.org/10 .1177/2167702617723376

Twining, P., Browne, N., Murphy, P., Hempel-Jorgensen, A., Harrison, S., & Parmar, N. (2017). *NP3 (new purposes, new practices, new pedagogy): Meta-analysis report.* http://edfutures.net/images/e/e7/NP3_Meta-analysis_report.pdf

Twining, P. (2021). Making sense of young people's digital practices in informal contexts: The Digital Practice Framework. *British Journal of Educational Technology*, *5*(1), 461-481. https://doi.org/10.1111/bjet.13032

United Nations Children's Fund (2010). The United Nations Convention on the Rights of the Child https://downloads.unicef.org.uk/wp-content/uploads/2010/05/UNCRC_united_nations_convention_on_the_rights_of_the_child.pdf

United Nations Children's Fund (2017a). *The state of the world's children 2017: Children in a digital world*. UNICEF.

United Nations Children's Fund. (2017b). *A summary of the UN Convention on the Rights of the Child.* Retrieved December 3, 2022, from https://www.unicef.org.uk/rights-respecting-schools/wp-content/uploads/sites/4/2017/01/Summary-of-the-UNCRC.pdf

van Dijk, J. (2020). The network society. Sage Publications Ltd.

Vaughan, K. (2005). Pieced together: Collage as an artist's method for interdisciplinary research. *International Journal of Qualitative Methods, 4*, 27–45.

Verhoeven, M., Poorthuis, A.M.G., & Volman, M. (2019). The role of school in adolescents' identity development. A literature review. *Educational Psychology Review, 31,* 35–63. https://doi.org/10.1007/s10648-018-9457-3

Virtanen, T.E., Räikkönen, E., Engels, M.C., Vasalampi, K., & Lerkkanen, M.-K. (2021). Student engagement, truancy, and cynicism: A longitudinal study from primary school to upper secondary education*, Learning and Individual Differences*, *86,* 1-9. https://doi.org/10.1016/j.lindif.2021.101972

Vromen, A., Xenos, M.A. & Loader, B. (2014). Young people, social media and connective action: From organisational maintenance to everyday political talk, *Journal of Youth Studies*, 1-21.

Vygotsky, L. S. (1986). *Thought and language.* MIT Press.

Wachsmuth, C., Lenzen, M., & Knoblich, G. (2008). *Embedded communication in humans and machines.* Oxford University Press.

Wallace, J., Scanlon, D., & Calderón, A. (2022). Digital technology and teacher digital competency in physical education: A holistic view of teacher and student perspectives, *Curriculum Studies in Health and Physical Education,* 1-17. https://doi.org/10.1080/25742981.2022.2106881

Wang, M. T., & Hofkens, T. (2020). Beyond classroom academics: A school-wide and multi-contextual perspective on student engagement in school. *Adolescent research review*, *5*(4), 419–433. https://doi.org/10.1007/s40894-019-00115-z

Weber, S. (2008). Visual images in research. In J. G. Knowles & A. L. Cole, (Eds.), *Handbook of the arts in qualitative research: Perspectives, methodologies, examples, and issues* (pp. 41–54). Sage.

Wenger, E., Trayner, B., & de Laat, M. (2011). *Promoting and assessing value creation in communities and networks: A conceptual framework.* Ruud de Moor Centrum, Open University of the Netherlands.

Wentzel, K. (2012). Socio-cultural contexts, social competence and engagement. In S. L. Christenson, A. L. Reschly, & C. Wylie (Eds.), *Handbook of research on student engagement* (pp. 479 - 488). Springer.

Wigfield, A., Eccles, J. S., Fredricks, J. A., Roeser, R., Schiefele, U., & Simpkins, S. (2015). Development of achievement motivation and engagement. In R. M. Lerner, C. Garcia Coll. & M. Lamb (Eds.), *Handbook of child psychology and developmental science, Volume 3: Social and emotional development* (7th ed., pp. 657–699), John Wiley.

Wilson, A., De Paoli, S., Forbes, P., & Sachy, M. (2018). Creating personas for political and social consciousness in HCI design. *Persona Studies, 4*(2), 25-46.

Wong, N. T., Zimmerman, M. A., & Parker, E. A. (2010). A typology of youth participation and empowerment for child and adolescent health promotion. *American Journal of Community Psychology*, *46*(1-2), 100–114. https://doi.org/10.1007/s10464-010-9330-0

Wood, D., Bruner, J., & Ross, G. (1976). The role of tutoring in problem solving, *Journal of Child Psychology and Psychiatry, 17*, 89–100. https://doi.org/10.1111/j.1469-7610.1976.tb00381.x

Woodhead, M., & Faulkner, D. (2000) Subjects, objects or participants? Dilemmas of psychological research with children. In P. Christensen & A. James (Eds.), *Research with children: Perspectives and Practices* (pp. 9-35). Falmer.

Xu, W., & K. Zammit. (2020). Applying thematic analysis to education: A hybrid approach to interpreting data in practitioner research. *International Journal of Qualitative Research Methods, 19*, 1- 9.

Yin, R.K. (2003). *Case study research: Design and* methods (3rd ed.). Sage Publications, Inc.

Yin, R.K. (2009). *Case study research: Design and methods* (4th ed.). Sage Publications, Inc.

Yin, R.K. (2018). *Case study research and applications: Design and methods* (6th ed.). Sage Publications, Inc.

Zimmer-Gembeck, M., Chipuer, H.M., Hanisch, M., Creed, P.A., & McGregor, L. (2006). Relationships at school and stage-environment fit as resources for adolescent engagement and achievement. *Journal of Adolescence, 29*(6), 911-933.