



Exploratory analysis of the opinions of and perceptions of technology workers around extended digital learning

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Abstract

In 2020, the Covid-19 pandemic compelled organisations to design and implement onboarding and development programmes that relied exclusively and extendedly on digital learning. Several organisations continued to experiment with hybrid learning models even after restrictions were lifted and this may lead, for some, to a permanent change in their learning design paradigm. While literature has started to examine the initial effects of this upheaval, little is known about how prolonged digital learning affected the experiences, motivation and needs of workers operating in the ever-accelerating present.

This exploratory study employed a qualitative approach and collected, through semi-structured interviews, the opinions and perceptions of technology workers in junior, senior, and middle-management roles who had acquired new skills or maintained them exclusively through prolonged digital learning during the pandemic. The thematic analysis of this data and the use of adult learning theory established emerging findings that suggest the need to formalise knowledge-sharing processes, structure on-the-job learning, and enhance leadership and management development within organisations to mitigate the effects of increased attrition on organisational learning.

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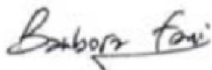
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List of abbreviations

ADDIE Analysis, design, development, implementation and evaluation

ALT Adult learning theory

IDS Instructional design systems

ERT Emergency remote training

L&D Learning and development

MNC Multinational corporation

MOOC Massive Open Online Course

SME Small medium enterprise

WFH Work from home

Introduction

Introduction

Learning and the flow of knowledge between different organisational levels are crucial resources that drive competitive advantage (Garavan, Carbery, O'Brien and Whelan, 2011). However, the forced shift to digital learning induced by the Covid-19 pandemic has challenged corporate learners by increasing the perception of psychological distance between learners, facilitators, and communities of practice. While the ability to respond to this upheaval varied across organisations, research shows that IT professionals in large technology-driven companies adapted consistently better than other categories of white-collar workers to the new conditions (Donati, Viola, Toscano and Zappalà, 2021).

This research aims to analyse the opinions of these professionals about the e-learning processes and tools they use, the challenges they experience, and the support they feel necessary, in order to draw general recommendations around Learning and Development (L&D) and knowledge-sharing interventions in dynamic sectors where learning requirements are constantly evolving.

This chapter will introduce this dissertation by first outlining the background and context of this work, followed by the research problem, question, and objectives. Furthermore, it will present the research design and ethics and provide an outline of the structure of this research project.

Background and context

While research exists around both digital learning and the initial effects of the pandemic-induced shift to remote learning (CIPD, 2021a), Bond, Bedenlier, Marín, and Händel (2021) argue that most of this early literature tends to only scratch the surface of the phenomenon through descriptive statistics but often without providing a more in-depth analysis through a well-grounded theoretical framework.

Pre-pandemic elective use of digital learning had been well-investigated through both quantitative assessing its hindrances and drivers (Garavan, et al., 2011; Clark and Mayer, 2016) and quantitative studies that dissected the features of this learning practice through the analytical tools of well-established conceptual frameworks like adult learning theory (Merriam and Bierema, 2013; Halpern and Tucker, 2015; Sharp, 2018). However, the compulsory and exclusive use of remote learning may present different features from the elective digital learning practices that were burgeoning before the pandemic and require a separate exploration (Hodges, Moore, Lockee, Trust and Bond, 2020) and the few works that have undertaken the task to thoroughly explore forced remote learning through the principles of adult learning theory mostly focus their analysis on the education system rather than workplace learning (Manoharan, Hua and Sultan, 2022). An additional dimension of complexity is added by the fact that the existing research seems to have focused exclusively on the onset of the pandemic, while few studies addressed the effects of extended restrictions on employees (Donati, Viola, Toscano, and Zappalà, 2021).

Research suggests that further investigation may be particularly needed around which remote learning technologies and processes are perceived as most effective by learners during prolonged exclusive remote learning (Giannakos, Mikalef, and Pappas, 2021), what factors may enhance learners' motivation and how organisations can support learners' needs (Choudhury and Pattnaik, 2020; Yarberry and Sims, 2021).

Research aim, question, and objectives

This dissertation aims to explore the opinions and perceptions of IT professionals at different stages in their career who operate in technology-driven multinational corporations (MNC) and who participated in extended and exclusive forms of digital learning during the pandemic, then attempt to explain their experiences through the conceptual framework of adult learning theory. This specific sample was chosen as large companies that operate in knowledge-intensive sectors were presumed to have both a strategic interest in enhancing learning and knowledge-sharing practices

and the resources to eliminate the “noise” deriving from the most obvious and well-researched hindrances to digital learning, such as faulty equipment and lack of basic digital skills in learners (Donati *et al.*, 2021; Morris, Vanino, and Corradini, 2019).

The research question was established as: “*How do IT professionals who operate in technology-driven multinational corporations perceive the exclusive and extended use of digital learning to acquire and maintain new skills?*”.

The objectives of the research are to:

- Understand the perceived effectiveness of diverse digital learning design, practices, and tools.
- Understand what factors affect the digital learner’s motivation.
- Understand which support system is required by digital learners.

Research design

A qualitative, mono-method of research was adopted for this dissertation, and data was gathered through eleven semi-structured interviews with IT professionals, operating in technology-driven MNCs, who had participated in forms of digital learning for at least three months during the height of the pandemic. Thematic analysis was employed to code and identify patterns in the interviews’ transcripts and five principal themes surfaced from this process.

Research ethics

Privacy and confidentiality were considered paramount ethical concerns throughout this project. The researcher required each participant to sign a consent form, informed them that participation in interviews was a voluntary process and that they could refuse to answer questions, terminate the interview at any stage or even withdraw their consent to participate in the project within three weeks from the date of the interview. Interviews recording, transcripts, consent forms and researcher journal were saved on a password-protected and encrypted device, accessible only by the researcher.

Dissertation structure

This dissertation is divided into the following chapters.

Chapter	Description
1 - Introduction	This chapter provides an outline of the dissertation, including its background and rationale. Furthermore, it establishes the research aim, question, and objectives, providing an overview of the research design and ethics.
2 - Literature Review	Literature review lays the foundation for further research, providing a synthesis of existing literature in the area of digital learning and identifying research gaps.
3 - Research question and aims	Research aims, question, and objectives are outlined.
4 - Methodology	This chapter discusses the options considered in terms of research philosophies, types and methods and explains the adopted research design and sampling choices. Methodological limitations are presented.
5 - Analysis and findings	The findings from the study are presented, analysed with quotations from the semi-structured interviews and categorised into five main themes. Analysis-related limitations are discussed.
6 - Discussion	This chapter examines and explains the five themes that surfaced from the Analysis and findings chapter.
7 – Conclusions	The framework of this dissertation is revisited, and key findings, limitations and general conclusions are summarised. Recommendations for future research and applications of the findings are included.

Table 1 - Dissertation structure

Literature Review

Introduction

The purpose of this chapter is to provide a review of the existing literature and research into the subject of digital learning and interpret this information through the conceptual tools of adult learning theory (ALT). The main areas examined are the key concepts of learning and development (L&D), ALT, digital learning and its overlaps with emergency remote training (ERT) during the and how ALT may be applied to understand the features of digital learning within knowledge-intensive industries like technology.

How adults learn in the accelerating present

During the Covid-19 pandemic, many adults were forced to learn under circumstances that presented several unprecedented features. Firstly, due to social distancing and restrictions on movement, many organisations had to undertake an unprecedented digital transformation, or, in the best case, had to shift from blended to fully remote learning for several months (Harman, 2021a). Beside the obvious challenges associated with the rapid uptake of new technologies from individuals with limited previous digital experience, this hastened metamorphosis has generated learning design-related issues, as contents originally intended to be delivered in person had to be adapted or retrofitted to online delivery: Hodges *et al.* (2020) label this phenomenon “Emergency Remote Teaching” (ERT) and suggest that it presents significant differences from well-planned online learning activities, including requirements for more flexibility and need to offer asynchronous alternatives to learners who may not attend remote synchronous courses.

Furthermore, the pandemic forced individuals to operate in a “wicked” learning environment, defined as a context that does not provide a consolidated and clear feedback mechanism (Hogarth, Lejarraga, and Soyer, 2015), where learners were deprived from social interactions and possibly burdened by domestic interferences or isolation-induced mental health challenges (Pietrabissa and Simpson, 2020; Hoss, Ancina and Kaspar, 2021). These circumstances were aggravated by notable

disruptions in employment as an initial wave of layoffs in the first and second quarters of 2020 was followed by a generalised skill shortage, which has been dubbed by market analysts ‘The great reshuffle’ or ‘The great resignation’ (Pontefract, 2021). Consequently, many workers experienced a job change during the pandemic and participated in fully digital induction training courses or were onboarded through other remote learning activities. Some of them had to reinvent their career completely, such as the numerous blue-collar workers who were recruited for entry-level positions in technology companies (Fuhrmans and Dill, 2022).

While ERT has gradually shifted to a properly structured online or hybrid learning model and in-person learning activities have been reintroduced, some of the circumstances that characterised ERT have become part of the “accelerating present” of contemporary learners (Bhargava, 2020): on the one hand, extended digital learning may be used to reduce carbon emissions, in case of future pandemics or simply to save travel time and resources (Harman, 2021a); on the other hand, it may be argued that professional deracination has become commonplace as jobs are being transformed, destroyed or created by AI, automation, delocalisation and that workers are consequently required to learn new skills in a self-directed manner to enhance their adaptive potential (CIPD, 2021d), especially in knowledge-intensive sectors like technology (CIPD, 2021a).

Adult learning theory (ALT) may offer a compass that helps navigating this new approach to digital learning. This theory differentiates the needs of older learners from those of children and has explored the characteristics of the former for decades, through extended testing in corporate environments, healthcare training, adult and remedial education (Knowles, Holton and Swanson, 2015; Henschke, 2011) and has even provided a descriptive and predictive examination of digital learning (Dyke, Conole, Ravenscroft, and De Freitas, 2007; Stewart and Waight, 2008; Criu and Ceobanu, 2013). The next sections provide a brief introduction to the ALT and its implications for digital learning.

Learning, Digital Learning and Adult Learning Theory

Definitions of learning, training, and development

Learning may be described as a cognitive or practical process by which learners earn or refine their knowledge, skills and attitudes or KSAs (Armstrong and Taylor, 2017; Garavan, Hogan, Cahir-O'Donnell and Gubbins, 2020) and achieve a modification of behaviour according to their objectives (Honey and Mumford, 1992). Sloman and Philpott (2008) outline the difference between “learning” and “training” and describe the latter as a short-term, instructor-led intervention aimed to enhance performances in the current role of participants. “Training” is, in other words, one of the possible learning methods employed by an organisation.

Basariya and Sree (2019) differentiates between off-the-job learning methods, which are normally used in a structured, lecture-like scenario such as instructor-led training or university lectures, and on-the-job learning methods that happen “in the flow of work” (Bersin, 2018). On-the-job learning methods can have different degrees of formality in a spectrum that ranges from a fully structured 1:1 coaching session to a friendly exchange of information in front of a coffee machine (Noe, Clarke and Kein, 2014). An overview of the toolkit of most frequently used learning methods is provided in [Appendix I](#), modified from Stewart and Rigg (2011) and Garavan *et al.* (2020).

Learning is part of the larger “development” of workers, a process designed to promote their continuous professional realisation and effectiveness (Masadeh, 2012).

The definitions of ‘learning’, ‘development’ and ‘training’ used in this dissertation and shared by most HR professionals (CIPD, 2018) stem from the behavioural learning theory. However, literature around learning is permeated by several other theoretical frameworks that result in an ample spectrum of taxonomies of learning, each focusing on a range of social, personal and organisational factors that may influence the learning process (Stewart and Rigg, 2011). The table in [Appendix II](#) provides a non-exhaustive overview of the diverse definitions of learning across the principal classic learning theories (adapted from CIPD, 2021b; Ertmer and Newby, 2013; Hall, Nielsen, Nelson and Buchholz, 2010; Western Governors University, 2020a).

Definitions of digital learning

Basak, Wotto, and Bélanger (2018) define “digital learning” or “d-learning” as any type of learning facilitated by technology, including offline stand-alone learning methods. This umbrella term includes several different remote learning practices, from MOOCs to learning management systems (LMS), which present very specific characteristics, to electronic learning (e-learning) and mobile learning (m-learning), which are considered synonyms with d-learning by recent literature (Basak et al., 2018; Giannakos *et al.*, 2021; CIPD, 2021a). A detailed description of the most common practices is provided in [Appendix III](#) (adapted from Garavan *et al.*, 2020).

It is possible to group digital learning practices based on their access mode, that is whether they are synchronous or asynchronous (Hrastinski, 2008), or on their level of interactivity (CIPD, 2021c), that is: “formal”, which offers minimal or no communication between learner and instructor or community of practice; “informal”, which allows the learner to request support or communicate through forums or other online networking tools; and “blended” or “supported”, which combines both formal and informal practices.

As previously stated, defining digital learning requires an important caveat about the boundaries of this term. Before the pandemic, digital learning practices were normally employed as an alternative to in-person learning where there was a specific rationale such as a fit between the topic learned and the digital learning practice (for example the computer-based simulations of specific scenarios), a necessity to reduce costs or a specific preference or convenience of learners. During the pandemic, digital learning practices were often stretched to virtually incorporate any kind of learning, even those that would have been more effective if delivered in person, had the circumstances allowed it (Harman, 2021a). This may have arguably been one of the reasons for which synchronous, informal or blended digital practices were more frequently used as ERT tools (Bond *et al.*, 2021), combined with the learners’ reluctance towards certain asynchronous methods like MOOCs, which present a user dropout rate of over 90% or higher in case the case of users whose peers have also abandoned a

course (Goel and Goyal, 2020). The motives and reasons behind users' preferences, however, have not been investigated in depth.

Adult Learning Theory

Adult learning theory and digital learning

Due to its learner-centric approach, ALT may provide some useful tools to explore not only the reasons behind this general preference toward synchronous and interactive practices but also to examine learners' perceptions around digital learning design, delivery, and support. In fact, this conceptual framework has been used extensively to analyse the features pre-pandemic digital learning (Merriam and Bierema, 2013; Halpern and Tucker, 2015; Sharp, 2018) and even to assess the impact of forced remote learning on students (Manoharan, Hua and Sultan, 2022)

Adult learning theory and its applications to corporate learning

Michael Knowles's 'andragogy' is often considered the first systematic model of ALT and the most influential one (Cercone, 2008). In addition to Knowles' seminal work, several other theorisations have researched the specific features of adult learning and influenced contemporary L&D practices. These alternative adult learning theories are directly influenced by or display some significant similarities with the principles of andragogy and, as the limited scope of this work impedes discussing them thoroughly, they are given a high level introduction in [Appendix IV](#) (adapted from Colman, 2019; Western Governors University, 2020b; Garavan *et al.*, 2020).

Andragogy, conceived as an extension of pedagogy, explores the way adults learn and proposes some key assumptions that are summarised by the image below (adapted from Knowles *et al.*, 2015 and Knowles, 1975).



Figure 1 - Principles of andragogy

The principles of andragogy are shared by most models of adult learning theory and are applied by instructional design systems (IDS), which are a constellation of practices extensively employed by organisations to manage the learning lifecycle (Moore, Bates and Grundling, 2003). The ADDIE model, that stands for Analysis, Design, Development, Implementation and Evaluation, is the most-widely IDS model and describes the five phases that should structure the creation and implementation of L&D programmes across private and public organisations (Salas, 2020). A recent version of the ADDIE model is shown in the following image (adapted from U.S. Department of the Army, 2019).

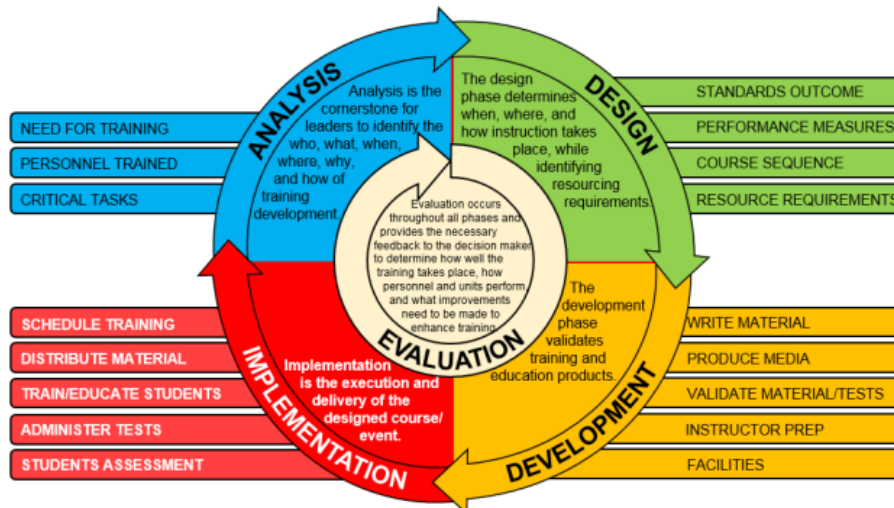


Figure 2 - ADDIE model

As the principles of ALT are combined with the ADDIE model to design both digital and in-person corporate learning interventions, the model above will be referenced in the in-depth discussion about the principles of ALT, which occupied the next sections, and throughout the rest of this dissertation.

Need to know

Adults need to know why they need to study a specific topic before they decide whether to engage in the learning process. This principle begs for a careful investigation of the learners' pre-existing knowledge, objectives, and expectations and also for a clear communication of the relevance of a specific initiative to the learners (Steele, 2022). The need to know is ingrained in the analysis phase of any ISD (Sink, 2014), as this phase attempts to understand the learners' requirements and how a learning programme can fit their needs. Other applications of this principle are the habit of listing learning objectives at the beginning of any training session, the customisation of contents to the learners' needs and the use of reflective activities that can help learners draw meaningful connections between the learning contents and their personal objectives (Langer, 1997).

Self-concept

Knowles *et al.* (2015) maintain that adult learners have the self-concept of being autonomous and responsible for their own choices but run the risk to regress to a state of passivity if they feel that

the learning process resembles their experiences in school and takes away their self-determination. Therefore, learning success in adults depends much more on how the process is designed to fit their needs (Lowe, 1975; Hough, 1984) and on how the ability of the instructor to elicit engagement (McClusky, 1975) than in children.

This principle has two implications: the first one is that not all adults may be spontaneously self-directed in learning activities, the second one is that engagement in adults may suffer significantly if learning design and delivery do not facilitate it (Harman, 2021b).

This insight finds copious applications in both learning design and delivery. Firstly, learning programmes should allow as much choice as possible to the learner so that they feel in control of the process (Steele, 2022): this may mean multiple accessibility options, for instance through synchronous and asynchronous methods; multiple content formats, such as instructor-led courses, written documentation, audio or video recording or massive open online courses (MOOCs); and finally multiple levels of complexity and scaffolding, as a manager, a junior analyst, and a seasoned executive may need three completely different learning programmes about the exact same topic. Another rationale for providing multiple options is that different learning methods may be more effective for different topics: for instance, Arthur, Bennett, Edens and Bell (2003) outline that self-learning appears to be the most effective method to acquire cognitive and procedural skills while, Lacerenza, Reyes, Marlow, Joseph and Salas (2017) contend that leadership programmes should include a mixture of lecturing, demonstration and on-the-job practice-based methods and are most effective when organised on-site.

Secondly, the instructor should act more as a facilitator than as teacher during training delivery (Hough, 1984), pointing learners to the right direction and encouraging their metacognitive awareness and self-direction without being overly controlling. Therefore, the inclusion of unsupervised practice and reflective activities in a learning programme may play an important role in promoting self-direction.

To sum up, both the design and the delivery of learning should incentivise the participants' self-concept of learning autonomy. This should also enhance the way learners value the knowledge transfer's results as they perceive them as important assets they contributed building, a psychological phenomenon known as the 'Ikea effect' (Norton, Mochon and Ariely, 2012).

Adult learner's experience

A crucial feature of adult learners is the weight of their personal experiences in the learning process, which they may interpret as an important portion of their own identities (Knowles et al., 2015).

Differences in experience may depend on specific personal characteristics such as learning preferences, on the stage the learner is in their career or in their life (Hough, 1984). Learners' age may also impact on their preference in term of learning delivery: Boomers may be generally more inclined to resist digital learning (Dobrovolny, 2006) than members of Generation X or digital natives in Generation Z.

This has an impact on the analysis phase of IDS but also in the early stages of development and delivery as the designer may be required to craft and present learning programmes for a diverse audience. In this case, learning designers need to ensure that all learners have the recommended background knowledge to be able to participate actively in future learning initiatives but also that the diverse experience of different learners is valued and shared. The first objective may be met by offering recommended readings or through a flipped learning approach, in which learners are requested to engage in some self-directed activities before a synchronous, structured training or coaching session begins (Caffarella and Caffarella, 1986). The second goal can be achieved through experiential activities such as case studies and group practice sessions (Harman, 2021b) or through reflective peer learning activities like group discussions (Brown, 2014).

Ignoring the previous experience of adult learners may jeopardise the efficacy of the learning experience not only because that fails to address knowledge gaps and biases but also because it may

impact the engagement of learners, who may feel ignored or rejected by the facilitator in accordance with the “Pygmalion effect” (Niari, Manousou and Lionarakis, 2016).

Readiness to learn

Knowles *et al.* (2015) argue that adult learners display a readiness to learn those KSAs that may help them handle real-life scenarios. The main implication of this principle is the need to tie learning experiences to work or life requirements through hands-on methods that favour practice, on-the-job learning, role-plays or computer-based simulation. The immediate relevance to the learners is also quite crucial, the application of new knowledge should be planned shortly after the learning activities.

Orientation of learning

Orientation of learning is tightly intertwined with readiness to learn as it states that adults are problem-centric and are more inclined to learn the application of new skills rather than theoretical concepts (O’Neill, 2020). Hence, it is recommended to employ learning methods that illustrate real-life examples, like case studies, demonstrations, or user cases.

Motivation to learn

Learners are sensitive to some external sources of motivation, such as financial incentives, but are mostly driven by internal motivators like increased self-esteem and job satisfaction (Sink, 2014). Deci and Flaste (1996) argue that external incentives might in fact negatively affect internal motivation and that, on the contrary, a learning experience designed to ensure a high degree of autonomy and choice, engagement and hands-on knowledge can harness learners’ motivation. More recent research confirms the importance of these learning design features but demonstrates the effectiveness of external incentives in improving performances, when combined with internal motivation (Cerasoli, Nicklin and Ford, 2014; CIPD, 2021f).

Other factors that may affect learners’ motivation are the possibility to share their experience with other learners, the awareness that the skills they are learning are in high demand and the potential

life of their KSAs, especially in sectors like technology where new knowledge tends to obsolesce rapidly (Neagu, 2014). Finally, literature links intrinsic motivation with engagement, defined as the involvement in a specific activity (Ainley, 2012).

It should be noted that lack of motivation and engagement were the most frequently self-reported issues by learners during the pandemic (Maguire, 2021) and a more in-depth investigation on learners' experiences and perceptions might be required to investigate this phenomenon.

Social learning

Social learning theory may provide some additional insights around the reasons for which learners' motivation may grow thinner during extended periods of exclusive remote learning. This theory, detailed in [Appendix II](#), describes learning as the result of human interplays and processes between actors belonging to a social context (CIPD, 2021b) and implies that social interaction may function as crucial catalysts not only to change the behaviour of individual learners but of entire communities of practice or even organisations, with large scale strategic implications (Reed, Evely, Cundill, Fazey, Glass, Laing, Newig, Parrish, Prell, Raymond, and Stringer, 2010).

Before the pandemic, the social learning element was often considered an implicit element of any synchronous learning activities, but this assumption appears to no longer hold true for extended digital learning (CIPD, 2021a). Restrictions have incentivised both the technical enhancement and the diffusions of social networking and video conferencing technologies like Slack, Zoom, and MS Teams. However, this has not always translated into adequate provision of social interactions and support for learners, which may have negatively affected their self-efficacy and motivation (Saefudin, Sriwiyanti and Yusof, 2021). Steele and Cobb (2020) suggest that an explicit stock-taking of the social elements of learning programmes may constitute a remedy for this issue, ensuring that the LNA and development phases of instructional design consider the most crucial dimensions of the social interactions such as immediacy, formality/structure, scale and transparency/opacity. However, while this recommendation may help learning designers describe the social implications of common learning methods, more prescriptive insights around the

appropriate selection of interventions may be provided by consulting the learners themselves.

Giannakos et al. (2021) state the need to investigate more granularly employees' needs and perceptions about digital learning technologies and processes. Using andragogy's learner-centric perspective and considering that communities of practice have an important role in sustaining motivation, it could be argued that research should also attempt to assess learners' opinions around how digital learning processes may convey remote social exchange and support.

Features of digital learning

Benefits and drivers

Garavan *et al.* (2020) outline that e-learning is highly accessible, allowing learners from different locations to connect, enables self-paced, personalised learning, immediate feedback and a centralised tracking of learning activities and reduce the administrative burden of training for organisations. Giannakos *et al.* (2021) and Choudhury and Pattnaik (2020) cite flexibility and personalisation, accessibility, lack of socioeconomic barriers, scalability in the distribution of knowledge, limited travel requirements, and enhanced responsiveness to business needs as crucial advantages of digital learning. Clark and Mayer (2016) demonstrate that e-learning may even expedite the acquisition of KSAs compared to onsite learning.

Challenges and barriers

The main challenges identified by talent development literature may be divided into three groups (CIPD, 2021a): technological, instructional, and learner-related.

Technological

Choudhury and Pattnaik (2020) indicate initial implementation cost, digital divide, and poor evaluation systems as some of the main technological challenges of d-learning while Ali, Uppal, and Gulliver (2018) cite poor software design and low-quality devices. Additional technological issues may be driven by poor internet connectivity (Zhang and Nunamaker, 2003), access rights management and internet navigation security (Garvan *et al.*, 2020).

Instructional

Recent literature (Ali et al., 2018; CIPD, 2021a; Choudhury and Pattnaik (2020) identifies shortfalls in the poor digital skills, preparation or attitudes of facilitators, and the transactional distance between learners, their community and instructor as key instructional barriers. Salas, DeRouin, and Littrell (2005) argue that quality of learning materials may be affected if they are too content-dense and not interesting enough. Garavan *et al.* (2020) touch on the potential lack of social environment collaboration that d-learning may exacerbate despite the possibility to encourage communication through social media, web forums and other cooperative tools.

Learner-related

CIPD (2021a), Choudhury and Pattnaik (2020), Stonebreaker and Hazeltine (2004) list lack of perceived relevance of e-learning courses, absence of time allocated employees' learning, poor engagement and retention in e-learning courses, technology resistance, isolation, and blurred lines between home and work as hindrances to effective learning.

Consistently with the relevance of self-direction and motivation highlighted by andragogy, insufficient self-discipline when approaching self-paced learning (Kearney, 2006), distractibility (Garavan *et al.*, 2020), limited social interaction (Stonebraker and Hazeltine, 2014) and the lack of sufficient technical skills (Carr, 1999) represent additional challenges that may demotivate learners and instil a sense of isolation.

Success factors

Nguyen (2014) argues that e-learning can be as successful as “brick-and-mortar” classes and recent literature indicates that some of the most crucial success factors may be easy-to-use e-learning technologies (CIPD, 2021b), human interaction and hands-on contents (Higton, Archer, Richards and Choudhury, 2019), with blended training regarded as most efficient (CIPD, 2021b). Learners and facilitators should also be supported by managers and peers, engaged and empowered enough to elicit self-efficacy (Choudhury and Pattnaik, 2020; Yarberrry and Sims, 2021; Smolka, Johnson, Glover, and Dodds, 2019; Curran, Gustafon, Simmons, Lannon, Wang, and Garmsiri, 2019).

Through a largescale quantitative study on e-learning participation, Garavan, Carbery, O'Malley and O'Donnell (2010) confirm the importance of general and task-specific self-efficacy of learners as a success factor for e-learning participation but also demonstrate that the relationship between self-efficacy and participation is mediated by learners' motivation. Motivation to learn appears to also influence the way in which perceived barriers or enablers affect participation, hence being considered a pivotal factor in e-learning participation, in accordance with ALT.

Conclusions and gaps in the literature

Quality of learning design and contents, motivation to learn, empowerment of facilitators and learners, communication between learners, instructor and community of practice and organisational support emerged as important success factors of digital learning, confirming the insights of ALT, on the one hand, but also highlighting a research gap around the experiences and motives of learners who operate remotely for extended periods, which are essential for the design of learner-centric experience that elicit motivation and promotes social interactions. In particular, a more granular analysis of learners' perceptions around digital learning practices may help provide reasons for the high dropout rate of certain asynchronous learning methods, such as MOOCs, and suggests ways to leverage communities of practice in a remote learning environment.

Since the beginning of the pandemic, research has investigated some aspects of ERT, such as the use of technology (Crompton, Burke, Jordan and Wilson, 2021) or the experience of educators and students (Oliveira, Teixeira, Torres and Morais, 2021), but these works focused mostly on higher education rather than corporate learning (Bond, 2021). Furthermore, it may be argued that these initial studies have just somehow scratched the surface of the phenomenon without offering more complex analyses or availing of a firm theoretical background (Bond *et al.*, 2021).

While some quality research about emergency remote learning in the workplace is available (CIPD, 2021a), this seems to have focused on the onset of the pandemic, while few studies addressed the effects of extended restrictions on employees.

As a possible way to fill these blind spots, Donati *et al.* (2021) argue that the experience of workers who responded well to extended WFH during the Covid-19 pandemic, like the employees of technology-driven MNCs, may be used as a petri dish. The opinions and perceptions of technology workers who have acquired new skills through exclusive and protracted digital learning, grounded by the consolidated theoretical framework of ALT, may serve as a basis for an in-depth qualitative research that attempts to identify facilitating conditions and organisational interventions that may support knowledge sharing and empower other learners in the accelerating present.

Research question and aims

The purpose of this study is to explore the opinions and perceptions of technology workers around digital learning, investigating in particular how their learning effectiveness and motivation were affected by the abrupt transition into exclusive and extended remote learning caused by the Covid-19 pandemic, then attempt to explain their experiences through the conceptual framework of ALT.

The research question is:

How do IT professionals who operate in technology-driven multinational corporations perceive the exclusive and extended use of digital learning to acquire and maintain new skills?

Research objectives

The objectives of the research are to:

- **Understand the perceived effectiveness of diverse digital learning design, practices and tools**
- **Understand what factors affect the digital learner's motivation**
- **Understand which support system is required by digital learners**

Methodology

Introduction

The current chapter firstly examines the principal research philosophies, types, and methods and then it selects a theoretical perspective and data collection method that may be employed to answer the specific research question of this dissertation.

Furthermore, it provides a breakdown of the sample chosen, and it discusses the data collection and data analysis processes, as well as the limitations of this research and ethical considerations.

Research philosophy

Research philosophy, which may be defined as the belief behind the development and nature of knowledge, is represented by the outermost scale of the research onion model designed by Saunders, Lewis and Thornhill (2016). The literature distinguishes between two aspects of research philosophy that are ontology, or the study of reality, and epistemology, which investigates how reality is known or perceived (Bryman and Bell, 2011). Ontology can be declined in the forms of objectivism, which maintains the existence of an objective reality independent from opinions (Given, 2008), and constructivism, which views existence as shaped by individuals through their interpretations of the world (Alvesson and Sköldbberg, 2009). Conversely, epistemology includes the two main research paradigms of positivism and interpretivism: positivism focuses on data that can be empirically observed and measured (Pascale, 2011), while interpretivism holds that human beings construct knowledge by interpreting and reflecting upon personal experiences (Hiller, 2016).

Research type

Research projects can be broadly classified based on their objective or aim as descriptive, explanatory and exploratory. Descriptive research defines or describes the features of a certain phenomenon (Blackstone, 2012) while explanatory research attempts to discover the causal nexus between events (Zikmund, Babin, Carr and Griffin, 2012). While both these methods provide a deeper understanding of already-investigated territories, exploratory research is normally used

during the embryonal stages of the process to broadly contour a new area of research (Howitt and Cramer, 2020). Not only exploratory research satisfies the researcher's curiosity about an untapped branch of knowledge, but also it helps evaluate the feasibility of more in-depth studies and assess the best research methods and design (Sue and Ritter, 2012).

Research method

There three primary groups of research methods are quantitative, qualitative and mixed.

Quantitative methods employ surveys and experiments to collect numeric data that can be used in statistical analysis (Creswell, 2003). On the contrary, qualitative methods rely on non-numerical information obtained through unstructured or semi-structured techniques, such as observation, surveys or interviews, to understand human emotions and motives that drive behaviour (Berrios and Lucca, 2006; Mills and Birks, 2014). Finally, mixed or triangulation methods are a combination of the previous two groups (Park and Park, 2016; Gunnell, 2016).

Quantitative research operates by exploring large quantities of hard data through the use of deductive reasoning, in order to validate or falsify hypotheses and shed more light on already-known phenomena (Park and Park, 2016). By contrast, qualitative research explores untapped theoretical areas through small data samples with the aim to generate insights for further research (Bansal, Smith and Vaara, 2018). To achieve this objective, qualitative research employs an inductive approach, that moves "bottom-up", from the experience of specific participants to generate general conclusions (Trochim, 2006; Creswell and Plano Clark, 2007).

Research design

Research may be described as an original investigation attempted to increase or deepen the comprehension of a certain area of knowledge (Myers, 2013) and research design is the deliberate plan of the conditions for the collection and analysis of data that answer a research question, which entails choosing a philosophical and epistemological perspective, determining the type of research, then selecting a suitable research method and the appropriate data sampling techniques (Jankowicz, 2005).

As this work focuses on the subjective opinions and experiences of digital learners operating in technology professions during the Covid-19 pandemic rather than on empirical data within a positivistic perspective and the objective reality conceived by ontological philosophies, the philosophical approach employed is epistemological and the research paradigm selected is interpretivist. Also, due to the novelty of the forced, extended digital learning experience investigated and its circumstances, the type of research of this dissertation may be classified as exploratory.

Saunders *et al.* (2016) explain that the research objectives and paradigm selected should influence the choice of research methods: more specifically, a positivistic perspective normally avails of the quantitative method of investigation while an interpretive paradigm should employ a qualitative research method. Consequently, due to its limited scope, to its exploratory nature and to the choice of employing an interpretivist perspective, this dissertation will use a mono-method of research that will be qualitative, with no initial research hypothesis.

Sampling Method

Qualitative research typically employs five main types of non-probability or non-random sampling methods: theoretical, in which sampling criteria may change in different phases depending on the development of the researcher's theory (Glaser, 1978); convenience, which involves the recruitment of the most accessible study subjects (Marshall, 1996); purposeful or judgment, which focuses on subjects that are information-rich and present the best fit with the objectives of the study (Shaheen, Pradhan and Ranajee, 2019); snowball, where existing research subjects recruit other subjects amongst their acquaintances (Goodman, 1961); and voluntary response, which consist of self-chosen participants who, for instance, may have responded to an online public survey (McCombes, 2022).

The general purpose of this work is to explore the opinions and perceptions of technology workers in MCNs around the prolonged and exclusive employment of remote learning.

The researcher had originally planned to sample employees from a single technology multi-national organisation. However, it was not possible to reach a satisfactory agreement with the selected organisation around research conditions, intellectual rights ownership, and ethical handling of interview transcripts to allow anonymity, hence, this initial plan was abandoned.

Study subjects were instead selected amongst employees of a diverse set of large technology or technology-driven MNCs and who had participated in forms of purely remote learning for at least three months during the Covid-19 pandemic.

This work uses OECD's definition of a 'large' company as an enterprise that employs 250 individuals or more (OECD, 2022) and it employs a classical definition of a 'MNC' as an organisation that owns business operations in at least one nation other than its home country (Chen, 2022). Furthermore, the definition of 'technology company' used includes any business that provides digital technical products, services, platforms, or hardware and heavily relies on them as a primary revenue source (Heath, 2017), while the term 'technology-driven company' defines an organisation that, albeit operating in a traditional sector, leverages technology-driven innovation to achieve a competitive advantage (Carrol and Hopkins, 2020).

These stringent criteria were applied to select individuals operating in companies where, on the one hand, the need for vertical integration would have created a certain familiarity with remote learning from before the pandemic, and, on the other hand, implementing knowledge-sharing best practices would have been considered a primary strategic objective, removing the most obvious and already-investigated barriers to digital learning.

Due to the difficulty of recruiting individuals with very specific characteristics, several sampling options were considered. A convenience sampling method was immediately deemed ineffective in selecting information-rich subjects while theoretical sampling was excluded due to time constraints. A mixture of other non-probability samples was employed, instead: three research subjects were selected through purposive sampling amongst the researcher's acquaintances, three more subjects

were onboarded via snowball sampling and five interviewees joined the project through voluntary response sampling, as they replied to online public surveys posted on social media groups of IT professionals. In addition to this, the profiles of all volunteers were checked on LinkedIn to ensure compliance with the same criteria used in purposive sampling.

The final sample consisted of eleven technology professionals who, during the outbreak of the Covid-19 pandemic, had been working in ten different companies (since 2020, two have started new assignments in different organisations and one is currently self-employed). Five of the study subjects were female and six were male, with age ranges of 24-48 and different levels of work experience: four subjects were junior employees who had had limited or no previous experience in digital learning before participating in a fully remote onboarding during the pandemic; three individuals held senior positions with no managerial duties; four subjects held a leadership role, of which three had been promoted to management during the pandemic.

Seventeen suitable subjects were contacted in total through an email or a social media message, which included the information sheet and the consent forms seen in [Appendix VI](#) and [VII](#) as attachments. Eleven of them responded expressing their interest to participate in this study. A breakdown of the sample participants is presented in the table below.

	PARTICIPANTS										
	1	2	3	4	5	6	7	8	9	10	11
GENDER	M	F	M	M	M	M	M	F	F	F	F
AGE	28	32	48	28	33	38	28	25	31	44	33
JOB TITLE	Technical support associate	Customer Service Team Manager	Principal Engineer	Policy Agent	Technical team Lead	Manager IT End User Service Europe	IT Executive	Cloud Technical Resident	Consultant	Project Manager	Senior Technical Content Designer
SENIORITY	Junior	Middle Manager/ Team Leader	Senior (non-manager)	Junior	Middle Manager/ Team Leader	Middle Manager/ Team Leader	Senior (non-manager)	Junior	Junior	Middle Manager/ Team Leader	Senior (non-manager)
PRE-PANDEMIC EXPERIENCE WITH DIGITAL LEARNING	None	Limited / Occasional use	Extensive / Frequent use	None	Extensive / Frequent use	Limited / Occasional use	Limited / Occasional use	None	Limited / Occasional use	Extensive / Frequent use	Extensive / Frequent use
WORKED IN TECHNOLOGY BEFORE THE PANDEMIC	No and had no IT-oriented education	Yes	Yes	No and had no IT-oriented education	Yes	Yes	Yes	No but had IT-oriented education	Yes	Yes	Yes

Table 2 - Breakdown of sample

Pilot Study

As recommended by Malmqvist, Hellberg, Möllås, Rose and Shevlin (2019), a pilot study was conducted to both allow the researcher to hone her interviewing skills and to refine the interview questions, which originally included some minimal repetitions or were, in some cases, slightly too elaborated or too vague and might have misled some interviewees or extended the duration of the interview excessively. Furthermore, the pilot interview allowed the interviewer to identify which questions required minor adjustments depending on the level of experience of the study subject or *ad hoc* probing, such as requests to elaborate an answer or provide examples. It could be argued that, had a quantitative research method been employed, this degree of flexibility would not have been achievable.

Data collection

Semi-structured interviews were chosen as their aim is to explore opinions and perceptions of technology workers who had extensively used digital learning during the pandemic. This allowed a certain degree of flexibility in the interaction with test subjects (Collis and Hussey, 2014). Due to the novelty of the research topic and the heterogeneity of the sample collected in terms of age, gender, life experience and personalities, the researcher adopted a responsive interviewing

perspective. This approach conceives the interviewer and interviewee as conversational partners, emphasises adaptability of design and requires the researcher to adjust to the temperament of the study subjects, adapting the interview process in response to what they hear (Rubin and Rubin, 2012). Consequently, the interviews conducted included a mixture of open-ended descriptive and comparative questions to which the researcher added *ad hoc* or probing questions on important matters, depending on answers and verbal and non-verbal cues provided by the interviewees.

Interview Structure

The interview questions were designed to answer the research question “How do corporate adult learners in the technology sector perceive the exclusive and extended use of digital learning to acquire and maintain new skills?”, hence they were structured into the following sections that reflect the research objectives:

- Effectiveness of digital learning design and methods
- Learner motivation
- Organisational support and environmental factors

A full list of the interview questions structured according the sections above is provided in [Appendix V](#).

Interview Procedure

Two interviews were conducted in person, in a quiet meeting room, while nine interviews were held through a video conferencing application chosen by the interviewee amongst Microsoft Teams, Skype and Zoom due to either to a significant physical distance between the researcher’s and the study subject’s location or to pandemic-related safety concerns. This enabled the researcher to take note of non-verbal responses and record them into a research journal (Driskill and Brenton, 2011).

All interviews commenced with an informal conversation about the interviewee’s background, a set of basic demographic questions and a discussion about any query the test subject may have had on

the research project. This initial exchange was not recorded to put the subject at ease, but the researcher took notes about any information or non-verbal cue she deemed worth investigating further. This ice-breaking phase was followed by the pre-defined interview questions, which were recorded, then by probing or *ad hoc* questions to expand any topic the researched deemed relevant to the project. Each interview lasted between 30 and 60 minutes.

Data analysis

Thematic analysis was used to detect patterns and themes from these categories. This was structured into an initial familiarisation with the data was carried out by re-visiting the video or audio recordings and by transcribing them or reviewing the automatically generated transcriptions (Braun and Clarke, 2013), followed by the coding of transcripts and by the generation of initial themes, which were then reviewed, condensed and relabelled into the five main themes, discussed within the Analysis and Findings chapter of this dissertation (Saunders *et al.*, 2016).

A high-level schedule of the data collection and analysis schedule is provided in the table below.

Phase	Week	Activities
Recruitment	Week 1	Interviewees selection
Interview Pilot	Week 2	Validate the interview protocol and questions and apply necessary amendments
Primary Data Collection	Week 2-4	Check interviewees background through email and LinkedIn, schedule and conduct interviews, transcription and first phase of coding
Data Consolidation	Week 5-6	Review and consolidates primary data collection, Analysis

Table 3 - Schedule of data collection and analysis

Limitations

This research suffers from several limitations intrinsic to the qualitative research method.

In qualitative research, participants' accounts are subject to their own interpretations and may be further influenced by the unconscious biases of the researcher (Bryman and Bell, 2011).

Specifically, this dissertation only considers learners' perceptions but it neglects to evaluate the effects of extended digital learning on their knowledge, behaviour, and organisation's business

objectives (Kirkpatrick, 1994), due to limitations in time and resources. Further research employing a mixed method and applying big data and analytics to evaluate digital learning methods usage and results (Giannakos *et al.*, 2021) might provide a more exhaustive and objective analysis of the forced remote learning phenomenon.

Nevertheless, the researcher contends that the value and usefulness of this work was not compromised by its limitations.

Ethical considerations

Respect for study subjects and confidentiality are considered paramount in the qualitative research literature (Myers, 2013). This study carefully considered these ethical concerns and managed them as follows.

Interviewees' awareness and data protection

An information sheet and a consent form were issued to each participant before the interview to ensure they were aware of the nature of the research and of their rights in term of privacy and data protection in compliance with GDPR and with NCI's the ethical guidelines. Each participant was asked to sign the consent form, informed that the interview was a voluntary process, which could be terminated at any stage, that they would be video or audio-recorded and that they could withdraw their consent to use their interview in the study within two weeks.

Interview schedule, recording redundancy and transcription

The time and the venue for each interview was agreed with the study subject based on their convenience and on their possibility to access a quiet and discrete environment if this was done remotely. Furthermore, interview questions were formulated to avoid any discriminatory terms. All interviews were video- or audio-recorded simultaneously with two devices in case of technical issues, in the interest of the interviewees' time.

When possible, the researcher availed of the automated transcription features of the video-conferencing application used while she resorted to manually transcribing the interviews in four

cases. In all cases, direct quotes from transcripts were curated to remove any direct mention of the study subjects' companies or products that may have made them recognisable. This allowed guaranteeing the level of confidentiality agreed upon in the consent form.

Encryption, archival and research journal

A research journal was used to annotate field observations and impressions, as literature indicates that field notes may help identify the researcher's personal bias and aid reflective activity (Seidman, 2006). These field notes together with a soft copy of signed consent forms, interviews recordings, and transcripts were encrypted and archived in a password-protected device and will be handled and destroyed according to NCI's policy.

Analysis and findings

Introduction

This chapter attempts to answer the research question about the perceptions and opinions of technology workers involved in extended remote learning by presenting the findings derived from the thematic analysis of semi-structured interviews involving eleven technology workers. It includes a discussion of the demographics of participants, an overview of the five main themes emerging from thematic analysis, a detailed presentation of each theme, and a conclusion and limitations section.

As this research employs the theoretical framework of the adult learning theory, the career stage dimension (Hough, 1984) was used to divide the interviewees into three groups and the presentation of the five main emerging themes was structured accordingly.

Demographics and seniority of participants

The sample used consists of eleven IT professionals, with an age range of 25-48, who engaged in extended remote learning, as discussed in the Methodology chapter. It includes five females and six males and comprises of a mixture of junior staff, senior staff, and middle managers or team leaders. No senior manager is represented in the sample as the researcher encountered issues in recruiting them.

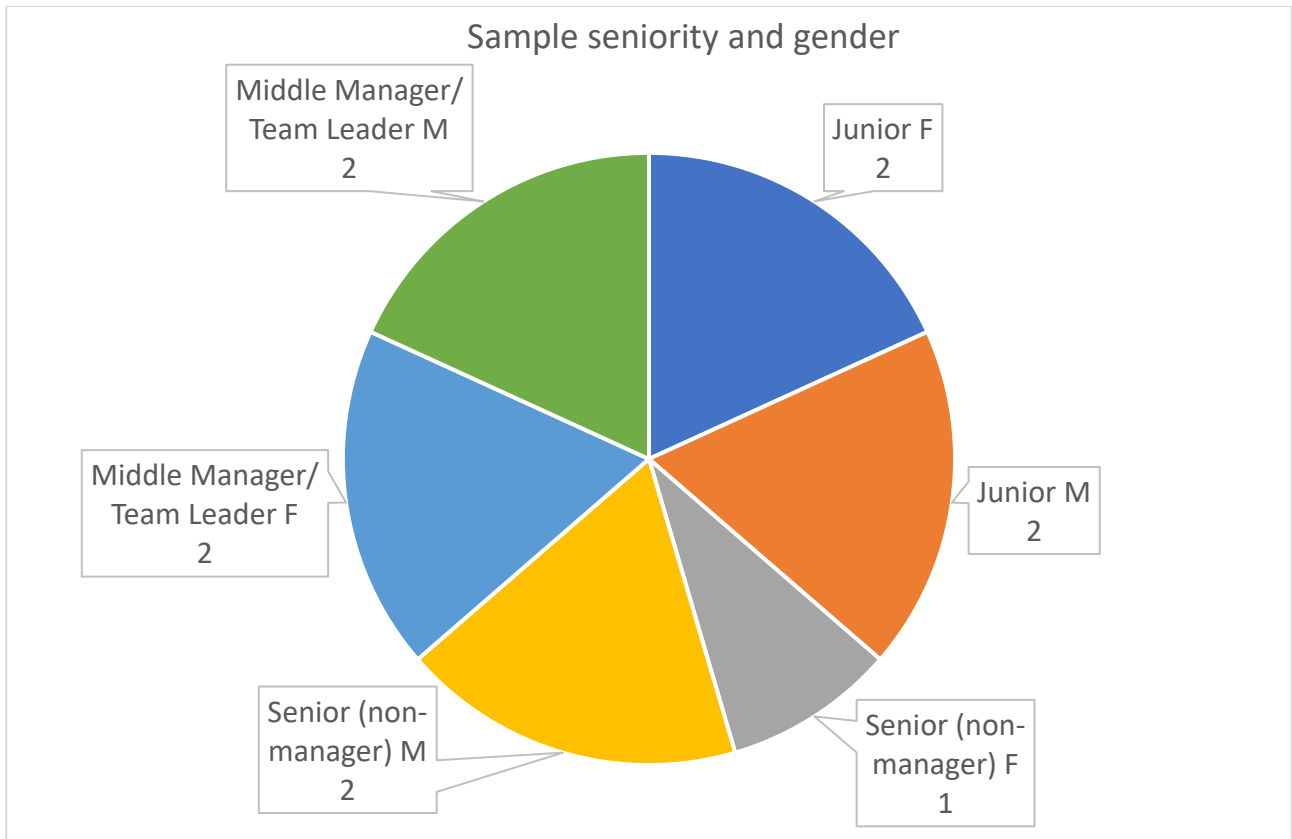


Figure 3 - Sample seniority and gender

Themes

This study employed thematic analysis to process the transcripts resulting from semi-structured interviews and then generate patterns and themes, as outlined in the Methodology chapter. After coding the transcripts of the interviews, twenty-eight themes initially surfaced, which were then reviewed and finalised into five principal themes. Initial themes, main themes and their occurrence in interviews' transcripts are shown in the table below. Please note that Interviewees ,1, 2 etc. are abbreviated as I1, I2, etc. in the table and in the following analysis sections.

Research area	Research objectives	Emerging themes	Initial themes	Theme occurrence													
				Junior				Senior (non-manager)			Middle Manager/Team Leader						
				F		M		F	M		F		M				
				I8	I9	I1	I4	I11	I3	I7	I2	I10	I5	I6			
Perceived effectiveness of extended digital learning	Digital learning design, practices and tools	Learning design	Instructor-led training for onboarding	X	X	X	X				X						
			Blended digital learning	X	X	X	X	X	X	X	X	X	X	X	X	X	
			Self-paced learning	X	X	X	X	X	X	X	X	X	X	X	X	X	
			Gamification	X		X	X										
			MOOCs and asynchronous learning	X	X	X	X		X	X	X	X	X	X	X	X	
			Hands-on, practice and simulation	X	X	X	X	X	X	X	X	X	X	X	X	X	
			Unstructured on-the-job learning					X		X	X	X	X	X	X	X	
			Structured on-the-job learning	X	X	X	X										
			Non-proprietary digital learning technologies/ learning partnerships	X	X			X	X	X	X	X	X	X	X	X	
	Peer learning	X	X	X	X	X	X	X	X	X	X	X	X	X			
	Motivation	Motivational factors	Personal interest			X		X	X	X	X	X	X	X	X	X	
			Relevance	X	X	X	X	X	X	X	X	X	X	X	X	X	
			Possibility of professional growth/development	X	X	X	X	X	X	X	X	X	X	X	X	X	
			Organisational recognition/financial reward			X	X										
		Engagement factors	Facilitator	X	X	X	X		X			X				X	
			Interactivity	X	X	X	X	X		X	X	X	X				
			Quality of learning design and materials	X	X	X			X	X	X	X	X			X	
			Hands-on	X	X	X	X	X	X	X	X	X	X	X	X	X	
			External interferences				X		X							X	
	Learner characteristics	X	X	X	X	X	X	X	X	X	X	X	X	X			
	Support system	Learning support	Equipment, furniture, technical support			X	X									X	
			Structured on-the-job learning	X	X	X	X										
			Feedback	X		X							X				
			Communities of users	X	X	X	X						X				
		Budget						X							X		
		Time allocated to learning						X			X				X		
		Management metacognition	Metacognition and direct involvement in restructuring learning					X				X	X	X	X	X	
	Management knowledgeability/understanding of training needs							X	X						X		

Table 4 - Themes

Theme 1 – Learning design

This theme includes the study subjects’ perceptions around the effectiveness of different digital learning practices and tools and their combined use as part of learning programmes in place in their

organisations. This theme is adjacent but separate from the themes of learners' motivation and engagement, which will be presented independently.

Junior staff

All junior technology workers interviewed participated in a fully remote onboarding process that lasted over three months and included a mix of instructor-led training, practice and simulation sessions, self-paced learning through MOOCs or documentation and structured on-the-job learning (coaching, buddying and mentoring) they received. All subjects in this group found this blended solution effective but, within the mix, all preferred forms of synchronous learning and declared that, given the choice, they would have opted for an in-person induction training due to a higher level of interactivity with peers and facilitator. I1 mused

“I would have preferred an in-person training because it allows more opportunity for interaction even if, given the circumstances, I think our onboarding was extremely well-structured”.

Structured on-the-job learning and practice or simulation session were considered particularly useful, even if I4 lamented some inconsistencies between their simulation software and the one used in real life.

Junior learners also expressed mixed feelings around MOOCs due to their scarce interactivity and the inability to ask questions while watching video courses, even though they enjoyed the possibility of watching the videos or revisiting them at their convenience. According to I9, asynchronous training

“Should never be used as the only learning method for important topics”.

However, Interviewees 9 and 8 felt that the quality of the courses can make a difference and that external MOOCs providers (Coursera, Udemy and LinkedIn Learning) normally offered better quality content than their company's MOOCs. All junior workers reported that they found MOOCs

courses more useful for delving into topics they already understood superficially and for personal development, combined with on-the-job learning and peer learning. I8 admitted

“Before I started that training, I would often try to do courses on my own that I would never finish because I didn’t have anyone who would ask me about my progress. So having [a coach] who does that has driven my accountability”.

Most junior workers only felt the need to use learning tools provided by their organisations.

Senior staff and managers

In the senior staff and middle managers/team leaders’ groups, study subjects engaged mostly in asynchronous self-directed learning through documentation, MOOCs or video recordings of previous training sessions together with some structured and unstructured on-the-job learning.

In the senior staff group, only I7 took part in remote synchronous induction training, and he also shared the opinion that

“Instructor-led training on-site would have been better because you have more interactivity with the trainer, you can ask questions”

However, he also found his structured remote coaching to be a better experience than the in-person, unstructured coaching he had received previously. “Teams work in silos so it was hard to learn something from other teams in the office”, he stated, while in structured remote coaching

“You know the purpose of the meeting and most of the time it’s recorded, the conversation will be much more focused”

Furthermore, structured coaching sessions could be scheduled at a convenient time for both parties involved with no interruptions.

Interview 11, who had done most of her learning through self-study and unstructured coaching before the pandemic, also found that structured remote coaching worked better for her. As she felt the pressure to make the best use of her and her coaches' time, so she would engage in intensive preparation before the call and ask more focused questions. Nevertheless, she did complain about the lag between questions and answers when liaising asynchronously with colleagues on different time zones.

I3 found that very little changed in his learning habits during the pandemic.

"I rely 20% on e-learning courses and 80% on self-directed learning for my technical learning",

he explained, clarifying that he has always made intensive use of e-book platforms like O'Reilly media or Packt Publishing or other specialised website to do research,

"Focusing only on the specific aspects that I am interested in, maybe without reading the full book".

Nevertheless, he admitted that the most creative part of his learning process was affected by forced remote work as brainstorming with colleagues was much more time-consuming when done via video conference and that he missed the sometimes-serendipitous learning derived from coffee-break conversations.

All interviewees in the management group were also acutely aware of the vacuum left by in-person social learning. Three of them were promoted to management positions during the pandemic and had to learn about their new role mostly through self-paced learning (MOOCs and documentation) and unstructured peer learning. No structured management learning was in place for I2 when she was promoted to her role.

“Before Covid, this was not really a concern because you could physically run at your line manager’s desk whenever you needed help or advice but becoming a manager during the pandemic was a mess, honestly [...], we were pretty much left to ourselves”

she reflects. Some unstructured shadowing and coaching were the only learning offered to I6 when he started working as a manager during the pandemic but, when his senior manager left the company, he was left with

“No plan, no vision about [his] growth path as a manager and had to fight above [his] class weight to carry out his duties”.

I5 participated in structured coaching and buddying, in addition to self-study; however, he felt that learning without social interaction

“was as hard as learning from a book without an index”

and reported difficulties in achieving effective brainstorming sessions.

Also, I10 explained that the pandemic had made learning harder in her company as outdated documentation and bad-quality MOOCs were the only official source of information. Most other study subjects in the managers and senior staff groups share their opinions about the inadequacy of company-designed MOOCs as main source of learning, considered *“boring”* or *“irrelevant”* (I2, I6, I7 and I10). External MOOCs providers were generally considered preferable but “often not advanced enough for experts” according to I3, who thinks that online courses provided by high-calibre universities are a better alternative and often not much more expensive.

Spontaneous peer learning through reflective activities or group discussions was successfully employed by I2 and I6 to compensate for the absence of guidance by more senior staff. Conversely,

I10 felt that early pandemic-induced layoffs had scared some of her colleagues into cementing their job security through their exclusive expert knowledge and becoming less helpful towards their peers.

All senior workers and managers used forms of external learning tools to integrate those provided by their organisation, such as search engines, forums, wikis, book sharing platforms, MOOCs and even video sharing or social networks. I7 noted that several companies tend to block social networks while they can provide useful technical insights.

Key findings

All interview subjects demonstrated a preference for blended approach to learning. However, within the mix, all junior staff members favoured synchronous learning methods, especially instructor-led training, as a means to introduce new topics, due to a higher degree of interactivity. The higher the familiarity with a topic, the more likely subjects were to prefer asynchronous learning methods for their daily learning, with senior staff members relying mostly upon self-learning. Nevertheless, all newly-hired staff across all seniority groups wished they could have participated in an in-person onboarding process.

The unique use of MOOCs as an asynchronous learning method was deemed undesirable for different reasons by all study participants, regardless of their seniority level.

On-the-job learning, particularly peer learning, was deemed essential by all interviewees. However, *after* the induction process, they declared to prefer structured, remote on-the-job learning, such as buddying, coaching or mentoring, over the in-person but unstructured alternative.

Lack of structured on-the-job or off-the-job learning was perceived as a particularly daunting challenge by managers who transitioned to their new roles during the pandemic, due to the lack of clear guidelines, loss of all tacit or implicit knowledge, and context management issues.

Conversely, senior non-managers did not feel that their learning had been significantly affected by

prolonged remote work. However, most subjects reckoned that exclusively remote learning could be detrimental to incidental or creative learning achieved through brainstorming processes.

Theme 2 – Motivational factors

This theme presents the opinions of study subjects around their motivation to learn in the workplace. Motivation and engagement in learning are overlapping but different themes: the former pertains to the intrinsic and extrinsic objectives that drive someone to learn, while the latter pertains to the factors that help the learner stay focused during learning.

Junior staff

I1 and I4 described intrinsic motivation as dovetailed with financial incentives.

“For sure, the career opportunities and the ability to apply knowledge to my job are a big source of motivation to keep learning. That’s probably where the 90% of my motivation comes”

admitted I4.

“Curiosity and motivation are two principles that my company encourages a lot [...] The rewards of a job well done include not only money and stocks but the possibility to be promoted”

pondered I1, who was the only junior worker to cite curiosity as a motivator.

I8 and 9 listed relevance of knowledge to their jobs and personal development but did not mention directly personal financial incentives, nor senior staff and management did. When the researcher asked probing questions on the matter, other interviewees clarified that they saw financial incentives as a hygiene factor rather than a special source of motivation as they are commonplace amongst most MNCs.

Senior staff and managers

All subjects from the senior staff and managers groups cited, in addition to relevance and career growth, personal interest or curiosity as powerful motivators.

“Something might not be interesting, but if I know it's relevant to me, even if it's not presented very well, I will just muscle my way through it somehow [...], because I know I will need it. And then there are even things that might not be relevant now but might become relevant in the future or [...] I'm interested in the topic - and that's probably the best kind of training. And of course, you know, the way things are presented”.

acknowledged I6.

Regarding the link between knowledge and professional growth, I3 ventilated the creation of “career development paths that are clearly linked to learning programmes”.

Key findings

All interviewees cited relevance to their job needs and potential for professional growth as intrinsic motivations for their learning, with some junior staff and most senior staff and managers also mentioning personal interest, curiosity, and fear of obsolescence as drivers. Most interviewees treated financial incentives as hygiene factors in their motivation.

Theme 3 – Engagement factors

This theme introduces the learners’ reflections about the elements of learning that kept them engaged as separated by the objectives that motivated them. Engagement dovetails with motivation as most subjects also listed learning engagement as a motivational factor but the former pertains to how involved the subject feels in the learning experience (Ainley, 2012) rather than to the learner’s objectives.

Junior staff

All junior workers recognised their personal responsibility in remaining engaged and hinted at their struggles with distraction while learning remotely. Mostly, lack of engagement was attributed to boredom but, in a few cases, their distraction derived from serious causes like mental health issues or feelings of isolation. I8 admitted

“I felt that [isolation] was the biggest challenge for me, especially coming from a university setting where I sat in a classroom with everybody else, learning together, and then I was thrown into this forest of new information alone”.

A facilitator with good presentation skills was considered helpful by most junior subjects.

“When you have the instructor in front of you [as your camera is switched on], you have to pay attention”,

quipped I9.

“If they have an interesting personality and [...] seem motivated, [trainers] can inspire you, too. This really influences me a lot”,

elaborated I1.

The interactivity of synchronous learning methods and hands-on learning were factors of engagement recognised by all junior workers: in particular, instructor-led training allowed them to ask questions that would be answered immediately, and potentially exchange opinions with other learners; also, practice and simulations enabled a faster understanding of technologies. Also, most junior workers mentioned good quality, scaffolded learning materials as engagement drivers.

Learners appreciated frequently updated materials due to fear of obsolescence.

“I am a bit scared of the future as I know things change rapidly and what I know today may be obsolete tomorrow”,

considered I1.

Struggling to find a quiet place to learn in shared accommodations was cited as an external factor that could jeopardize engagement.

Senior staff and managers

All senior staff and managers felt responsible for their own engagement but declared that feeling isolated affected their engagement. All subjects in these two groups admitted they were occasionally prone to distraction and boredom while learning and most of them attributed these struggles to unclear, irrelevant or verbose learning contents. Outdated or repetitive learning, such as the mandatory yearly compliance courses, was considered detrimental as it

“Did not add any value while wasting everybody’s time”,

as summarised by I7. Learning about widely-used and popular technologies was instead regarded as

“Easier [...] because supported by a large community of users and loads of documentation [...]. Furthermore, the technology could be recycled both to improve the current work and for career development”,

according to I5. Fear of obsolescence was cited as an additional engagement factor. Furthermore, all seasoned technology professionals considered hands-on learning as extremely engaging.

“I don’t just want to see something on the slide. I want to try it out. I want to break it and then see how I can fix it”,

explained I6.

Senior staff and managers also stated that they felt engaged by peer learning but would consider coaching or training helpful only if the facilitator was extremely competent and had excellent digital presentation skills, otherwise preferring self-study. Spontaneous remote peer learning, however, often clashed with boundary management:

“It’s really hard to know if it’s an appropriate time to contact [your colleague] as you never know if they are busy with other tasks”.

noted I2.

Those who had to care for young children or work from rural areas during the height of the pandemic cited family duties and internet connectivity issues as external factors detrimental to their engagement.

Key findings

All subjects placed the *locus* of learning control internally but cited a concoction of factors that had aided or made it difficult for them to engage. These ranged from the quality of the learning contents to the ability of the facilitator and the environment surrounding them.

All interviewees considered hands-on and up-to-date learning content as drivers of engagement, often combined with fear of obsolescence.

The presence of an instructor with good presentation skills was considered particularly helpful by junior staff, who also valued interactivity as a motivator, while senior staff and managers only preferred synchronous learning to self-study if their facilitator or coach was considered exceptionally knowledgeable.

Finally, all subjects felt that isolation had interfered with their learning to some extent while only some cited other elements of disturbance.

Theme 4 – Learning support

This theme presents the observations of learners about the ways in which they felt supported or unsupported by their organisations, supervisors, and peers. This theme is strictly linked to the development of metacognitive skills amongst managers and direct involvement in restructuring learning. However, as the latter theme was discussed in detail across all interviews in the management, the researcher decided to introduce them separately.

Junior staff

All junior interviewees perceived the structured on-the-job learning organised for them as an important form of support from their facilitators and organisations. Being able to receive encouragement and feedback from facilitators, community of users or managers was considered essential to their learning.

While most senior workers treated the provision of the equipment and office furniture needed for digital learning as a hygiene factor, some junior workers considered it a significant form of support.

Last but not the least, organisational responsiveness to feedback was considered an important element of support by most junior professionals.

“My company works on feedback and seeks any opportunity for improvement”,

declared I1.

Senior staff and managers

The main elements of organisational support listed by senior staff and managers were adequate budget, sufficient time dedicated to learning and ability of senior management to act upon feedback and facilitate the appropriate interventions, which could mean authorise the budget for external learning courses when needed, be knowledgeable enough to understand technical issues and direct the learner to the right subject matter expert or listen to feedback.

Support by peers and supervisors was also deemed important by more senior staff groups but most noted that it was their responsibility to actively seek support when needed.

“I do have people supporting me, but I have to be very proactive”

stated I6.

Key findings

Study participants across all groups considered help from their community of users and organisational responsiveness to feedback as very important support factors for learning. Junior staff deemed structured on-the-job learning an important channel of support. Senior staff proactively sought support when learning interventions were not directly provided by their organisations; however, they considered budget, adequate time allocation, and senior management's ability to understand training needs crucially important for the learning process.

Theme 5 – Management metacognition

This theme presents the reflections of middle managers on how extended remote work affected their understanding of the learning process in themselves and their team and how they decided to act upon the metacognitive skills they acquired. This theme is tightly intertwined with the previous theme of learning support and, specifically, with the ability of senior management to act upon feedback.

All subjects in the management group reported being involved in digital learning both as coachees and as facilitators, coaches, or mentors. On the one hand, they provided intensive learning and emotional support to their subordinates. This involved numerous on-the-job interventions and was considered taxing by some of them. I6 explained,

“As a team leader, I felt responsible for the well-being of my team members but having daily 1:1 meetings with each person [...] was quite draining for me, especially because it was done remotely and it felt harder [...], from a human rather than technical perspective”.

Managers took stock of the difficulties of sharing implicit knowledge and the impracticality of unstructured learning in a remote setting, resorting to the formalisation of the learning process to counter these issues.

“I am currently working on [the introduction of] more structured on-the-job learning and of simulation sessions [with the help of] tenured colleagues [...]: we are squeezing the knowledge out of them and asking them to recreate user cases and challenging scenarios to use in practice sessions. [...] In the office, knowledge [...] was easy to propagate as new starters could just sit next to somebody and learn by observation. After Covid, this experience was completely erased and we are trying to fill the gap”,

explained I2. Also, all other subjects recounted attempting to implement a more organized approach to learning in their teams.

The ability or inability of senior management to understand learning needs and processes was cited by interviewees as a crucial facilitator or obstacle in their attempt to reform and restructure learning.

Key findings

Middle managers had to directly address the new learning issues generated by a sudden shift to the prolonged and exclusive use of digital learning, which initially involved a lot of direct involvement in mentoring and coaching sessions. They reported that operating remotely under duress induced them to reflect on their own and their teams' digital learning needs and that they attempted a formalisation of knowledge sharing and learning processes to counter the loss of social and implicit learning.

Conclusions and limitations

This chapter presented the findings resulting from the thematic analysis of eleven semi-structured interviews with technology workers who had taken part in remote learning during the pandemic. These findings attempted to answer the research question about the perceptions and opinions of technology workers around digital learning and specifically to analyse their experiences around digital learning design, motivation, and support systems. The sample used was a blend of junior workers, senior workers, and middle managers, well-balanced in terms of gender representation.

Summary of key findings

Five main themes emerged, which were experienced differently across different seniority groups: learning design, motivational factors, engagement factors, learning support, and management metacognition.

The key findings emerging from the thematic analysis of the digital learning design were four: first, in the mix, junior staff preferred synchronous learning methods while senior staff favoured self-paced methods, but all newly-hired subjects across all seniority groups would have preferred an in-person induction process; second, after induction, subjects across all seniority groups favoured remote, structured on-the-job learning even over the in-person, unstructured alternative; third, no group displayed a preference for MOOC as main learning method but junior staff considered them a useful revision tool; last, the newly-hired managers group reported the most negative experience with forced remote learning.

The thematic analysis of motivational factors highlighted that relevance, professional growth, personal interest, and fear of obsolescence were cited as intrinsic motivators, while financial incentives were mostly treated as hygiene factors.

The principal findings around engagement factors suggested that subjects considered themselves accountable for their learning process but cited hands-on and up-to-date learning content, facilitator's skills, their mental health, and the environment surrounding them as factors affecting their engagement. Interactivity was also considered an important engagement factor by newly onboarded staff.

Data suggested also that the key factors in learning support were the availability of a responsive community of users, structured on-the-job learning, and organisational responsiveness to feedback, with more senior staff stressing the importance of budget and work time allocated to learning.

Finally, the management metacognition theme suggests that managers felt challenged by having to provide intensive coaching to their teams without adequate plans in place for their own support. However, they declared to have used this experience to develop their metacognitive skills and apply them to the rationalisation of learning processes in their organisations.

Limitations

The analysis process highlighted two main limitations, which adds to the limitations already outlined in the Methodology chapter.

First, the sample did not include the perspective of any senior manager.

Second, some of the findings gathered within theme 1 would have been more aptly addressed through the combined use of a multiple-choice questionnaire and a semi-structured interview, which was not done because of time constraints.

Discussion

Introduction

This chapter aims to explain and interpret the significance of the previously presented findings to answer the research question of this study around the opinions and perceptions of technology workers who participated in exclusive and extended forms of digital learning. The discussion compares the results obtained with existing research in the literature review, addresses the reasons why they emerged, and attempts to achieve the research objectives, which concern the perceived effectiveness of diverse digital learning design, practices, and tools, the factors affecting motivation and the support systems required by learners

Each main theme surfaced in the Analysis and Findings chapter relates to at least one research aim: the first theme is associated with understanding the perceived efficacy of learning design, practices, and tools; the second and third themes concern motivation; and finally, the third and fourth themes pertain to learning support.

Discussion of Theme 1 – Learning design

The data suggests that learning programmes bending different methods were considered most effective by most study subjects, supporting both previous research (CIPD, 2021b) and the principle of self-concept in adult learning theory, which outlines that learners are more likely to thrive if provided with multiple options of accessibility and content formats (Steele, 2022; Knowles *et al.*, 2015).

However, data also hints at several additional findings. First, it suggests that less experienced staff forced into emergency digital learning value interactivity over learning autonomy, preferring synchronous methods to approach new topics while more experienced staff generally favours asynchronous learning methods. The principles of self-concept and learners' experience may explain the reason behind this preference: virtual training classrooms provide the learner with closer supervision while they are developing not only their KSAs but also their sense of accountability and self-efficacy; this metacognitive development has normally already taken place in seasoned professionals, who are more at ease with autonomous learning methods (Hough, 1984).

Furthermore, synchronous learning in the context of an onboarding process may increment socialisation with colleagues and catalyse peers learning (Reed *et al.*, 2010). Conversely, senior workers could rely on their pre-existing social ties with their colleagues if they had remained in the same company. The longing for an on-site induction programme expressed by new-joiners across all groups, possibly corroborated by pandemic-induced isolation, seems to also confirm the current inability of digital learning tools and practices to fully convey the in-person dynamics that foster social and incidental learning (Saefudin *et al.*, 2021), as suggested also by the considerations around the inefficiency of remote brainstorming amongst senior staff.

The second emerging finding, however, indicates that *after* the induction period, most junior and senior staff in non-managerial roles preferred remote, structured on-the-job learning around procedural skills even over the *in-person* unstructured alternative. Interviewees reported that, during

busy times, unstructured in-person coaching might be neglected or rushed. Conversely, data suggests that remote coaching compelled participants to plan meetings in advance, allowing them to schedule coaching in quiet timeslots and define the duration and objectives of each call. This finding supports the need-to-know principle of the adult learning theory, according to which defining clear learning objectives may improve focus and efficiency (Steele and Cobb, 2020).

The third finding relates to the aversion of all subjects toward the use of MOOCs as their main learning method. This is consistent with previous literature that identified the high dropout rate of this practice and linked it to insufficient corroborating peer learning (Goel and Goyal, 2020).

However, the data of this study identifies some additional key factors that may influence abandonment: the inability of MOOCs to adapt to the learner's previous experience and the fast obsolescence of e-learning video courses. In accordance with previous studies, junior staff declared they disliked MOOCs because they did not encourage interactivity, and their content was occasionally too complex but considered them a useful revision tool if combined with instructor-led training. Were these the only issues, it would be reasonable to expect higher popularity of this learning practice amongst senior staff and managers. Instead, data suggests that seasoned professionals considered the content of many e-learning courses not *advanced* or relevant enough. As MOOCs' contents are static, they appear to be both time-consuming to update and unlikely to provide a "Goldilocks learning zone" that fits the needs of workers with diverse levels of experience and backgrounds and would predict a high efficiency according to adult learning theory (Knowles *et al.*, 2015). Nevertheless, most interviewees suggested that specialised MOOCs providers were more likely to offer better-scaffolded and relevant courses than other companies.

The fourth finding concerns the poor experience of managers with digital management development initiatives in technology-driven MNCs, which emerged consistently across all interviews with managers in the sample used. Only one subject, while still considering his remote onboarding stressful, reported having participated in well-structured, extended on-the-job learning while the

others all felt left to their own devices. The lack of structure and contingency plans in the L&D programmes for a key section of their talent pool seems even more remarkable considering the financial resources and innovation-oriented attitude professed by many technology-driven MNCs. Research data suggests a possible explanation for this phenomenon: the unstructured shadowing and coaching mechanisms that seemed well-oiled in tidier times may have fallen through during the “great reshuffle” triggered by the pandemic (Pontefract, 2021).

Discussion of Theme 2 – Motivational factors

The findings around motivational factors indicate relevance, professional growth, personal interest, and fear of skills obsolescence as the main motivational drivers. As financial incentives are commonplace in MNCs, it appears unsurprising that they were treated as hygiene factors by most interviewees, with the exceptions of I4 and I1, possibly because these junior professionals had moved into IT roles from their previous blue-collar occupations. This supports both the existing research on motivation (Cerasoli, Nicklin and Ford, 2014; CIPD, 2021f) and specific studies on knowledge-intensive industries (Neagu, 2014). Consistently with adult learning theory (Ainley, 2012), most senior workers and one junior staff member also cited personal curiosity or engaging learning process as motivational factors, and the latter will be addressed in the next section.

Discussion of Theme 3 – Engagement factors

All subjects across all groups considered themselves responsible for their involvement in the learning process, confirming previous studies on the relevance of self-efficacy in remote learning (Garavan *et al.*, 2010; Saefudin *et al.*, 2021). However, they recognised that their engagement could be affected by learning-related factors like hands-on and up-to-date content, especially if presented through simulation and practice sessions, and the skills and expertise of facilitators. This validated both previous studies on digital learning (Higton *et al.* 2019) and the principles of adult learning theory (O’Neill, 2020).

In addition to this, domestic interferences or isolation-induced mental health challenges were considered detrimental to engagement, consistently with previous research (Pietrabissa and Simpson, 2020; Hoss, Ancina and Kaspar, 2021)

An emerging finding was the difference in the attitudes of junior and senior staff toward digital synchronous learning methods. While less experienced professionals felt that being assisted by instructors, coaches, and peers was not only engaging but emotionally reassuring, non-managerial senior staff only felt that instructor-led training or coaching was necessary only if the facilitator was significantly more experienced than them in the subject covered, otherwise preferring self-paced learning. Newly-hired managers presented mixed learning needs in this sense: on the one hand, they did not require interactive support for procedural tasks, having solid technical experience; on the other hand, they sought mentoring and coaching to support their leadership skills. These findings may be explained by the principle that learning needs vary depending on the learner's specific experience in a certain set of KSAs (Knowles *et al.*, 2015).

Discussion of Theme 4 – Learning support

All learners reported that their self-efficacy was corroborated by the support system in place, whose principal components were responsive communities of practice and organisational responsiveness to feedback, which confirmed the existing literature on digital learning (Garavan *et al.*, 2011, Garavan *et al.*, 2020; Saefudin *et al.*, 2021). However, the way in which support was expected from their community of practice was interpreted differently by junior staff, senior staff, and managers. Data suggests that junior staff identified support primarily with structured mentoring, coaching, and buddying sessions provided by their organisations, which were perceived as both learning support and emotional assistance. Conversely, managers and senior staff proactively sought support when in need. This may be interpreted again as a difference in the self-concept of less and more mature learners (Lowe, 1975; Hough, 1984).

Furthermore, senior staff and managers stressed the importance of budget and work time allocated to learning by their organisations and senior managers. Data suggests that these factors may be particularly relevant to senior staff not only because their learning needs may not be covered by the standard training provision in organisations and require additional financial support but also because their work duties may often conflict with knowledge sharing and personal development needs.

Discussion of Theme 5 – Management metacognition

As discussed in the previous sessions, managers operating remotely during the pandemic experienced two important challenges: on the one hand, they provided an unprecedented level of 1:1 coaching and mentoring and, on the other hand, they felt they were not receiving adequate learning provision and support from their organisations.

Consistently with the need to know, readiness and orientation to learn principles of adult learning theory (Steele, 2022), managers handled this “swim or drown” situation by proactively seeking help from peers, senior managers of other departments and educating themselves about learning theories. Once they acquired new metacognitive skills, they employed them to redesign their team’s learning processes. The solutions that all subjects in the management group attempted to implement were the formalization of knowledge-sharing processes and the structuring of spontaneous and unplanned on-the-job learning. These interventions aimed to contain the impact of high personnel attrition rates on organisational knowledge and ensure that adequate time for coaching new starters was fairly allocated across tenured staff, establishing on-the-job learning as a priority despite the pandemic-induced turmoil and increased work volumes.

These design choices are consistent with Steele and Cobb’s (2020) suggestion to explicitly plan for social learning while designing digital learning programmes and seem to be validated by the preference for remote *structured* coaching and buddying of non-managers in this study.

It should be noted, however, that not all the managers endeavours were endorsed by their organisations: one subject out of four reported that lack of support from senior management led to her decision to leave her company.

Limitations

In addition to the methodological and sampling caveats already discussed in the Methodology and Analysis and Findings chapters, this research presents several other limitations.

To begin with, all study subjects belong to technology or technology-driven MNCs, by design, therefore, results may not be applicable to the general population. The sector investigated may also affect the experience of workers with no previous technology background, as they may have been hired because of their high level of digital acceptance and self-efficacy rather than developing these qualities as a consequence of their learning process.

Secondly, as the recruitment of participants in this study was based on voluntary basis, the topic of this research may have attracted subjects with a higher-than-average level of metacognition hence findings on management responses to learning under duress may not be representative of all individuals at the same career level.

Finally, while interviewees had different job titles and seniority, genders, nationalities, ethnic and socio-economic backgrounds, nobody in the sample presented any physical or intellectual disability. The effects of forced remote learning on disabled students and workers have been poorly investigated so far and would require additional research (Bond *et al.*, 2021).

Conclusions and review of research objectives

This chapter attempted to answer the research question of this dissertation around the opinions and perceptions of technology workers who participated in extended and exclusive remote learning.

This was attained by discussing and interpreting the five themes that emerged in the previous

chapter through the theoretical framework of adult learning theory and by comparing them with existing literature.

The discussion of theme 1 has achieved the first research objective that concerned the understanding of the perceived efficacy of learning design, practices, and tools. This discussion mostly supported existing research on digital learning and confirmed that a blended approach to digital learning is considered the most effective. Nevertheless, four new findings emerged from the discussion of this theme and were examined and explained through the theoretical framework of adult learning theory: first, the predilection for synchronous learning in junior or newly-hired staff and self-paced methods in senior or tenured staff combined with the longing for in-person learning during onboarding across all seniority groups; second, the preference for structured remote on-the-job learning even over unstructured in-person alternative across all seniority groups after induction; third, the inadequacy of MOOCs to fit the learning needs of even those who favoured self-paced methods when they are used as sole learning method; and, finally, the poor experience of managers with digital leadership development processes.

The discussion of themes 2 and 3 have accomplished the second research aim that pertained to the comprehension of factors affecting digital learners' motivation, by supporting existing literature around motivational and engagement factors in digital learning and attempting to explain the role of facilitators as strong engagement drivers in remote induction programmes.

The discussion of themes 4 and 5 have achieved the third research objective that related to the understanding of the support system required by digital learners. The discussion confirmed the importance of cooperative communities of practice and organisational responsiveness to feedback as main support needs. Furthermore, the discussion attempted to interpret the new findings around managers' challenges with their onboarding learning and the inadequate organisational support they experienced. These difficulties have, in some cases, triggered the resignation of the manager and, in others, catalysed the development of managers metacognitive skills through proactive research and

peer learning. This growth process resulted into the managers' attempt to redesign and formalise knowledge-sharing and on-the-job learning processes in their organisations.

Conclusions and recommendations

Conclusions

This chapter concludes this dissertation by providing a summary of the research journey and of the resulting key findings in relation to the research question and objectives, as well as the interest and contribution thereof. Furthermore, it will revisit the main limitations of this study and suggest opportunities for future research and applications.

Research question and objectives

The purpose of this dissertation was to explore the opinions and perceptions of IT workers in technology-driven MNCs who participated in forms of extended and exclusive digital learning during the Covid-19 pandemic. The research question was established as “*How do IT professionals who operate in technology-driven multinational corporations perceive the exclusive and extended use of digital learning to acquire and maintain new skills?*”.

The research objectives required the investigation of the perceived effectiveness of digital learning design, practices and tools employed during forced remote learning, of the factors that influenced the digital learners' motivation, and of the support systems they felt necessary to succeed.

Literature review and gaps in research

This study commenced with a review of the literature around digital learning. This examination led to the identification of research gaps that suggested a need to provide an in-depth interpretation of digital learning experiences in the workplace through a grounded theoretical framework. In particular, the literature review seemed to indicate the necessity to investigate how prolonged and exclusive use of remote learning had affected learners' perceptions of the effectiveness of different learning design approaches and contents, of their own motivational factors, and of the support they

required from communities of practice and organisations. These blind spots in research guided the definition of the research aims and to the choice of adult learning theory as a conceptual framework for this study.

Methodology

A qualitative, mono-method of research was adopted for this dissertation, and data was gathered through eleven semi-structured interviews with IT professionals, operating in technology-driven MNCs, who had participated in forms of digital learning for at least three months during the height of the pandemic. Thematic analysis was employed to code and identify patterns in the interviews' transcripts and five principal themes surfaced from this process.

Summary of key findings

The first finding resulting from this dissertation is that the preference for digital learning methods varies depending on their seniority or familiarity with the subject to learn. While blended learning was preferred by all subjects, consistently with previous research, junior or newly-hired staff valued interactivity over autonomy and favoured a prevalence of synchronous learning methods; conversely, senior or tenured staff members were more oriented towards forms of asynchronous learning. The induction programmes appeared to be a particularly delicate learning phase that requested a prevalence of synchronous methods. Moreover, all newly-appointed interviewees across all seniority groups reported that they would have rather received their initial training in-person. These preferences were explained through the principles of self-concept and self-efficacy, which increase once learners familiarise themselves with new contents and learning environment; furthermore, it appears that even in well-structured and interactive induction programmes are unable to convey certain important elements of social learning.

The second finding states that, due to insufficient interactivity and adaptability to diverse levels of experience, MOOCs were considered unsuitable as the only learning method across all seniority groups, but junior staff members found them a convenient revision tool.

The third finding is that, after induction, structured on-the-job learning is preferred to unstructured learning across all seniority groups, even when it happens remotely. This finding was explained through the need-to-know principle of ALT, according to which defining clear learning objectives may improve focus and efficiency. Another reason why formally planned learning may be preferred to the informal alternative is that on-the-job learning appears to be often neglected unless an official time slot is assigned to it, especially when the work volume increases, as was the case for most technology firms during the pandemic. Brainstorming represents a partial exception to this rule as interviewees prefer this and other creative forms of peer learning to take place in person even when they are unstructured.

The fourth finding concerns the poor experience of middle managers and team leaders with management development initiatives throughout the pandemic and links with the previous results. This result was explained by the fact that most companies relied on unstructured shadowing or coaching from senior management as key learning methods for their managers and this approach fell through due to mandatory remote work and the increased attrition rate.

These four findings contributed to achieving the first research objective and addressed gaps in research around the need to explain digital learners' perceptions of the efficiency of different design approaches, methods, and tools through a grounded conceptual framework. These results are of interest as they may provide some learning design guidelines, particularly around onboarding programmes, in companies experimenting with voluntary hybrid work or drafting contingency plans, in case remote work becomes again mandatory.

The fifth finding supported existing research and confirmed the importance of learning relevance, opportunities for professional growth, learners' personal interest, fear of skills obsolescence, and engagement as key motivators to learn in technology professions, while isolation, boredom and family duties were reported as main hindrances to engagement. Financial incentives were mostly considered hygiene factors, as they are commonplace in large corporations. A new finding around

engagement is that facilitators, through their digital presentation skills and expertise, represent a key engagement factor as well as a source of emotional reassurance for both junior staff and new joiners across all seniority groups, which is consistent with the preference for learning synchronicity of these groups. This finding helped meet the second research objective and may provide relevant insights into the necessity to develop digital presentation and motivational skills in facilitators and explicitly include elements of structured interactivity, peer learning and networking into remote learning programmes.

The sixth finding confirmed the importance of cooperative communities of practice and organisational responsiveness to feedback as main support needs of remote learners and examined, through the lens of adult learning theory, the effects of insufficient support and learning provisions in the middle managers group. All managers reported intense stress while providing high volumes of 1:1 coaching to their team members while adapting to remote work without a proper L&D plan. In some cases, the lack of support triggered the manager's decision to resign. In other cases, however, managers engaged in compensatory self-directed learning through personal research, reflective activities and proactively seeking peer learning. This led managers to a steep development of learning metacognitive skills that guided them into purposeful experimentations with the redesign and formalisation of knowledge-sharing and on-the-job learning processes in their organisations. This finding contributes to the achievement of the third research objective and may be of interest for organisations attempting to redesign their digital management development programme as it suggests, on the one hand, that managers operating in a knowledge-intensive sector need to acquire learning design competences as well as coaching and mentoring skills; on the other hand, it restates the importance of the structuring and formalisation of knowledge-sharing processes, including on-the-job learning, when they happen remotely and especially under volatile circumstances.

The fifth and sixth findings fill gaps in research about the effects of forced and long-term remote learning on the motivation and support needs of learners.

Limitations

Beside the methodological caveats intrinsic to quantitative research and limited data sample, this study presents some limitations that may impede all findings to be applicable to the general population.

Firstly, even if the sample selected was well-balanced in terms of gender and included managers, and senior and junior staff members, no senior manager could be recruited for interviews.

Secondly, the sample selected consists of voluntary participants working as IT professionals for technology-driven MNCs and may have attracted study subjects with higher-than-average self-efficacy and metacognitive skills.

Thirdly, none of the participants presented any form of physical or intellectual disability.

General conclusions

To conclude, findings indicate that all participants find blended learning the most efficient approach, which should include in-person and remote delivery and synchronous or asynchronous learning methods, but the prevalence of specific type depends on each learner's previous experience. Interactions with facilitators are regarded as crucial engagement factors and as an emotional support tool by both junior staff and newly-appointed senior staff or managers, leading to a preference for synchronous learning.

Findings also consistently call for a systematic effort to formalise knowledge-sharing processes.

According to this study, this formalisation effort has been successfully employed in the design of digital learning programmes for junior staff in most organisations but not applied to L&D initiatives targeted at more senior staff. Findings confirm that senior professionals normally acquire technical knowledge through self-learning and requires on-the-job learning only occasionally, however, the

needs of newly-appointed managers are more complex, and a lack of adequate learning provision may have repercussions on managers' efficacy and morale.

Future research recommendations

This research did not include the experiences of disabled remote learners so future research could address this gap and include a sample of individuals with a physical or intellectual disability to explore their feelings and perceptions around digital learning.

Furthermore, as new findings emerged from this dissertation, such as the attempts of managers to formalise the knowledge-sharing processes in their teams, future research could make use of a quantitative method to validate these insights through a larger dataset, considering at the same time learners' perceptions and impact of digital learning on the learners' knowledge, behaviour or ability to meet organisational objectives. Should these results be confirmed, a longitudinal approach could be employed to explore the long-term impact that a period of forced digital learning may have had on organisations.

Recommendations

As discussed in the findings, the two most important pain points identified by this dissertation in relation to digital learning are lack of formalisation in knowledge-sharing processes and inadequate digital learning provision for newly-appointed managers. The following recommendations may be suggested to employers who wish to mitigate the negative effects of these issues.

Formalisation of knowledge-sharing processes

Formalisation of knowledge-sharing processes involves the creation and distribution of documentation and procedural flowcharts, the design of training materials, but also the structuring of on-the-job learning interventions, with the aim of minimising the impact of high attrition rates on organisational knowledge and ensuring adequate time and resources allocation.

In large organisations, this recommendation may be implemented by hiring or developing internally a knowledge specialist to create and maintain documentation around work processes. This specialist and the L&D team may also define the learning needs of team members in collaboration with the team manager, who will formally allocate learning time slots and budget.

The financial impact of this solution may be significant as one new resource should be needed for each team of 15-20 members and each knowledge specialist will generate an overhead of €30-70k per year in terms of employment costs. Furthermore, implementing this solution may require a timeframe of 3-6 months, inclusive of recruitment and onboarding. This investment may be worthwhile if the documentation and learning content designed by the knowledge specialist can be sold to external users, such as clients or partners of the organisation.

If a dedicated knowledge specialist is not recruited, the burden of designing documentation and learning contents will fall on the shoulders of team members, who may not always have enough time to comply with this requirement. An alternative or supporting intervention to guarantee an efficient information flow during busy times could be periodical knowledge sharing sessions that involve the whole team and include demonstrations and workshops regarding new processes and products, to be recorded for future use. Recordings extracted from these meetings can be edited by the manager or team members to create short how-to videos, that can be saved on a shared location and used to revisit a specific topic, whenever needed. This solution does not involve any extra cost and can be easily implemented with little notice even by SMEs.

Digital management development programme

As highlighted by the findings of this study, the digital management development programme of many organisations may also require to be restructured. In addition to procedural and technical competences, managers require leadership and coaching skills, as well as basic L&D competences, and the acquisition of these KSAs should be formalised.

Larger organisations and SMEs alike have several, scalable options to achieve this objective.

Firstly, a company could offer their best performers externally provided courses, university degrees or MBAs can cost anything between €1k and 60k per person and their duration can last from a few weeks to several years. Alternatively, they could opt for a customised leadership programme, which would entail contracting or hiring an L&D specialist with sufficient expertise and investing 3 to 8 months and between €20k and 80k in the implementation effort. A less expensive but more time-consuming third option would be to establish a learning partnership with a university, which may require several years to implement but provide long-term educational benefits for the organisation.

Several short-term and inexpensive interventions can also be implemented, such as the inclusion of formal coaching and succession plans as part of the performance objectives of senior managers, with the consequent allocation of time slots for structured on-the-job learning for their designated successor and mentees, combined with the periodical meetings between managers to discuss their experiences and challenges.

Review

After one year from their initial implementation, both recommended interventions should be reviewed. This should be done through the performance review of managers and team members, which should be benchmarked both against their performance objectives and against the previous year's results, through the performance review of any new resource hired to assist, and through an anonymous employee engagement survey. Results of the review should be then used to finetune existing interventions or plan new ones.

Personal learning statement

I chose to undertake my research in the area of digital learning as this subject has become an object of extreme interest in both academic and corporate research.

Completing this dissertation study allowed me to gain extended knowledge in the area of adult learning and its applications to remote knowledge-sharing. I thoroughly enjoyed conducting

interviews and listening to the passionate opinions of IT professionals who are purposefully experimenting with new ways of designing and participating in learning initiatives, however, I found this research extremely challenging to synthesise in a short dissertation and I regret having to leave out numerous topics.

I found the research process to be a significant experience as it allowed me to refine my research and analytical skills, gain insight into qualitative research, and hone my interviewing, communication, and interpersonal skills.

My main challenges were due to limited word count and time constraints. The interviews transcripts I analysed were extremely rich and information dense and I often felt that my limited analysis was not doing justice to the intelligence and serendipity of my interviewees. Leaving out themes and passages felt a bit like “murdering my darlings”, in the words of Francis Scott Fitzgerald, but I sincerely hope to be able to expand and apply my research as part of my daily work as a L&D and corporate knowledge specialist.

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Appendix I – Learning methods

Structured classroom, off-the-job learning	Structured, supported on-the-job learning	Unstructured, incidental, social and reflective learning
Lectures or training (including flipped classrooms and error management training)	Internship	Observation of peers
Learning partnerships	Apprenticeship	Learning from mistakes
Demonstrations	Coaching	Social exchanges with informal coaches and mentors
Seminars and workshops	Mentoring	Help-seeking
Programme instructions	Job instructions	Spontaneous knowledge sharing
Case studies	Job shadowing	Day-to-day experience
Case Incidents	Job rotation, international assignments and one-off special projects	Reflection and conversation with others
Role-play	Secondments	Common sense and intuition
Simulations	Job performance aids	Networking
Games and gaming	Action learning	Team development
In-tray or e-tray exercises that simulate real work scenarios under time or information pressure	Strategic learning initiatives and collaborative learning	Self-study (self-directed or requested by a facilitator)
Brainstorming	Communities of practice	Microlearning or bite-sized learning
	Career counselling and development discussions	
	Multisource feedback	

Appendix II – Classic learning theories

Learning Theory	Description	Implications
Behaviourism	<p>Behaviourism conceives learning as a process that generates a change in behaviour through structured <i>stimuli</i> delivered through training and education. These <i>stimuli</i> are referred to as positive or negative reinforcements when they encourage or deter a specific conduct (Thorndike, 1911; Skinner, 1954; Noe, 2010).</p>	<ul style="list-style-type: none"> • Emphasis on producing observable and measurable outcomes as learning objectives • Need to assess what the learner already knows and build a bridge from this existing knowledge to new concepts • Need to sequence the structure learning materials and programmes from simple to complex, proceeding from practical to abstract • Use of reinforcements to improve performances such as badges, tangible rewards, positive encouragement
Cognitivism	<p>Cognitivism defines learning as a change in knowledge caused by experience and investigates the mental processes and skills employed to achieve learning, such as recognition, mnemonic processes, analysis, and</p>	<ul style="list-style-type: none"> • Active involvement of the learner in the learning process through direct control and metacognitive training such as teaching self-planning, self-evaluation and mnemonic techniques

	<p>models such as managers and instructors and imitation of peers in a social context (Bandura, 1986). According to this theory, the learning process appears to be influenced by learners' self-efficacy. Self-efficacy is defined as a form of self-confidence that encapsulates three dimensions: the maximum difficulty a learner can achieve (magnitude), their perceived magnitude (strength) and their learning versatility (generality). Self-efficacy is considered separated from a learner's actual ability; however it appears to be directly related with training engagement, motivation and post-training performance (Colquitt, LePine and Noe, 2000)</p>	<ul style="list-style-type: none"> • Flipped classroom model where learners engage in self-study then apply what they learnt through team activities or assignments in the classroom • Emphasis on communities of practice that may gather through networking events, meetings, forums etc. • Motivation and reward through gamification • Emphasis on intrinsic motivation that may be solicited through objectives that are sufficiently challenging, milestones etc.
Constructivism	<p>Constructivism identifies learning with a process in which the learner actively participates in constructing meaning from</p>	<ul style="list-style-type: none"> • Anchoring learning in meaningful context

	<p>perception. Cognitive theories stress the importance of organised instructions, coherent representation of information that should be encapsulated with practice opportunities, of linking new concepts with old one and chunking them into groups to favour encoding of new information (Bruner, 1966; Gagné, Briggs and Wager, 1992).</p>	<ul style="list-style-type: none"> • Cognitive task analysis procedures such as analysis of hierarchies and relationships between concepts • Structuring materials and learning environment to facilitate learning such as by stating prerequisites skills, initial learning objectives, using summaries, textbook headings, examples etc.
Humanism	<p>According to Humanism, Learning is a personal act and a self-actualising process. Humanism focuses on affective and cognitive learning needs and highlights the importance of learners' self-management, control, personal autonomy and autodidaxy (Candy, 1991).</p>	<ul style="list-style-type: none"> • Personalised learning programmes • Need to foster positive human relationship between instructor and learner and amongst learners • Emphasis of self-direction, creativity and autonomy of learners • Emphasis on the intentionality and adaptability of facilitators
Social Learning	<p>Social learning theory presents learning as the acquisition of new KSAs through "modelling", which is the observation of influential</p>	<ul style="list-style-type: none"> • Observational learning through shadowing a more senior colleague, peer coaching

	<p>understanding and in acquiring new knowledge through experience and reflection. This learning theory focuses of the process of reconciling previous and new information and on how learning involves self-regulation as well as abstraction and reflective activities (Piaget, 1951; Vygotsky, 1978).</p>	<ul style="list-style-type: none"> • Emphasis on the application of learning through practice, simulations, internships etc. • Revising information at different times, from different perspectives and in rearranged contexts • Emphasis on the development of problem-solving skills that allow to recognise patterns, detect hidden information and present problems in alternative ways • Emphasis on assessing the transfer of KSAs
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Appendix III – Digital learning practices

Digital learning practice	Description
E-learning and m-learning	<p>Noe, Hollenbeck, Gerhart and Wright (2017) define e-learning as a system for guided competence development, which may include a wide range of processes and applications made available through the internet such as web-based or computer-based learning and virtual classrooms. E-learning includes both instructor-led methods, such as remote classrooms and lectures, and self-directed methods such as instruction videos, podcasts or documentation (Johnson and Brown, 2017). Furthermore, e-learning can be delivered both in a synchronous or an asynchronous manner (Garavan et al., 2020): for instance, an interactive webinar held via MS Teams may be an example of a synchronous, live e-learning method while a pre-recorded lectures are asynchronous.</p> <p>Mobile learning or m-learning can be considered a subset of e-learning as it includes any type of content that can be delivered on a portable device (mobile phone or otherwise) and, hence, it is not limited to a specific location (Woodall, 2012).</p> <p>Given the technological overlaps between mobile devices and laptops and a tendency of most technology-drive learning to happen online, it is arguably unsurprising that most literature appears to use d-learning, e-learning and m-learning interchangeably, as demonstrated by several comparative studies (Basak et al., 2018; Giannakos et al., 2021; CIPD, 2021a).</p>
Computer-based simulation	<p>Garavan <i>et al.</i> (2020) define technology-based simulations as operational replicas of realistic scenarios that may involve the use of virtual reality or VR (an artificial environment that reproduces key features of reality) or augmented</p>

	<p>reality or AR (a specific type of VR that includes elements of the physical reality). This type of d-learning may facilitate interactivity, practice and hands-on knowledge acquisition and be incorporated both as part of instructor-led and self-directed learning sessions.</p>
<p>Massive online open courses</p>	<p>Massive open online courses (MOOCs) fixed-duration courses, potentially involving exams and certifications, ‘open’ to a ‘massive’ number of participants, who can potentially subscribe and access any MOOC content as long as they have an internet connection (Noe <i>et al.</i>, 2017).</p> <p>Coursera and Udemy courses are examples of canonical MOOCs, while e-learning courses developed in-house by organisations may be referred to as corporate open online courses (COOCs) or small private open online courses (SPOCs) (ICT Post, 2016). MOOCs may also offer tools of social cooperation between users such as blogs, interactive forums and chats (Nielsen, 2015). It should be noted that corporations frequently establish educational partnerships with MOOCs (Dodson, Kitburi and Berge, 2015).</p> <p>Garavan <i>et al.</i> (2020) observe that literature presents several gaps in the knowledge of MOOCs: while this d-learning tool is convenient and offers learners the possibility to build highly personalised development paths, the efficacy of MOOCs and the drivers to enrolment and dropout rates remain scarcely investigated.</p>
<p>Learning management systems</p>	<p>Learning management system (LMS) are enterprise technology systems that facilitates the administration of digital learning: for instance, MOOCs can be made available within an organisation through an LMS (Nielsen, 2016), which</p>

	<p>may provide features that guarantee a safe and convenient access to courses, such as encryption and single-sign-on mechanisms.</p> <p>LMSs may also include tools to design online training programmes, track progress and maintain and may cater for interactions between users through integrated forums and videoconferencing applications.</p> <p>By incorporating a blend of multiple d-learning technologies and offering instruments for social interaction, LMS may allow companies to deliver remotely to their employees most of their off-the-job and off-the-job learning and, for this reason, the uptake of these platforms increased substantially during the Covid-19 pandemic, despite the negative impact of forced remote work on social learning (CIPD, 2021a).</p>
Gamification	<p>While it may be argued that the integration of game-playing activities in L&D practices is already commonplace, Salas, DeRouin and Littrell (2005) maintain that the gamification of technology-based L&D may encourage experiential and exploratory learning and may be applied across all other types of d-learning methods.</p>

Appendix IV – Adult learning theory models

Adult Learning Theory	Description	Implications
Experiential Learning	<p>Drawing from constructivist theory, this adult learning approach was developed by Kolb in the 1970s. It prescribes active involvement, reflection upon practice, conceptualisation of experience and practical application of knowledge. This hands-on approach puts the learner at the centre of the learning process.</p>	<ul style="list-style-type: none"> • Creation of a meaningful context for learning • Simulation of work conditions e.g. models of workplace, machines, sandpits, Virtual Reality/Augmented Reality simulation, role play, case studies etc. • Practice and rehearsal combined with ongoing constructive feedback by instructor/facilitator
Self-Directed Learning (SDL)	<p>Developed by Alan Tough and elaborated by Garrison, SDL stresses the ability of adults to take initiative in their learning by analysing their needs, planning, implementing, and evaluating their own learning experiences.</p> <p>While SDL may rely on the help of</p>	<ul style="list-style-type: none"> • Blended learning • Digital learning • Personal development plans

	<p>facilitators, mentors, resources, and peers, the learner exercises control over all learning decisions.</p>	
<p>Project-based Learning (PBL)</p>	<p>Initially developed by Dewey (1897), PBL suggests that learners acquire deeper knowledge through active exploration of real-world problems (“learning by doing”). According to PBL, learners should engage in a constant, iterative process of feedback request and outcomes assessment to achieve and retain improvements in KSAs.</p> <p>This process requires learner to develop a diverse range of skills, which include critical thinking, curiosity, problem solving, cooperation, and communication.</p>	<ul style="list-style-type: none"> • Workshops/projects • Distributed practice in series of sessions linking past and new knowledge • Right amount of guidance to prevent boredom, demotivation or the learner not feeling in control • Error Management Training (EMT) that is the deliberate incorporation of error management and troubleshooting in the learning process
<p>Action Learning</p>	<p>Action learning promotes a problem-solving approach to learning that involves taking action but this theory stresses the importance of collective analysis and reflection within a group,</p>	<ul style="list-style-type: none"> • Reflective group activities • Communities of practice for learners

	which ease the problem solving process and simplifies the resulting solutions (Revans, 1982).	
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Appendix V – Final interview questions

Research objective 1: **Understand the perceived effectiveness of diverse digital learning design, practices, and tools**

1. Digital learning activities and practices include instructor-led training, MOOCs or other types of e-learning courses, self-study (through books or documentation, bite-sized videos, forums etc.), on-the-job learning like coaching, buddying, mentoring, action learning, or educational partnerships such as your company sponsoring university courses. Which types of learning activities did you take part in before the Covid 19 outbreak and did you familiarise yourself with any new kind of digital learning since then?
2. What were the challenges and the benefits of the digital learning practices you familiarised with, and which ones did you find more useful?

Research objective 2: **Understand what factors affect the digital learner's motivation**

3. What may improve your engagement and motivation in digital learning?
4. Did you make use of any e-learning tool use outside your organisation to support your learning, such as video courses on Youtube, Vimeo etc., forums like Stackoverflow etc., e-learning platforms like Udemy etc.? Would recommend employing them?
5. What were the main challenges and obstacles in your e-learning experience? Were any of them related to non-work-related issues (such as wifi issues, family duties)?

Research objective 3: **Understand which support system is required by digital learners**

6. How would you describe your experience with the support provided to you outside of structured digital learning such as classroom training? Was the support structured/planned or unstructured? For example, coaching, mentoring, on-the-job training, access to documentation or training materials, and support from your team.

7. Has your experience with the support received from your colleagues and manager changed your on-the-job learning experience in any way?
8. What could your company do to support your digital learning experience? Are there any suggestions you would like to offer?

Appendix VI – Information Sheet

Exploratory analysis of the opinions and perceptions of technology workers around extended digital learning

I would like to invite you to take part in a research study. Before you decide you need to understand why the research is being done and what it would involve for you. Please take time to read the following information carefully. Ask questions if anything you read is not clear or if you would like more information. Take time to decide whether to take part.

WHO I AM AND WHAT THIS STUDY IS ABOUT?

My name is Barbara Favi and I am completing my master's degree in Human Resources Management. Throughout my professional life and studies, my core interest has been adult learning, with a special focus on corporate learning. This study consists of my final dissertation and it proposes an exploratory analysis of the opinions and perceptions of technology workers around digital learning.

Digital learning adoption has recently reached a tipping point due to the pandemic-induced restrictions and this may lead to a permanent shift to a hybrid learning model. Previous research has not yet provided granular investigation of the perceptions of learners around e-learning processes and tools and around the organisational interventions that may improve their experience. This work suggests exploring these topics through the thematic, qualitative analysis of interviews conducted with workers in the technology sector. Thanks to their experience with technology, these professionals may provide insights and suggests organisational interventions to improve digital learning acceptance.

WHAT WILL TAKING PART INVOLVE?

Taking part in this research involves engaging in an interview of the duration of 40 to 60 minutes that will touch on the opinions and perceptions of the interviewee around the different forms of digital learning they have adopted during the Covid 19 pandemic, the support received from their companies and their suggestions to improve their remote learning experience. All interviews will

emotional or sexual abuse, concerns for child protection, rape, self-harm, suicidal intent or criminal activity) or if a serious crime has been committed.

It is important to note that non-anonymised data in the form of signed consent forms and audio recordings are collected and retained as part of the research process.

HOW WILL INFORMATION YOU PROVIDE BE RECORDED, STORED AND PROTECTED?

Signed consent forms and original audio recordings will be retained in a password-protected hard drive to which only I have access until after my degree has been conferred. A transcript of interviews in which all identifying information has been removed will be retained for a further 5 years after this. Under freedom of information legislation, you are entitled to access the information you have provided at any time.

This research does not avail of any funding and presents no conflict of interest to the best of my knowledge.

In case I decide to include direct quotes of the interviews within my dissertation, I will contact participants to confirm them before they are included.

WHAT WILL HAPPEN TO THE RESULTS OF THE STUDY?

My final research will be used to submit my dissertation and may be used in the future for conferences, publications or teaching purposes.

WHO SHOULD YOU CONTACT FOR FURTHER INFORMATION?

Please contact me or my supervisor in case you have any additional question.

Researcher: Barbara Favi

Degree: MA in HRM, National College of Ireland

Researcher's Email: Barbara.favi@gmail.com; x20244029@student.ncirl.ie

Researcher's Phone number : +353 85 1844120

Supervisor: David Mothershill

Supervisor's email: David.Mothersill@ncirl.ie

[THANK YOU]

take place in English and be audio or video-recorded via Skype, MS Teams or a mobile recording application.

WHY HAVE YOU BEEN INVITED TO TAKE PART?

You have been selected through a snowball approach because of your experience with digital learning in the technology sector.

DO YOU HAVE TO TAKE PART?

Your participation is completely voluntary, and you have the right to refuse participation, refuse any question and withdraw at any time without any consequence whatsoever.

WHAT ARE THE POSSIBLE RISKS AND BENEFITS OF TAKING PART?

This research aims to learn from the experience of workers in technology multi-national corporations, in which digital learning is successfully used even before the pandemic, to draw up general guidelines and recommendations to ease the acceptance and uptake of distance and hybrid learning. No physical or psychological harm should come to a participant as a result of participating in the research as no sensitive or potentially triggering topics will be discussed. Technical details regarding products and services provided by companies will not be discussed and, in case they arise accidentally in conversation, will be edited out of transcripts.

WILL TAKING PART BE CONFIDENTIAL?

Confidentiality and anonymity of the participant and any individuals they talk about will be guaranteed by anonymising individual and companies names, for example by referring to them as Interviewee A and Company X. The only details about each participant directly mentioned in the dissertation will be age, job title, gender and region.

The only situations in which confidentiality may be broken are if I have a strong belief that there is a serious risk of harm or danger to either the participant or another individual (e.g., physical,

Appendix VII – Consent Form

Consent to take part in research

- I..... voluntarily agree to participate in this research study.
- I understand that even if I agree to participate now, I can withdraw at any time or refuse to answer any question without any consequences of any kind.
- I understand that I can withdraw permission to use data from my interview within two weeks after the interview, in which case the material will be deleted.
- I have had the purpose and nature of the study explained to me in writing and I have had the opportunity to ask questions about the study.
- I understand that participation involves taking part in an interview about my feelings and perception around digital learning, which will take part either remotely or in person.
- I understand that I will not benefit directly from participating in this research.
- I agree to my interview being video or audio-recorded.
- I understand that all information I provide for this study will be treated confidentially.
- I understand that in any report on the results of this research my identity will remain anonymous. This will be done by changing my name and disguising any details of my interview which may reveal my identity or the identity of people I speak about.
- I understand that disguised extracts from my interview may be quoted in a dissertation, conference presentations, published papers or journal articles.

- I understand that if I inform the researcher that myself or someone else is at risk of harm they may have to report this to the relevant authorities - they will discuss this with me first but may be required to report with or without my permission.
- I understand that signed consent forms and original audio recordings will be retained in a password protected HD until December 2022.
- I understand that a transcript of my interview in which all identifying information has been removed will be retained for a maximum period of 5 years from now.
- I understand that under freedom of information legalisation I am entitled to access the information I have provided at any time while it is in storage as specified above.
- I understand that I am free to contact any of the people involved in the research to seek further clarification and information.

Researcher: Barbara Favi

Degree: MA in HRM, National College of Ireland

Reseracher's Email: Barbara.favi@gmail.com; x20244029@student.ncirl.ie

Reseracher's Phone number : +353 85 1844120

Supervisor: David Mothershill

Supervisor's email: David.Mothersill@ncirl.ie

Signature of research participant

Signature of participant

Date

Signature of researcher

I believe the participant is giving informed consent to participate in this study

Signature of researcher

Date