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Information Literacy at the Workplace

Digital literacy skills required by employees at the workplace



Master's thesis in the International
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Abstract for Master's thesis

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Title: Information Literacy at the workplace- <i>Digital literacy skills required by employees at the workplace</i>	
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<p>Information literacy is a standardized concept to determine the ability of an individual to identify his information needs and have the abilities to locate, access, evaluate and use information efficiently. With the explosion of information through digital environments and increased use of technology tools for management of information, the concept of information literacy is increasingly linked with the concept of digital literacy. With some limitation to the multi-literacies concepts, the study focused on studying essential digital literacy skills required by employees for being operational in digital information environments and solving work-related problems. With the aim of finding key digital skills, the present study posed two main research questions: [1) What kinds of digital literacy skills can be identified in the workplace context? 2) Which key digital literacies are required by employees for effective use of information in problem-solving?]</p> <p><i>'Information Literacy'</i> and <i>'Digital Literacy'</i> are two abstract concepts, which are inextricably entwined with each other. Several definitions and concepts of these two notions were reviewed to comprehend a theoretical framework as a constructive roadmap for the present study. After reviewing multiple frameworks of digital literacy, the thesis adopted the digital competence framework developed by Ferrari (2012), as an empirical framework. In relation to the various elements of the digital literacy skills, the framework proposes seven different areas of digital competencies that helped with the data collection and the analysis process.</p> <p>The present study adopted qualitative research method, and a collective case study design was implemented for carrying out an empirical study. The interview was chosen as a data collection method, and semi-structured interviews were conducted using an interview guide that covered questions related to the themes of digital competence areas in the workplace context. In total, six interviews were conducted from personnel representing four different organizations, whose work role varied significantly. The content analysis of the empirical data revealed several interesting findings regarding the digital skills required by the employees at their workplaces.</p> <p>The findings from the present study revealed that technical knowledge is an important part of being digitally literate, as employees need to have the knowledge and skills to operate different technological tools for various operational activities at the workplace. While technical knowledge is essential, the most crucial skills are evaluation of information, logical and critical thinking skills, which helps to solve problems at work with the support of technology. Thus, it can be comprehended that digital literacy is a subset of information literacy because digital literacy skills are in fact information skills required in the digital information environments. Moreover, the study advocates that it is essential to have a contextual awareness when analyzing digital literacy skills, as the skills requirements depend on the context of digital uses, which can vary depending on the profession and the organizational culture, where employee operate.</p>	
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List of Abbreviations or Symbols

ACRL	Association of College and Research Library
ALA	American Library Association
CILIP	Chartered Institute of Library and Information Professional
DL	Digital Literacy
EC	European Commission
HR	Human Resource
ICT	Information and Communication Technology
IIA	Information Industry Association
IKM	Information and Knowledge Management
IST	Information Society Technology
IL	Information Literacy
JRC	Joint Research Centre
LIS	Library and Information Science
SME	Small and Medium Enterprises
WIL	WORKPLACE INFORMATION LITERACY
WWW	World Wide Web
ÅAU	Åbo Akademi University

1 INTRODUCTION

1.1. AREA OF RESEARCH

For the past few decades, man has advanced into the realm of science and technology faster than ever before, which has dramatically changed the way we live. Today, technology means power in the broadest sense of the term and not merely the power of the mind. It is this power potential that has given it the status that we human beings now enjoy. This advancement of human civilization has made life easier in countless instances, but has also created challenges. We now live in the modern information era, where we encounter a massive amount of information (data) on a daily basis, through numerous sources, and in various forms and formats, which we access and process in our everyday life. Needless to say, the rise of the global network platforms, increased use of the World Wide Web (WWW), intranets, social media platforms, etc. have connected people around the globe despite location boundaries. The comfort of technology has made communication easier, but the arrays of information that we perceive today have created the importance of acknowledging the consequences of misguided information (Mutch, 1997). For instance, an incorrect piece of information can lead a person to make wrong decisions and, consequently, affect him reaching his goals and objectives (Kirton & Barham, 2005). Thus, it has become crucial for every human being to become information literate: to be able to identify his information need, find information through different sources, evaluate its reliability, efficiently use it, accomplish information needs and achieve goals, which are the major components of the information literacy concept defined by the Association of College and Research Library (ACRL, 2000).

A similar concept of information literacy spreads over the workplace context as well. The past few decades have witnessed increased attention to the importance of Information Literacy skills at the workplace (Behrens, 1994; Bruce, 2000). Globalization, rapid technological advancement, and computer-oriented information systems have transformed the traditional way of information use and dissemination at the modern workplaces. Digitization and location-independent workplaces are in the phase of emerging, making the future workplaces more complex and advanced with both physical and digital information environments, creating new challenges and expanding influential

factors on organizations' information management strategies (White, 2012). Moreover, with the current pace of technological advancement and modernization of workplace practices, we can foresee the future workplace environments experiencing a paradigm shift with more advance reforms. The future generations of knowledge workers aim for more mobile, digital, and location-independent workplaces, which requires organizations to facilitate advanced information management systems that support accessibility, findability, visibility, and usability of information assets through several digital platforms with a high level of security (White, 2012). White (2012) also claims such changes at the workplaces and changing information behavior to be one of the significant challenges of the modern organizations to implement effective information management initiatives.

Digital literacy, a subset of information literacy, is a relevant concept in the context of digital transformation at the workplace (Crawford & Irving, 2013). Information and Communication Technology (ICT) services are the regular gears for modern organizations, which act as tools for interacting with information at different levels of operational activities (Fink & Disterer, 2006). Consequences of failing to use information efficiently and the inability to use available resources and tools that facilitate daily work practices can hinder organizations from achieving goals, and they waste invaluable resources, time, money, efforts, and energy (Porter & Millar, 1985). Acknowledging the fundamentals of Information and Knowledge Management (IKM) literature, modern organizations are suggested to implement effective information management initiatives as an organizational strategy, providing the right information to the right people, at the right time, using the right medium. Such an open management structure ensures an innovative work atmosphere and a responsible working culture, where employees are well motivated. It also provides high-quality services, enhances productivity, and gains a competitive advantage in the global marketplace (Heizmann, 2011). Nevertheless, it has also become essential for modern organizations to have an awareness of fully informed employees, having information literacy skills ranging from the different levels of information processes and the ability to use available technology resources for the efficient use of information and its management (Williams, Cooper, & Wavel, 2014). Therefore, the present study intends to study the concept of digital literacy in the workplace settings and ought to underpin essential skills required by employees to be an entirely informed workforce in today's digitized workplaces.

1.2. MOTIVATION AND SIGNIFICANCE OF THE STUDY

'*Information Literacy (IL)*' is a broad concept in the Library and Information Science (LIS) studies. Many definitions, concepts and notions of IL have expanded over the last few decades and have been developed to accommodate the growing requirement of modern IL literature (Lloyd, 2011). Most of the studies and the traditional literature on IL have mainly focused on the library and the educational sectors, giving special attention to how IL skills support learning and study outcomes in the educational environments (Lloyd & Somerville, 2006). Many academicians have claimed that there has been relatively less research conducted on IL in the workplace context. Most of the studies carried out in workplace contexts have been primarily based on the individual employee's information behavior or his information skills (Bruce, 1999; Lloyd, 2010). It signifies a clear research gap on IL literature in the workplace context, particularly about the information interactions through the digital environments. The gap in the literature has raised the need of developing a theoretical framework for a better understanding of the digital information literacy conception in the workplace, where social aspects of human information behavior should be considered within the digital work environments. The need today is to revive the traditional literature and organize empirical scientific research along modern lines, so that the benefits of knowledge in technology can be applied to comfort the employees at the modern workplaces.

'*The Impact of Information Literacy in the Digital Workplace (DiWIL)*' is a cross-disciplinary research project, currently active and ongoing at Åbo Akademi University (ÅAU), which aims at contributing to the current research gap, and creating a better understanding of workplace information literacy. The project triggered my interest, and I eventually decided to research this subject area as a part of my master's thesis. Thus, the present study will be an indirect part of the research project, and will partly contribute to exposing some aspects of the research area with a specific focus on digital literacy skills required by employees at the workplaces, and digital competencies complementing their information literacy skills. The present study will serve the purpose of filling the gap in the literature and expose certain aspects of digital information literacy in the workplace that should add value to the DiWIL project.

1.3. OVERALL AIM OF THE THESIS AND RESEARCH QUESTIONS

The present study investigates employees' information behavior practices at the workplace, focusing on their information interactions through the digital information environments. It serves the purpose of determining essential skills required by employees for solving work-related problems and achieving personal and organizational goals. Contained within these aspects is the need to look at the required skills for dissemination and use of information through formal, informal, physical, digital, and virtual ways of interactions. It also examines the institutional and cultural context wherein employees operate, and attempts to discover the challenges that they experience while interacting with information through digital channels.

Studying digital information literacy in the workplace context requires a broad approach, as it can be presented on different levels of organizational activities and individual employee's skill levels. With some limitation to the multi-literacies concepts, the present study will focus on the essential digital literacy skills required by employees at the digital information landscapes. Henceforth, the present study aims to provide an elementary understanding of the digital information literacy conception from an individual employee's perception. The findings from this study will try to shed some light on digital information behaviors of employees at the modern workplaces, and expose the essential digital skills that are vital for the current and next-generation employees.

Research Questions:

The present study attempts to answer the following research questions:

1. What kinds of digital literacy skills can be identified in the workplace context?
2. Which key digital literacies are required by employees for effective use of information in problem-solving?

1.4. STRUCTURE OF THE THESIS

This section covers the design of the present study and briefly outlines the main chapters and contents included in this thesis.

Introduction

The introductory chapter includes an overview of the structure of the present study. It presents the area of research, motivation on choosing the topic of the study, its purpose and objectives, the main research questions and the limitations of the study.

Literature Review

Chapter 2 covers the literature proposed by various authors and scholars on the concepts of information literacy and digital literacy. This chapter presents a holistic viewpoint on the different literacy concepts and emphasizes the gap in the literature, particularly about the digital literacy concept in the workplace environment. Review of different conceptual theories helped in understanding the digital literacy concept in the workplace and applied a theoretical framework for conducting the empirical study.

Methodology

Chapter 3 covers the methodology part that elaborates how this research is conducted. The motivations for choosing a qualitative approach as a research method, data collection processes, and qualitative data analysis strategies are presented here.

Empirical Framework

Chapter 4 covers the systematic report of the research data and provides a contextual overview of how the empirical study was carried out. Presentation of the study participants, their workplaces, and details of the interview data, are categorized and reported. The identity of the respondents and information about the organizations are kept confidential and are only broadly described.

Analysis and Interpretation of Results

Chapter 5 gives a detailed presentation of the research findings, analysis of the gathered data and interpretation of the results. This chapter builds a base for the concluding chapter and supports on reflecting the research findings into the theoretical framework.

Discussion

Chapter 6 reflects on the research findings in relation to the theoretical framework of the DL concept, attempts to answer the research questions and presents the validity and the reliability of the present study. Additionally, it discusses the limitations of the research and proposes the direction for future research.

Bibliography

List of references used in the present study, including textbooks, scientific articles, web pages and other information sources are listed in chronological order.

Appendices

An interview guide used during the data collection process is presented here.

1.5. LIMITATIONS OF THE STUDY

Information literacy and digital literacy are both abstract concepts that can be studied in various contexts and different ways. For instance, it has been mentioned above that they can be studied on both organizational and individual levels in the workplace context. However, the primary purpose of the present study is to learn the essential digital literacy skills for employees of today's generation at work. Thus, the focus of the present study has been set mainly on the digital literacy skills on an individual level of an employee for solving work-related problems. Information Literacy (IL) and Digital Literacy (DL) are inextricably entwined concepts that each one is difficult to study without considering the other. Even though the purpose of the present study has been narrowed down to study only digital literacy skills required in the workplace, different aspects of the information literacy concept are also recognized. Additionally, it is not possible to study only an employee's level of literacy skills without considering the organizational level, as they are both interrelated with each other. Notably, an organization's information management strategies have a direct/indirect influence on the skills required by the employees. However, due to lack of time and resources, the organizational level has only been partly acknowledged, as it cannot be neglected entirely.

2 LITERATURE REVIEW

This chapter is the detailed presentation of the academic literature on different theories of ‘*Information Literacy*’ and ‘*Digital Literacy*’ concepts. It covers observations and findings of several researchers, their definitions, concepts and multiple frameworks, which contribute to design a constructive roadmap for the present study. Furthermore, the literature addressed will be applied in the analysis process.

2.1 INFORMATION LITERACY (IL)

Traditionally, the word ‘*Literacy*’ has been used to refer to an ability to read and write (Søby, 2013), but in a much broader sense, it is associated with the cognitive thinking abilities (knowledge and skills) and mobilization of mental prerequisites to meet complex demands confronted by individuals in the modern society (OECD, 2002). With this understanding of the literacy concept, information literacy can be seen as a uniform concept to evaluate an individual’s information skills. Many practitioners and scholars have provided research-based articles focusing on various concepts and definitions of information literacy since 1970’s (Behrens, 1994). Below, some of the well-known definitions are outlined for our understanding of the IL concept.

The American Library Association (ALA, 1989) Presidential Committee on Information Literacy issued a final report that defined Information Literacy (IL) as the abilities of an individual to “*recognize when information is needed and have the ability to locate, evaluate, and use effectively the needed information.*”

Likewise, the Association of College and Research Libraries (ACRL, 2000), a division of the American Library Association (ALA) defined information literacy as “*a crucial skill in the pursuit of*

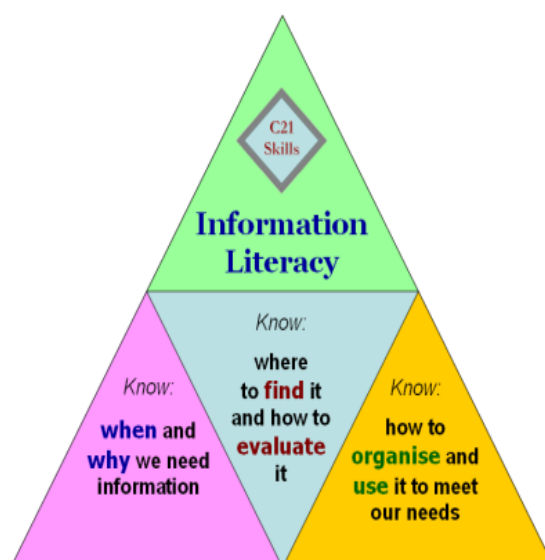


Figure 1: Information Literacy

Source: <http://freezapnuggets.com/wordpress/>

knowledge. It involves recognizing when information is needed and being able to efficiently locate, accurately evaluate, effectively use, and clearly communicate information in various formats.” Further, ACRL developed the Information Literacy Competency Standards for Higher Education and outlined the standards of an information literate person. According to the standards, *“An information literate individual is able to:*

- *Determine the extent of information needed*
- *Access the needed information effectively and efficiently*
- *Evaluate information and its sources critically*
- *Incorporate selected information into one’s knowledge base*
- *Use information effectively to accomplish a specific purpose*
- *Understand the economic, legal, and social issues surrounding the use of information and access and use information ethically and legally.”*

- (ACRL,2000)

More recently, in 2013, the Chartered Institute of Library and Information Professional (CILIP) defined Information Literacy as: *“knowing when and why you need information, where to find it, and how to evaluate, use and communicate it in an ethical manner.”* With reference to the above conceptualizations of IL, it could be determined that IL is a standardized concept that recognizes the information skills of an individual, who is able to recognize when information is needed and have the ability to identify, locate, access, evaluate and make efficient use of information to address and help resolve personal and work-related problems (Bundy, 2004).

However, it is argued that most of these definitions are generally defined concepts of IL, which have been initially developed within the libraries and higher education sectors, focusing on the academic information environments that reflect the information seeking processes, which support formal learning and teaching practices (Lloyd, 2010). According to Lloyd (2010), information literacy is a complex and dynamic practice that manifests differently according to the context within which a person is situated. Hence, to become an information literate person, one requires to engage with the information within the landscape and understand the path, nodes, and edges, which shape those landscapes. In other words, it can be understood that the information practices differ according to the context of information environments. Thus, the guidelines of IL concepts

from the educational sector may not necessarily reflect the realities of information experiences and uses in other contexts.

Furthermore, most of the information literacy studies conducted to date have been undertaken from a behavioral perspective, where information literacy is seen as a discrete set of individual information skills that claim to be generic and transferable (Elham, Partridge, & Bruce, 2013; Kuhlthau, 2004; Lloyd, 2010). In contrast, there are socio-cultural perspectives on the rise that claim IL to be a way of learning from a variety of sources and argue that information use should not only be considered in terms of an isolated individual or outside a specific context. Supporting this viewpoint, Johnston & Webber (2003; 2006) stated that information literacy should not only be understood as the individual experience of information need and fulfillment but also as a social activity. The authors defined information literacy as the adoption of appropriate information behavior to identify information through different mediums and channels that meet the information needs and critical awareness leading to the efficient and ethical use of information in the society. Tuominen, Savolainen & Talja (2005) also noted that IL literature rarely attempts to study how people interact with each other in their information environment.

In the words of Lloyd & Williamson (2008), information is created and used more collaboratively in today's global economy, where human interaction and discourse take place, through which information sharing occurs and ultimately remain as knowledge. Thus, Lloyd (2010; 2011) claimed that the individual focus of IL concept limited the social aspects of behavioral information practices and emphasized IL from a socio-cultural perspective. The author stated that understanding IL conception requires a holistic approach that acknowledges IL as a situated practice, where information is always situated, diverse and tied up with specific activities (saying or doing things), which are constructed and shaped through interaction and collaboration between people within a specific context where information literacy is practiced. In the words of Lloyd (2010), information literacy practice is defined as:

“Knowledge of information sources within an environment and an understanding of how these sources and the activities used to access them are constructed through discourse; Information literacy is constituted through the connections that exist between people, artifacts, texts and bodily experiences that enable individuals to develop both

subjective and intersubjective positions. Information literacy is a way of knowing the many environments that constitute an individual being in the world.”

There exist many different conceptualizations of the IL concept in the literature, because of which there is a confusion in understanding the term. Most of the confusion arises due to the perceptual arguments made by several authors on different critical elements of the IL concept that varies depending on the context of the information environment. Thus, a precise and applicable framework of IL still ceases to exist, which could be applied in several different contexts. Despite the ongoing debate about the different conceptualization, general uncertainty in this area has led to a burgeoning body of research literature, which aims to outline the clear-cut framework that can be applied at the workplace contexts. For the core purpose of the present study (i.e., studying literacy skills at the workplace), it would require an understanding of the information literacy concept that would be appropriate in the context of workplace information environments.

2.2 INFORMATION LITERACY AT WORKPLACE

Importance of information literacy skills at the workplace have been at the very peak of the information science studies, and over the past few decades, academicians have worked diligently to develop discipline-specific IL standards for the workplace (Hepworth & Smith, 2008). However, it has been noted that there is not much research conducted about the information literacy in the workplace contexts. Thus, a standard definition or the concept of workplace information literacy is still lacking, which is relevant to the current workplace practices. Nonetheless, Behrens (1994) mentioned Paul Zurkowski, the president of the Information Industry Association (IIA), to be the first person to bring the concept of information literacy at the workplace. Zurkowski (1974) linked the concept of IL in the private service sector with the attainment of economic and workplace goals, and defined information literates as the people who are trained, have acquired technique and skills for utilizing a wide range of information tools and primary information sources for solving work-related problems. Nevertheless, Christine Bruce's (1999) information literacy concept is considered as one of the milestones in the IL literature. Bruce conceptualized IL from a relational viewpoint through her empirical study, focusing on formal information practices by the knowledge workers at the higher education workplace.

According to Bruce (1999), information literacy is the ability of an individual to operate efficiently in an information society, which involves critical thinking, ability to identify an information need, an awareness of personal and professional ethics, evaluation of information, organizing information, interacting with information professionals and making efficient use of information in problem-solving and decision-making processes. Bruce's model: '*Seven Faces of Information Literacy*' (1997) outlined the multifaceted nature of IL and identified seven different ways individuals experience information at a workplace. According to Bruce (1999), following '*Seven Faces of Information Literacy*' can be identified at a workplace:

- Using information technology for information retrieval and communication;
- Finding information located in information resources;
- Executing and information process;
- Controlling information;
- Constructing knowledge;
- Extending knowledge;
- Using information wisely for the benefits of others.

Bruce (1999) produced evidence that the *seven faces of IL* can be linked to the workplace processes that effectively relate information experiences of an individual employee at the workplace. Further, Bruce advised that IL skills should be learned in the context of workplace competencies and expectations. Bruce also warned that decontextualization of information processes outside of the workplace context could fail the individual's IL skills. In this vein, Bruce (2000) empirically demonstrated that knowledge workers experience IL in their workplaces as:

- Varying emphasis on technology;
- Emphasis on the capacity to engage in broad professional responsibilities, rather than specific skills;
- Social collaboration or interdependence between colleagues, rather than an emphasis on individual capability;
- Need for the partnership of information intermediaries; and
- Emphasis on intellectual manipulation of information rather than technical skills with IT.

Even though Bruce's work has been regarded as a foundation of the workplace information literacy concept, it is not without its limitations and arguments. As stated earlier, it is argued that the framework has been developed focusing on formal information experiences within the educational environments. Mutch (2000) argued that information used in higher education sectors are bounded, contextualized and directed, which may differ in comparison to other workplace environments, where the problems are messy and open-ended, making information practices less measurable and challenging to study (Lloyd, 2010). Lloyd (2010) clarified that the skill-based paradigm from the educational sectors' information literacy concept exists at the workplace, but also reminded that it is crucial to understand the complexity of the information experiences that are situated at the particular workplace settings. An empirical study by Lloyd (2004) on firefighters produced evidence that the learning about the requirements and practices of work occurs at both formal and informal levels, and it requires access to both explicit and tacit sources of information, which specifies ranges of information modalities present at the workplace context (Lloyd, 2012).

Cheuk (2002) prioritized that employees need to access, manage and use information that is encountered in different formats and through a variety of mediums, which is a critical characteristic of an information literate person at the workplace. According to Cheuk (2008), information literacy at the workplace is understood as *“A set of abilities for employees to recognize when information is needed and to locate, evaluate, organize and use information effectively, as well as the abilities to create, package and present information effectively to the intended audience. Simply speaking, it is a set of abilities for employees to interact with information when they need to address any business issues or problems at work.”* Likewise, Lloyd (2013) emphasized that modern workplaces require employees who are capable of more than just locating and accessing information. Instead, they should have the capacity to connect and engage with information, critically evaluate information to address challenges, transform information into creating new knowledge, think logically, and leverage knowledge for creatively solving problems and making crucial decisions.

2.2.1. PROBLEM-SOLVING

According to Duncker (1945), cited in Fischer et al. (2012), a problem exists when an individual has a goal to reach, from one situation to the desired situation, but is unable to

reach the goal state because of undefined barriers. Newell and Simon (1972) conceptualized that a problem occurs in a space which contains three elements: a problem state, which is the information regarding the issue of the problem; a goal state that constitutes the solution to the problem; and a search space that consists of the strategies employed to solve the problem (Middleton, 2002). Newell and Simon's (1972) conceptualization on problem-solving suggests that to solve a problem, one must go through a series of operations and actions (i.e., search space) from the problem state to the goal state. In other words, to solve a problem one needs to identify the nature of the problem, gather needed information and structure the cause of the problem by careful inspection, analyze the possible solutions and select the best alternative solution for its implementation (Beecroft, Duffy, & Moran, 2003).¹ Employees face various challenges when they operate in and move between multiple parallel activity contexts, which requires expert knowledge, skills, and experiences (problem-solving capabilities) to determine the needed information from different contexts and achieve hybrid solutions (Engeström, Engeström, & Kärkkäinen, 1995; Eric, 1994). Middleton (2002) also pointed out that issues and problems at work are context-dependent, which requires an individual to have the site-specific knowledge to identify and solve complex problems. Thus, it commends that the most important skills at the workplace are critical thinking and evaluation around the information, which supports in problem-solving and decision-making processes (Goad, 2002; Lloyd, 2010).

Furthermore, with the explosion of information on the Internet, increased use of technological tools and an increase in digitized and 'born digital' information, the phenomenon of IL is increasingly linked with the concept of digital literacy and other forms of information and communication technology (ACRL, 2000; Lloyd, 2010). Lloyd (2010) clarified that information and communication technology tools are an essential feature in the information age, and developing information technology skills and digital information skills are critical for effective socio-technical practices, which is also valid at the workplace environments. Henceforth, the concept of digital literacy and its relationship with information literacy is presented comprehensively in the next chapters, which should support the objective of studying digital information literacy skills required by the employees at the workplace.

¹ <http://asq.org/learn-about-quality/problem-solving/overview/overview.html>

2.3 DIGITAL LITERACY (DL)

2.3.1. EVOLUTION OF DIGITAL LITERACY CONCEPTS

The phrase '*Digital Literacy*' is not a new concept (Buckingham, 2006); it can be traced back to the 1990s when the term '*Media Literacy*' was in trend to express an ability to read and comprehend information in the hypertext or multimedia formats (Bawden, 2001). Lanham (1995), cited in Bawden (2008), expressed the need of new literacy concepts that determine the presentation of information through digital sources in the form of texts, images, sounds, etc., which differs from the traditional literacy concept of being able to read and write. Nevertheless, the work of Paul Gilster (1997), concluded in his book '**Digital Literacy**' is viewed as a foundation of the term by many practitioners (Bawden, 2008; Huvila, 2012; Stordy, 2015). Gilster (1997) broadly defined the concept of digital literacy as "*an ability to understand and use information in multiple formats from a wide range of sources when it is presented via computers.*". According to Lankshear & Knobel (2008), Gilster's definition of digital literacy provides the generic viewpoint of the concept and highlights the ideal view of attaining basic skills, awareness, and acquiring a conceptual understanding of the digital culture. Through this ideal view, digital literacy is understood as a person's ability to comprehend and interpret information from whichever multi-mediated sources it is presented or delivered.

Bawden (2001; 2008) recognized that the traditional concept is an essential aspect of the broad notion of digital literacy that is still valid, but it is generally defined which put specific emphasis on technological aspects and skills that are restrictive and arguably influenced by the technologies of that time. Gilster (1997) explicitly stated that digital literacy is about mastering ideas (critical thinking), not keystrokes (using a computer), which distinguish his viewpoint from the traditional concept that focuses from technical skills to a much broader prospect. Bawden (2008) strongly acclaimed Gilster's viewpoint of digital literacy and determined it to be a broadly defined concept that prioritizes not only the technical skills but also cognitive and critical thinking skills, which are essential in the digital age. However, Gilster's view remained as a concept and eventually failed to provide a comprehensive notion of digital literacy that outlines the complete set of skills, competencies, and attitudes that are required in today's digital information age (Bawden, 2001; 2008). Supporting this viewpoint, Säljö (2012) makes the point that in the

technological era the information is documented outside the human body in forms of graphical signs on material artifacts such as texts, visuals, and audios. Thus, adding competencies to the traditional concept of print-based literacy, a digitally literate should encompass knowledge, attitude, and skills for operating technological tools, which are one component of digital literacy, and should also be able to manipulate and transform available information through digital platforms.

The notion of digital literacy has undergone quite a dramatic change. In the past, the majority of frameworks focused on the technical aspects of operating in digital environments, developing skills and abilities to use a specific set of tools or applications (Ferrari, 2012). The concept has since gradually become embedded into a much broader domain that goes beyond the narrow view of the technical aspects and focuses onto the context of cognitive and socio-emotional aspects of work using digital technologies (Eshet-Alkalai, 2004; Eshet-Alkalai & Chajut, 2009). Due to the various notions and viewpoints of the digital literacy concept, there is inconsistency in understanding the term that has been creating confusion. Lankshear and Knobel (2008) stressed that the term digital literacy is rather a broad concept, which should encompass several different concepts related to digital literacy and can be significantly seen through diverse scenarios. Thus, the term ‘*digital literacy*’ should be referred in its plurality form as ‘*digital literacies*,’ which would benefit in understanding the term much clearly.

2.3.1.1. SOCIO-CULTURAL PERSPECTIVES

Lankshear & Knobel (2008) outlined three different perspectives on the digital literacy concept, which are *a conceptual view, standardized view, and socio-cultural view*. The authors strongly emphasized the socio-cultural view of literacy and stressed that literacy is best understood as a social practice which implies many literacy skills applied in social collaboration. They defined literacies as “*socially recognized ways of generating, communicating and negotiating meaningful content as members of Discourses through the medium of encoded texts.*”. The authors made a point that the generic view of literacy is limited as reading and writing skills that vary enormously depending on each individual and in different contexts. Hence, the authors expressed digital literacies as a social practice that encompasses conception of engaging in the meaning-making of texts, which are produced, received, distributed, exchanged, etc., via digital codification. Thus, they argued that the literacy is an active relationship and a way of orienting to the social and

cultural environments. Therefore, it cannot be generalized as an individual skill or conceptual understanding of a person but is best understood as a social practice, where people engage using standard symbols, language and script to interpret the meaning and make sense by applying background knowledge (Lankshear & Knobel, 2008).

Lankshear & Knobel (2008) formulated digital literacy comprising many literacies and determined digital literacies as a social practice that *'involve the use of digital technologies for encoding and accessing texts by which we generate, communicate and negotiate meanings in socially recognizable ways.'* Through this view, a digitally literate person has an ability to participate in a socially organized practice that involves meaning-making through digital technologies and media (Rantala, 2010). Ferrari (2012) also supported this view by stating that the literacy need of today's society includes decoding and encoding of digital texts. Lankshear & Knobel (2008) produced evidence by conducting studies on a variety of social practices on the Internet and concluded that people's relationship with media in the digital age is tied to social and cultural contexts. Therefore, it has become necessary to understand literacy going beyond the individual skill based literacy, and approach as a constellation of social practices.

2.3.2. DIGITAL LITERACY, INFORMATION LITERACY, AND OVERLAPPING CONCEPTS

There is a considerable debate in the literature whether digital literacy and information literacy are competing or complementary concepts. The clear distinction between these two sets of skills still ceases to exist, but it is determined that they are interrelated with each other (Cordell, 2013). Despite the ongoing debate, many academicians have pointed out that IL and DL are two partly overlapping concepts that share many elements and associated concerns and confusions (Cordell, 2013; Huvila, 2012; Kanwal & Gorman, 2009). Mutch (1997) criticized that *'information literacy conception is focused on the concepts rather than its implications,'* which Huvila (2012) reflects it parallels with the digital literacy concept. Goodfellow and Reedy (2012) emphasized the relativeness of digital literacy with information literacy through their definition of digital literacy. They defined DL as *"ability to find and use information (otherwise known as Information Literacy) but goes beyond this to encompass communication, collaboration, and teamwork, social awareness in the digital environment, understand e-safety and create new information."*

Further, Newman (2008) showed the relationship between ICT literacy, digital literacy and information literacy, which can be seen in figure 2 below. Through the figure, the author demonstrated that critical thinking skills are needed in the context of technology uses, which requires an understanding of ICT uses (digital skills) and an understanding of finding, evaluating and communicating information (critical thinking skills). Through this viewpoint, the focus of digital literacy is not only on the technological aspects of digital uses but towards the critical thinking skills required to efficiently identify an information need, find, use, evaluate, create and communicate information, which are the fundamentals of the information literacy concept (Newman, 2008). In another word, both IL and DL are underpinned by critical thinking and evaluation of information. Hence, it is understood that digital literacy and information literacy are complementary concepts, which are used interchangeably in the literature.

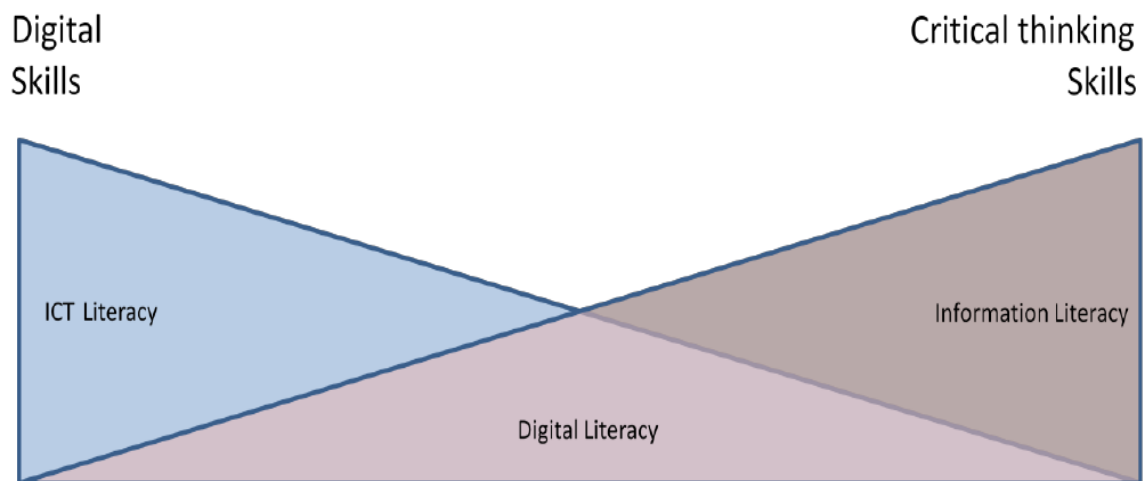


Figure 2: The relationship between ICT Literacy, IL, and DL

Source: Adapted from (Newman, 2008)

Furthermore, several different terminologies are related to digital literacy, which is often used interchangeably in the information science literature. The standard terms used to determine different literacies are such as computer literacy, ICT literacy, media literacy, network literacy, Internet literacy, e-literacy and so forth (Bawden, 2001; 2008; Huvila, 2012; Martin, 2006), and often regarded as iSkills in some literature (Katz, 2007). Increasing use of technological tools at the workplace creates new literacies that require employees to learn specialized vocabularies and concepts to be functionally literate and communicate across different work communities (Smith, Mikulecky, Kibby, Dreher, & Dole, 2000).

2.3.3. THREE LEVELS OF DIGITAL LITERACY

Martin and Grudziecki (2006) proposed and developed a conceptual framework of digital literacy through the DigEuLit project, which was funded by the European Commission e-Learning Initiative. The project proposed the definition of digital literacy as “*the awareness, attitude and ability of individuals to appropriately use digital tools and facilities to identify, access, manage, integrate, evaluate, analyze and synthesize digital resources, construct new knowledge, create media expressions and communicate with others, in the context of specific life situations, in order to enable constructive social action; and to reflect upon this process.*”.

The project developed a conceptual model and a framework consisting of three-stage development of digital literacy as an individual engages with the digital environment. The framework highlighted that digital literacy could not be standardized as a set of digital competencies or skills. Therefore, it emphasized on the development of digital competencies on an individual level, context-dependent as an essential element of digital literacy, and considered the level of digital usages and transformation abilities to become digitally literate.

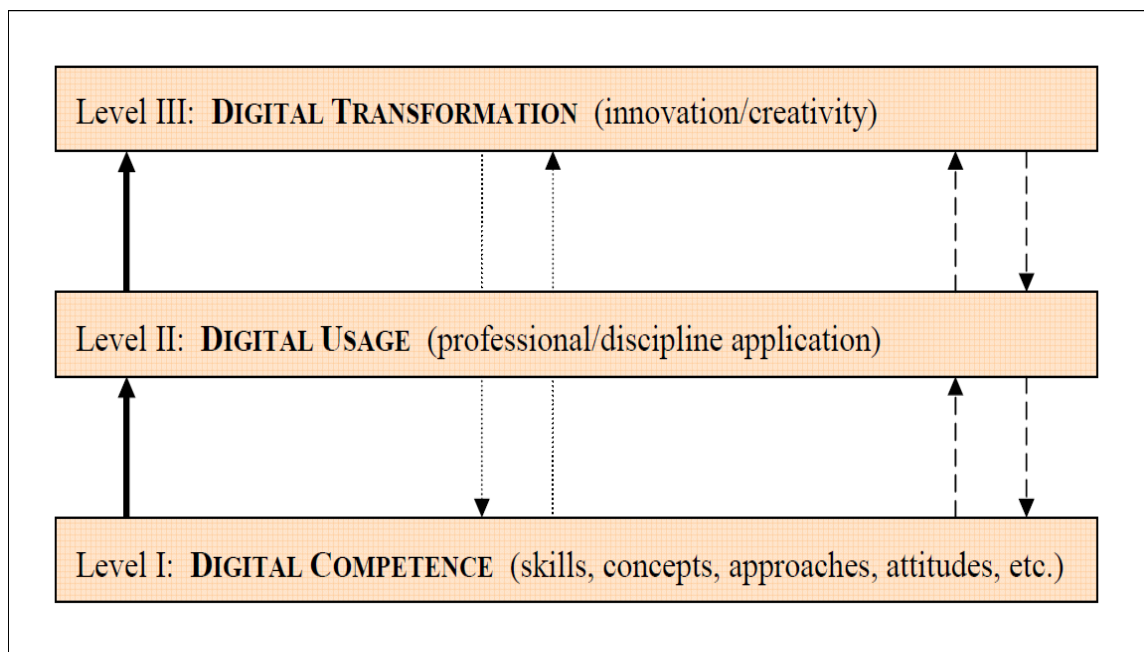


Figure 3: Three Levels of Digital literacy proposed by DigEuLit project

Source: Adapted from Martin & Grudziecki (2006)

Level I: Digital Competence

Digital competence, the first level refer to the operative techniques that cover a wide range of topics ranging from general skills to more critical and analytical approaches, which includes attitudes and awareness. The digital components may be mastered at different levels of expertise, from the basics to the complex competencies, which are organized around thirteen processes of digital literacy that is necessary for the digital engagement. The thirteen processes are ‘*statement identification, accession, evaluation, interpretation, organization, integration, analysis, synthesis, creation, communication, dissemination, reflection.*’. (Martin & Grudziecki, 2006; Martin, 2008)

Level II: Digital Usage

According to Martin (2008), digital usage is a central and crucial level where users draw upon relevant digital competences and elements specific to the profession, domain or the context. This level determines the usage of appropriate application of digital tools that are contextually dependent, specifically on an individual profession, group, community or organization. The use of digital competences is shaped by the requirements of the context of solving problems, completing a task, or achieving outcomes, thus, are embedded within the activity of the professional context.

Level III: Digital transformation

The third level is achieved when digital usage enables innovation and creativity, and stimulates significant change at the individual or organizational level within the professional context. However, the level of transformation is not an essential stage to become digitally literate, as the level of appropriate and informed usage would describe the digital literacy level of an individual.

2.3.4. DIGITAL LITERACY FRAMEWORK

Eshet-Alkalai (2004) emphasized that digital literacy is the survival skill in the digital age that constitutes a system of skills and strategies applied by the users to improve performance and solve problems within the digital environments. The author observed that digital literacy involves more than just the technical ability to use software or operate a digital device. It includes a slightly wide range of complex cognitive, sociological and

emotional skills that users need to employ in digital information environments for being functional. (Eshet-Alkalai, 2004; 2009; Eshet-Alkali & Amichai-Hamburger, 2004)

In 2004, Eshet-Alkalai developed a holistic conceptual framework contending five complementary skills that encompassed the umbrella term digital literacy; (a) *Photo-visual literacy*; (b) *Reproduction literacy*; (c) *Branching Literacy*; (d) *Information Literacy*; and (e) *Socio-emotional literacy*. Eshet-Alkalai and Aviram (2006) added one additional skill '(f) *Real-Time thinking skill*,' to the previous framework and outlined six cognitive skills required by the users in the modern digital environments. The six cognitive digital thinking skills that comprise the framework developed by Eshet-Alkalai & Aviram (2006) are outlined below:

- a. **Photo-visual literacy** is the ability to read, understand and deduce information from graphical user interfaces that are displayed in a visual format. A competent photo-visual literate person would have the cognitive skill of good visual memory and strong intuitive-associative thinking and make meaning out of visual messages that are represented by graphical symbols and icons in the digital environment.
- b. **Reproduction literacy** is the ability to use modern digital technologies to create a new piece of artwork by reproducing and editing existing pieces of work to create new meanings and interpretation. Glister's (1997) definition of digital reproduction literacy is relevant in this aspect as he defines it as '*the ability to create new meaning or new interpretations by combining pre-existing, independent shreds of information in any form of media-text, graphic, or sound.*'
- c. **Branching literacy** is the cognitive skill or ability of the user who can successfully navigate in the hypermedia environments or non-linear environments to find the desired information. The modern hypermedia environments such as the Internet, and other multimedia environments and digital databases are unlike the traditional way of literacy. For instance, skills in reading a book that is more linear and straight, allows users freedom to navigate in a branching order through their knowledge domains, but it requires them to construct knowledge from independent shreds of information accessed in a nonlinear way.

- d. **Information literacy** is the ability to search, locate, assess and critically evaluate the quality of information. Due to the growth in the availability of information through digital sources, it has become essential for information users to be able to make a careful assessment and make efficient use of information. This cognitive information skill is one of the critical survival skills of the digital information era.

- e. **Socio-emotional literacy** refers to the social and emotional aspects of working and communicating efficiently in networked cyberspace. Digitization and technological advancements have made digital communication easy by offering numerous platforms (knowledge communities, discussion groups, chat rooms) for collaborating, socializing and consuming information through networking and mass communication. Hence, it has created the necessity for users to employ social and emotional skills to recognize the challenges they may encounter in digital environments, such as the ability to share formal knowledge, sharing emotions, identifying hoaxes, Internet traps, viruses and so forth.

Eshet-Alkalai (2004) argued that socio-emotional literacy is one of the most complex digital literacy skills to acquire, as users need to be critical, analytical and mature in their approach to the digital text, and already display high competency in information literacy and branching literacy. Socio-emotional literacy skills require proficient sociological and emotional skills to effectively communicate when collaborating and sharing formal knowledge through online platforms, such as in chat rooms and discussion boards, and through informal spaces such as social media sites (Eshet-Alkali & Amichai-Hamburger, 2004).

- f. **Real-time thinking skill** is the cognitive thinking ability of a user to efficiently perform, process and evaluate a large volume of digital information in multimedia environments such as simulations, online games or chat rooms, where information is experienced simultaneously at high speed and in real time.

Ng (2012) developed the digital literacy model applying the concepts of Eshet-Alkalai (2004) and demonstrated the relationship between three dimensions of digital literacy through the intersecting diagram presented below. Figure 4 presents how the three dimensions propose the inter-relatedness among various literacy skills to combinedly form digital literacy skills. It is also interesting to note that critical literacy

is a common aspect of all the three dimensions, which indicates critical thinking as an essential skill for being digitally literate.

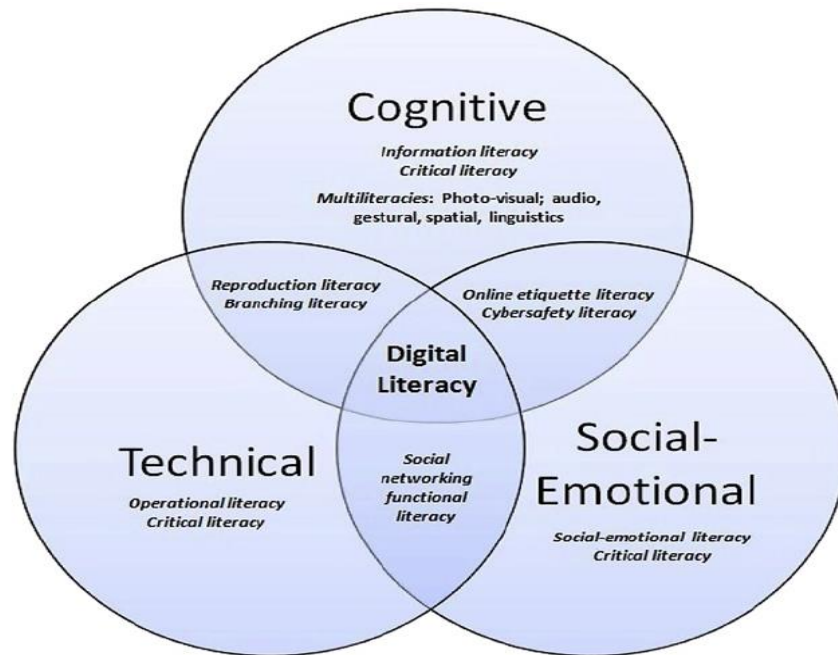


Figure 4: Digital Literacy Model

Source: Ng (2012)

2.3.5. DIGITAL LITERACY AND DIGITAL COMPETENCES

In 2013, the American Library Association’s (ALA), Office for Information Technology Policy’s (OITP), Digital Literacy Task Force (DLTF) defined digital literacy as “*the ability to use information and communication technologies to find, understand, evaluate, create, and communicate digital information, an ability that requires both cognitive and technical skills.*”. This definition is determined to provide digital literacy instruction to the library sectors, however, the concept could be applied in other settings as well. Furthermore, the DLTF outlined the characteristics of a digitally literate person and stated that “*A digitally literate person:*

- *possesses the variety of skills- cognitive and technical-required to find, understand, evaluate, create, and communicate digital information in a wide variety of formats;*

- *is able to use diverse technologies appropriately and effectively to search for and retrieve information, interpret search results, and judge the quality of the information retrieved;*
- *understand the relationships among technology, lifelong learning, personal privacy, and appropriate stewardship of information;*
- *uses these skills and the appropriate technologies to communicate and collaborate with peers, colleagues, family, and on occasion the general public;*
- *uses these skills to participate actively in civic society and contribute to a vibrant, informed, and engaged community”.* - (ALA, 2013)

Ferrari (2012) demonstrated the term digital literacy as ‘*Digital competence*’ and addressed it as a multifaceted concept covering many other literacies. According to Ferrari (2012), digital competences is “*an ability to understand digitalized media, search for information and be critical about it, and be able to communicate with others using a variety of digital tools and application.*”. The author also notified that all these abilities could belong to different disciplines, from media studies to information sciences, and demonstrated that it is necessary to understand different conceptualizations relating to the context of digital literacy uses. After carefully analyzing fifteen different frameworks, the technical report by the Joint Research Centre (JRC) of the European Commission encompassed a merged and adjusted definition of digital competences that is required by an individual to be functional in digital environments. According to the report, digital competence is “*the set of knowledge, skills, attitudes (thus including abilities, strategies, values, and awareness) that are required when using ICT and digital media to perform tasks; solve problems; communicate; manage information; collaborate; create and share content; and build knowledge effectively, efficiently appropriately, critically, creatively, autonomously, flexible, ethically, reflectively for work, leisure, participation, learning, socializing, consuming, and empowerment*”. Due to the complexity of this definition, it has been broken down into multiple building blocks; learning domains, tools, competence areas, modes, and purpose, as shown in figure 5, for more natural understanding. Using this definition of digital competence, Ferrari (2012) developed a digital literacy framework, which will be implemented for analyzing the empirical data and findings.

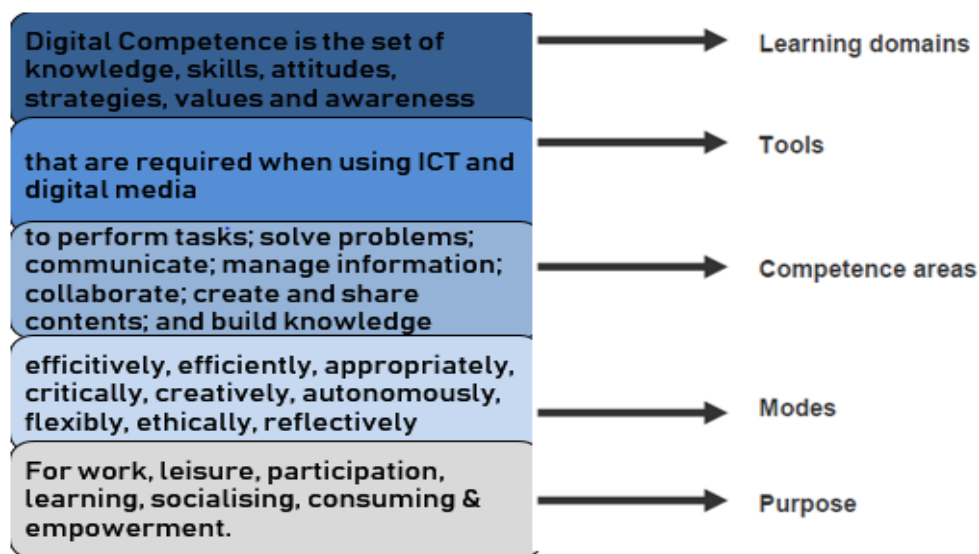


Figure 5: Parts of the definition of Digital competence

Adapted from Ferrari, 2012

The areas of digital competence can be summarized as follows:

Information: Identify, locate, retrieve, store, organize, and analyze digital information, judging its relevance and purpose.

Communication: Communicate in digital environments, share resources through online tools, link with others and collaborate through digital tools, interact with and participate in communities and networks, cross-cultural awareness.

Content-creation: Create and edit new content (from word processing to images and video), integrate and re-elaborate previous knowledge and content, produce creative expressions, media outputs, and programming; deal with and apply intellectual property rights and licenses.

Safety: Personal protection, data protection, digital identity protection, security measures, safe and sustainable use.

Problem-solving: Identify digital needs and resources, make informed decisions on most appropriate digital tools according to the purpose or need, solve conceptual problems through digital means, creatively use technologies, solve technical problems, update own and other's competence. - (Ferrari, 2013)

In the words of Ala-Mutka (2011), digital competencies are needed to be developed across the time with the rapid technological advancement and changing practices at work. Following the similar viewpoint, Belshaw (2014) demonstrated that digital literacy practices change over time and depends on the context of use of digital tools and applications. Belshaw (2011) argued that digital literacy is context-dependent and is more a condition than a threshold, which rapidly evolves as new technologies emerge. According to Davison & Ou (2016), digital work is a broader term that encompasses a variety of technology-centric work practices. The authors make the point that people who are digitally literate and perform the digital work may work in a variety of organizational settings, which suggest that digital competencies are contextual.

2.3.6. CONCLUSION FROM THE LITERATURE

A countless number of digital literacy definitions and concepts exists in the literature, which has been developed encompassing several different areas and in different contexts. After reviewing several definitions and frameworks of the digital literacy concept, it is concluded that being digitally literate is more than just being technologically skilled. Although most of the digital literacy frameworks have prioritized technical skills as a core part of being digitally literate, it is essential to understand that it is only one core element of the different digital components. In addition to the technological skills, cognitive and critical thinking skills are equally important, as the primary motive is to efficiently use information and apply intellectual knowledge to solve problems using digital tools. Thus, a digitally literate employee must have the necessary knowledge, skills, attitudes, and awareness to operate technological tools for interacting information through the digital environments. It is logical to comprehend that, perhaps, digital literacy is an application of information literacy in the digital information environments, and this is how the concept of digital literacy is understood in the present study. Furthermore, digital literacy is an abstract concept, which encompasses several other literacy skills, computer literacy, ICT literacy, Internet literacy, visual literacy, etc., as standardized literacy skills that come under the umbrella term '*Digital literacy*'. Therefore, digital literacy is, in fact, a blend of numerous other literacy skills that are required to operate in the digital environments. Moreover, it is important to keep in mind that information and digital literacy skills are highly contextual; the literacy skills may vary individually depending on the context of the workplace and the organizational settings.

3 METHODOLOGY

To conduct a legitimate study and ensure reliable findings from the research, it is crucial to select a suitable method for the data collection process that meets the requirements set by the main research questions and the purpose of the study. The objective of the thesis, as mentioned in the introduction chapter, is to identify the digital literacy skills required by employees for efficient use of information in problem-solving at the workplace.

Given the paucity of research on digital information literacy, a qualitative approach was considered appropriate, as the focus was to explore skills pertaining to digitally literate employees. Throughout this chapter, qualitative research method is introduced, and the core motivation for choosing this approach for the present study is explained. Moreover, it explains how the study is directed, how research participants were chosen and how the primary data collection and analysis of data were conducted. This will educate the readers in developing a clear understanding of the study and provide support for the findings and conclusions.

3.1 QUALITATIVE RESEARCH METHODS

Qualitative research is primarily an empirical research method, which allows researchers to explore and discover data and findings that cannot be measured numerically or quantified statically. In the words of Ghauri and Grønhaug (2010), the qualitative research method is quite standard in social and behavioral science, where it enables understanding human behaviors and functions, which are suitable for studying organizations, groups, and individuals. It provides an opportunity to explore people's thoughts and expose their insights and allows the identification of intangible factors such as individual perceptions, experiences, knowledge, opinion, emotions, and attitudes of the respondents (Patton, 2002). According to Gorman and Clayton (2005), a qualitative methodology assumes social constructions of the reality (Pickard, 2013). Similarly, Pope & Mays (1995) described it as the development of concepts that help one to understand a social phenomenon in its natural settings, while emphasizing the meaning, experience, and views of the participants. Qualitative methods are flexible and unstructured, and try to explain different aspects of the research problems or the theory (Ghauri & Grønhaug, 2010).

The present study adopted a qualitative research method for the data collection and the data analysis process. The study demands an in-depth insight into the digital skills required by employees for solving information-related problems at the workplace, which are unquantifiable variables. Therefore, a qualitative method is thought to be a suitable approach for the empirical study.

3.2 COLLECTIVE CASE STUDY AS A RESEARCH METHOD

A case study is a research method designed to observe a particular context, which has the specific purpose of collecting and presenting detailed information about individuals, a group, or an organization and its cultures that includes accounts of the subject. Yin (2008), cited in Pickard (2013), defined a case study as “*an empirical inquiry that investigates a contemporary phenomenon within its real-life context; when the boundaries between phenomenon and context are not clearly evident; and in which multiple sources of evidence are used.*”. The primary purpose of a case study is to provide a holistic picture of a case and gain in-depth knowledge of the specific context situated in a particular setting (Pickard, 2013). It also considers many different variables that other approaches such as experiment or survey methods are inappropriate in quantifying the concepts and variables inside its natural settings (Ghauri & Grønhaug, 2010).

During the initial phase of the present study, the idea was to conduct a case study of an organization and observe the digital literacy skills required by the employees. Later, it was decided to conduct a collective case study of employees working in different organizations and different work positions, to gather versatile data on the literacy skills required in different workplaces. Thus, a collective case study was chosen as the qualitative research approach to collect the primary data required for the study. A collective case study uses more than one case to investigate a particular phenomenon. In other words, it can be termed as ‘*triangulation,*’ where multiple data sources can be used within a case study. Yin (2008), cited in Pickard (2013), claimed that the purpose of triangulation is to collect information from multiple sources with the intention of validating the same facts or phenomena that complement the data sources. However, the aim is not to compare the phenomena studied in different cases, but to explore different dimensions and examine different levels of research variables such as in comparative case studies (Ghauri & Grønhaug, 2010).

3.3 INTERVIEW AS A DATA COLLECTION METHOD

There are several different qualitative research approaches and strategies applied in research studies. Among others, an interview is considered as one of the best data collection methods (Ghauri & Grønhaug, 2010). Järvinen (2012) described an interview as “*a conversation between interviewer and respondent with the purpose of eliciting certain information from the respondent.*”. Interviews are frequently used research methods in information and library studies because they stretch the possibility to gain an in-depth understanding of individual perceptions about the subject (Pickard, 2013). They allow the interviewer to enter into the other person’s perspective, access what is in and on the interviewee’s mind, gather their stories, experiences, opinions, behavior, feelings, attitudes and knowledge that can be made explicit data (Patton, 2002). Another significant advantage of using the interview approach is its advocacy to conduct ‘real-time’ online interviews, using virtual technologies or digital communication tools, when the respondents are remotely located from the interviewer (Gilbert, 2008).

3.3.1. SEMI-STRUCTURED INTERVIEWS

Several different types of interview techniques can be used while conducting research. However, the choice of interview technique depends on the approach used by the researcher to achieve the desired outcomes of the study (Pickard, 2013). Semi-structured interview approach was used as the primary source of data collection for the present study. Semi-structured interviews, technically known as non-formalized interviews to certain contexts, allow the interviewer to gather data of the life-world of the interviewee concerning the interpretation of the meaning of the described phenomena (Kvale, 1983, cited in Järvinen, 2012). This type of interview offers maximum flexibility to pursue information, spontaneity, and responsiveness to the individual differences of the interviewee’s settings or contexts (Patton, 2002). On the one hand, it allows full liberty to the interviewee to present his opinions and to discuss reactions and behaviors on a particular issue (Ghauri & Grønhaug, 2010). On the other hand, it also allows freedom to the interviewer to explore, probe and ask follow-up questions that are not pre-determined in the interview guide and deepen the conversation to specific topics or subject areas to maximize concreteness and immediacy of the interview questions (Patton, 2002; Pickard, 2013). Due to the nature of the present research and the sample population of the probable

interviewees, the semi-structured interview approach was considered to be suitable for the present study.

3.3.2. INTERVIEW GUIDE

After the above scrutiny, an interview guide was prepared. An interview guide is the list of questions or issues that are to be explored during an interview, which covers the topic areas of the research and focuses on a particular subject that has been pre-determined. According to Patton (2002), the purpose of an interview guide is to help the interviewer to stay focused during an interview and establish a conversation with an interviewee to collect information covering the topic and issues that have been pre-determined.

A semi-structured questionnaire with roughly pre-determined open-ended questions, covering the topic digital information literacy was prepared as an interview guide. The guide was prepared in consultation with the supervisors to check the congruence between the questionnaire and the purpose of the present study. After the first draft version of the guide, pilot studies were conducted to test the consistency between the purpose of the study and the interview questions, which helped to evaluate if the questions were sufficient and thorough enough to find the answers to the research questions. Pilot studies were conducted with two convenience sample population, which helped to understand the interview process and determine the viability of the answers to the research questions. Moreover, it also facilitated on determining the time frame required to conduct an interview and exposed practicalities of the interview settings. After the pilot studies, the final interview guide was prepared with adjustments and the additional questions. The interview guide used in the present study can be found in the appendix section.

3.4 QUALITATIVE DATA ANALYSIS

The purpose of the data analysis is to develop an understanding of the research phenomena by interpreting the collected data and answer the research questions. The present study applied the idea of ‘Grounded Theory’ approach for qualitative data analysis. Grounded theory is the research method developed by Glaser and Strauss (1967), in which the discovery and development of the theory are provisionally verified through systematic data collection and analysis of data obtained from the empirical research (Järvinen, 2012).

In other words, it is an analysis process that concentrates on theories that emerge from the investigation of the collected data (Pickard, 2013). It, however, is not the core purpose of this study to develop a new theory, but to examine the existing theories through the empirical research and validate the findings. Thus, this study borrowed the idea of grounded theory and applied in a slightly different manner.

Typically, qualitative analysis is inductive during its early stages, unlike deductive methods applied in quantitative studies. In the words of Patton (2002), '*Inductive analysis*' involves discovering patterns, themes, and categories that emerge from interaction with the data, whereas, in '*deductive analysis*' the data are analyzed according to an existing framework. According to Strauss and Corbin (1998), cited in the Patton (2002), the grounded theory involves both inductive and deductive analysis processes. In their own words, "*At the heart of theorizing lies the interplay of making inductions (deriving concepts, their properties, and dimensions from data) and deductions (hypothesizing about the relationships between concepts).*". Practically, the inductive analytical method is applied at first to define, identify, establish themes and categories that are developed and articulated from the data. Later, during the confirmatory stage of analysis, a deductive method is applied to examine and affirm the authenticity and appropriateness of the inductive content analysis (Patton, 2002). Due to this reason, grounded theory method was thought as the most suitable analytical approach for the present study as it emphasized data to be grounded with the theory and offered the possibility in meaning making and emerging relationship with the theory through the data observation.

4 EMPIRICAL FRAMEWORK

In this chapter, the practicalities of the data collection and the analysis process are described. In particular, the empirical work has been performed using the digital competence framework developed by Ferrari (2012), which covers several competence areas and elements related to digital literacy skills that support the data analysis process. Figure 6 below is adapted from the report of JRC that proposes seven areas of digital competences, which refer to the competencies required for being digitally literate. Empirical data were assigned to themes under the headings provided by the JRC digital competence framework, which are used for analyzing and interpreting the results.

Information management	identify, locate, access, retrieve, store and organize information
Collaboration	link with others, participate in online networks & communities, interact constructively
Communication and sharing	communicate through online tools, taking into account privacy, safety and netiquette
Creation of content & knowledge	integrate and re-elaborate previous knowledge and content, construct new knowledge
Ethics & Responsibility	behave in an ethical and responsible way, aware of legal frames
Evaluation & Problem solving	identify digital needs, solve problems through digital means, assess the information retrieved
Technical operations	use technology and media, perform tasks through digital tools

Figure 6: Digital Competence Areas

Source: Adapted from (Ferrari, 2012)

4.1 PRESENTATION OF STUDY OBJECTS

As mentioned earlier, a collective case study design is implemented in the present study. Case study research mainly uses a purposive sampling technique to identify information-rich sources within the case (Pickard, 2013). It is a popular approach for selecting participants in qualitative research, who are chosen strategically and purposefully based on their unique characteristics, which allows the researcher on gaining insights from the respondents (Gilbert, 2008). Participants for this study were supposed to be employees

working in an organization, whose work tasks include interaction with information through digital information environments, and who acquire digital skills to do the everyday work. Thus, purposive sampling and snowball sampling techniques were applied to find the potential respondents for this research. Snowball sampling, also known as ‘network’ sampling, occurs when one participant suggests or introduces another participant to the researcher (Harrell & Bradley, 2009).

Nine potential personnel working in different organizations were approached for the interview. Potential respondents were drawn from different sized firms; multinational companies, subsidiary operations, SMEs, and start-up companies. Interviewees were selected using purposeful intensity sampling that would provide information-rich cases. Information about the research and the purpose of the interview and other practical information about the study were sent to the respondents through an email. Out of the nine personnel, four agreed to the interview and appointments were made with an agreed date, time and place. One of the interviewees mentioned two other potential interviewees, who were working for the same organization, but in different departments and with different job roles. The contacts were approached in the same manner, and two more respondents agreed to the interview. In total, six interviews were conducted for the primary data collection for this study.

The participants of this research study, four males, and two female interviewees represented different organizations, different work positions, and varied work roles. Interviewees worked in various industries; including an international hotel chain, IT and software development firms, service sectors, and a business consulting agency. Specifically, job positions and titles of the respondents include HR specialist, Service-supervisor, Guest-service executives, Software engineer, Software developers, and housekeeping management staff. Most of the respondents were highly educated experts in their professional disciplines and had acquired extensive knowledge of their work; three of them held a Master’s degree, two of them held a Bachelor’s degree, and one held a high school degree and vocational training. At the time of the interview, most of the interviewees were relatively new to their current workplace, but they claimed they had several years of relevant work experience from their previous employment. The age range of the interviewees was between 20 and 35 years old.

The purpose of choosing respondents working in several different organizations is to collect versatile data and to discover a variety of findings. According to the literature, digital information literacy is a context-dependent concept. So, in order to study how it differs in different work contexts, it was decided to study what kinds of digital literacy skills are attained by the employees working in different organizations and with different work roles. However, the purpose is not to examine the organizational level of digital literacy in this study, but only the individual level of literacy skills attained by the employees. The study participants from different case organizations were considered individually, so each respondent was treated as a single case. Nevertheless, it is not the core purpose of this research to conduct a comparative study, but rather a collective study that provides a broad view of the digital literacy concept. These aspects provided data on the individual level of information literacy skills, and the workplace information practices, available resources, findability and usability of information through digital channels.

The conclusions from each case were used as a data contributing to the study altogether, but each case remained individual. Each case was analyzed separately, and the shared skills were examined across and between the different cases. Semi-structured questions were asked regarding daily work practices; important information sources for the participants' work, use of technical infrastructures and their application, and essential skills required to do everyday work. Interviewees were encouraged to relate their information encounter experiences in digital environments and their opinions regarding their level of literacy skills in using digital tools for information finding, handling, providing, saving and communicating. Multiple sub-questions were asked for data clarification, and the interviewees were encouraged to provide relevant examples. Content analysis was conducted manually, with cross-case analysis with each interview sample and between the literacy skills among employees in different work positions.

4.2 INTERVIEW DETAILS

Semi-structured interviews were taken in May 2017. Out of the six interviews, three were conducted at the interviewees' respective workplace locations in Turku, Finland. Three of the interviewees were living abroad or were at a distant location at the time of the study. Therefore, the interview questions were sent to them via email and followed up

individually with an online video conversation. Before the interview, all the participants were introduced briefly to the topic of the study and its purpose. All the interviews were conducted on different dates and different locations (see Table 1). Information regarding the respondents' identity, the organization where they work, and the data and information gathered during the interviews have been kept confidential. All the interviews were conducted in English and were recorded with the permission from the participants. The recorded audiotape files were later transcribed word by word into a text form. All the interviews were carried out smoothly without any disturbance or technical issues that could have affected the gathered data. On average, all the interviews took more or less than an hour of time. The most lengthy interview took an hour 15 minutes and 17 seconds of time, whereas the shortest took for 48 minutes and 50 seconds.

Interviewee	Job Position	Current employment relationship	Previous Work Experience relevant to the current position	Interview Date
A	Service Supervisor	6 years	5 years	11th May 2017.
B	Housekeeper	10 months	2 years	11th May 2017.
C	Guest Service Executive	8 months	4 years	15th May 2017.
D	Human Resource Specialist	2 years	3 years	23rd May 2017.
E	Software Developer	4 years	None	24th May 2017.
F	Software Engineer	1 year 3 months	2 years approx.	25th May 2017.

Table 1: Information on interviewees

5 ANALYSIS AND INTERPRETATION OF RESULTS

This chapter presents the results and findings of the empirical study. The data collected from the interviews revealed several interesting findings of the respondents' information experience through digital environments. The findings are presented based on the empirical framework of digital information literacy in context at work that embraces the digital literacy skills acquired by the employees. The data collected were categorized into themes of the digital literacy framework, segmenting the data about information interaction at work into digital environments and the skills needed for efficient use of information. In particular, the data are segmented into the context of information management; identifying an information need, searching, finding, accessing, providing, organizing, storing and retrieving information through digital platforms at work. Moreover, the information systems and IT tools in use, social collaboration, communication and sharing aspects, evaluating information, ethical use of information, critical thinking, as well as innovation and creativity at work are other essential aspects of digital information literacy concept, which have been considered during the empirical study and analysis process. Some of the data collected remained uncategorized as they contained no meaningful information relating to the topic, so data reduction techniques were applied during the analysis process. The segments are categorized, and the data collected are analyzed under the subheadings below.

5.1 INFORMATION MANAGEMENT

5.1.1. INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) TOOLS

Technological tools were the common gears for information management and communication for all the interviewees at their workplace. All the respondents reported that they depend on technological tools to do their jobs. Desktop computers, laptops, smartphones, tablets, iPad, walkie-talkies (transceiver), and other similar electronic devices were found to be used by the interviewees, depending on the organization of their work. For instance, interviewee E said: *“We use very general tools like a computer, phones, and tablets for our work...”*. Similarly, interviewee A said: *“We use basic tools like work computer, work phone, smart tablets and such tools in our office. We also use this two-way radio (transceiver) at work to communicate with team leaders, supervisors,*

and customers... ”. These technological tools are made available by the organization, and their use is part of interviewee’s daily work responsibilities for managing information, exchanging information and performing tasks at work. Thus, the know-how of operating different technology tools is one of the primary skills needed for the interviewees to do their jobs.

The intensity of using technology tools, however, varied depending on the roles and responsibility of the interviewees’ job positions and the organization where they work. Some were immensely dependent on technology tools to perform tasks that they needed to perform on a regular basis, whereas some use fewer tools because of the nature of their work. For instance, interviewee B, a housekeeper at a hotel, does not require the use of technology for actual fieldwork. However, she requires knowledge of using computers and the Internet as she receives and provides work-related information through a digital medium. In her own words, *“We receive an email from the company about what is happening in the company...we receive our salary information from email, like e-salary slips...we also have this system where we can login with our id and password. There we can provide our days off request and receive our work schedule. Also, we get other important information through a bulletin board; like a newsletter, information about our holidays and some important information about some changes in law and rules, also you can find the contact numbers of your colleagues there...”*. It is worth noting that even employees whose work specifies physical work are bound to use technological tools for receiving or providing information needed for work. Thus, having basic knowledge of using technological tools and digital devices is one of the necessities for the employees.

5.1.2. INFORMATION SYSTEMS AND SOFTWARE APPLICATIONS

The interviewees stated that the organization where they work endorses their own information systems and software for efficient and effective management of information. All the interviewees mentioned about using the company intranet as the primary source of information for their work. Through the corporate intranet, employees receive essential information about their work, including organizational policies and rules, essential information updates, and share information in various digital forms and formats. For instance, interviewee A said: *“We have our own means of communication here, and information flows really well...we have company intranet where all the staff can log in, get access to the system and see what’s going on. We basically get all the information*

from there. We communicate a lot about the company there, and we share lots of information on this platform where everyone can see and get updated...". Likewise, interviewee D, working for the same company as interviewee A and interviewee B, mentioned using the company intranet as the central platform for sharing information at work. Interviewee D's work responsibility as a human resource specialist requires her to provide information to the other employees, and the company intranet is the central platform through which she provides information. In her own words, *"We have this company intranet. We provide information to our supervisor through intranet where we put lots of introductions. All our information are saved on our intranet, and they can find the information when they need it and where they need. This is our main channel from where they can read the information and learn it."*

Through the corporate intranet, information is shared as a written web-based text, graphical images, documents and files in various forms and formats. Also, important web pages are hyperlinked for easy access to other informative platforms. In the words of interviewee D: *"The information is usually text on the web or through documents, mostly in PDF file format which cannot be edited, or excel or word files as there are some forms that they need to fill up through the computer."* Interviewee D also emphasized the advantage of digitization and highlighted the new e-platform her company is introducing, through which she claims to provide crucial work-related information to her employees in the future. In her own words, *"We are also planning to bring this new e-platform, which will be for all the employees where they can find all the important information about the work. We are also trying to implement an e-recruitment platform where we can hire someone taking online interviews and so on. We realized that we lose lots of time and resources while recruiting new employees, training them. So, with this e-platform when we hire someone, they can go to this platform and get the orientation and brief training before starting work."* Due to the operation of the business in the service sector, the majority of employees working for her company are blue-collar workers performing physical work. Accompanying the statement provided by interviewee B earlier, it is essential for employees performing manual work to be technologically literate in order to receive and provide work-related information.

On the contrary, systems and software applications in use for the software developers were found to be different from the other interviewees. Most of the time,

software development works are based on team projects, and the interviewees use project management tools to keep track of the projects. In particular, interviewee E and interviewee F mentioned using software such as Trello, Basecamp, GitHub as the primary channel to receive and provide information about the projects and work collaboratively with their team members. For instance, interviewee E said: *“That kind of things goes very specific with the software development. In our line of work, especially, to keep track of anything is very critical, we have a tool where we record all the information. We use this ‘Trello’ to track things; it’s a project management tool...those days we use email to keep track of things, and now we use trello to track things...”*. Through such collaborative platforms, interviewees work together with their team members, where they communicate, comment an opinion, share information in various forms and formats, and work towards accomplishing project goals. For example, interviewee E explained how they work through such platforms: *“We record everything that our client has said. Okay, the client wants this and this and this, and if they draw something that needs some further explanation then I take a picture of that one and upload to trello and try to explain it to others...I have to write there everything explicitly about what I’ve done and what needs to be done...with Trello we can communicate as long as we want to, for one particular issue, and we can come up with a common understanding and particular conclusion...particular issues can be taken in brief and communicate with a group where everyone can participate and comment an opinion...”*.

In addition, the interviewees mentioned using various systems and software tools for different purposes at work. For instance, interviewee D said: *“We use lots of different platforms for getting information or to provide information...there are lots of systems that I need to use for my work...we use different systems for different things”*. Likewise, interviewee A said: *“Our company intranet is the main portal which we use every day. But within the portal, there are other systems that we use for different purposes. I have a system to put salary, I have a system to make a schedule, and I also have a system to send invoices to our customers...”*. Moreover, use of system and software also varied within the organization, depending on the work responsibilities of the employee and their need to use specific software application for specific tasks. For example, interviewee A said: *“There are some tools that my colleagues use which I don’t, but I don’t use it because I don’t need to use for my work.”*. Thus, systems and software use varied for all the interviewees depending on the organization where they work and also their work roles

and responsibilities, as the technological tools are used based on the requirements posed by the work tasks.

The company website is another platform where employees can find general information about the company and other information related to their work. Usually, the information available at the company website is for the customers and external stakeholders of the company. However, interviewees mentioned using the company website to get general information about the company and serve their information needs. Depending on the work role, employees produce or change content on the website and provide information to the users. Nevertheless, they need to have the authority to edit or develop digital content and responsibly provide information to the users. For instance, interviewee F said: *“We also have our company website but basically the information there is seen by everyone, so there is general information for our users and customers... we have wiki pages with information about different things. It might not always be updated, but there might be many details there which you can retrieve some information from there. Usually, I just keep updating things, like if there is a wiki file, and I realize some information is outdated, I just change it and put the new information there...it’s kind of important that I have to make decisions before we release some things to the public, so I need to be careful.”*. This illustrates that employees need to have the skills to create and edit digital content, which depends on the responsibility of their work tasks.

5.1.3. INFORMATION SEARCHING

The interviewees responded that they could easily find information through the digital environments, but at first, they need to know what information they need and where they could find it. Most of the time when they are searching information on the digital platforms, interviewees use the search option and type keywords to find the information. For instance, interviewee A said that all the information is made available on the corporate intranet, categorized into different headings, and he needs to know where to find the information as it can be classified into different headings and sub-headings. In his own words, *“That portal is classified, it has specific headings related to several topics, that means if you are looking for something you should first think under which heading would that information be. When you go there, it might take a little bit time because most of the information is under different heading and subheadings, so you need to find on which exact place you will find the information. There is always information, but you need to go*

step by step if you carefully search you will find the information. At first, you have to know what information you are looking for in order to find the right information that can be categorized under different headings... ”.

According to the interviewees, finding outdated information is one of the challenges they face when looking for information on the digital platforms. For example, interviewee F said: *“Sometimes some information is not even written anywhere like it might be some decisions which were just made recently, and I’d just have to ask someone about it or about some change if I feel that I didn’t know about. I mean it’s not always written, so sometimes I’ll have to chat with colleagues and understand what is happening.”*. In most of the cases, outdated information can mislead interviewees into making wrong decisions. If the interviewees realize that the information is outdated, they usually inform the responsible personnel about the outdated information and ask their colleagues or their superiors for the right information. For instance, interviewee C said: *“If we face problems and we realize something is missing, we talk during our briefing, and our superiors will try to sort out the problems for us. For instance, updating information in the system if there is missing something...”*. This suggests that people are also the legitimate source of information at the workplace.

5.1.4. EXTERNAL INFORMATION SOURCES

The interviewees stated that they also need to depend on other external sources to find information related to their work. Depending on the situation of their information need, employees tend to use the Internet to find relevant information through different search engines such as Google. For instance, interviewee C said: *“Sometimes we also need to depend on the Internet to find other information... If my hotel doesn’t have information regarding it, of course, we need to google and find out information. We need to use other sources to get information than our own company sources.”*. Similarly, interviewee D said: *“It depends on what information and which situation I need them, then I just look for the best possible options I have. If I don’t find the information that I need, I just Google. Google is the best!”*.

The respondents were also found to be involved in different online networking communities and forums, through which they keep themselves up to date with the current trends in their professional disciplines, learn new things and find information regarding

their work and get help from the community. For example, interviewee D said: *“I like to develop myself all the time, and I am always trying to find new information and new ways to do things...I am actually involved in different kinds of the forum in HR area. LinkedIn is a really good example that there are lots of different groups and people are sharing information there. I also try to read a lot of different articles that people share and try to learn more about the things that they refer.”*. However, for some interviewees, the information needed for their work is contained with one particular source of information, and they do not need to look for information elsewhere. Moreover, it also depends on the personal learning attitudes of an individual employee, as some of the interviewees said that they are reluctant to learn new things and their lack of motivation on their job restrains them from looking for other information sources.

In particular, interviewee E actively participates in the developers’ community to find the information and seek help from the members in developing software codes for his work. In his words, *“Since everything that we do is mostly about technology, the Internet is the most reliable source, or you can say Google. Most of the time within the Internet even, what we as a software developer do is go to ‘Stack overflow’ which is one of the sources where we find the information about any code for the software, we can ask questions, and someone with knowledge provides with an answer. It is like a developers’ community where everyone can talk with everyone and try to help each other...these forums are created to help all the developers around the world, and I think that is exactly the place where developers should go. In most cases, these people are very nice and kind and will help to fix the codes and provide help to us.”*.

The interviewees also said that they share their expertise, knowledge, and information to help other members of the community. According to interviewee E, his company allows the developers’ team to help and develop the open source community because they use the forum for the company benefits and they believe they should also give back in return to develop the community. In his words, *“We are involved in a community in that sense that we get some things from others and in order to get we also have to give. We try to help the community with what we have learned and provide comments or do some free coding or something like that. So, it’s like giving something in return for using open source for our company.”*. However, when sharing information with others in the open source environments, employees need to take precaution about whom

to share what information because of the confidentiality and the work ethics. Interviewee E said: *“Of course, we do share information about what we know. As long as it doesn’t contain our customer’s privacy, we share because we also learn by sharing.”*. Similarly, interviewee A also provided a similar viewpoint that he needs to be careful when sharing some information with people outside of his organization, *“...when it comes to my friends outside of the company, I don’t share much about our work as I am abided with the confidential agreement. I can talk about general things, but not something specific that is confidential...We have to be careful about when to speak what and with whom we are providing the information. Otherwise, I think it is important to share correct information in right time and take necessary action...”*.

5.1.5. INFORMATION STORAGE AND RETRIEVAL

The interviewees were using different techniques and strategies for saving important information and documents for future retrieval. Important documents were saved in their computer drives and files were organized under respective folders for easy access in the future. For instance, interviewee F said: *“I have different folders and subfolders for different types of files and features under related headings, and I separate them into the category...I save lots of files for later use...”*. Important information received through emails were highlighted with stars, marked as important and saved in the archives. For example, interviewee C said: *“If we received an important email, then we highlight it with stars, or to move it to other folders and retrieve the information later... We also save some information in desktop as an excel file or MS-Word or PDF or JPG, so that we can easily get the information when we need and no need to look every time in other places...”*.

The interviewees also mentioned about using open source platforms such as Google Drive, Dropbox and other cloud services for saving documents. For instance, interviewee C said: *“We also use Google Drive a lot to share files, documents, and information...”*. Some of the interviewees said that the organization also provide the database for saving information in the company’s cloud. For instance, interviewee D said: *“I use Dropbox and Google Drive to keep documents...company also has its own intranet and systems to save documents, and it’s easy to look for files at the same workspace when we need particular information related work...”*. In the context of software developers, interviewee E and F mentioned using ‘GitHub’ software that tracks all the information and saves in the cloud automatically. For instance, interviewee E said: *“All the*

information are saved in GIT with all the changes that we have made and what changes and when, who, how, in fact, every detail and history that we can check on what have we done before. We can use the GIT file when we need it, even after years and everything will be there with precise details on changes and everything. And all these GIT files go to the cloud and keeps track of the file where I have left last time. My desktop is usually clean and whatever information or file I need, I get it from the cloud. Even if I lost or broke my laptop, those files will be there, unharmed...". This suggests that all the interviewees have their discrete information management strategies to access, retrieve, store and organize information with the help of technological tools.

5.2 COMMUNICATION, COLLABORATION, AND SHARING

Communication with internal and external stakeholders were the daily work responsibilities for the interviewees, as most of the work-related information was received or provided through social interaction. According to the interviewees, they rely on their colleagues as a valid source of information when they cannot find information through the primary sources. Interviewees use several different digital channels to communicate with their colleagues and clients depending on the situation and circumstances at work. Telecommunication is one of the standard ways for verbal interactions and sharing information for most of the interviewees. However, it is mostly used when the information is needed to be shared quickly or in emergency cases when other means of communication were ineffective. For example, interviewee C said: *"We all have an internal extension phone number so we can communicate through phone and get or provide information. We use telephone mostly when its emergency, like some information, needs to be passed quickly to our colleagues."* Interviewees also mentioned that when they receive information during a verbal interaction, they note down important information and save it to the digital platforms for future references.

In the context of interaction through digital channels, employees use several different ways to keep the communication going. However, the ways of communication differed depending on the organizational culture as all the interviewees mentioned using different methods and channels for the communication. Electronic mail (e-mail) was one of the most common ways of communication for the interviewees to share information across the departments within the organization, and also with their clients and customers.

Through email, employees provide and receive information, share files and digital content as an attachment in various forms and formats. All the interviewees mentioned about email use for information exchange in one way or another. For example, interviewee A said that the primary source of information for their work is from their customer and they communicate through email every day. In his own words, *“Mostly, we receive information through email because they need to attach some documents... information is usually attached as a pdf file or excel file depending on what kind of information they are providing us. And, if they need to provide more detail information, they do it by writing. Email is the easiest way for us to communicate.”*.

Nevertheless, the interviewees also mentioned using different software applications for the internal communication with their colleagues. Depending on the organization's culture, interviewees mentioned using various software applications for communication, such as MSN live messenger, Skype, Google hangouts, Flack, Slack, Zoom and other similar applications. These platforms were used for both formal and informal interactions among the colleagues to share information. Interviewee A said: *“we use windows live messenger where we can see who is available online and we can live chat from there...We share information in a lot of different ways. Basically, we do it in writing, but we also share information through pictures, through videos, attach documents, sometimes we send web links to provide more information where the receiver can get more information...”*.

Specifically, interviewee E and interviewee F said they mostly performed distant work as most of their colleagues were working from different parts of the world. Thus, virtual communication through group chats and video conversations was the company culture for the internal communication in their organization. For example, interviewee F mentioned about using a software application affiliate to their organization: *“We use a software called Slack; it’s a communication application. We have group chats and channels in Slack which is subscribed by most of us. Since everyone is working remotely, we are automatically logged into a conversation through this chat. We use that for chatting with our colleagues or for holding our meetings like a conference call...”*. Moreover, interviewee F emphasized the easiness of communicating through digital channels, where people can be tagged and notified, and the conversation histories are easily recovered. In his own words, *“It’s quite easy to chat I’d say...People are working*

from different parts of the world, and you can talk through chats and if you are in a group chat you can always tag the particular person and mention the person using '@' and their id/name if you want that person to notice the message and the person get the notification. Another thing is, an online conversation is easily retrievable that you can always go back and check the history of what you had talked before.”.

Due to the company culture of remote work in interviewee E’s and interviewee F’s company, all the meetings were held through video conferences, and essential information was shared among the participants. For instance, interviewee F said: *“Usually, it’s a video conference as we all are working distantly; all our meetings are online. We have Friday meeting when every employee in the company is attending. Everyone is attending this meeting remotely from a distant location. We have a few meetings each week, and every meeting has an online link”.* Similarly, interviewee E said: *“Each week, one morning we have a company meeting for one hour, where everyone in the company will be participating. During this meeting, everyone is online, and we discuss all the projects that are running and what’s going on.”.*

5.2.1. SOCIAL MEDIA

Social media are the latest software applications, which is used as a networking platform for people to stay connected with each other and extend their network. Famous applications such as Facebook, LinkedIn, WhatsApp, Skype, Viber and other similar platforms were used by the interviewees to stay connected with their colleagues. The interviewees mentioned using social media platforms to share information, documents, and graphical content and provide work-related information to their colleagues. However, some respondents also think that it is unprofessional to use such platforms for communication when the company has endorsed their own means of communication. Nevertheless, it is one way for interviewees to connect with their colleagues and share information, depending on the situation and their relationship with the colleagues for formal or informal interactions. For example, interviewee C said: *“We use other social media like Facebook, Viber, WhatsApp, Skype and other such to communicate with our colleagues, but depending on whom we are communicating with. We do use such mediums to communicate with colleagues, depending on our personal relationship, network or friends circle, both on duty and off duty.”.* Interviewees also tend to use social media as an option when their primary communication channels were ineffective or out of order.

For instance, interviewee A said: *“Sometimes when the email server is down, we also use social media like Facebook to share documents, exchange information and communicate. But using social media is the last resort.”*

5.2.2. CHALLENGES IN COMMUNICATION

The interviewees expressed their view that it can be difficult to communicate or express themselves when communicating through a digital media. When asked if it is easy to communicate virtually, interviewee C said that he faces challenges when interacting through digital mediums: *“There are some challenges, of course, it’s not like talking face-to-face. I cannot say it’s difficult, but some things are easier to explain when we talk face-to-face...”*. Similarly, interviewee E said he faces difficulties when more than two people are interacting through one media: *“when there are more than two people in a conversation with email it gets really complicated, and the one who is developing the software actually does not understand what’s going there.”*. In such circumstances, when communicating through the digital media, it can create risks of misunderstanding or misinterpreting information. Due to the reason for possible risks of misunderstanding, interviewees preferred face-to-face communication over interaction through digital mediums. For example, interviewee A preferred to have direct interaction to avoid miscommunication: *“Well, no means of communication is perfect but I assume face-to-face communication is the best...sometimes we need to discuss something that is more convenient when we interact face-to-face, and that makes more sense. It is much easier to talk with people and explain them the situation, which they understand more clearly than writing down a long email.”*

Furthermore, interviewee E stressed about the challenges when interacting online with his colleagues from different nationalities. He pointed out that language and cultural differences can also create challenges of misunderstanding when interacting through digital media. According to him, there are risks that people can misinterpret and understand messages differently because of the way of expressing themselves through a digital medium: *“It is very difficult sometimes, and I think it is because of the culture. Thai people are very polite, and they like to smile all the time, and here we have Finnish culture, who doesn’t like to smile or let’s say don’t smile too much, and they say what they want, and they say exactly they like and don’t respond if they don’t like. In such cases, sometimes when we are chatting or let’s say when there is a mistake in a report or*

while reporting, we face problems. The person who is commenting or complementing they take it in another way, and there can create an awkward situation or not so nice environment when people understand things differently. So, sometimes we have to put some smiley face so that it will put the right motive for the sentence.”. Additionally, interviewee A made a point that it could be because of the individual perceptions on how one understands the information: “...*some do not understand the message, some misinterpret the information...it also depends on the reader how he interprets the message depending on his perception. So, I need to be careful while providing them information and make them understand what I mean...I always call them to ask if they received my message and understood it...*”. In contrast, interviewee F provided a different perception about interacting through an online medium and claimed that it is an interpersonal skill on how to communicate through the digital channels, which depends on the individual and also communication culture of the organization. In his own words, “*I think it is just part of the company culture that how you communicate with people through online mediums. I think it is pretty easy just to have a chat, sometimes even easier than to talk face-to-face....you need to know how to talk with different people in different situations and such basic skills that you need in social life...these skills are important to have a better work life.*”.

Furthermore, interviewees also use code words or technical terms affiliated with their professional line of work while exchanging information, through which they make meaning out of the abbreviations. Thus, it was crucial for the interviewees that they recognize the commonly used abbreviations to understand the information and avoid misunderstandings. Interviewee A remembered one of the incidents that someone misunderstood when using short abbreviations at work: “*We call our group leaders as ‘RV’ here, and once one of the group leaders told our normal workers to go to a place because he could not send RV there. So, the worker misunderstood ‘RV’ as ‘Arabi,’ and he thought he was discriminated at work because of his nationality. It was just his misunderstanding, and we made him clear, and the problem was solved.*”. Moreover, it is quite common to use abbreviations and the Internet slangs when sending short messages through chat rooms. Therefore, it is important for the interviewees to have a vocabulary of commonly used cyber slangs or acronyms to understand the messages when communicating through chat rooms; otherwise, it can create confusions and create miscommunication. For instance, interviewee E said: “*we use those random LOL, RN,*

FYI and such in chats. One time I had to search in Google what FYI mean when I didn't know what it meant...". Similarly, interviewee F said, "someone may write 'AFAIK' which mean 'As Far as I Know,' or 'IMO' = 'In My Opinion' and things like that. Those things are common, but there might have been some time when I didn't know what the person means. So, I usually go online and check what it means when such situation arises that I don't know what it means."

5.3 ETHICS AND RESPONSIBILITIES

When looking for information on the Internet, interviewees implemented safety and security measures for seeking valid and reliable information sources. Interviewees said that they should be aware of Internet hoaxes and viruses and must apply security measures when using information from external sources. Moreover, they also use their instincts to identify harmful web pages and fake information. For instance, interviewee B said: *"Especially on the Internet, you know there are lots of click baits and viruses there, and I try not to go there. I have anti-virus on my computer, but I easily know when I see such suspicious links, I just don't click such links."* Most of the interviewees also said that their work computers are networked through desktop virtualization and are controlled by their IT department, which prevents them from accessing insecure web pages and protecting their database from external threats. For instance, interviewee C said: *"For this kind of thing we have our IT department. It is the job of IT department to filter all the websites which are not genuine. Our work computer does not allow us to go to harmful sites or we get a warning that the site is not secure to browse and we do not go further that point. So, when we see such, we have to be careful with the information, or we just look for reliable sources which we can trust and depend on, and sometimes we know what is fake and right information."* Similarly, interviewee D also said: *"there are IT guys which keeps our database secure and our network. There are websites that we cannot access which are harmful to our system, and they protect our system from virus and things like that. And of course, I know where to share, which information so that information is secure and confidential."*

Ethical use of information is one of the principle that interviewees apply in their workplace. Interviewees were aware of different copyright and piracy laws when using external information sources or any publicly available software that are not endorsed by

their organization. Awareness of different legal frames and cyber laws were respected by the respondents when using contents and information from the external sources. For instance, interviewee E said that he needed to be aware of licensed software and code contents which are openly available on the Internet. In his own words, *“every content would have some piracy or copyright laws...what is important to notice is that every content has its license, and we have to take the license of any software or any code that we use...it is critical for us to make sure that those licenses are free to use and we can use it. So, those are the only things we need to consider.”*

5.4 CRITICAL THINKING AND EVALUATION

The interviewees stressed that receiving right information is crucial for them to bring the right outcomes and solve problems at work. Before making important decisions, interviewees tend to critically evaluate the information and think logically for the best solutions. For instance, interviewee A said: *“Mostly, when I receive information I do not react immediately, I have to first understand what it means and confirm before taking any action...I only make decisions after receiving proper information and when I feel I understand well.”* However, interviewees also believed that they need to analyze the context of the problem and the source of information before making decisions. Sometimes interviewees just need to work with the information they receive from their superiors and follow the instructions. For example, interviewee F said: *“It depends on what the information is about...I need to think before making any decisions...I need to be critical if I think something is not right...And sometimes you just need to work with the information what you receive or the decision taken by the head. So, sometimes the source of information is also important and of course you need the right information to bring right outcomes.”* Similarly, interviewee B also said: *“Well, it depends on what type of information and from where you get the information. If I receive information from my supervisor, I have to follow what she says, and if I get information from my friends I have to think if they are telling the truth... I have to think and understand the information before doing anything...I would rather have the right information because I don't want to do something wrong... the main thing is that people need to know what to do with the information they get and understand it so that they do the right thing...”*

In addition, interviewee D added that it is essential to critically evaluate the information received from the trusted sources, as wrong information can come from the reliable source as well. In her own words, “*It is important to think if it is right or wrong information and also you cannot trust always, sometimes wrong information can come from someone you trust...When I receive information, I try to concentrate and understand what the information is about, and if there is a problem, I need to understand the situation and find the best solution for it...I usually take time to analyze the situation; you need time to think and concentrate on how to solve the problem in a right way.*”. Likewise, interviewee C also thinks that it is important to critically evaluate the information from the trusted sources because of the human factor that people can make mistakes. In his words, “*Information must be logical; if it does not make any sense or we feel it is not right then we confirm by asking our superiors or just look for other reliable information sources...Sometimes our superior may also be wrong; it can happen as we are all human beings and we can make mistakes...sometimes we need to be creative in solving certain situation...*”.

In order to determine the credibility of the open information sources such as the Internet, interviewees apply different techniques to evaluate the information. Specifically, in the software development field, interviewee E and interviewee F tend to apply a similar technique for evaluating the source of information. They mainly confirmed the reliability and credibility of the source by checking the number of users and contributions from the other developers in their community. In his own words, interviewee E said: “*We work in an open source environment which means that no one guarantees nothing. And it also means that everyone can use everyone’s codes. When we seek for the authenticity about how good is the code or how reliable source code is, there are few steps or things that we consider...we check at first that how good is the developer, and history of the person, and how many people have contributed to the project code and so on. If the code is made by a single person, then we probably do not want to use that. The safety measures are to use the common code which is widely used by others and is safe to use.*”.

5.5 PROBLEM-SOLVING AND DECISION-MAKING

Solving work-related problems were found to be very context-dependent, as the interviewees said that not every day is same for them at work. Depending on the work

tasks and job responsibilities, interviewees solve work-related tasks that are built on different situations and circumstances. For example, interviewee D said: *“Let’s say, not every day is same for me; it is always a bit different. Because there are sometimes more challenging situations in the field that needs to be solved quickly. And some days you have some kind of reporting things to prepare, and you work on writing reports and prepare to excel files and so on.”*. Likewise, interviewee A also provided a similar viewpoint about problems at work being very situational and context-dependent, and they work with the information at hand, think logically and find solutions for the problems. In his words, *“It depends on what problem or issue you are tackling with. If it is some issue that I have to consider individually, then I have to think myself about what should I do. I need to find the right solution for the problem based on the information that I have in that context and at that time... we have to analyze the situation critically, look for the right information in order to make proper decisions.”*.

Problem-solving and decision-making go hand-in-hand, as making decisions is the final phase of solving a problem. Decision-making is critical, for which interviewees required an authoritative position and a great responsibility. Most of the interviewees said that at some level they could make their own decisions. However, in complicated situations, interviewees also needed approval from their superiors as a confirmation. Thus, problem-solving and decision-making skills are dependent on the situation of the problem and the authoritative position of the interviewees to make informed decisions. For instance, interviewee C said: *“We work as a team, but sometimes we need to work alone and take decisions individually, so it depends on the situation. Also, decision-making in some situation can be risky, so we need approval from our superior before doing something in some situation. We always need to have the right information before making any decisions. We need to think after we receive the information and only act if we do things without even understanding what we are supposed to do then things will turn out to be a mess. And sometimes we need to be creative in solving the certain situation with what information we have, think and react accordingly...”*. Similarly, interviewee E said: *“At some level, I can make decisions on my own, depending on my level of confidence. Otherwise, I need to ask from someone who can authorize.”*. In addition, interviewees also tend to seek advice and help from the experts to make critical decisions. For instance, interviewee A said, even though he is authorized and can take his own decisions, it was important for him to seek support from the experts when making decisions in critical

situations. In his words, “ *Sometimes the situation is just different for some cases when we require more detailed information, and we need expert help to solve problems...we need someone else’s opinion to help solve the problem, especially the experts in complex cases. When such case arises, before making any decision we need to contact HR who has more experience and advise us for decision making... because our own opinion might be good or may be wrong too. We are human; we are social. So, we need to ask somebody’s opinion that we do not make mistakes...*”.

5.6 TECHNICAL USES AND KNOWLEDGE DEVELOPMENT

All the interviewees said that they are competent in using different system and tools, which they use in their workplace. Some interviewees claimed that their organization had endorsed the best systems, outfitting them with the right technological tools as per their needs and requirements for managing information and team collaboration. During the time of employment or whenever the organization implemented new tools and systems, interviewees were trained on how to use different tools and system software for different work-related purposes. During the training, they received instructions about different features of the tool and how to use them in different work situations. However, most of them believed that they learned and developed skills after getting acquainted with the systems and software. For example, interviewee D said: “...*we have training when we use these new systems or tools...You always learn when you use it, and you know what the function is for what purpose*”. Similarly, interviewee F said: “*There is a learning curve; you learn lots of things when you just join the company... You basically learn most of the things in your first few weeks, but then it’s always a process that you learn something all the time...*”.

Moreover, interviewees also think that the competencies in using different system tools can be developed from previous work experiences and knowledge of using similar system software. For instance, interviewee C said it was easy for him to learn the new system quickly as he had used similar systems before: “*Everyone is trained properly, introduce to different tools and system and how to use them and when you use them on the different situation... I have been using the similar system in my previous job. However, this one we use here is a bit different but doesn’t vary so much from the one I was using before. So, I had the idea and knowledge about the system, and I think it just took me a*

couple of days to understand the system that we are using here.”. However, the competencies on using digital tools varied according to the work roles of the interviewees. Depending on the profession, some interviewees’ work tasks only required them to have general skills on using digital tools, such as computers and other electronic devices for performing work tasks. Whereas, for tech-savvy like interviewee F, he needed to have technical know-how of how to use various systems and different operating tools as his work required him to know how differently web features behaved in different technological devices: “I am a tester, I need to check how the software or website looks on different devices and systems.... there is a desktop version, mobile browser version, IOS app, Android app... it is impossible to work for me without knowing about different technology tools and concepts which I don’t know then I would not be able to do my work or provide services to the company and users...”.

Moreover, due to the line of work in the technology field, interviewee E and interviewee F said that they needed to keep up to date with the current technologies and have the know-how of the current trends in their professional disciplines. For instance, interviewee F said: “...*technology changes so quickly that something that was new yesterday becomes old tomorrow...In my line of work, the know-how of latest technology and new features are equally important that I need to keep updated myself with. I always have to stay one step ahead so that we can provide recent and easy user experience to our customers...*”. Additionally, their profession also required them to be creative and innovate new features and services. For instance, interviewee E mentioned his hobby projects to create and develop new software features, “*In order to develop ourselves we have a hobby project in every team. We try to learn latest things and apply to our project and then try to create some good application or something new that does not exist yet, it is like a creation.*”.

6 DISCUSSION

This chapter includes a summary and description of the study performed. The chapter attempts to reflect the empirical findings with the literature, particularly about the digital competence framework developed by Ferrari (2012), and ought to answer the research questions. In addition, validity and the reliability of the findings are discussed to ensure the authenticity of the present study. Furthermore, possibilities for future research and suggestions for improvements are provided.

6.1 REFLECTING RESULTS WITH LITERATURE

6.1.1. INFORMATION MANAGEMENT

The content analysis of the empirical study revealed that employees encounter and access work-related information through various platforms, including physical interfaces, digital interfaces, and virtual interfaces. Nevertheless, interacting with information through digital channels is one among many ways for employees to access work-related information and there are numerous different platforms where employees interact with information. To outline some, interviewees mentioned using the company intranet, the company website, and other external Internet sources for accessing work-related information. Moreover, the study shows that employees often receive information verbally as an instruction/direction from their superiors to undertake well-defined tasks and sometimes employees even do not require information as they do similar work tasks on a daily basis. These kinds of work practices are emphasized by Lloyd (2010) as practice-based work, where the need for information among employees is predefined (Hepworth & Smith, 2008), and employees develop a knowledge base by performing similar tasks as their daily work assignments. This highlights that information environments at the workplace are very complex and employees must have the abilities to synthesize multiple information sources depending on the context of their information need, locate and access the needed information through several different platforms.

The task of information management is to make sure that information is created, stored and delivered, when and where it is needed through clearly defined and understood communications (Kirk, 1999). Technology and system tool assist employees in

organizing, managing, accessing, communicating, collaborating, storing, retrieving and sharing information and contents through digital channels for which employees need to be equipped with the right technology tools and competencies to use them. The findings produced evidence that employees have their personal information management strategies to locate, access, retrieve, store and organize information depending on the organizational culture and practices. However, the dependence of technology tools and system uses may vary depending on the work responsibilities of an employee and the organizational culture where he works, as there are different tools for different aspects of work and employees need to use the right tool for performing work. Thus, employees need to know which different technological tools, devices, systems and software applications should be used for management of information at different levels of operational activities at the workplace. This clearly signifies the need for proper computer skills and Internet skills as one of the necessities to operate in digital information environments, which helps to implement effective information management practices at the workplace.

6.1.2. CONTENT CREATION AND KNOWLEDGE DEVELOPMENT

Within the digital environments, interviewees encounter information in various media forms and formats, such as in the form of web-texts, pictures, videos and other graphical presentations. It requires cognitive thinking skills to deduce information that is represented via multimedia formats, which corresponds to the need for media literacy and photo-visual literacy skills, '*the ability to understand and make meaning out of visual messages as an information*' as highlighted by Eshet-Alkali (2004). Moreover, employees need to design and produce content using digital tools and to transform data and information into digital formats, for which they are required to have reproduction skills as emphasized by Eshet-Alkali (2004). This implies the need for competencies to create and edit digital contents, integrate and re-elaborate previous knowledge and develop new knowledge (Ferrari, 2012). Additionally, the respondents mentioned that when looking for information through web platforms, they needed to have non-linear information searching skills and understand site navigation, as the information can be scattered or categorized in different headings on different web pages, menus, and sub-menus. According to Belshaw (2014), site navigation can be complicated if one does not have the knowledge or experience to operate in non-linear hypermedia environments such as the Internet. Thus, the logic of branching is necessary when interacting with information

through multimedia environments such as the Internet, which Eshet (2004) refers to branching literacy.

Eshet & Chajut (2009) suggested that digital literacy skills are developed along with the experiences and observation of technological changes throughout a lifetime. The respondents from this study stated that they needed to keep up-to-date with current technological advancements and have the know-how of the latest trends and concepts of digital uses. This finding supports the viewpoint of Ala-Mutka (2011) that digital competencies and skills are developed across time with the advancement in technology, and that the employees need to develop new literacy skills with changing practices at the workplace. Crawford and Irving (2007) also highlighted that dispelling assumptions about the perception that people come to a workplace with an already developed cache of information skills and competencies are required (Lloyd, 2010). This suggests that to become digitally literate in a changing environment, one should be open to learning new ways of working, to utilizing the latest technology tools and adapting to the changes that enhance his operational performances and bring productive outcomes in achieving organizational goals.

6.1.3. COMMUNICATION AND COLLABORATION

The present study emphasized the importance of socializing and networking at the workplace, as the respondents mentioned that most of the work-related information is received through social interaction with their co-workers. The findings validate the statement provided by Crawford and Irving (2009), that people should be recognized as a valid source of workplace information. Moreover, it also supports Bruce's (1999) finding that in a workplace there is a need for a partnership of information intermediaries, which refers to the importance of socializing for collaborative work practices and sharing information.

The analysis of the results revealed that interaction at the workplace takes place both physically (verbally) and virtually. Electronic communication channels are one of the media for the employees to engage, collaborate and participate in a wide range of communication activities through a virtual network, despite their work locations. According to Gibson and Gibbs (2004), cited in Stahl and Björkman (2006), global virtual teams rely heavily on a range of different electronic communication technology tools,

which enables collaborative work practices in accomplishing work tasks across different time zones and geographical distances. The respondents mentioned using different software applications for communication, through which they share information and digital content with their colleagues and team members. However, communication methods and channels can vary depending on the organization's culture and the resources endorsed by the organization for communication purposes. Employees communicate and collaborate via email, through instant messaging applications, group chats for teamwork, and through video conferences for sharing information and digital contents, both formally and informally. This emphasizes the point outlined by Lloyd and Williamson (2008), that information is created and used collaboratively at the workplace, where interaction and discourse take place in a social context to share information and create new knowledge.

First and foremost, employees must have technical skills to operate different technological tools and have the know-how of how to use different features and functions of software applications for being functional in the virtual communication environments. In addition, employees are required to have sociological and emotional skills (Eshet-Alkalai, 2004) to communicate and share formal knowledge through the digital medium. Moreover, when communicating through chat rooms and video conferences, employees are required to have cognitive thinking skills for processing and evaluating a large volume of information, which is experienced at high speed and in real time. Thus, as emphasized by Eshet-Alkalai (2004), employees are required to have a high level of information literacy skills, branching literacy and real-time thinking skills when communicating through online platforms. According to Belshaw (2014), literacy could be defined as being able to encode and decode the text and understand its meaning. The study shows that when interacting through online platforms such as in chat rooms, it is common for respondents to use the short text forms which can create confusion and misunderstandings when one cannot decode the encoded texts used by the other person. Thus, it is essential to have a vocabulary of commonly used short word forms to be able to communicate a meaningful conversation. All these findings from the study support the viewpoint of Lankshear and Knobel (2008), that literacy is best understood as a social practice, where people collaborate and communicate using familiar symbols and language as encoded texts to negotiate a meaningful interpretation of the information.

Virtual communication has made collaborative work more comfortable for the employees, however, it is not without its shortcomings. The present study exposed that communication through the virtual medium can create challenges as there are higher risks of misunderstanding or misinterpreting information. The interviewees mentioned language difficulties and cultural differences as constraining factors when communicating virtually. Moreover, virtual communication also limits the ability to express as one could when communicating face-to-face. Therefore, respondents preferred face-to-face over virtual communication for a more relaxed and smoother interaction. Additionally, interviewees also believe that it is crucial for them to have face-to-face conversations at least for the first few meetings and later use the virtual medium for fast communication. It could mean that personality traits and trust issues (Van den Hooff, Schouten, & Simonovski, 2012) could also hinder communication processes that restrict employees from sharing information and knowledge through a virtual medium. According to Fiske and Taylor (1991), people have different perspectives on reality, and an individual perception can lead to different understandings. This could also be one of the challenges for employees when people understand things differently and interpret different meanings of the information when interacting virtually. In the words of Townsend et al. (1998), cited in Sthal and Björkman (2006), virtual team members should have the proficiency in using varieties of computer-based communication technologies, but should also acquire skills on expressing oneself and understand others when interacting electronically in a virtual environment. Therefore, it is necessary for employees to have operational skills to use different communicating tools, but most importantly, they are required to have personal attributes to communicate effectively and engage in a meaningful conversation.

6.1.4. SHARING INFORMATION ETHICALLY AND RESPONSIBLY

The findings from the present study validate the point that the sharing of information and knowledge is vital for collaborative work practices. However, the present study raises an important point that it is necessary to know what level of information can be shared among the intended audiences. For instance, personnel at the highest level of an organization, with a hierarchical structure, require awareness of what level of information is to be shared among other lower level employees. This indicates that it is important to know what information can be shared with others depending on the situation and circumstances. Furthermore, this study also clarifies that employees use informal spaces such as social

networking platforms with their colleagues outside of their organization and are also involved in different online knowledge communities of their respective professional disciplines. Through such networking platforms, employees anonymously share information and knowledge, provide necessary feedback and helpful comments to anyone in need among their network as a professional courtesy, and help each other to develop competencies and construct new knowledge. When sharing information through such informal spaces, employees need to be careful on what level information can be shared anonymously, respecting confidential information and the company's privacy policies. Thus, it is crucial for employees to have skills to communicate anonymously, have a conscience of when, how, and with whom to share information, have full awareness of legal frames, and behave responsibly and ethically.

Moreover, when looking for information and content through external Internet sources, it is crucial that employees have an awareness of encountering invalid information and harmful contents. Thus, it is important for employees to have an awareness of personal safety and data protection from external threats. The respondents from this study asserted that safety and security measures are provided by the IT departments of the company, preventing them from accessing malicious web pages and protecting the database from external threats and viruses. This suggests that employees often do not need to worry about the external threats, but it is essential they should be mindful of such threats when using external sources. Additionally, when using publicly available information from digital environments, employees need to be aware of different legal frames and copyright laws and make ethical use of information respecting intellectual property rights and provide credit for others' contents and work.

6.1.5. EVALUATION, PROBLEM-SOLVING, AND DECISION-MAKING

Several skills affect the actual work performance of the employees, including technical knowledge which is one element of being digitally literate. While technical knowledge is essential, the experts of their respective professions believe that information skills are more crucial for their work performance. The findings suggest that cognitive and critical thinking abilities are essential keys to personal and professional success in the workplace. The respondents from this study emphasized that critical and logical thinking skills are essential for them as they require correct information to bring positive outcomes, solve work-related problems and achieve personal and organizational goals. For instance,

employees claimed that sometimes they encounter outdated information on their company intranet or the company websites, which means wrong information can come from trusted sources as well. Moreover, external Internet sources may contain irrelevant, unreliable and false information, which requires critical evaluation of information to determine the reliability of the information sources. Therefore, critical evaluation of information is essential to ensure the quality of information and for its effective and efficient use. This validates the statement of Bruce (1999), that information literacy skills in the workplace indicate varying emphases on technology tools, but the primary emphasis is to engage in the broad professional responsibilities and intellectual manipulation of information, rather than specific technical skills for using IT tools.

Critical evaluation of information and logical thinking skills are vital for solving problems and making crucial decisions. Respondents claimed that whenever there is a problem, they need to analyze and understand the situation of the problem and determine their information needs, locate and access reliable information, measure the credibility and validity of the information source. In order to make effective decisions, employees need to critically evaluate the retrieved information, think logically, and go through a series of operations and actions (Newell & Simon 1972), and then operationalize the best possible solution to the problem, using their knowledge, skills, and experiences and solve problems creatively. In some cases, employees also seek support and help from the experts to make critical decisions, when they think that their knowledge and expertise are not sufficient to make complex judgments. Therefore, critical thinking skills and logical thinking abilities are crucial characteristics of a digitally literate employee, who contributes to solving problems creatively and innovatively, using appropriate technological tools.

6.2 CONCLUSION

The findings from the empirical study support the ideology of the digital literacy concept that has helped in answering the research questions proposed by the present study. The discussion section presented in chapter 6.1 accomplishes the objective of identifying the digital literacy skills required by employees in the workplace context. Concisely, the findings affirm that it is crucial for employees of all levels to have a certain level of understanding of computer-technological tools, and to have the know-how of how to operate different electronic devices and system software for effective management of

information at work, i.e., to identify, locate, access, manage, store, retrieve, disseminate information and enable integration through technology. However, is the competence to operate technological tools the only essential element of digital literacy skills required in the workplaces? Based on the findings, the answer to the above question is evidently no. The operational competencies to use technological tools appropriately, to achieve desired outcomes, implies one crucial element of digital literacy concepts. However, information literacy skills are more crucial, as digital tools are just a media to work with information at the different levels of operational activities at work. It is necessary to use technological tools, but the primary motive of using tools is to make management and interaction of information easier with the help of technology. Moreover, the problem-solving processes require critical evaluation of information and analytical skills, to logically find solutions to the problem and make informed decisions. For this reason, to be able to access the necessary information and perform tasks through digital means, technological skills are identified as one of the crucial elements, but in order to functionally solve problems through digital means and contribute in making crucial decisions, the importance of cognitive and logical thinking skills are also undeniable.

Grassian & Kaplowitz (2001) emphasized the point that having the technical know-how and digital skills is not sufficient for today's information age; employees also need to learn how to evaluate information accessed from digital environments and use it ethically. It is necessary to understand that people who are technology literate and have the know-how of how to use digital tools might not be information literate. Accordingly, the findings from this study support the statement provided by Ferrari (2012) that to be digitally literate a person should acquire knowledge, attitudes, and skills for operating technological tools, but it is only a single element of the digital literacy concept. A logical reason for this is perhaps the multifaceted concept of digital literacies, which acts as an umbrella term covering many other literacies, such as computer literacy, IT literacy, ICT literacy, media literacy and so on. From this finding, it can be concluded that digital literacy skills cannot be generalized as a standard set of skills or competencies, as the application of digital tools and competencies is highly contextual and depends significantly on the professional disciplines and organizational context. As can be seen from the findings, it is suggested that all the respondents are competent users of different digital systems and technological tools affiliated with their organization and professional disciplines. However, it is important to note that the respondents' required level of digital

competences varies individually and mainly by their work descriptions and the organizational culture of their workplace.

Further, the findings of the present study are aligned with Alan Martin's (2006) three levels of digital literacy conceptual framework that plead for paying attention to the context and situation of digital usage in specific contexts. The analysis of the results revealed that some respondents are only required to have generic computing skills to perform their work tasks, while others are required to have a more comprehensive, more critical knowledge about technology, and the latter tend to strive for using their creativity to produce innovative outcomes in their work. The findings from the present study support Martin's theoretical concept and provide confirmatory evidence that it is almost impossible to generalize the standard digital literacy skills required at different workplaces. The process, hardship, and success of solving problems at work depend not only on the nature of the problem but on the context where they occur and on the competency of the employees solving those problems. The application of appropriate digital tools and relevant competencies on solving problems and completing a task can differ according to the requirements of the professional context or the capabilities predefined by the organization. For instance, an employee can be digitally literate at the company X and has the competencies to perform work tasks in that specific work context. However, it does not necessarily mean that his competence level might fulfill the requirements determined by other professions or in another organizational context. Therefore, it can be concluded that digital competencies and required skills depend entirely on the purpose, content, and context of their implication.

6.3 RELIABILITY AND VALIDITY

In the words of Pickard (2013), the reliability of a research study is concerned with the stability of the findings produced by similar studies, conducted by multiple researchers, with the same phenomenon and purposes. To demonstrate the reliability of the present study, there is not much research conducted in this research area to be able to compare the results. However, the study applied relevant literature, presented by multiple authors and researchers, to elaborate a conceptual framework of digital information literacy concept and validate the research findings. In order to study digital information literacy at the workplace, the present study applied a holistic conceptual framework to cover various aspects of workplace literacy skills and answer the research questions.

Furthermore, to show the authenticity, the qualitative research strategy and data collection methods applied in the present study are clearly presented in the methodology chapter. An interview guide was prepared in consultation with the experts in the research field, and pilot studies were conducted for the reliability of the data. Purposeful sampling techniques applied during the data collection process ensured reliable data sources and were able to collect quality information from the respondents. Interviews were recorded and transcribed word by word to eliminate any biases. Data reduction techniques were applied, and data were categorized according to the theoretical framework and were interpreted and analyzed thoroughly. These aspects of the study provide reliable findings and ensure the reliability of the research.

Findings from the empirical study were collateral with the theoretical framework, which ensures the viability of this study. Moreover, purposive sampling technique applied in this study enabled findings to be generalized to the similar sample population in same workplace contexts, which braced the external validity of the study (Pickard, 2013). Nevertheless, both physical and digital information environments existed at the workplaces, and respondents did not differentiate these two environments during the interviews. Thus, generalizations during the analysis process were applied thoughtfully to support the validation, as both information literacy and digital literacy concepts are interrelated.

6.4 FUTURE RESEARCH

Obviously, this research is not without its limitations. The topic of this research itself is a broad one, and it is somewhat difficult to study all the aspects and variations of the digital literacy concepts, which could have been deliberate from the present study. Many aspects could have been considered but have been left out due to the limited time and resources available at the time of this research.

Precisely, the data gathered in the present study were limited to six interviewees, who were representing four different organizations. On the one hand, this study was able to gather a variety of data findings that helped to conclude that the digital literacy skills vary significantly in different organizational settings and work contexts, which validate the digital literacy concept to be holistic. On the other hand, different digital practices among respondents, according to their organizational working culture, produced great

complexity and confusion while interpreting the results and were unable to illustrate a clear picture of digital literacy skills required by employees within an organizational context. Thus, it is recommended that a single case study of an organization, under different departments and units, is conducted that could disclose overall findings of the information interactions through digital channels within an organization. Then, it could be an idea to generalize findings and results to enumerate as necessary digital skills of employees to be functional in similar working environments as the topic of discussion.

Furthermore, some aspects revealed from this study could open new horizons of the workplace literacy skills. Explicitly, the present study has ignored the generational factors of digital uses at the workplaces. However, the rich data gathered through this study suggest that there are generational differences when using technological tools for work purposes. Analyzing the results, it was interesting to learn that some interviewees noticed generational differences among their colleagues, especially from older age groups, who face challenges using the latest technological tools. For example, Interviewee C said, *“...when we started using iPad, most of my older colleagues didn’t like using it because they didn’t know how to use it and they found it difficult. It was not a problem for our young colleague, but we also have some old colleagues, and they might not be so good at using these advanced tools. I think bringing new technology to the property is quite challenging for the management team because of the diversity of workers...”*. Likewise, Interviewee B mentioned that her supervisor faced trouble using the system even though she had been using it for a long time. Pointing out the age difference, she said, *“...she was having a problem changing the password for opera system...I helped her change the password, and she got surprised by, how did I know how to do it. It was funny for me because she had been using the same system for years and years and still don’t know how to use it properly. However, I understand that she is a bit old person and doesn’t use technology so much...”*. It is easily predictable that the next generation of employees will be more digitally competent as today’s generation of youth already creates a relationship with the latest technological tools at an early age. Organizations failing to adapt and facilitate workplaces with such digital transformation along with the trend can face considerable challenges in achieving organizational goals in the competitive marketplace. Thus, it would be interesting to study how organizations are tackling such generational differences for sustaining collaborative work practices for better work performance and efficient work outcomes.

Moreover, the results also revealed that there are cultural and language barriers while communicating and interacting through digital mediums. Most of the interviewees from this study preferred face-to-face communication over virtual communication to avoid misunderstandings. It suggests that cultural differences and language variation could be one of the constraining factors, which can make collaborative work practices through digital mediums ineffective. Thus, future research should also integrate studies across countries, and access the complex interaction of culture and language, while interacting virtually. In addition, this study also produced evidence that learning about new technical infrastructures and developments depends on individual motivation and attitudes towards learning. Therefore, motivational factors affecting employees' learning attitudes at the workplace settings could also be another interesting aspect of studying literacy practices in the workplace settings. Empirical work exploring issues along these lines in greater depth would undoubtedly be of great academic importance and interest. It may be worthwhile to re-examine the factors that have been identified throughout this study and to further explore the relationships within and between the elements of IL and DL frameworks. Further, empirical work is required to overcome methodological problems and develop an integrative and multidisciplinary understanding of the concepts, with theoretical rigor and concrete operationalization of different terms.

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APPENDIX

INTERVIEW GUIDE

Briefing:

This interview is a part of my master's thesis research on the topic '**Digital information literacy skills required by individuals at the workplaces.**'. I would like to thank you for taking part in this interview for my research.

The interview questions are structured from general to specific subject areas. The interview is estimated to take less than an hour of your time. Your identity, organization of work and the information provided will be kept confidential and will be used only for this study. I wish to record our conversation and would like to ask your permission for the recording. Would you like to ask any questions in advance before we begin?

Demographics/ Information on the job

1. Could you please shortly introduce yourself.
2. What is your educational background? (*Highest level of education/degrees/other specific training*)
3. Could you tell about the organization of your work?
 - *What is the purpose of the company?*
 - *What is your current position?*
 - *Which department do you belong?*
 - *How long have you worked for the company?*
 - *Any previous work experiences relevant to the current work?*
4. Can you shortly describe how your normal day at work looks like? (*major tasks, duties, roles, and responsibilities*)

Information interaction

5. In general, how does information flows in your organization? (meetings, training, conference)
 - *Do you keep records? (Transformation of information/data into digital format)*

- *In which different formats do you encounter/gather/receive/distribute information? (Graphical presentation, audio, video, pictures, visual messages, etc.)*
 - *Can you easily interpret information found in different formats?*
6. When you need to solve a work-related problem, what do you do? (seek information)
- *What information do you require to do your job?*
 - *What would be the most important/ reliable source of information regarding your work? E.g., official information system/ channels endorsed by the company, Your Colleagues (internal or external), other specific sources, Internet, etc.*
7. Is it easy for you to find relevant information concerning your work? Or Have you ever felt that it is difficult for you to find the information you need? Do you remember any such situation?

Information and Communication Technology aspects:

8. Can you name some of the technology tools you regularly use at work?
- *For what purposes and in which different context do you use them? (innovation and creation)*
9. Do you use any specific software or systems for your work? (Portal/Intranet)
- *Have you ever had any problems/ difficulties using the system/tools?*
 - *Did you receive any specific training on how to use?*
 - *How would you describe your skills using it? (Competences, knowledge, attitudes)*
10. In your opinion, how has technology helped you at work?
- *How would you describe the essentiality of technology in managing information?*
 - *What strategy do you apply to manage information? Which tools do you use? In which formats?*
11. Can you name some tools/ software you hardly use at work? (e.g., something some of your colleagues are using but not you, or something you think is useful)
12. Do you think you are interested in learning and using new software and computer system for your work? (Keeping updated with latest technology tools)

Social aspects: Collaboration and Information sharing

13. How do you usually communicate? (Internally/externally)
- *Which tools or methods do you use for communication purpose?*

- *Do you actively share information with your colleagues?*
- *How do you usually share? In which different context and situation? (Formal meetings, Informal, virtually)*
- *Which tools do you use? On which formats, do you usually share information? (Collaborate and share digital content)*

14. On which different circumstance do you usually interact online?

- *Which platform or tools do you use for such interactions? (official company platform/ informal social media, live chats, instant messages)*
- *What challenges/ difficulties do you experience while interacting online for information (providing/gathering) or interacting through digital sources?*
- *Do you apply any security/safety measure? If yes, how? If no, why? (identify hoaxes, scam, Internet traps, viruses)*

15. Is it difficult to know when to communicate, what to communicate or to understand what the other person means? *(Use of code words: coding and decoding information, meaning making, graphical symbols, icons)*

Critical thinking, Cognition, Creativity, and Innovation

16. When you receive/encounter information, what do you do at first before processing it? Do you challenge the information? *(critically evaluate, analyze, etc.)* When do you know that you have the right information you need?

17. How do you make decisions? Do you make decisions based on your instincts or do you have reliable information to back you up? What is important to you when making decisions? *(quality of information, information sources/trust, creative ways of solving problems even not endorsed by the company).*

18. Do you remember any situation when you misinterpret information that led you to make wrong decisions?

19. In your opinion, which key skills are essential for managing information at work?

Debriefing:

Our interview session has come to an end. Before we formally end, would you like to add or correct anything? If you have any questions later concerning about this research, you can contact me in person. Also, I could share my thesis with you if you would be interested in reading. Lastly, I would like to Thank you for participating in this research and providing me with your valuable time and dedication. Thank you! 😊