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## Higher education students and digital literacies: A systematic literature review

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A thesis submitted in partial fulfillment of the requirements for the Master of Arts degree in Education

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## Abstract

This study is a systematic literature review of digital literacies and students in higher education. It sought to identify the state of knowledge on digital literacies in higher education including what studies have been conducted in this nexus and what remains to be known. The deductive themes drew on two prominent concepts of digital literacies: the Seven Elements of Digital Literacies (Jisc, 2014) and the Charter for 21st Century Literacies (Burnett & Merchant, 2018). The review's methodology identified 23 studies published in the last five years across 21 countries. The findings suggest that researchers demonstrated interest in discussing how students utilize digital technologies for generating learning strategies that they can use beyond graduation. Additional pertinent topics include the digital divide, digital natives, information literacy, and media literacy, among others. Core recommendations include the creation of learning spaces that foster meaningful knowledge of digital literacies by universities and colleges.

## Keywords

Digital literacies; higher education; students; systematic literature review

## Summary for Lay Audience

The world has long gone digital. By April 2023, the global count of internet users had reached 5.18 billion, representing 64.6% of the world's populace. Among these, approximately 4.8 billion individuals, equivalent to 59.9% of the global population, engaged with social media platforms (Statista, 2023). Information and communications technologies (ICT) are increasingly irreplaceable as resources for modern societies to organize themselves, mediating their economic growth and giving them access to swift information. Such information pervades communities and influences many fields, among them agriculture, health, and education, the latter being the focus of this study.

This review synthesizes 23 studies to identify the current state of knowledge on digital literacies in higher education, pointing out what has been studied and what potential problems future research might address. It is a systematic analysis of studies coming from 21 countries, offering a picture of what this body of literature says it means to be digital literate in higher education settings. The findings suggest that universities are paying close attention to the development of digital literacies in their students, although they still have a long way to go to offer not only training that caters to the need for technical skills, but also a deep commitment to bridge gaps in digital access, creating an environment that fosters digital literacies for goals that surpass higher education, developing tolerance, critical thinking, and lifelong learning for all students. The review also gives recommendations for research and practice, including suggestions for more qualitative investigations in the field of digital literacies in higher education and for more affective approaches from universities and colleges when teaching digital literacies, recognizing the value of students' previous experiences and knowledge.

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My first thought as I write my acknowledgments is in how good God is and how unworthy of all his blessings I am, and yet he keeps pouring his calming presence and love over me. To him all the glory!

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## Section 1: Introduction to the Research Problem

The world has long gone digital. By April 2023, the global count of internet users had reached 5.18 billion, representing 64.6% of the world's populace. Among these, approximately 4.8 billion individuals, equivalent to 59.9% of the global population, engaged with social media platforms (Statista, 2023). Information and communications technologies (ICT) are increasingly irreplaceable as resources for modern societies to organize themselves, mediating their economic growth and giving them access to swift information. Such information pervades communities and exerts influence over every field, including agriculture, health, and education (Ainley et al., 2016), the latter being my focus in this work.

There is an ongoing argument coming from a variety of educational and other policymakers that it is necessary for people to develop what has been termed digital literacy (Jisc, 2014; European Commission, 2013; Ministry of Education and Child Care, 2022). To give one example, the European Union (2023) has set goals to overcome the claim that 42% of “Europeans lack basic digital skills, including 37% of those in the workforce” (European Commission, 2023). It is further argued that it is necessary to also develop citizens capable of using criticality towards the digital (Farias-Gaytan et al., 2022). To foster the engaged involvement of informed and independently thinking citizens within the digital era's democratic landscape, critical digital literacy must encompass comprehension of the digital sphere where information propagates (Breakstone et al., 2022; Goldstein, 2019). The literature offers advice on what might be included in such criticality; for instance, Polizzi (2019) claims this entails people grasping the socio-economic dynamics of the internet, coupled with recognizing its capacities and limitations concerning democracy, politics, and civic engagement. What is clear is that the literature points to there being more than a single notion of digital literacy, hence this study's use of the pluralization of the term. Also clear is the literature's recognition of formal education as vital to promoting digital literacies with education stakeholders all over the world acknowledging it as a demand for the present, not a luxury (Burnett & Merchant, 2015, 2018; Clark, 2021; Ng, 2012). They are essential not only throughout all levels of education, but also in both professional and personal realms of an individual's life (Bejaković & Mrnjavac, 2020). This necessity stems from the increasingly integrated nature of the online and offline worlds, where the distinctions between the two are becoming nearly indistinguishable (Polizzi, 2023). In today's era, being digitally literate

is crucial for effective participation in various aspects of public and private life (Breakstone et al., 2022; Fuchs, 2014; Polizzi, 2019, 2023).. Such a reality is what has forced school systems to rethink curricula, attitudes, and operations (Goriss-Hunter et al., 2022). Such rethinking includes higher education, and the literature is suggestive of the importance of digital literacies in higher education. Digital competencies, for instance, have been found to be determinant in raising higher education students' chance of academic success (Ahmed & Roche, 2021), and to be digitally literate means, among other things, to develop critical thinking for a broader participation in digital democratic processes (Breakstone et al., 2022), to ensure access to information for impaired students (Arslantas & Gul, 2022) and other minorities (Ahmed & Roche, 2021; Timmis & Muhuro, 2019).

## 1.1 Place of the Study in the Research Conversation

As suggested by the literature described next, with so many studies being conducted in the last few years around the topic of digital literacies, there are attempts to paint a picture of what digital literacies looks like in higher education. To gather the knowledge that has been produced on digital literacies and its variants, some systematic literature reviews have been published, each with different perspectives, goals, and foci. The juxtaposition of these reviews allows for a version of this picture and suggests what research might be needed to create a more robust picture.

Farias-Gaytan et al. (2022) undertook a systematic literature examining works concerning digital transformation and media literacy that were designed to make an impact in higher education. Their goal was to map what kinds of research and topics these publications address, and to identify the effect they might have in higher education. The same researchers went on and performed a systematic literature review to find studies addressing digital transformation and digital literacy in higher education (Farias-Gaytan et al., 2023). One systematic literature review has its focus on research about higher education faculty (Basilotta-Gómez-Pablos et al., 2022), targeting works that investigated what kind of skills and attitudes university teachers need to make effective use of digital technologies. Spante et al. (2018) conducted a review of how studies have been defining digital literacy and digital competence in higher education, depending on the time, discipline, country, method, or level of analysis in which the research was made. Sillat et al.'s (2021) systematic review focuses on analyzing digital competence assessment

methods and processes in higher education. While the existence of these reviews suggests the prevalence and importance of digital literacies in higher education what they seem to leave out is the literature focused on students. As I argue in the next section, such a perspective is vital.

## 1.2 Research rationale

Life in contemporary times is interconnected, digitally produced, and stored; therefore, digital literacies is increasingly becoming a high-profile concern (Spante et al., 2018), and the systematic literature review that I undertook contributes a focus on students to the picture digital literacies and higher education.

Higher education institutions have seen the development of digital technologies around them, and they have noticed that such resources can support teaching and learning (Clark, 2021), and examples of their use are numerous (Basilotta-Gómez-Pablos et al., 2022). Whether we call them digital competence (Cabero-Almenara et al., 2023; Martzoukou et al., 2020; Scheel et al., 2022; Spante et al., 2018) or digital literacy (Ng, 2012; Spante et al., 2018), or even other iterations this topic has gained over the years, such terms acknowledge, at an enormous rate, the myriad of literacies connected to the utilization of digital technologies.

In the ever-evolving landscape of technology and information, digital literacies extend beyond foundational competencies to become critical enablers of lifelong learning. As information becomes more accessible yet increasingly complex, students must not only consume content, but also critically assess, validate, and engage with it (Lilian et al., 2020; Monteiro & Leite, 2021). Higher education serves as the pivot point at which students transition from structured educational environments to the self-directed learning necessary in their professional and personal lives (Inamorato dos Santos et al., 2023; Martzoukou et al., 2020). By developing robust digital literacies, students are understood to be equipped to continue learning beyond the confines of formal education, adapting to new knowledge and technological advancements throughout their lives (Littlejohn et al., 2012).

This study joins an ongoing conversation in the educational research community through a systematic literature review that focuses on scholarly research aimed at centering students and digital literacies. Students are an essential element in the higher education ecosystem (Martin, 2022), thus they play a key role in how the future looks in terms of the job market,

culture, politics, and society as a whole (Martin, 2022; Smith & Storrs, 2023). Understanding how students view digital literacies, and how they tackle their difficulties with digital approaches and methods could contribute to the development of curricula that foster digital literacies, thus enabling learners in higher education to acquire skills that are meaningful in the present and will be continuously growing in importance and participation in society over the coming years.

### 1.3 Research questions

With this study I respond to the following research questions:

1. What are the trends in research that investigated higher education students and digital literacies?
2. What are the affordances and challenges of incorporating digital literacies in higher education reported by the research conducted in the last five years?

For this review, I draw from findings and data knowledge published in academic journals during the last five years to paint a timely picture of what digital literacy in higher education looks like now and what it might look like in the future.

### 1.4 Research overview

This is a manuscript thesis, seeking to be adapted for future publication in the format of a journal article. Some sections included in the current thesis will be edited or left on the floor of the editing room altogether to allow for the document to ultimately conform to the requirements of a journal article.

My thesis is organized in five major sections: Introduction to the Research Problem, Theoretical Framework and Background, Methodology, Findings, and Discussion and Implications.

In Section 1, I have established the background and research issues, pinpointed the gap in existing research, formulated research inquiries, elucidated the reasoning behind my study, and highlighted the potential impacts of my research. In Section 2, I introduce the elements of the theoretical framework that guided me in proceeding with the review, giving definitions to describe digital literacies, and presenting literature that grounds the

theory. I also give a brief positionality statement to situate me as a researcher interested in drawing students in higher education and digital literacies. In Section 3, I delineate and expound upon the methodological structure, the techniques employed for collecting and analyzing data, which I utilized to construct a clear, all-encompassing, and replicable systematic literature review. In Section 4, I elaborate on the findings of the articles reviewed according to the themes and codes initially proposed. I report on the trends that I found in the literature, as well as the affordances and challenges of digital literacies in higher education for students. Section 5 brings the conclusion, with a discussion of my findings and my recommendations for future research.

## Section 2: Theoretical Framework and Background

In this section, I discuss the focal term of this study, digital literacies, then introduce the literature that informed the theoretical framework that I used to guide the study, including the data analysis. Specifically, I share the seven elements posited by the Joint Information Systems Committee (Jisc, 2014), followed by the nine principles of the Charter for 21<sup>st</sup> Century Literacies (Burnett & Merchant, 2018). I used the core of these texts as sources for the deductive codes I employed in my data analysis, which I discuss in more detail in section 3. Lastly in this section, I make use of a concise statement of positionality to situate myself in the present study.

### 2.1 Why Digital Literacies?

There are numerous definitions and conceptualizations of digital literacies in the research literature (Dudeney, 2022), as well as in curriculum and policy (ELI, 2019; European Commission, 2013; Ministry of Education and Child Care, 2022). Amongst these are expansive notions of literacy proper which include the digital in various forms, such as is the case with the concept of multiliteracies (Cope & Kalantzis, 2023; Ng, 2012). For the purposes of this thesis, as mentioned at its outset, I have parsed out the term digital literacies for investigation.

The literature on digital literacies reflects a rich tapestry of perspectives, encompassing diverse dimensions such as organizational affordances, educational implications, societal development, and health-related outcomes. This multifaceted nature underscores the complexity of digital literacy and its far-reaching implications across various domains. Some argue that digital literacy should encompass situated social practices (Reinhardt & Thorne, 2019), while others call for the acknowledgement of a criticality towards the potential goals of digital literacies, with an emphasis on creating a skilled workforce for an increasingly digital marketplace (Pangrazio & Sefton-Green, 2020). Some researchers have emphasized the importance of digital literacy in the context of organizational affordances, highlighting its multi-dimensional nature within the framework of digital transformation (Cetindamar Kozanoglu & Abedin, 2020). Additionally, the literature has addressed digital literacy in relation to specific demographics, such as older adults, and its implications for their ICT use and self-determination (Schreurs et al., 2017). The impact of digital literacy on human development has also been a subject of investigation, with

evidence suggesting its significance in promoting societal progress (Nipo et al., 2020). Furthermore, the literature has delved into the role of digital literacy in educational settings, particularly in relation to teachers' attitudes and its integration into the syllabus (Pratolo & Solikhati, 2021). This highlights the practical implications of digital literacy within the realm of pedagogy. Additionally, the concept of transformative agency in education has been explored in the context of digital literacies, shedding light on the dynamic and evolving nature of literacy in the digital age (Lund et al., 2019). Moreover, the plurality of viewpoints in approaching digital literacy has been acknowledged, encompassing conceptual, operational, and sociocultural perspectives (Wang & He, 2022). The feminist perspective has also been brought into the discourse on digital literacy, emphasizing the need to reimagine digital literacies from a feminist lens in a postcolonial context (Bali, 2019). This highlights the intersectionality and diversity of perspectives within the literature on digital literacy. Finally, the impact of digital literacy on various aspects of life, such as health literacy and eHealth literacy, has been a subject of investigation, emphasizing the multidimensional nature of digital literacy and its implications for different domains (Jeong & Bae, 2022; Lee & Tak, 2022; Li, 2018).

## 2.2 Definitions of Digital Literacies

Digital literacy has been defined in many ways in the research and grey literatures, and its meaning keeps being redefined and revised as the literacies themselves continue to evolve. Early uses of the term encompassed the capacity to comprehend and effectively utilize digitized information, along with the diverse range of tools and platforms associated with it (Ainley et al., 2016; Burnett, 2020; Clark, 2021, 2021; Kim, 2019). In a nutshell, digital literacy referred to a person knowing how to use devices and software to receive and produce information (Sparks et al., 2016). However, further definitions expressed that although having the ability to use communication technologies may mean that a person has some level of digital literacies, there is research that posits that a person must have additional knowledge and skill to be considered a *digital native* (Ng, 2012). The term has been used for persons who are said to be able to use computers and mobile devices for communication and mobility, as well as for inserting themselves into an increasingly digital society through social media (Prensky, 2012), but what Ng (2012) observed was that a more comprehensive digital literacies would amplify this knowledge

to lead the digital beyond entertainment and social interactivity. In this view, being digital literate would mean transferring such knowledge to technology other than amusement, towards educational digital technology. The concept of digital native has also been noted as problematic because it entails that one is born skilled in digital literacies, what is not necessarily true (Bennett et al., 2008; Brown & Czerniewicz, 2010; Helsper & Eynon, 2010).

Following the concern of forwarding the idea of digital literacy beyond the digital natives discussion, the Joint Information Systems Committee (Jisc, 2014) – the UK digital, data, and technology agency for tertiary education, research and innovation, the official statistics provider on higher education in the United Kingdom – states that digital literacy extends beyond mere functional IT skills to encompass a more comprehensive array of digital behaviors, practices, and identities. The meaning of digital literacies evolves over time and in different situations, making digital literacies essentially a collection of context-specific academic, professional, and social practices that are supported by a wide range of ever-changing technologies (Mayisela, 2022; Noble & Gachago, 2022; Smith & Storrs, 2023; Yehuda, 2021). They go further on their description of digital literacies, by distinguishing seven elements (see Figure 1) that are included in what they express it means being digital literate: media literacy, communications and collaboration, career and identity management, ICT literacy, learning skills, digital scholarship, and information literacy. This framework aligns with the evolving demands of the digital age and is well-suited to suggest to the study what might be important for equipping individuals with the competencies required for effective engagement in online learning environments. Furthermore, the framework's emphasis on digital scholarship and information literacy reflects the growing significance of these aspects in the digital era, particularly in the context of academic and research endeavors. Given its scope, I have adopted it to help guide this study. In the next subsection, I discuss each of these elements.

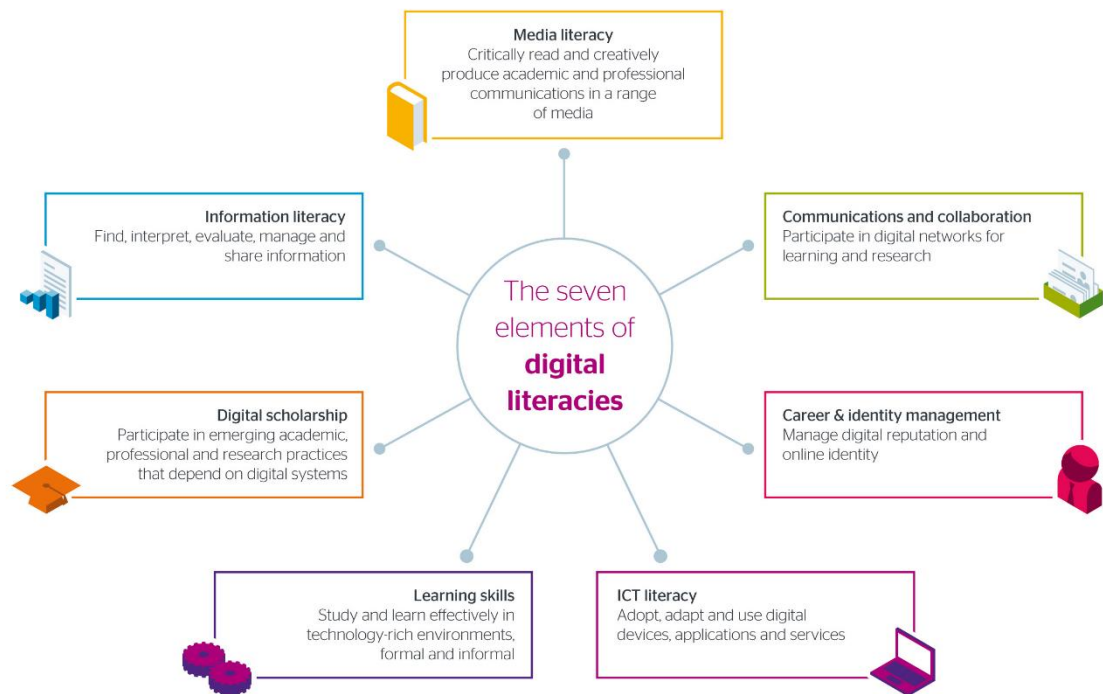
## 2.3 The Seven Elements of Digital Literacies

In the following, I introduce the two concepts that I used to compose the framework for this review. The deductive codes I used in my qualitative analysis derived from these concepts. Firstly, I explain the seven elements of digital literacies (Jisc, 2014), which I chose for being a frequent source of definitions for digital literacies (Spante et al., 2018) in official reports. As it is seen on Figure 1, all elements are presented in a circle, each



one being part of the same sphere, entailing no hierarchy between them. Jisc’s definition and conceptualization of digital literacies focuses on higher education, which is also my focus in this review, and it is mentioned in six articles of the reviewed literature (Ahmed & Roche, 2021; Bhatt & MacKenzie, 2019; Caverly et al., 2019; Martzoukou et al., 2020; Raji et al., 2023; Smith & Storrs, 2023). From this concept and each element’s definition, I drew the deductive codes that guided me through the reading and analysis of the literature, helping me organize the full text reading stage and the subsequent coding of the articles.

*Figure 1* The seven elements of digital literacies (Jisc, 2014)



The first element of digital literacies – and it is worth noting that Jisc (2014) uses the plural form of literacy, denoting a wide range of perspectives and abilities related to the digital – is “media literacy”. This element addresses the ability to use criticality in reading media and to apply creativity in the production of academic and professional content. A critical reading of media is also included in Burnett and Merchant’s (2018) Charter for 21<sup>st</sup> Century Literacies, and its main concern to this matter is that an education that engages in media and digital literacy is one that generates contexts that enable criticality without “demonising texts young people use in everyday life” (Burnett & Merchant, 2018, p. 91). In this sense, it is essential to foster all the benefits of these digital services available, through which students can play games, write fanfiction, interact with peers

who share common interests, and engage in all sorts of collaborative activities, such as political activism and support groups; however, all of these features should be seen through a critical lens – or critical lenses – so they do not lose sight of elements like unequal power relations, safety concerns, trustworthiness or the lack of it thereof, ethics, and unwelcome attention that come with the digital (Timmis & Muhuro, 2019). Additionally, Fuchs (2014) highlights the discussions on how data are collected and to what purposes, reminding us, readers and researchers, that the issues to be addressed through a critical reading of digital media are far from being scarce.

The next element, “communications and collaboration” (Jisc, 2014), discusses the role of digital literacies in ensuring individuals’ opportunities to learn how to work collectively. Collaborative creation and collective participation is one of the many advantages of digital literacies being increasingly advertised by advocates, and social media in general are known as tools for the development of a participatory culture (Fuchs, 2014). In educational settings, the digital has provided the chance of not only accomplishing things with technology, but also in cooperation with others (Burnett & Merchant, 2018).

The third item brings us to “career and identity management” (Jisc, 2014). Being able to understand and situate learners within the digital, or the new media (Burnett & Merchant, 2018), and use that as a path to discover a potential career is more than possible; it is necessary. Needless to say, who learners are entails much more than just what they do for a living; it involves knowing ourselves and more specifically who we are as dwellers of this world, and we find more and more that finding and negotiating our identity in the digital – and outside of it – is a matter of survival (Cummins & Early, 2011). Identity, the literature is clear, is interrelated with wellbeing (Clark, 2021). In this sense, Naidoo (2022) states that the feeling of belonging to a place or a group is connected to what students consider as more engaging intellectual interactions, generating a sense of accomplishment.

Moving forward, the fourth element, “ICT literacy”, is integrated into the initial idea of what digital literacy meant, that is, the ability to use and comprehend devices, tools, and platforms (Ainley et al., 2016; Clark, 2021; Lilian et al., 2020; Ng, 2012; Sillat et al., 2021) to navigate the internet, sending text messages, and a whole number of activities. Nevertheless, although those skills do entail some digital literacy, they are not enough to make someone digitally literate (Ng, 2012).

The fifth element of digital literacies, “learning skills,” brings me to my teaching background and its intersections with the literature. In my teaching career, I have always tried to be up to date in technological resources available to engage my students in learning content and enhancing their critical thinking skills. Among the many things I have learned from this effort to bring technology into classes, I noticed that most learners born in the digital age are not digitally literate when it comes to use technology for learning. There is research that approaches the existing learning gap between being familiar with digital devices and using them for learning purposes (Clark, 2021; Ng, 2012; Shahrokh & Milla, 2021).

Moving on in the figure, I come to the sixth element, “digital scholarship,” which relates to how we can use digital systems to engage in academic, professional, and research practices. There is not a consensus on the question of a distinction between scholarship and digital scholarship, although there is a common understanding that technologies have provoked changes on scholarly practices (Martin, 2016), and Lynch (2014) posits that scholarship, after all, is scholarship, whether it is digital or not. But what this element brings about is the fact that there have been big shifts in how we do research since databases became available all over the world at the tip of the fingers.

Finally, the seventh element of digital literacies is “information literacy.” This item emphasizes the need for an education that empowers students with tools that enable them to read, interpret and distinguish good from bad information, activating their criticality in viewing whatever is spread out in social media and the news (Tekoniemi et al., 2022). According to Jisc (2014), possessing this skill means that one is able to find, interpret, evaluate, and manage information before sharing it.

## 2.4 The Charter for 21<sup>st</sup> Century Literacies

To help me define digital literacies and build my framework in the search for deductive themes and codes approached in the literature to be reviewed, I also drew on the Charter for 21st Century Literacies by United Kingdom literacy researchers Cathy Burnett and Guy Merchant (2018). I selected this Charter because of its contribution to the discussion of new media and the new forms of literacies emerging and its ability to relate digital literacies with ways of doing education within real classrooms, acknowledging research affordances, and connecting theory with lived experiences of teachers, instructors, and professors. Instead of elements as per Jisc’s (2014) work, this concept is built on

principles, acknowledging and “building on recent research in literacy, research that has drawn attention to the generative and emergent quality of the kinds of meaning making associated with digital technologies” (Burnett & Merchant, p. 3, 2018). It is developed under the understanding that these new literacies are not born from a mere substitution of one medium for another. Instead, it recognizes that the availability of communication tools and options has greatly expanded, offering a wider range of choices and greater versatility than ever experienced previously. New ways of creating meaning entice new perspectives, thus the emergence of new principles. Additionally, the Charter addresses a noticeable gap between the way state-centered curricula see literacy and the youth’s everyday literacy practices (Burnett & Merchant, 2015). As literacies keep evolving and shifting over short periods of time, curriculum practices take longer to keep themselves up to date, entailing an increasing distance between theory and practice (Burnett & Merchant, 2015; Cope & Kalantzis, 2023; Ng, 2012). Important to notice is that the Charter was developed for pre-tertiary education and is more related to the teaching stage in the educational process, which makes the principles contained in it more of directions, functioning as an inspiration for this particular systematic literature review. Next, I explain the Charter for 21st Century Literacies’ nine principles and make suggestions about what the implications may be for tertiary education.

1. “Acknowledge the changing nature of meaning making” (Burnett & Merchant, p. 13, 2018) – this principle addresses the ways in which new technologies have transformed communication practices (Gillen & Merchant, 2013). Official transactions are increasingly shifting to the digital realm. Our daily interactions are closely intertwined with mobile technology, resulting in a rapid transformation in how we communicate, express ourselves, and engage with others. With the ability of written words to be spoken aloud and voice recognition technology assisting in writing through predictive text, traditional notions of literacy and the processes involved are being challenged. Consequently, these changes are expected to impact education, eventually finding their way into the classroom (Burnett, 2020). In higher education meaning making is also in a shifting process, and it can be seen in how students are increasingly moving from note-taking to photographing professors’ notes on the board (Nouri, 2019), as well as the number of devices and software learners use to process, summarize and share content taught in class (Shahrokh & Milla, 2021).

2. “Recognise and build on children’s [or higher education students’] linguistic, social and cultural repertoires” (Burnett & Merchant, p. 25, 2018) – this principle affirms the importance and significance of the learner’s repository, understanding that it is key that curriculum making acknowledges how the increasingly fluid communication practices reflect students’ repertoires. In order to make a curriculum effective, it needs to be meaningful. It has to matter to learners (Burnett & Merchant, 2018). Being the new literacy environment “broader, more dynamic, more fluid, multi-layered, and multimodal” (Razfar & Gutiérrez, 2013), it is key to give learners the chance of making sense in a plethora of significant ways. As Maine (2017) has demonstrated in her study of children playing Monument Valley, background, previous knowledge and lived experiences have influence on how learners read and make sense of multimodal texts, such as videogames, film, music, and social media. Being able to see those things as both resources and important modes of literacy, without undervaluing and overlooking a learner’s cultural and linguistic repertoire, is essential to bring education closer to what real life looks like (Maine, 2017). Higher education students would benefit from this principle when institutions choose not to overlook learners’ prior knowledge, skills, and cultural backgrounds; instead, universities and colleges see students’ previous abilities as assets, offering new learning opportunities for learning and teaching (Ahmed & Roche, 2021; Kim, 2019; Timmis & Muhuro, 2019).
3. “Acknowledge diverse modes and media” (Burnett & Merchant, p. 35, 2018) – here we come upon a reality we cannot overlook. There are a variety of forms of communication, modes, and media available in students’ everyday lives, meaning that there is a diverse range of ways through which learners can create meaning. Digital media brings access to easier tools for creation, which opened possibilities for students to learn about different modes, generate texts within much broader limits than before the new literacies to emerge, and to be evaluated accordingly (Burnett & Merchant, 2018). The teaching paradigm is transformed by multimodality, presenting us with the need to reconsider our notions, strategies, and implementation of teaching and learning (Seguna, 2021), in all levels of schooling, including higher education (Nouri, 2019).
4. “Recognise the affective, embodied and material dimensions of meaning making” (Burnett & Merchant, p. 45, 2018) – The interpretations we create are constantly

influenced by our emotions, recent experiences, companionship, and the various factors that surround us. The present circumstances, resources available, personal backgrounds, and collective past experiences all significantly impact how students engage with digital media. Regarding all aspects of students' lives while learning or demonstrating their 21<sup>st</sup> century literacy skills is a more comprehensive way to show that the teacher cares not only about learners' development as students, but also their growth as human beings (Tau et al., 2022). Digital literacies meaning making in the classroom entails intellectual reactions as well as emotional, and such reality is not to be ignored (Burnett, 2020; Seguna, 2021), or we risk implementing a perpetuation of a technocratic education, aimed only at forming heartless, controllable, and manageable students (Bhatt & MacKenzie, 2019; Timmis & Muhuro, 2019).

5. "Encourage improvisation and experimentation" (Burnett & Merchant, p. 55, 2018) – Unplanned and emergent creative engagement is a common occurrence, particularly in informal digital technology activities outside of school. Enabling such experimentation involves recognizing the dynamic process of meaning-making, which may not necessarily result in a final product (Burnett & Merchant, 2018). This approach serves as a valuable contrast to the current educational focus on predetermined objectives and behavioural outcomes which are often promoted in higher education (Willey & Gardner, 2012). Approaches that encompass creativity through the utilization of various modes and media continue to emphasize the significance of design and production. Research has shed light on the spontaneous and unplanned nature of creativity, countering the emphasis on intentional design (Leander & Boldt, 2013). For educators, this implies being receptive to unforeseen paths (Hobbs, 2013) and embracing playful and improvisational methods. Scholars like Phillips and Willis (2014) advocate for a "living authorship" characterized by action, generativity, authenticity, openness, interconnectedness, emotions, responsiveness, constant evolution, and engagement.
6. "Use playful pedagogies" (Burnett & Merchant, p. 65, 2018) – the adoption of playful pedagogies, along with providing room for improvisation as mentioned in the previous principle, open a window of opportunity for unexpected paths in the learning journey. Although playful pedagogies might be more associated with the initial stages of schooling, and indeed the Charter for 21st Century Literacies is

aimed at these phases, there has been an increase in the number of studies interested in how playful learning, teaching, and pedagogies have a place in higher education (Holflod, 2023; Nørgård et al., 2017), considering that playful activities are an important element of digital media and literacies. Among the advantages of embracing these pedagogical approaches, we can emphasize an active engagement of students, as well as the development of learners' autonomy in their creative strategies (Burnett & Merchant, 2018).

7. "Create opportunities to work with the provisionality of digital media" (Burnett & Merchant, p. 77, 2018) – digital texts are usually provisional, meaning that they can be remixed, remade, deleted, and edited. They can be remade entirely new, as it is possible to see on *Instagram* remix videos, in which users can collaborate with existing videos at the platform, inserting their comments, reactions, reviews, or suggestions also on video format next to the original one, thus generating a completely new text. Embracing a provisional approach can create valuable prospects for higher education students to connect with fresh audiences, exchange feedback, and creatively reinterpret the work of others (Abdellatif et al., 2023). This allows for both critical examination and innovative remixing of existing content (Burnett, 2020).
8. "Provide contexts that facilitate criticality" (Burnett & Merchant, p. 91, 2018) – here, the Charter proposes a greater criticality towards students' digital production and consumption. Calls for a more accurate reading of what kinds of interests, messages, and worldviews are behind digital resources and media are increasingly noticeable throughout the educational field (Burnett & Merchant, 2019). However, it is important not to vilify every element of digital media. Instead, learners must possess the resources to make conscious decisions on what data they will make available for the audience in digital platforms, what sort of information they will be feeding with – and will help spread (Burnett, 2020). Other than that, the provision of criticality allows educators not to simply lean on digital tools to fill educational gaps and to give content to students, but to engage in purposeful, targeted actions that facilitate the development of a better understanding of learners' outer and inner worlds (Burnett & Merchant, 2019).
9. "Promote collaboration around and through texts in negotiating meaning" (Burnett & Merchant, p. 105, 2018) – the importance of cooperation and collaboration in education is not new. In digital literacies, however, chances for collaborative

pedagogical production have been considerably enhanced and amplified in scale and reach (Gillen & Merchant, 2013). One aspect of this principle that may be more associated with higher education is the co-construction of texts, using tools like *Google Docs* to foster collective creation even when working remotely. Burnett and Merchant (2018) posit that “the process of collaborative text creation offers considerable potential for supporting learning through: exchanging perspectives and peer review; gathering, collating and sharing information; as well as developing ideas and imagining new possibilities together” (p. 109).

## 2.5 Researcher Positionality

Under the comprehension that a researcher’s positionality characterizes someone’s view of the world, therefore contributing to how research is conducted and how it may affect what it is being investigated (Patton & Winter, 2023), it is important to state my positionality towards the focus of this study.

I am a teacher in Brazil and a graduate student in Canada, conferring on me a perspective that traverses socio-material contexts. As a teacher, I have always attempted to give students the opportunity to develop their learning through the use of digital resources, whenever possible, given the financial reality in the Brazilian educational system in which I have taught. Only in the last five years the schools where I taught have become able to provide some technology to increase digital literacies learning opportunities among learners, but even this growth is slow and far from enough. The Covid-19 pandemic the world experienced recently helped highlight the needs of digital literacies for Brazilian public schools’ students. Differently from what advocates for the digital natives concept say, my students lacked opportunities to develop basic digital competencies, despite being considered the generation that was born and raised with digital devices, thus supposedly fluent in digital literacies.

As I read about digital literacies and learn more about how the related research has been developed and evolved, I realize that my own experience in using technology in the classroom is useful in understanding how essential digital literacies is in this digital world for all aspects of life, including schooling, communications, society, ethics, culture, and economy, just to mention a few. My positioning as a teacher has enabled me to look into digital literacies through a pragmatic, pedagogical view, whereas my place as a graduate



student has given me the scholarly resources and theoretical grounds to develop research on the matter.

This section covered the aspects included in two concepts for digital literacies, as well as my positionality as a researcher. In the following section, I delineate paths that my research walks in as a systematic literature review. With the help of existing literature, I define what a systematic literature review is, and how I collected and analyzed the data. In this sense, I will describe the criteria for my search, which guided me as I attempted to map the landscape in digital literacy and higher education from a students' perspective.

## Section 3: Methodology

Fink (2014) defines a literature review as a "systematic, explicit, and reproducible method for identifying, evaluating, and synthesizing the existing body of completed and recorded work produced by researchers, scholars, and practitioners" (p. 2). Its systematic nature is attributed to the series of steps that need to be followed to make the review process efficient and streamlined. Booth et al. (2022) underscore the importance of a systematic approach in conducting a literature review, which serves two purposes: one, "the more systematic we are, the less likely we are to introduce bias" (Booth et al., p. 3, 2022) and two, "working systematically also helps you... to be efficient" (Booth et al., p. 3, 2022). As Webster and Watson (2002) note, a successful literature review is fundamental to advancing knowledge as it facilitates the development of theories, identifies areas that require further investigation, and fills gaps in areas where extensive research already exists.

According to Booth et al. (2022), a systematic literature review is conducted to gain an understanding of the quantity and diversity of literature available in a particular subject area. The review serves the purpose of "mapping the landscape" (p. 5) or presenting an overview of the current understanding and information available in a specific field of expertise (Page et al., 2021). To make their review useful for readers, authors of a systematic review must provide a clear, comprehensive, and precise explanation of their review's purpose, methodology, and outcomes. Page et al. (2021) suggest using the Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA 2020) statement and its flow diagram (Figure 2) as a checklist to ensure credibility and absence of bias in conducting a systematic literature review. The PRISMA statement and flow diagram guide researchers in presenting a clear and accurate history of the reason for conducting the review, the procedures and criteria used, and the resulting findings.

### 3.1 Purpose of the literature review

The literature review that I performed focused on higher education students and digital literacies. I aimed to understand what is known to be happening in the digital literacies landscape in higher education vis-a-vis students, not faculty, staff, or more specialized personnel, such as librarians.

## 3.2 Methods of systematic review

To answer both research questions, the first one about the trends in research on digital literacies vis-a-vis students and the second one addressing the affordances and challenges of digital literacies being implemented in higher education reported by the research conducted in the last five years, I utilized a deductive thematic analysis, as posited by Boyatzis (1998), who points out that this sort of analysis is one that is compatible with the majority of, if not all, qualitative methods. In qualitative research, a code is typically a concise word or phrase that symbolically represents a significant, summarizing, essence-capturing, or evocative characteristic of a segment of language-based or visual information. This information can encompass interview transcriptions, field notes from participant observations, written records, illustrations, artifacts, pictures, videos, online platforms, email exchanges, literature, and similar sources (Saldaña, 2013).

## 3.3 Searching and screening the literature

The focus of this review is digital literacies and higher education students, which justifies the use (and the exclusion thereof) of specific search terms, to keep the study within the chosen topic and time scope. I started my search after meeting with Denise Horoky, Western University librarian, when I was taught two important points: one, that I could use Covidence to assist me in my review; two, that if I used quotation marks in my search, that would give me more accurate results, in connection to what I was looking for. Therefore, to locate papers investigating specifically digital literacies and higher education, I endeavoured to search on ProQuest Education Journals, since it provides access to more than 1000 highly regarded educational publications (Zhang et al., 2019), for literature which contained these terms as their subjects. Thus, my search was undertaken by applying the terms “digital literac\*” AND “higher education” AND students, ensuing 155 results. It is important to observe that those results were obtained also using the filters “last 5 years”, and “peer-reviewed” as an inclusion factor, to find only the most recent research on the chosen topic, and leave out of the search books, reports, encyclopedia articles, conference papers, speeches, and presentations.

Moving forward, I applied specific filters to eliminate from the search non-related articles even before the title and abstract screening. Those filters are available on the ProQuest website, and I read through all of them on the field “Subject”, marking all topics that were

out of what I was looking for my review. They are over 20 topics, including “nursing education”, “teaching”, “teachers”, “curriculum design”, “curriculum development”, among others. By using those filters, I managed to get to 68 articles.

The next step was to proceed with the title and abstract screening. I used Covidence to assist me with these stages of my work. In order to limit the search outcomes to a manageable quantity and guarantee the selection of the most pertinent studies, I employed four screening criteria:

1. The studies were published in the last five years (2019-2023).
2. The studies were published in peer-reviewed journals.
3. The studies were conducted focusing on students and digital literacies.
4. The studies investigated the above in higher education.

Table 1 illustrates inclusion and exclusion criteria, which I used from the starting point in the literature screening.

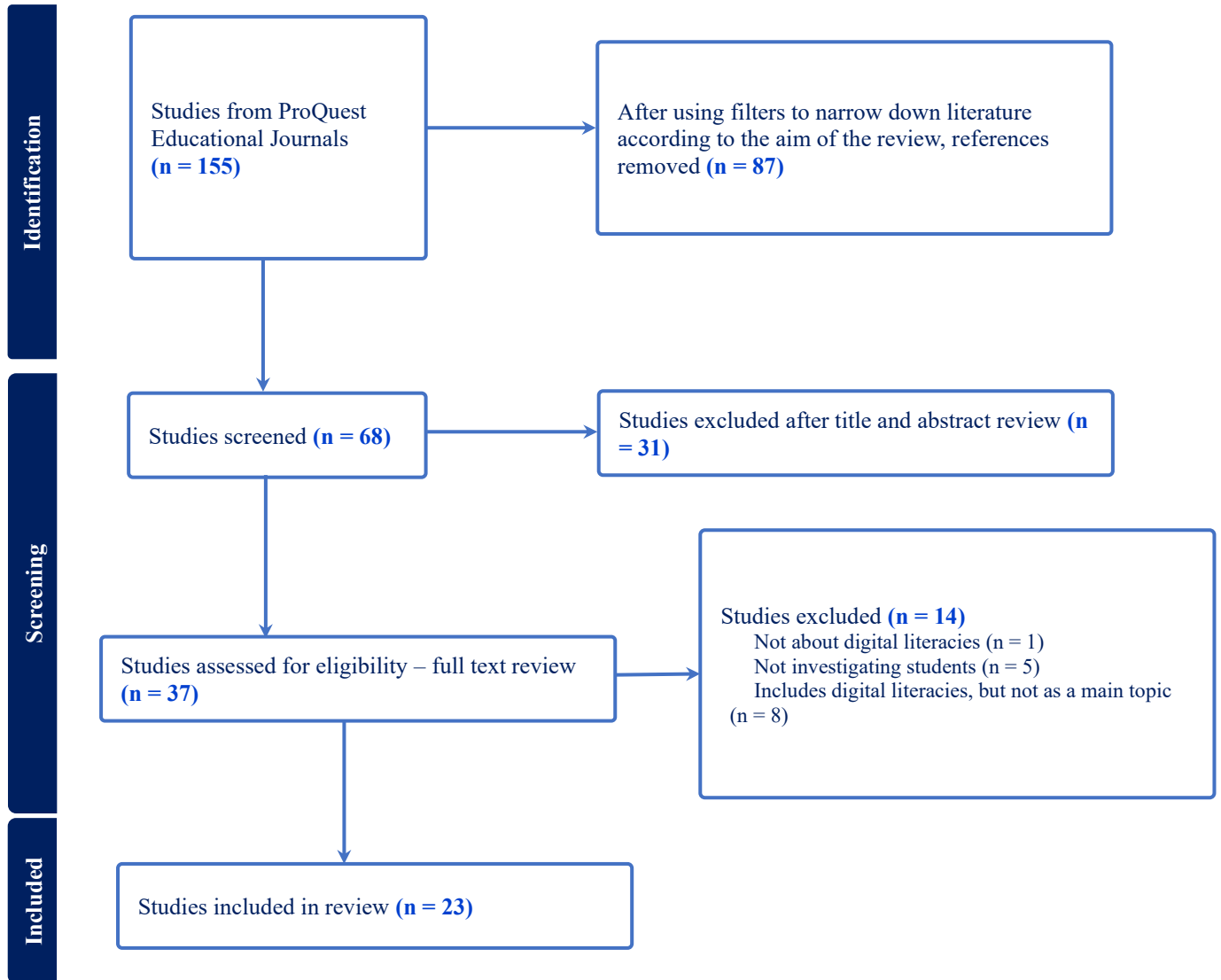
*Table 1* Inclusion and exclusion criteria

<b>INCLUSION</b>	<b>EXCLUSION</b>
- Peer-reviewed articles	- Not peer-reviewed articles
- Published from 2019 to 2023	- Includes digital literacies, but not as a main topic
- Investigating students’ digital literacies/competences/skills	- Not investigating students
- in higher education	- Not in higher education

After collecting these results, I proceeded with an analysis of titles and abstracts, and this resulted in 37 papers. I applied the inclusion and exclusion criteria discriminated above, which gave me a more focused view of what I needed for my review. Moving on to the next step, I performed a full text review of the literature, and this close reading revealed that 14 articles did not fulfill the inclusion criteria, with one article not being about digital literacies, five articles not investigating students’ perspective, seven articles including digital literacies, but not as a main topic, and one article not approaching digital literacies for learning purposes. After the full text review, 23 articles were selected to be included in the systematic literature review. Figure 2 shows the process of article selection, by using

the PRISMA protocol (Page et al., 2021), already described in the introduction to this section.

Figure 2 Article selection using the PRISMA protocol (Page et al., 2021)



### 3.4 Data collection

To collect the data I needed to perform my systematic review of the literature, I read the papers and proceeded to code them according to the codes I developed (Boyatzis, 1998; Saldaña, 2013) from the two concepts I presented in section 2: the Seven Elements of Digital Literacies (Jisc, 2014) and the Charter for 21st Century Literacies (Burnett & Merchant, 2018). There are seven deductive codes deriving directly from the Seven Elements of Digital Literacies (Jisc, 2014), which are: “Media literacy”, “Communications and collaboration”, “Career and identity management”, “ICT literacy”,

“Learning skills”, “Digital scholarship”, and “Information literacy”. Additional seven deductive codes were developed drawing from five principles of the Charter for 21<sup>st</sup> Century Literacies (Burnett & Merchant, 2018): “Digital divide”, “Digital natives/Digital immigrants”, “Students and digital literacies”, “Adapt learning spaces to address digital literacies”, “Critical thinking”, “Academic success”, and “Cultural practices and prior knowledge”. Table 2 illustrates the deductive codes. Using those deductive codes, I was able to find trends and generate a picture of my aims with this review.

Utilizing deductive coding allows the research to be grounded in an established theoretical framework, ensuring that the study’s findings can be directly related to pre-existing research and theories on digital literacies (Booth et al., 2022; Saldaña, 2013; Shaw et al., 2004). This approach can be particularly advantageous when the aim is to compare and contrast existing literature or to measure the current body of research against established standards or models (Booth et al., 2022; Xu & Zammit, 2020). By aligning the data categorization with the selected framework from the outset, the research is designed to provide a focused examination of how the contemporary literature on digital literacies in higher education corresponds to or diverges from recognized academic paradigms, potentially offering a streamlined and hypothesis-driven inquiry (Maxwell, 2013; Saldaña, 2013).

Employing a deductive coding strategy also enhances the comparability and reproducibility of the study (Maxwell, 2013; Saldaña, 2013). By applying a set of pre-defined codes, other researchers in the field can more easily understand the basis for data categorization and can replicate the study to verify findings or apply the same codes to different datasets (Gibbs, 2018; Petticrew, 2006; Saldaña, 2013). This methodological rigor is essential for synthesizing research in systematic literature reviews (Booth et al., 2022), where the clarity of the process and the ability to reproduce results are crucial for validating conclusions and advancing the scholarly conversation about digital literacies among higher education students (Gibbs, 2018).

This study is a form of qualitative content analysis (Wheeler, 2022). Qualitative content analysis encompasses the methodical examination of a collection of written material and the systematic use of a standardized coding system to capture and classify both explicit and underlying themes present in the text. This process allows for the deduction of insights and interpretations (Wheeler, 2022). While its origins lie in scrutinizing newspapers during the late 1800s and early 1900s, this approach has been employed in

wider social science contexts since the 1940s (Wheeler, 2022). The coding of the literature was performed on Atlas.ti Web, a web-based resource for qualitative research that allows for color coding and gathers all quotations in groups, optimizing this stage in the review process. This resource gives the exact number of mentions for each code, providing the systematic literature review with reliability.

Additionally, the data collection and review of the findings were both evaluated and corroborated by Dr. Rachel Heydon and Dr. Zheng Zhang, who formed my thesis committee. This committee scrutinized the thesis, offering suggestions regarding the organization of the work, the reporting of the findings, and the thesis conclusions.

*Table 2* Deductive codes used in data collection

<b>THEMES</b>	<b>CODES</b>
ELEMENTS OF DIGITAL LITERACIES (JISC, 2014)	Media literacy (Critically read and creatively produce academic and professional communications in a range of media)
	Communications and collaboration (Participate in digital networks for learning and research)
	Career and identity management (Manage digital reputation and online identity)
	ICT literacy (Adopt, adapt, and use digital devices, applications, and services)
	Learning skills (Study and learn effectively in technology-rich environments, formal and informal)
	Digital scholarship (Participate in emerging academic, professional and research practices that depend on digital systems)
	Information literacy (Find, interpret, evaluate, manage, and share information)
PRINCIPLES FROM THE CHARTER FOR 21 <sup>ST</sup> CENTURY LITERACIES (BURNETT & MERCHANT, 2018)	
<b>ACKNOWLEDGE THE CHANGING NATURE OF MEANING MAKING</b>	Digital divide
	Digital natives/Digital immigrants
	Students and digital literacies
<b>CREATE OPPORTUNITIES TO WORK WITH THE PROVISIONALITY OF DIGITAL MEDIA</b>	Adapt learning spaces to address digital literacies

<b>PROVIDE CONTEXTS THAT FACILITATE CRITICALITY</b>	Critical thinking
<b>ACKNOWLEDGE DIVERSE MODES AND MEDIA</b>	Academic success
<b>RECOGNIZE AND BUILD ON [HIGHER EDUCATION STUDENTS'] LINGUISTIC, SOCIAL AND CULTURAL REPERTOIRES</b>	Cultural practices and prior knowledge



## Section 4: Findings

In this section I report on the results from my review of the literature. The purpose here is to elaborate on what the selected papers ( $n=23$ ) have to say regarding the goal of the review, which is responding to the following questions:

1. What are the trends in research that investigated higher education students and digital literacies?
2. What are the affordances and challenges of incorporating digital literacies in higher education reported by the research conducted in the last five years?

### 4.1 The where and how of the studies

In terms of studies' geographical location, I did not find the prevalence of one country, although two of them are from Chile, two from England, and two others were conducted in Ireland. There are papers coming from all over the world, all continents – except for Antarctica – considering North, Central and South America as one single continent. Almost half of the studies came from Europe ( $n=12$ ), being the continent with more contributions to this review (see Table 3 for the countries of the studies).

*Table 3* List of countries of the studies<sup>1</sup>

<i>Country (alphabetical order)</i>	<i>Number of studies</i>
<i>A Gulf State (unknown)</i>	1
<i>Australia</i>	1
<i>Canada</i>	1
<i>Chile</i>	2
<i>Finland</i>	1
<i>Germany</i>	1
<i>Greece</i>	1

<sup>1</sup> Two studies included in the review investigated students' perceptions in more than one country.



As for the methodology each study used to conduct research, I found that most of them used quantitative methods ( $n=14$ ), and that is because the vast majority of papers included in the review collected data with the help of surveys that had only close-ended questions. Table 4 discriminates the methodologies used in the studies. Based on this evidence, one trend that helps answering the first question of this review is that a vast majority of researchers investigating digital literacies – and their related topics – and higher education students conduct quantitative studies, with a noticeably short number of them being qualitative, mixed methods or of other alternative designs. Worthy of note is that some of those quantitative studies include in their final recommendations for future research the incorporation of qualitative approaches to expand knowledge and add new and more detailed information on the topics (Kim, 2019; Lilian et al., 2020; López-

Meneses et al., 2020; Morgan et al., 2022; Raji et al., 2023; Scheel et al., 2022; Shahrokh & Milla, 2021; Smith & Storrs, 2023).

*Table 4* Research design

<i>Methodology</i>	<i>Number of studies</i>
<i>Quantitative research</i>	14
<i>Qualitative research</i>	4
<i>Mixed methods</i>	4
<i>Participatory research</i>	1

Next, I present findings from the literature reviewed for each deductive code (see Table 2), starting from “Media literacy”.

## 4.2 Media literacy

Thirteen studies reported on the topic of media literacy (Ahmed & Roche, 2021; Arslantas & Gul, 2022; Bhatt & MacKenzie, 2019; Cabero-Almenara et al., 2023; Lilian et al., 2020; López-Meneses et al., 2020; Martzoukou et al., 2020; Morgan et al., 2022; Nouri, 2019; Scheel et al., 2022; Silva-Quiroz & Morales-Morgado, 2022; Tóth et al., 2022; Yehuda, 2021). Among the seven elements of digital literacies proposed by JISC (2014), media literacy is put on the top of the graphic, indicating a starting point for being or becoming digitally literate. Media literacy stands for a critical reading and creative production of academic and professional communications using a variety of media, digital or non-digital. It is not only about being able to use criticality towards media (Potter, 2023), but also about the capability of making creative work in both academic and professional fields. We require studies on media literacy in order to gain a deeper comprehension of the ever-changing interplay among media, literacy, personal identity within a community, and the global context (McDougall, 2020). As one of the deductive codes I looked for in the studies, media literacy turned out to be present in the literature, although with not as much presence as other codes, which indicates that criticality towards media is not among the main concerns for researchers in the last five years.

From the literature reviewed, media literacy was coded 61 times. Although the term itself is mentioned only once in the studies (Bhatt & MacKenzie, 2019), they do mention the students' ability to critically read and analyze media products and texts, as well as their creativity skills to generate academic and professional texts in all sorts of media.

The studies indicate that higher education students prefer “activities such as accessing content and using the internet to communicate, rather than for the purposes of creating digital content” (Arslantas & Gul, 2022, p. 5608), and that when performing academic tasks, particularly writing, students have difficulties in finding appropriate sources and applying English referencing practices (Ahmed & Roche, 2021). One study has found that this is mostly true with *Culturally and Linguistically Diverse* students (Ahmed & Roche, 2021). Studies indicate that although numerous students can utilize social media platforms for casual interactions with friends and family, they frequently lack the digital literacy skills necessary for academic settings (Jisc, 2014), and Ahmed and Roche's (2021) study found that culturally and linguistically diverse students demonstrate a disconnection between what they think they know in terms of digital literacies and what they actually produce in action.

Agreeing with this trend, one Chilean study reported that, after having their digital competences assessed, pedagogy students in three public universities had the lowest scores in “problem solving”, “information and digital literacy”, and “content creation” (Silva-Quiroz & Morales-Morgado, 2022). In fact, research has shown that “content creation”, a topic related to media literacy, is one of the fields with the least achievement (Silva-Quiroz & Morales-Morgado, 2022). This finding is in agreement with other studies, like Scheel et al (2022), who found that while contemporary students are commonly perceived as having adeptness with technology and practical knowledge, they frequently exhibit deficiencies in digital skills, including information and data comprehension, communication and teamwork, generation of digital content, ensuring safety and security, troubleshooting, as well as critical analysis and introspection.

Among the studies reviewed for this work, several others reported that HE students lack skills in critical analysis of digital texts, as well as self-perceptions that they do not have developed abilities to create digital content (Bhatt & MacKenzie, 2019; Cabero-Almenara et al., 2023; Caverly et al., 2019; López-Meneses et al., 2020; Martzoukou et al., 2020; Morgan et al., 2022; Nouri, 2019).

### 4.3 Communications and collaboration

Moving on to the next element of digital literacies, “Communications and collaboration” is among the deductive topics I looked to identify in the literature. The description of the code was given by JISC (2014), which is “Participate in digital networks for learning and research”. At first sight it is possible to relate such topic with digital literacies, and the articles are brimming with mentions and findings approaching it. Mentions of this topic appeared 66 times in the coding stage, being reported in seventeen studies (Arslantas & Gul, 2022; Bhatt & MacKenzie, 2019; Caverly et al., 2019; Holloway et al., 2021; Kim, 2019; López-Meneses et al., 2020; Martzoukou et al., 2020; Morgan et al., 2022; Nouri, 2019; Raji et al., 2023; Scheel et al., 2022; Shahrokh & Milla, 2021; Silva-Quiroz & Morales-Morgado, 2022; Smith & Storrs, 2023; Timmis & Muhuro, 2019; Tóth et al., 2022; Yehuda, 2021).

A Turkish study investigating digital literacy skills of higher education students with visual impairment reported that those learners use social media platforms and email to engage in conversations with their peers, exchanging insights about homework tasks and sharing files among each other to enhance their learning of content (Arslantas & Gul, 2022). Communications and collaboration have also been found useful to students who develop self-regulated learning strategies, which “have a large influence in fostering digital literacy” (Lilian et al., 2020, p. 2410); such strategies include peer learning and help-seeking, which aid students in pursuing ways to achieve academic success.

It was noted that this element of digital literacies is one in which students have the highest percentage of knowledge (Silva-Quiroz & Morales-Morgado, 2022). Not only there are studies that report high scores in communications and collaboration (López-Meneses et al., 2020; Silva-Quiroz & Morales-Morgado, 2022), considering that López-Meneses et al. (2020) applied an exam to assess students’ digital competences – the COBADI 2.0 (Basic Digital Competences) – whereas Silva-Quiroz and Morales-Morgado (2022) used a different test, the DIGCOMP 2.0 (Digital Competence Framework) to evaluate students’ skills, but also other seven articles mention how students themselves self-perceive as having a great amount of skills in this area (Bhatt & MacKenzie, 2019; Caverly et al., 2019; Holloway et al., 2021; Kim, 2019; Morgan et al., 2022; Timmis & Muhuro, 2019; Yehuda, 2021).

## 4.4 Career and identity management

The third element of digital literacies, following JISC's (2014) concept, "Career and identity management" turned out to be found 47 times in the literature that I reviewed, appearing in fourteen studies (Ahmed & Roche, 2021; Arslantas & Gul, 2022; Caverly et al., 2019; Kim, 2019; Lilian et al., 2020; López-Meneses et al., 2020; Martzoukou et al., 2020; Morgan et al., 2022; Raji et al., 2023; Scheel et al., 2022; Smith & Storrs, 2023; Timmis & Muhuro, 2019; Tóth et al., 2022; Yehuda, 2021). One relevant statement found in the literature says that digital literacies skills have been increasingly important for one to be prepared for the marketplace (Lilian et al., 2020). In order to be able to navigate the reality of the digital age, it is necessary to develop digital competence not only for achieving academic success, but also for acquiring lifelong learning, something that remains and helps in fulfilling one's professional identity (Tóth et al., 2022). "Digital competence thus becomes a prerequisite for successfully managing the digital transformation of education, adapting the students in such a transformed educational process, and successfully managing the study, as well as applying oneself in professional practice" (Tóth et al., 2022, p. 153).

To prepare students for their lives beyond university, there is an increasing understanding that higher education institutions need to help learners develop digital literacies (Ahmed & Roche, 2021). Bhatt and MacKenzie (2019) also noted that institutions usually take digital literacies for granted, approaching these skills as something that students have or do not have, instead of something that must and can be developed, taught, and learned. Ahmed and Roche (2021) found that culturally and linguistically diverse undergraduate students "bring many digital strengths which can be capitalized on" (Ahmed & Roche, 2021, p. 4616), demonstrating a high amount of confidence that they will be able to apply their knowledge in the university as well as in the workplace.

Teacher students with visual impairment from Turkey think of digital literacies as an essential skill to have for their teaching career, and one reason for that being their concern of not being mocked by their future students, who would see them as incompetents if they are not digitally literate (Arslantas & Gul, 2022). Participants in Arslantas and Gul's (2022) study also considered digital literacies as a decisive factor that can open opportunities for them, giving them new chances for success despite their visual impairments.

The second part in this element, “identity management”, has been found as an element to be developed in HE students (Martzoukou et al., 2020), in the sense that their self-perception is that they lack ability to analyze their digital footprint and impact of their actions on the internet. An Israeli study collected data from pre-teachers and concluded that, although 88% of the respondents acknowledge the dangers of cyberbullying and its consequences, still 29% of them would not report damaging dialogues online, and 21% would not even make any comment to rebuke inappropriate conversations (Yehuda, 2021). Those data led Yehuda (2021) to ask the question: “To what extent are students digitally ready to teach in the digital age?” (Yehuda, 2021, p. 2888).

The studies also point that higher education students learn or feel the need to learn how to manage their differences in their identity in their homes and in the university, and how to deal with this as members of digital communities (Timmis & Muhuro, 2019). One South-African study found that students coming from rural areas felt this need more intensively, as they learned how large their deficit in digital etiquette was (Timmis & Muhuro, 2019). Digital systems and rules made students create hybrid identities, blending their newly acquired academic life with their previously possessed rural subjectivities, suggesting that many times students feel that they are inadequate for HE institutions (Timmis & Muhuro, 2019).

## 4.5 ICT literacy

This element is related to the use of digital devices, applications and services, their adoption and adaptation (Jisc, 2014). It is a more technical element, regarding the use of software for learning purposes, enhancing students’ chances of academic achievement and production.

This code was detected 48 times in the literature, in fifteen studies (Arslantas & Gul, 2022; Cabero-Almenara et al., 2022, 2023; Damsa, 2019; Holloway et al., 2021; Isnah et al., 2022; Lilian et al., 2020; López-Meneses et al., 2020; Martzoukou et al., 2020; Morgan et al., 2022; Nouri, 2019; Scheel et al., 2022; Shahrokh & Milla, 2021; Silva-Quiroz & Morales-Morgado, 2022; Yehuda, 2021). Although a great majority of studies recognize the importance of ICT skills for the digital age, they often state that being digitally literate is more than knowing how to use digital devices and software (Lilian et al., 2020). Still, digital materials are increasingly seen as valuable resources for learning,

and knowing how to use them appropriately, how to take advantage of them in their full potential is what makes ICT literacy a key skill in the digital world (Damsa, 2019).

In my review I found that not rarely studies mention the concept of digital natives – which I will elaborate more moving forward in this review – and how they are perceived and associated with technical skills that allow them to control and manage digital devices with more ease than the so-called digital immigrants (Tóth et al., 2022). However, being born in the digital age does not guarantee that a student will have the necessary digital skills to use all the resources available in their learning process; even digital natives require training and guidance to harness digital tools' full potential (Silva-Quiroz & Morales-Morgado, 2022).

Nouri (2019) highlights the impact that ICT literacy has had on higher education, pushing institutions into walking a path of multimodal curricula, more than ever before. In fact, research has shown that students feel “more comfortable and perform better in multimodal learning environments that cater for their predominant learning style” (Nouri, 2019, p. 684). This finding is in accordance with Martzoukou et al. (2020), who observed that the more universities understand how to use students' previous knowledge and ICT skills, the higher level of academic proficiency students will achieve. Cabero-Almenara et al.'s (2023) study concluded that a greater use of digital resources or the lack of them thereof can affect academic performance.

## 4.6 Learning skills

As one element of digital literacies, “Learning skills” stand for “Study and learn effectively in technology-rich environments, formal and informal” (JISC, 2014), and the code was found 106 times, in all twenty-three studies (Ahmed & Roche, 2021; Arslantas & Gul, 2022; Bhatt & MacKenzie, 2019; Cabero-Almenara et al., 2023, 2023; Caverly et al., 2019; Damsa, 2019; Holloway et al., 2021; Isnah et al., 2022; Kim, 2019; Lilian et al., 2020; López-Meneses et al., 2020; Martzoukou et al., 2020; Morgan et al., 2022; Nouri, 2019; Raji et al., 2023; Scheel et al., 2022; Shahrokh & Milla, 2021; Silva-Quiroz & Morales-Morgado, 2022; Smith & Storrs, 2023; Timmis & Muhuro, 2019; Tóth et al., 2022; Yehuda, 2021). As I have stated in the previous section, being born in the digital age does not mean that one is undoubtedly a digital expert, nor that one has what it takes to learn using digital resources. I found that the research produced in the last five years has corroborated this view, that it is necessary to learn how to learn, especially when it



comes to digital environments (Morgan et al., 2022). The need to achieve proficiency in digital literacies exists because new paradigms are emerging rapidly, creating new forms to disseminate knowledge, hence new ways to assimilate it (Martzoukou et al., 2020; Morgan et al., 2022). One article asked two questions that resonated with what I was looking for when coding the literature: “What do students practise at home?” and “How do they transfer habitual everyday life practices and behaviours into the educational environment?” (Martzoukou et al., 2020, p. 1418). These are much needed questions that call for equally needed answers, and fast. The reason for that is the reality of higher education institutions not keeping up the pace in adapting learning spaces to address and develop digital literacies in their students (Martzoukou et al., 2020).

The high number of times this code was detected signalizes a significant trend in the literature. Research is interested in how students are developing strategies to learn through the affordances brought by digital resources. Kim (2019) posits that higher education students are experiencing the Fourth Industrial Revolution, and to be successful in their academic goals they must consider how their learning will happen and which digital tool they will use to engage in meaningful lifelong learning. By studying South-Korean students, Kim (2019) found that female and four-year college students had higher perceived learning strategies than male and two-year students, although no significant differences were found in their digital literacy competences, regardless of any indicators. This may indicate that the first group of students are more prepared to apply learning strategies in digital environments, putting them some steps ahead of the second group.

Holloway et al. (2021) analyzed geography students’ use of smartphones as active learning tools in their coursework. They found that “digital technologies can enhance active learning in geography for all students” (Holloway et al., 2021, p. 47). Respondents in this study reported the feeling that learning with the aid of smartphones was nothing more than natural; as a matter of fact, they believe that learning through technology is the most effective way of achieving academic goals in current times (Holloway et al., 2021).

Holloway et al. (2021), described in the previous paragraph, echo the trend noted by Damsa (2019), who investigated pre-service teachers’ perceptions of digital materials as aid resources for their learning process, and found that the students view those materials as ideal tools to support their studies. The article concludes that digital-material resources such as tablets and online platforms are viewed by students as tools of great value for learning enhancement and knowledge acquisition (Damsa, 2019). The same conclusion is

found in Caverly et al. (2019), who studied how students use digital literacies to develop academic literacies. They applied a qualitative research methodology to find authentic, firsthand experiences of university students regarding their pursue of skills that help them be successful in higher education and beyond. Among the findings of the study, it is the view that digital devices are beneficial when they need to build up learning strategies that they can keep even after graduation (Caverly et al., 2019).

Following this trend, Nouri (2019) points out that, in a groundbreaking manner, technology has fundamentally altered the way knowledge is conveyed and portrayed. The affordances brought by technology, the author concludes, have transformed “monomodal learning practices into multimodal learning practices” (Nouri, 2019, p. 695). He discovered that when it comes to acquiring knowledge and engaging with available digital educational content, students favored and utilized videos as a learning resource more frequently than textual resources (Nouri, 2019). Drawing from Kalantzis & Cope (2012), he categorizes students as designers of their own learning, making use of a multimodal network of semiotic affordances to produce and consume knowledge.

One study, however, observed a contrasting point regarding generation-z students and their relationship with technology for learning in higher education. Cabero-Almenara et al. (2022) concluded that the students’ inclination toward technological media and tools is not as pronounced as anticipated based on their characterization as highly tech-savvy individuals. Additionally, when engaging in tasks closely tied to academics, such as academic reading, information retrieval, exam preparation, or information recall, they exhibit a preference for printed materials over alternative digital sources. Among the literature that I reviewed, this realization was identified in this study alone, although Caverly et al. (2019) mention very briefly this preference for print over digital.

Despite the finding above, the vast majority of studies reviewed emphasize how beneficial for students’ learning process digital literacies and digital resources can be. Interestingly, the same leading researcher from the study mentioned in the last paragraph, Cabero-Almenara et al. (2023), found that students who use digital tools to enhance their learning have a positive effect over their academic efficacy. Following this line of thought, I could identify that building up learners’ knowledge of digital technologies is key for their academic performance and lifelong learning (Shahrokh & Milla, 2021), although digital literacies should not be taken for granted in so-called digital natives, when it comes to use technologies specifically for learning purposes (Morgan et al.,

2022). Students' perceptions included in another study showed that they associate social media use with their university learning in the sense that they seek help from each other for academic activities, thus enhancing their performance in the courses (Smith & Storrs, 2023).

## 4.7 Digital scholarship

This code's description reads "Participate in emerging academic, professional and research practices that depend on digital systems" (JISC, 2014), which means that learners who have this literacy can use digital systems to achieve research goals and accomplish academic targets. I found "digital scholarship" 28 times in the coding stage, in nine studies (Bhatt & MacKenzie, 2019; Cabero-Almenara et al., 2023; Caverly et al., 2019; Holloway et al., 2021; López-Meneses et al., 2020; Martzoukou et al., 2020; Morgan et al., 2022; Nouri, 2019; Shahrokh & Milla, 2021)

Tóth et al. (2022) write in consonance with what JISC proposes, by stating that a digitally competent student is one who can perform research activities with the aid of digital resources, whether it is searching for information or getting involved in digital research communities. Tóth et al.'s (2022) study investigated Slovenian higher education students' attitudes towards technology in education, by asking them if they "consider themselves ready for the digital transformation of education and whether, from their point of view, they meet the requirements for such digital education" (Tóth et al., 2022, p. 155). They found that students indicated their confidence in using technology for educational and research purposes, and pointed out that this self-perception is an improvement compared to previous studies.

One study from Finland concluded that students with high levels of digital literacies skills have a higher expectancy of putting less effort in performing learning activities in higher education (Shahrokh & Milla, 2021). According to the paper, the acquisition of information literacy and digital literacy skills is essential for the achievement of not only academic success, but also lifelong learning (Shahrokh & Milla, 2021). Such abilities enable higher education students to endeavor in online research activities with more ease, knowing where to look for information sources, how to evaluate those sources with criticality, and how to organize and report all the information collected, avoiding plagiarism (Shahrokh & Milla, 2021).

Coming from Ireland, one study drew my attention when looking for mentions of digital scholarship. Holloway et al. (2021) sought to find if digital technologies have the potential to enrich interactive learning experiences in geography for every student. To do so, they engaged in participatory learning activities with students, given that this pedagogy has been praised as an excellent way of making learners constructors of their own learning, developing research skills that they will use for a long time (Holloway et al., 2021). By using a smartphone app, students were divided into research groups and sent off to collect and analyze data regarding urban land use patterns in Cork, Republic of Ireland. The results showed that students enjoyed doing research, feeling that they were more active in the data collection, instead of sitting by a computer searching for data someone else collected and analyzed (Holloway et al., 2021). The emphasis on the use of technology to the production of research is significant in Holloway et al.'s (2021) study, and through participatory learning – facilitated by technology – students could “self-identify as researchers, highlighting the ability of active learning to influence positively student understanding” (Holloway et al., 2021, p. 53).

## 4.8 Information literacy

Our final element of digital literacies requires learners to be able to “find, interpret, evaluate, manage and share information” (JISC, 2014). In times of abundant information, it is necessary to develop strategies to curate and assess all that is available on the internet. As a deductive code, “information literacy” was identified 100 times in the literature, in eighteen studies (Ahmed & Roche, 2021; Arslantas & Gul, 2022; Bhatt & MacKenzie, 2019; Cabero-Almenara et al., 2022, 2023; Caverly et al., 2019; Isnah et al., 2022; Kim, 2019; Lilian et al., 2020; López-Meneses et al., 2020; Martzoukou et al., 2020; Morgan et al., 2022; Raji et al., 2023; Scheel et al., 2022; Shahrokh & Milla, 2021; Silva-Quiroz & Morales-Morgado, 2022; Tóth et al., 2022; Yehuda, 2021), making it the second most detected code in my research, the first being “learning skills”.

A study with visually impaired higher education students from Turkey (Arslantas & Gul, 2022) discovered that participants, by entering university, had prior knowledge of how to find and access online information sources, as well as how to use collaborative resources to get help from peers in the evaluation process of the information (Arslantas & Gul, 2022).

Ahmed and Roche (2021) utilize the American Library Association (ALA) definition of information literacy, positing that it is a skill that empowers an individual to “recognize when information is needed and have the ability to locate, evaluate, and use effectively the needed information” (American Library Association, 1989). In their study, Ahmed and Roche (2021) state that informal ICT abilities students might have before their first year in university “do not transfer well to academic learning situations” (Ahmed & Roche, 2021, p. 4605), indicating that, despite students’ knowledge of social media and digital devices, they lack skills to use such knowledge in digital practices necessary for academic settings. As evidence to support their claims, they found that when asked about preferred or known sources of information for academic purposes, students responded Wikipedia, Google and YouTube, whereas less than 5% of respondents nominated the university library website or Google Scholar (Ahmed & Roche, 2021). Additionally, the study discovered that students had some sense of how online information could be evaluated, although still a limited one (Ahmed & Roche, 2021).

Evaluating information sources is seen as a challenge in much of the literature reviewed – nine studies (Ahmed & Roche, 2021; Kim, 2019; Lilian et al., 2020; Martzoukou et al., 2020; Raji et al., 2023; Scheel et al., 2022; Shahrokh & Milla, 2021; Silva-Quiroz & Morales-Morgado, 2022; Tóth et al., 2022). Scheel et al. (2022), for example, say that among other digital competences, knowing how to evaluate information found online is one of the factors that help create positive perceptions in students of technology for learning purposes. Shahrokh and Milla (2021) highlighted the need for university programs aimed at developing information literacy in students and staff, in order to a more optimal use of all the affordances technology brings.

Investigating pre-service teachers’ self-assessment of digital literacies, Yehuda (2021) reported that more than 70% of the respondents said they feel comfortable and confident in their understanding of how to compile information. As for information appraisal, 77% of respondents said they can analyze and assess authenticity of information they find online (Yehuda, 2021). The scholar demonstrated concerns due to 20% of the students in the study were unable to discern what precise information they need to collect for a specific assignment (Yehuda, 2021).

One Australian study looking at students’ perceptions of digital literacy proficiency (Morgan et al., 2022) found that participants gave low rates to their ability to access and critically evaluate information, as well as disseminate digital information safely and with

confidence that they are spreading knowledge that is trustworthy. The authors point out that there is an urgent need of empowering students in this area, given that they lack those skills, despite their proficiency in using social media (Morgan et al., 2022). This urgency is relevant because proficiency in searching for information online has been found a substantial factor in academic achievement, according to one of the articles reviewed (López-Meneses et al., 2020).

Bhatt and MacKenzie (2019) examined the way through which students process information they find online, by asking them “how they search for information, engage with it critically (or not), and make evaluative judgements about its credibility and relevance to curricular work and assignments” (Bhatt & MacKenzie, 2019, p. 303). They undertook their research under the view of digital literacy as a social practice, heavily influenced by the power of algorithms, which may have the final say on what students read, write, and learn (Bhatt & MacKenzie, 2019). They argue that we should know how to be “strategically ignorant and highly selective in the things we know or seek to know in order to remain epistemically functional” (Bhatt & MacKenzie, 2019, p. 306), especially in a time when most of us are intensively present (even drowned) in environments containing all sorts of information. Focusing on critical thinking towards internet resources, the authors posit that big tech algorithms are designing new asymmetries of power, that make us see internet big, trendy companies as better sources of information than anything else (Bhatt & MacKenzie, 2019).

The paper goes on, supporting the authors’ claim with students’ comments about how they search for information and which reasons they have to trust in one source and distrust another. In a rich collection of students’ interviews, Bhatt and MacKenzie (2019) demonstrate that students lack self-confidence in their information literacy skills, feeling that they need to have their knowledge acquisition curated by faculty, YouTube videos, and other sources. The contribution the authors give to the discussion is that students must be able to find, analyze, and curate their own information, and that they need to be aware of the research sources available in the university outside social media and popular websites that claim to be trustful, but are in fact more data miners than anything else (Bhatt & MacKenzie, 2019).

## 4.9 Deductive codes from the Charter for 21st Century Literacies

So far, I reported my findings in the literature from my exploration of the deductive codes coming from the Seven Elements of Digital Literacies (Jisc, 2014). The remaining part of section 4 is dedicated to the deductive codes that were originated in five out of the Charter for 21<sup>st</sup> Century Literacies' (Burnett & Merchant, 2018) nine principles.

### 4.9.1 Digital divide

This code was identified 46 times, being approached in twelve studies (Ahmed & Roche, 2021; Arslantas & Gul, 2022; Cabero-Almenara et al., 2022; Caverly et al., 2019; Holloway et al., 2021; Isnah et al., 2022; Martzoukou et al., 2020; Morgan et al., 2022; Raji et al., 2023; Silva-Quiroz & Morales-Morgado, 2022; Smith & Storrs, 2023; Timmis & Muhuro, 2019). The digital divide is one of the challenges that digital literacies must address (Adam-Turner & Burnett, 2018), given that, despite all the affordances provided by digital literacies, there remain factors that create disparities in the access to digital resources, such as social and economic inequalities (Arslantas & Gul, 2022). As the world faces the growth of screen-based communication, new ways of meaning making arise in the form of digital technologies, to which a considerable portion of the population does not have access (Burnett & Merchant, 2018). The Charter for 21<sup>st</sup> Century Literacies addresses this matter in its first principle, "Acknowledge the changing nature of meaning making" (Burnett & Merchant, 2018, p. 13). Culturally and linguistically diverse students studied by Ahmed and Roche (2021) have not had enough chances to develop their digital literacies, which increase their probability of completing their studies in HE. Silva-Quiroz and Morales-Morgado (2022) got to a similar conclusion, when they stated that families' socio-economic status plays a role in shaping students' digital skills. The presence of a home computer enhances students' digital proficiency and impacts their capacity to engage with new technologies using the resources accessible to them beyond the school environment. After investigating students' digital proficiency in Chilean universities, they confirmed their hypothesis that the higher the socioeconomic level of students, the higher the level of their digital competence, which leads to higher scores in Chilean university entrance standardized tests that enable pupils to enter better higher education institutions (Silva-Quiroz & Morales-Morgado, 2022).

In one example of an attempt to bridge the gap between different digital literacies skills – thus diminishing the digital divide – Raji et al., (2023) report about a comprehensive digital education initiative, Essential Digital Skills, developed and executed across a prominent university in London, with the primary target audience being incoming students, while remaining accessible to all enrolled students at the institution. The authors noted differences in how students perceived their experience during the training, some feeling that the program had no significant impact in their digital literacies, whereas others – particularly Black and Minority Ethnic (BAME) students – saying that the program helped them a lot in their development of digital skills that they lacked before entering the university (Raji et al., 2023). The study points out that research has indicated that ethnicity is one aspect of digital divides, which explains why BAME pupils felt that the training contributed greatly to their learning (Raji et al., 2023).

Another factor for the existence of digital divides is demonstrated in Morgan et al. (2022), who found that international students in their study were less skilled than domestic students “in the cognitive dimension of access and digital etiquette” (Morgan et al., 2022, p. 270), with older students sharing the same status. This realization made the authors approach the digital divide, by stating that the expanding reliance on international students being experienced in universities in developed countries should call for a closer look at those students’ prior knowledge of digital technologies. In this regard, it is timely to remember that in “many parts of the developing world, the digital age has not even started” (Hill & Lawton, 2018).

Two studies invested a great deal of effort to approach the digital divide (Martzoukou et al., 2020; Timmis & Muhuro, 2019). In Martzoukou et al. (2020), one realization is an invitation to reflection: socio-demographic features (age, income, level of education, disabilities) generate “two levels of citizens: those who are digitally enabled and those who are digitally divided, both on levels of digital connectivity (e.g. access to the internet) and digital skills” (Martzoukou et al., 2020, p. 1416). The article presents the statistic that, in 2016, 10.5 million of people in the UK did not have the necessary digital skills to access and use government online services appropriately. Specifically approaching digital literacies in higher education, Martzoukou et al. (2020) consider that the sheer adoption of sophisticated digital systems in universities, shifting to everything being made online, including marking and assessments, may increase the digital divide in students who did not experience access to technology prior to enrolment in tertiary



education. Some universities are addressing this problem by implementing training programs like the one described in Raji et al. (2023) and already discussed here.

Presenting strong accounts of how digital divides collaborate to expand inequalities, Timmis and Muhuro (2019) focused on South African rural students in their path to higher education, highlighting what happens when students get trapped between two worlds: one with a ubiquitous presence of technology and the other without it whatsoever, or with just a feeble presence of digital resources. For the authors, “students are entering a digitalised university system that is completely alien to life in a rural community, frequently without access to computers, the Internet or in some cases, electricity” (Timmis & Muhuro, 2019, p. 10). They write based on the concept of figured worlds, meaning social interactions where the roles and positions of the participants hold significance. A rural community, a social network, or a university are examples of figured worlds. Our attitudes towards new figured worlds are decisive to shape new identities and expand or eradicate unequal relations of power. Timmis and Muhuro’s (2019) work analyzes how highly technology-driven universities can erase students’ identities in benefit of a standardized way of thinking, ultimately contributing to stronger digital divides rather than bridging these barriers. The authors found that students’ prior knowledge is widely unrecognized by universities, and the conclusion was that such treatment lead students from rural communities make them see themselves as inadequate, in lower positions in relation to their peers coming from digital literacy backgrounds (Timmis & Muhuro, 2019).

To conclude this subsection, I report the findings of Smith and Storrs (2023), whose work is also to be discussed in the next code, “digital natives/immigrants”. They surveyed undergraduates to find about what they believe they need to know in regard to digital literacies. The results showed that female students reported a higher utilization of social media, although also a higher necessity to learn digital literacies than male students. Such discovery rises the red flag of a digital gender divide, following the Organisation for Economic Cooperation and Development (OECD), which depicted variations in digital literacy based on gender, emphasizing that a deficiency in education stands out as a prominent factor hindering women and girls from fully capitalizing on the prospects presented by the digital revolution (Smith & Storrs, 2023). Given this context, it is imperative to create educational plans that target these disparities among marginalized communities. It is crucial that any future endeavors aimed at enhancing digital literacy

within the undergraduate curriculum prioritize the promotion of digital fairness, encompassing not only gender-related issues but also extending to broader aspects. Striving for digital fairness also entails a substantial push for the meaningful integration of individuals who have faced marginalization across various social, economic, cultural, and political settings. Embracing an intersectional approach that acknowledges distinct facets of identity, inequality, and marginalization adds substantial significance to this effort (Smith & Storrs, 2023).

#### 4.9.2 Digital natives/immigrants

Mentions of the concept of digital natives and digital immigrants were a constant throughout the literature reviewed, with seventeen papers approaching the topic (Ahmed & Roche, 2021; Arslantas & Gul, 2022; Cabero-Almenara et al., 2022; Caverly et al., 2019; Holloway et al., 2021; López-Meneses et al., 2020; Martzoukou et al., 2020; Morgan et al., 2022; Nouri, 2019; Raji et al., 2023; Scheel et al., 2022; Shahrokh & Milla, 2021; Silva-Quiroz & Morales-Morgado, 2022; Smith & Storrs, 2023; Timmis & Muhuro, 2019; Tóth et al., 2022; Yehuda, 2021). As one of the concepts that formed my framework for this review, the Charter for 21<sup>st</sup> Century Literacies (Burnett & Merchant, 2018) approaches the topic in its first principle, “Acknowledge the changing nature of meaning making” (Burnett & Merchant, 2018, p. 13). In general, the “digital natives” concept is the idea of a whole generation being born in the so-called digital age, thus growing up with a wide array of digital resources, entailing the acquisition of digital literacies per se. The term “digital immigrants,” on the other hand, refers to individuals who weren't born into the digital era but rather embraced new technologies at a later stage in their lives. They contrast significantly with digital natives, as digital immigrants must acquire what digital natives inherently grasp as a native language from their upbringing (Tóth et al., 2022). Such proposition is criticized in most of the articles in this review. Additionally, Burnett (2020) says that technology itself is not as important as what technology does when it is related to people and other things, meaning that what matters is rather one's attitudes towards technology than if someone belongs to a ‘digital generation’.

An increasing recognition exists that students' casual ICT proficiencies do not readily translate into academic learning environments. For instance, studies have revealed that although numerous students can effectively employ social media platforms for informal

interactions with peers and relatives, they frequently lack the essential digital literacy competencies necessary for academic settings (Ahmed & Roche, 2021).

Tóth et al. (2022) reported that digital native students perceive themselves as able to undertake online learning and even perform research without any difficulties. In their study, although the concept of “digital natives” is seen as too simplistic if we consider just the time of birth, all results are consistent with digital natives’ features. Digital natives feel confident in their technical skills, are propense to apply multitasking for studying, and see digital resources as their main tool for learning (Tóth et al., 2022). Shahrokh and Milla (2021) study found that, for digital natives, learning with the use of technologies is a natural behavior.

Six studies have come to different conclusions. Silva-Quiroz and Morales-Morgado (2022), Scheel et al. (2022), Raji et al. (2023), Yehuda (2021), Morgan et al. (2022), and Smith and Storrs (2023) approach the topic by stating that, despite the widespread assumption that there is a generation of learners who grew up surrounded by digital technology and therefore now possess all necessary skills to use it in favor of their learning, research has demonstrated that frequently, students lack the necessary skills essential for achieving success with digital technologies in their educational endeavors (Martzoukou et al., 2020). They encounter difficulties when attempting to employ their existing skills at the anticipated proficiency level. This underscores the urgency of curricular initiatives that explicitly foster these literacies (Smith & Storrs, 2023).

### 4.9.3 Students and digital literacies

Studies that focused on higher education students were the spotlight of my systematic review, hence the high number of times this code appears in the literature, being identified 104 times, in 21 studies (Ahmed & Roche, 2021; Arslantas & Gul, 2022; Bhatt & MacKenzie, 2019; Cabero-Almenara et al., 2022, 2023; Caverly et al., 2019; Damsa, 2019; Holfod, 2023; Holloway et al., 2021; Isnah et al., 2022; Lilian et al., 2020; Martzoukou et al., 2020; Morgan et al., 2022; Nouri, 2019; Raji et al., 2023; Scheel et al., 2022; Shahrokh & Milla, 2021; Smith & Storrs, 2023; Timmis & Muhuro, 2019; Tóth et al., 2022; Yehuda, 2021). The topic of students and digital literacies is explicitly stated in Cabero-Almenara et al. (2022), who stated that the aim of their study was to understand the inclinations that college students possess concerning the utilization of diverse materials for various educational tasks, along with their mental exertion and perception of

learning ease associated with distinct media and technological resources. They concluded that there is a tendency for students to have different perceptions of the various media they mentioned in the survey (Cabero-Almenara et al., 2022), although the findings indicated that there is a very low variability in the technological resources students use, and one of them is not digital at all: printed materials, followed by laptops.

In another study, Cabero-Almenara et al. (2023) found that students' perceptions of need for digital literacies increased during the pandemic period, when they felt they needed a higher level of familiarity and dexterity with digital resources, especially learning management systems (LMS), to which a large number of higher education institutions migrated during the pandemic. The research findings also indicated that students exhibited moderate levels in all aspects constituting the construct of digital competence (Cabero-Almenara et al., 2023).

To mention one example from qualitative studies, Bhatt and MacKenzie (2019) reported that, to complete assignments in university courses, all four interviewed students mentioned a feeling that they were obligated to follow ritualised practices of digital literacies, so they could fit into the academic universe, warranting high grades and guaranteeing their success in the university. Such ritualization, Bhatt and MacKenzie (2019) argue, influences instruction and, instead of promoting the development of skills for critical assessment and self-reliance, it can limit research practices due to a significant degree of trust placed in specific entities, whether they are instructors, search engines, or news platforms. This has the potential to confine and hinder students' approaches to collecting information, ultimately perpetuating a lack of awareness about alternative sources (Bhatt & MacKenzie, 2019).

#### 4.9.4 Adapt learning spaces to address digital literacies

Research indicated that academic staff's expectations of undergraduate students' digital competence were not entirely met, highlighting the need for systematic integration of digital literacy skills into the curriculum (Ahmed & Roche, 2021). Eighteen papers concluded that institutions must support the development of digital literacies in all students, whether to address knowledge gaps among minority students, or to improve digital competences in those learners who are proficient in digital resources but need to learn how to use them for learning purposes (Ahmed & Roche, 2021; Cabero-Almenara et al., 2022, 2023; Damsa, 2019; Holloway et al., 2021; Kim, 2019; Lilian et al., 2020;

López-Meneses et al., 2020; Martzoukou et al., 2020; Morgan et al., 2022; Nouri, 2019; Raji et al., 2023; Scheel et al., 2022; Shahrokh & Milla, 2021; Silva-Quiroz & Morales-Morgado, 2022; Smith & Storrs, 2023; Timmis & Muhuro, 2019; Yehuda, 2021).

Besides the factors stated above, two studies found that adapting learning spaces to address digital literacies helps developing important skills that must walk hand in hand with digital literacies: creativity and critical thinking (Kim, 2019; Lilian et al., 2020), both abilities being shown in research as in need to be fostered in higher education students (Cabero-Almenara et al., 2023; Morgan et al., 2022). This deductive code also draws from the Charter for 21<sup>st</sup> Century Literacies' (Burnett & Merchant, 2018) seventh principle, "Create opportunities to work with the provisionality of digital media" (Burnett & Merchant, 2018, p. 77). By creating learning spaces that make extensive use of digital technologies, higher education institutions can generate opportunities for the development of creativity and critical thinking in their students (Burnett, 2020).

#### 4.9.5 Critical thinking

This code was found 70 times in my review, being mentioned in seventeen studies (Ahmed & Roche, 2021; Arslantas & Gul, 2022; Bhatt & MacKenzie, 2019; Cabero-Almenara et al., 2023; Caverly et al., 2019; Isnah et al., 2022; Kim, 2019; Lilian et al., 2020; López-Meneses et al., 2020; Martzoukou et al., 2020; Morgan et al., 2022; Scheel et al., 2022; Shahrokh & Milla, 2021; Smith & Storrs, 2023; Timmis & Muhuro, 2019; Tóth et al., 2022; Yehuda, 2021). Arslantas and Gul (2022) reported how the term "digital literacies" was initially associated with the use of computers, in a technical sense; however, as technology went through constant shifts and was put under scientific and theoretical scrutiny, new understanding was added and new discussions included other skills in the term's comprehension, such as cognitive and social-emotional dimensions, along with the technical one (Ng, 2012). In agreement with what I already discussed in the code "Information literacy", critical thinking is included in the cognitive dimension of digital literacies, being one of the required abilities to think critically in searching for and evaluating digital information, selecting appropriate software for specific tasks, and in creating products that best demonstrate new understanding (Arslantas & Gul, 2022).

As one example of study that approached critical thinking, Martzoukou et al. (2020) used a survey with Library and Information Science students from three universities in Scotland, Ireland, and Greece to understand how learners perceive their digital

competences for learning purposes in several areas of their lives, including leisure, democracy, government, and health. Students' accounts collected from the completed surveys reported that respondents were aware of the potential impact that their online presence may have in other people; they also reported that they understand the possibilities that digital literacies present for their bigger participation in democratic inquiries and discussions, which are related to a high level of critical thinking towards digital literacies (Martzoukou et al., 2020). Nonetheless, the researchers found that there is still a long way to go to developing digital fluency in students, enough to not only read critically, but also to communicate and design critically, besides making “informed decisions, and solving wicked problems while anticipating new ones” (Martzoukou et al., 2020, p. 1434).

#### 4.9.6 Academic success

The relationship between the deductive code “Academic success” and the Charter’s principle “Acknowledge diverse modes and media” comes from the understanding that learning is now multimodal, embracing and recognizing the potential of multiple modalities of knowledge to develop students capable of learning more than just enough to pass school graduation, going beyond and reaching a broader understanding of a plethora of life dimensions, including the digital one (Burnett & Merchant, 2018). In the reviewed literature, “Academic success” was highlighted 53 times, in fourteen studies (Ahmed & Roche, 2021; Cabero-Almenara et al., 2022, 2023; Caverly et al., 2019; Isnah et al., 2022; Kim, 2019; Lilian et al., 2020; López-Meneses et al., 2020; Martzoukou et al., 2020; Scheel et al., 2022; Shahrokh & Milla, 2021; Silva-Quiroz & Morales-Morgado, 2022; Timmis & Muhuro, 2019; Tóth et al., 2022).

Considering that the term “Academic success” may generate discussions and questions on its meaning and significance, Cabero-Almenara et al. (2023), for the purposes of their study, consider the idea of academic success as receiving good grades in courses. In this sense, they found that an adequate level of digital competences, as well as “the number of digital resources utilized for the teaching-learning process, the previous preparation for managing their studies, as well as the level of education of the parents, mainly the father, significantly had an influence on” (Cabero-Almenara et al., 2023, p. 683) students’ academic performance. They also observed that the more motivated students are to learn

and develop digital skills, the more they will engage in discovering and utilizing digital resources for their learning process (Cabero-Almenara et al., 2023).

In one more example, Ahmed and Roche (2021) reported that Culturally and Linguistically Diverse students in English as Medium of Instruction universities underperform in higher education due to their broadened gap of digital literacies, especially when it comes to know how to use technology in academic production, including abilities to cite, paraphrase, reference, and format documents (Ahmed & Roche, 2021). Additionally, they pointed out that Culturally and Linguistically Diverse students are aware of the importance of digital literacies, viewing technology as “central to their academic success” (Ahmed & Roche, 2021, p. 4606).

#### 4.9.7 Cultural practices and prior knowledge

This code was identified 22 times in the reviewed literature, with mentions in seven studies (Ahmed & Roche, 2021; Bhatt & MacKenzie, 2019; Damsa, 2019; Kim, 2019; Martzoukou et al., 2020; Nouri, 2019; Timmis & Muhuro, 2019). To acknowledge students’ cultural repertoire is to recognize the complexity and diversity of their previous lived experiences and to state their significance for the students’ future learning (Burnett & Merchant, 2018).

Following this realization, Timmis and Muhuro (2019) state their concerns for the seemingly systematic erasure of students from rural backgrounds’ knowledge before entering university. They found that students’ previous understanding “appeared to be largely unacknowledged by institutions, leading them to view themselves negatively in relation to urban students or those from ‘better’ schools whom they regarded as more digitally literate” (Timmis & Muhuro, 2019, p. 23). For the authors, institutions need to cultivate a heightened sense of discernment regarding the impacts of a culture centered on technology and engage students directly in the transformative process (Timmis & Muhuro, 2019). They call for universities to recognize that those students have prior digital experiences, therefore should build upon such experiences to develop “mechanisms for shaping a decolonized digital education” (Timmis & Muhuro, 2019, p. 26).

## Section 5: Discussion, limitations, significance, and conclusion

This systematic review identified, collected, and analysed findings from 23 studies on digital literacies in higher education from students' perspectives. In section four I synthesized the findings, created a narrative summarizing the main points of each paper, and highlighted topics that drew great attention from researchers, as well as subjects that were less discussed. The present review afforded a systematic comprehension of what is the scope of the knowledge being gathered in the last five years addressing challenges and achievements in digital literacies, focussing on students. In this concluding section, I address limitations of this review, provide recommendations for practice and research, and offer a few insights on the significance that this review might have.

For limitations, I can nominate that, despite all decisions made with the aim to reduce the chance of bias in the interpretation of studies' findings, I cannot guarantee that my review is completely free of it. Yet, not even reviews undertaken by big teams are free of this possibility (Booth et al., 2022). Every qualitative analysis is done out of interpretation, and many factors may influence the way in which a researcher reads and codes a text (Saldaña, 2013). Furthermore, I focused solely on students and digital literacies, however a complete compilation of research on digital literacies would include all points of view, coming from faculty and other members of the higher education community. For future research, it would be useful to review literature approaching the topic including those points of view. In defense of this decision, however, I point out that learning specifically about students and digital literacies is a contribution for the enhancement of training programs and curriculum development. In that sense, I present recommendations for practice and research of digital literacies.

A notable limitation of this study is its reliance solely on English-language studies. As suggested by the numerous countries that were represented in the study findings, the topic is one of concern across the globe. Future research may benefit from encompassing studies written in languages additional to English, thereby better capturing the range of international knowledge and broadening the scope and diversity of perspectives and findings.



In reflecting on the coding strategy employed in this review, it is essential to acknowledge what may have been overlooked due to the exclusive use of deductive coding. While this approach provided a structured analysis aligned with the theoretical underpinnings of digital literacies, it inherently constrained the exploration to predefined concepts and themes. This means that emerging themes that were not anticipated in the conceptual framework may now have been identified. Inductive coding, which allows for themes to arise from the data itself (Gibbs, 2018; Maxwell, 2013; Saldaña, 2013), could have potentially uncovered novel insights or nuances within the field of digital literacies from the student perspective that deductive coding might have missed.

Moreover, in the context of digital literacies, which is a rapidly evolving field influenced by continual technological advancements, inductive codes could have captured the fluid and dynamic nature of how students interact with and perceive digital technologies (Elo & Kyngäs, 2008). By not incorporating inductive codes, there may have been a limitation in understanding the full spectrum of digital literacy practices, particularly those that are informal, innovative, or outside the scope of established frameworks (Hine, 2015).

The reliance on deductive coding also might have restrained the recognition of contradictory or divergent perspectives among the studies. Inductive coding could allow for a more grounded theory approach, where unexpected patterns or relationships could suggest alternative interpretations or propose new theoretical constructs relevant to students' experiences with digital literacies. Such perspectives emphasize the multimodal, social, and critical aspects of engaging with digital content and tools, proposing nuanced ways of navigating and making sense of the digital landscape (Cope & Kalantzis, 2015; Hobbs, 2011, 2013; Hobbs & Coiro, 2019; Kalantzis & Cope, 2012; Rodrigues et al., 2021; Taylor, 2022). By focusing primarily on 'digital literacies' as conceptualized within the theoretical framework of this review, there is a recognition that these alternative literacies, which often intersect with digital literacies, may provide additional layers of understanding the complex and multifaceted nature of how students in higher education engage with digital environments (Eshet-Alkalai, 2012; Lankshear & Knobel, 2005). Therefore, it is important to consider these varied dimensions of literacy when interpreting the findings of the present review and to explore them in future research endeavors.

Additionally, there is a pressing need for future research to delve into the analysis of cross-codes. This would involve examining the interplay and integration of different

coding schemes and perspectives (Fletcher et al., 2015; Rudel, 2008), potentially unveiling deeper insights and connections within the field of digital literacies that might have been overlooked in this review.

In conclusion, while this review has systematically synthesized the existing research on digital literacies from the perspective of higher education students, the coding limitations highlight opportunities for further investigation. Expanding the coding framework in future work could provide a more comprehensive picture, revealing not only what digital literacies afford but also the constraints they may impose on students' academic and professional development.

## 5.1 Practice

After reviewing the studies and comparing them with the literature that make up the framework for my study, some recommendations may be made in regard to how digital literacies is used in higher education. First, the promotion of learning spaces that foster not only technical skills, but also that help students achieve meaningful knowledge of and engagement with media and information literacy, beefing up their opportunities for developing critical thinking and creativity (Burnett, 2020). This might look like Ahmed and Roche's (2021) study, that recommends integrated, institution-wide digital literacy development focused on accessing, assessing, and incorporating online resources in students' work. Additionally, Cabero-Almenara et al. (2023) highlight the urgency of creating training programs to enhance individuals' ability to operate effectively in increasingly digital and technological environments they are likely to encounter in the near future. Second, higher education institutions should not assume that someone inherits skills just for belonging to a given generation. Although there are some favourable positions about it, the concept of digital natives has been increasingly defied and criticized (Burnett, 2020; Ng, 2012). By correcting this misconception, higher education institutions will be forced to recognize their responsibilities for pedagogically and materially addressing the gap that exists in digital literacies as reported in the studies, which creates or reaffirms digital divides (Hill & Lawton, 2018; Timmis & Muhuro, 2019). This might look like what is recommended by Hill and Lawton (2018), who argue for digital literacies to be embedded in the curriculum across different disciplines, ensuring that all students, irrespective of their major and background, gain essential digital competencies. One of the reviewed studies (Timmis & Muhuro, 2019) states that

universities have the potential to extend their support to rural communities and schools, assisting rural students in transitioning to higher education through digital means. Higher education institutions can identify the origins and technological backgrounds of incoming students and collaborate with current rural students to develop alternative methods for induction and application processes (Timmis & Muhuro, 2019). Third, higher education institutions should take advantage of students' prior knowledge and lived experiences in their development of and engagement with digital literacies (Bhatt & MacKenzie, 2019; Timmis & Muhuro, 2019), so as to integrate them in their learning process, acknowledging the importance of diverse perceptions and experiences with digital tools to the design of curricula. For example, Kim (Kim, 2019) suggests that constructivist learning settings aid in the development of cognitive learning. These environments provide tools that help learners share knowledge and information, effectively enhancing problem-solving abilities by linking prior knowledge with new insights. Such an approach values and utilizes not only content learnt in higher education, but also students' backgrounds and perspectives towards digital literacies (Kim, 2019).

## 5.2 Research

Most of the reviewed studies obtained their results using quantitative methods, offering their contributions to the research community by reporting statistical data of great value. Most gathered information from surveys answered by a large number of students, providing a strong broad overview of findings. However, following recommendations from many of the reviewed studies (Kim, 2019; Lilian et al., 2020; López-Meneses et al., 2020; Morgan et al., 2022; Raji et al., 2023; Scheel et al., 2022; Shahrokh & Milla, 2021; Smith & Storrs, 2023), qualitative studies that gauge higher education students' views on digital literacies would expand the topic with the addition of more personal, individualized experiences, thus enriching the discussion and providing more insights into how to practise digital literacies for learning in the university and beyond.

Recommendations for research also take into account that existing literature concerning the assessment of information literacy consistently demonstrates that relying on individuals' self-reports cannot replace the evaluation of their tangible information handling abilities (Smith & Storrs, 2023). This view recognizes that there may be differences between what students say of their abilities and other measures (e.g. external metrics, observable changes) that assess students' actual achievement (Cabero-Almenara

et al., 2022). For future research, suggested practice involves corroborating this data with additional sources, like levels of digital proficiency or preferences in usage (Cabero-Almenara et al., 2022; Smith & Storrs, 2023).

### 5.3 Significance

This study contributes to a significant conversation on students and digital literacies in higher education. Systematic reviews frequently offer a comprehensive conceptual understanding of the knowledge in a given area (Timulak, 2013). This present review has produced recommendations from its findings that illuminate paths that research on digital literacies has been walking in recent years and to indicate future roads where researchers and educators in higher education may choose to travel moving forward. It can also potentially have implications for curriculum development of higher education institutions regarding digital literacies, given that some of the reported findings demonstrate concern about how digital literacies programs are developed, namely how some of them disregard students' prior knowledge and cultural backgrounds, helping to augment the digital divide, thus increasing inequalities. The study also confirms how complex and diverse notions of the digital either intertwine or go separate ways, pointing to different purposes and foci. This review has explored distinct aspects of digital literacy. Although it was initially thought that digital natives are inherently skilled in digital literacies (Prensky, 2012), our findings suggest that digital literacy can be achieved in several ways, beyond the idea of a generation born with digital devices. A major implication of disrupting the notion of students being naturally digital literate is the need for higher education pedagogies that promote equity through digital literacies education. Finally, my goal is to provide a narrative, by telling a story of how digital literacies is shaping higher education, and where it could be focusing from now on. The challenges are many, including bridging the digital divide, creating spaces that foster digital literacies for everyone, treasuring prior knowledge and empowering students to engage in a meaningful use of all that this digital age has to offer. My hope is that this study collaborates with addressing these challenges, so that digital literacies may be a reality for everyone.

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## Appendix 1. Reference List of All Reviewed Papers

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