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Taxonomy of literacies

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Abstract

Purpose – Digital technologies have transformed what it means to be literate and to experience literacy. Various literacies have been coined to capture this transformation including established literacies like computer literacy, information literacy, digital literacy, media literacy and internet literacy, to newer conceptions like transliteracy, metaliteracy and multimodal literacy. The purpose of this paper is to assimilate the various conceptions of literacy and literacy types is becoming increasingly more complex. There is a need for a taxonomy of literacies that reflects more recent developments, one that more comprehensively captures the current literacy landscape and one that might have affordances in the future.

Design/methodology/approach – “Library and Information Science Abstracts” (LISA), “Education Resources Information Center” (ERIC) and “British Education Index” were searched for documents relating to digital technologies and literacy. Relevant documents were retrieved and reviewed. This was followed by selective backward and forward citation searching and a further review of relevant documents.

Findings – Based on a review of the literature, two significant dimensions of literacy were identified. These dimensions were used to create a literacy framework to enable the classification of literacies and literacy types, i.e. a taxonomy of literacies. This taxonomy was successfully applied to various prominent literacies and literacy types.

Research limitations/implications – The literacy framework was only applied to those literacies and literacy types that are directly or indirectly related to digital technologies.

Originality/value – There have been a few attempts to classify some literacy types. When conceived, these classifications comprehensively captured some aspect of the literacy landscape. However, they are now dated and there is a need for a taxonomy of literacies that meets the needs identified above. This paper proposes a taxonomy that meets these criteria.

Keywords Information literacy, Literacy, Taxonomy, Media literacy, Digital literacies, New literacies

Paper type Conceptual paper

Introduction

Digital technologies have transformed what it means to be literate and to experience literacy. In the last three years, 685 articles and books were published related literacy and digital technologies. Each stressed a particular conception of literacy. Of these, 35 different “types” of literacy were highlighted ranging from established literacies like computer literacy, information literacy and digital literacy, to newer conceptions like transliteracy, metaliteracy and multimodal literacy. Assimilating the various conceptions of literacy and literacy types is becoming increasingly more complex. Each conception has developed within a particular historical context, by people and organisations with differing backgrounds and motivations. The myriad of different literacies that emerges is perplexing for the uninitiated. There have been previous attempts to classify some aspect literacy landscape (e.g. Addison and Meyers, 2013; McClure, 1994; Spitzer *et al.*, 1998; Bawden, 2001; Savolainen, 2002; Lonsdale and McCurry, 2004). However, with the exception of the information literacy framework created by Addison and Meyers (2013), they are now dated. There is a need for a taxonomy of literacies that reflects more recent developments, one that more comprehensively captures the current literacy landscape and one that might have affordances in the future. This paper develops and illustrates



such a taxonomy. Two often-cited perspectives of literacy are described and used as the dimensions of a generic literacy framework:

- (1) Lankshear and Knobel (2007), who distinguish between those literacies that are genuinely new from those that are essentially conventional; and
- (2) Street (1984) who distinguishes between traditional psychological-cognitive approach towards literacy from an approach that has its roots in New Literacy Studies.

The components of this generic framework are illustrated with reference to some archetypical literacies. The paper concludes with a potential definition of literacies that relate directly or indirectly to digital technologies and encapsulates the various perspectives identified in the literature.

Origins of term “literacy”

The origins of the term “literacy” are relatively recent. Originally coined towards the end of the nineteenth century, it was used to express achievement and possession of what was increasingly seen as a necessary skill (Williams, 1983). Essentially, it focused on people’s ability to decode and encode text (Gurak, 2001). From the mid-twentieth century this conception was replaced by one where being literate implied a higher level of cognitive ability, where scholars made judgements about the superiority of one culture above another (Gurak, 2001). It was not until the 1970s that the term “literacy” *per se* became prominent in educational discourse (Lankshear and Knobel, 2003). Conceptions of literacy expanded from “simply” encoding and decoding printed text to considering reading and writing as a meaning-making activity, with different texts requiring different backgrounds and skills if they are to be properly understood.

The 1980s witnessed the fracturing of literacy into various subject literacies. These essentially meant competence or proficiency in some associated subject area (Lankshear and Knobel, 2003). For example, being maths literate or environmentally literate meant that a person knew how to operate the language of the subject well enough to make sense of it. It also saw the origins of literacies and qualification structures that attempted to encapsulate the skills and competencies required by the ICT industry to satisfy the need for a technical literate workforce (Gillen and Barton, 2010). For example, the concept of computer literacy became increasingly prevalent to encapsulate the skills and competences necessary to effectively use computers and software packages.

With the internet firmly established in the economy and increasingly in education, the 1990s witnessed the development of various conceptions of literacy that focused on the “softer” skills and competencies required to cope with the perceived explosion in information and worries about the credibility of internet sources. For example, Gilster (1999) popularised the term “digital literacy” with his book of the same name and the academic library community promoted “information literacy” (Gibson, 2007). Within the academic community, there was an increasing recognition that the prevailing technical treatment of literacy was deliberately misleading and needed to be challenged (Crowther *et al.*, 2001). Rather than a set of skills and competencies, literacy was increasingly being conceived as a social practice where some conceptions of literacy are more powerful and imposed on other cultures or classes (Street, 2003). One consequence was the development of New Literacy Studies movement, a term coined by Gee (1990) and popularised by Street (1996) and more recently Barton *et al.* (2000).

The twenty-first century saw the beginnings of what has become known as “Web 2.0” (O’Reilly, 2005), the emergence of online collaborative communities, social media and increased worries about children’s internet safety (Livingstone, 2003). Static webpages were increasingly incorporating user interaction, user collaboration, sound and video. Online chat sites were becoming commonplace, particularly amongst the young. A proliferation of new literacies were posited in response to these developments including “internet literacy” (e.g. Livingstone, 2008), “e-literacy” (e.g. Martin, 2003), “cyber-literacy” (Gurak, 2001) and “media and information literacy” (UNESCO, 2013). More recently, social media web sites have attracted vast numbers of the public to seamlessly and effortlessly engage in collaborative online and mobile text, video and image dialogues. Conceptions of transliteracy (e.g. Thomas *et al.*, 2007), multimodal literacy (e.g. Jewitt and Kress, 2003), information literacy 2.0 (Tuominen, 2007) and now metaliteracy (Mackey and Jacobson, 2014) have emerged to capture this new digital landscape. However, anyone looking for consistency in the application and use of these literacy types will be disappointed. As noted by both Bawden (2001) and Tyner (1998), although individuals and organisations use identical terms to label “their” conception of literacy, they can differ markedly in emphasis and scope. It is as if scholars and organisations have developed their conception of literacy without reference to others or they have “cherry-picked” ideas to form their own conception.

Approach

To comprehensively capture this literacy landscape related directly and indirectly to digital technologies, two literature reviews were conducted. The aim was to identify the diversity of literacy types that relate directly or indirectly to digital technologies, and to identify those conceptions of literacy that are considered key. The first review took place in 2010 and primarily consisted of searching three databases via Proquest: “Library and Information Science Abstracts” (LISA), “Education Resources Information Center” (ERIC) and “British Education Index” for records written in English since 2000 that contained (literacy OR literacies) OR (internet OR Web OR digital OR WWW) in the title or abstract. Potentially relevant documents were retrieved and reviewed. Over the next two years, other key documents were identified by selective backward and forward citation searching to develop a comprehensive understanding of the area. The second literature review took place in 2014 with the aim of updating the review for this paper. The same databases searched again, but the search was slightly modified to ensure more key documents were retrieved[1]. Again, relevant records were identified and the original source reviewed.

Dimensions of literacy

Of the 685 unique records retrieved in 2014, 375 focused on a particular literacy type. The following table summarises the frequency that each literacy type was central to the records retrieved (Table I).

Whilst information literacy and digital literacy are the most frequently cited literacies, 40 records contained “new literacy” or “new literacies” in the title. Lankshear and Knobel note that literacy proponents sometimes describe “their” conception of literacy as “new” in an attempt to convince readers that it encapsulates something hitherto not conceived. However, Lankshear and Knobel have questioned the newness of many so-called “new literacies”. First, they may once have been new, but have now

Literacy type	Number of records
Information literacy	121
Digital literacy/literacies	61
New literacies	40
Media literacy	36
Health literacy	13
Scientific literacy	9
Technological literacy	9
Computer literacy	8
Critical literacy/literacies	7
eHealth literacy	7
New Media literacy	7
Other (25 types)	52
Total	375

Notes: Other literacy types included: financial literacy, technology literacy, visual literacy, academic literacy, environmental literacy, science literacy, ICT literacy, multimodal literacy/literacies, assessment literacy, mathematical literacy, multiple literacies, STEM literacy, bias literacy, depression literacy, energy literacy, global literacy, metaliteracies, news literacy, online literacy, quantitative literacy, urban literacy, visual literacy, political literacy, transliteracy and web-based literacy

Table I.
Number of records retrieved where the literacy type was central

“[...] been incorporated into mainstream everyday social practice to the point where they are invisible, taken for granted, and lived out as ‘normal’” (Lankshear and Knobel, 2006, p. 1). Second, some new literacies “simply replicate longstanding literacy practices” (Lankshear and Knobel, 2007, p. 7) but using modern technologies. They cite how common software bundled into many PCs enables users to easily rip music from CDs, splice different songs together, add as background music to a video and upload the final product to the internet for others to experience. Whilst this practice is chronologically new, it replicates practices that have existed for many years, albeit limited to organisations with bulky equipment and expensive reproduction systems. Lankshear and Knobel described such conceptions as “peripheral cases” of new literacies since they only involve new “technical stuff” and no new “ethos stuff”. They contrast this with what they call “paradigm cases” of new literacies. These have both new technical stuff and new ethos stuff. New ethos stuff mobilises “very different values and priorities and sensibilities than the literacies we are familiar with” (Lankshear and Knobel, 2007, p. 7), tending to be more “participatory”, “collaborative” and “distributed” than conventional literacies and also less “published”, “individuated”, “author-centric” and “expert-dominated”. To some extent, new ethos stuff is the “stuff” that “insiders” are involved with (Lankshear and Knobel, 2003), frequently encapsulated in their use of Web 2.0 technologies, where their new literacy practices turn “the consumption of popular culture into active production” (Lankshear and Knobel, 2007, p. 13).

Lankshear and Knobel describe those literacies that are not “new” as “conventional” literacies, but do not elaborate. Conventional literacies are not necessarily concerned with new technical stuff or new ethos stuff. For the purpose of developing a framework to compare different literacies, conventional literacies include those literacies that may have been reconsidered or reformulated in the light of new technologies, but could still apply to practices that involve either no or older technologies. Furthermore, Lankshear and Knobel do not define what they mean by new technical stuff, implying it is a matter of personal judgement. Again, for the purpose of developing a framework, a conception

of literacy that is nonsensical without the existence of digital technologies (including the internet) is considered to be about new technical stuff.

Many of the new conceptions of literacy have theoretical and methodological underpinnings in New Literacy Studies, a term coined by Gee (1990) and popularised by Street (1996) and Barton *et al.* (2000). New Literacy Studies is informed by applied critical linguistics and social anthropology, and examines “the nature of different participants’ expectations, interpretations and understanding in any textual encounter” (Jones and Lea, 2008, p. 13). In doing so, it highlights that “reading and writing can only be understood in the context of social, cultural, political, economic, historical practices of which they are a part” (Lankshear and Knobel, 2007, p. 1) and the meaning attributed to any text cannot be separated from its associated “values and gestures, context and meaning, actions and objects, talk and interaction, tools and spaces” (Lankshear and Knobel, 2003, p. 8). More specifically, literacy is conceived as a social practice where some conceptions of literacy are more powerful and are imposed on cultures or classes (Street, 2003). This conception of literacy contrasts with earlier, more “conventional” conceptions of literacy that stress literacy as being largely psychological or cognitive and “a set of abilities or skills residing inside people’s heads” (Gee, 2008, p. 2), unrelated to the text being decoded. New literacies were seen as more of a sociological concept, culturally relative (Cook-Gumperz, 1986; Gee, 1991; Crowther *et al.*, 2001; Rodríguez Illera, 2004) and core to students’ education.

The distinction between sociocultural and psychological-cognitive approaches towards literacy, has been successfully championed by Street (1984). He distinguishes between “autonomous” and “ideological” models of literacy. The former views literacy as a cognitive ability, independent of the context it operates in and more amenable to quantitative-type assessments. Autonomous models view literacy “principally as an individualistic, internal matter” (Andrews, 2007, p. 129), a view typically promoted by governments and psychologists (Lankshear and Knobel, 2003; Barton, 2007) and one that has tended to dominate literacy research (Jones and Lea, 2008). Writing for the Australian Department of Education, Science and Technology, Lonsdale and McCurry (2004) identify the common attributes of this perspective:

- it is perceived as related to an individual’s intellectual abilities and can be measured via psychological tests;
- illiteracy is viewed as a deficit in an individual’s ability for which they are largely responsible;
- literacy is perceived as independent of its context and primarily about print-based texts; and
- the underlying purpose of literacy education is political and about instilling acceptance of the dominant ideologies to enhance economic productivity.

In contrast, ideological models view literacy as a social practice that cannot be detached from its context which both creates and perpetuates it. This view is more amenable to qualitative research methods being encapsulated in New Literacy Studies. Again, Lonsdale and McCurry (2004) identify the common attributes of this perspective:

- it views literacy as a social responsibility;
- there is not just one literacy, but multiple learner-centred literacies that involve a diverse range of skills and understandings, for example digital literacies;
- critical thinking skills are frequently paramount in this conception;

- the extent of an individual's literacy can only be assessed by intensive observation; and
- the social context of literacy practices is paramount; outcomes less vocational and more holistic, being related to empowerment and building communities.

Literacy framework

Lankshear and Knobel's (2007) conception of traditional, paradigm and peripheral literacies, and Street's (1984) distinction between autonomous and ideological literacies are two literacy dimensions that could be used to compare and categorise literacies. Taken together, they produce six categories or perspectives of literacy (Table II).

This framework was successfully applied to literacies and the following sections illustrate how it was used. The decision to categorise a particular literacy within one of the six categories was based on an analysis of the associated literature and the criteria identified in the previous section. Both Lankshear and Knobel (2007) and Street (1984) stress that components of their dimensions are not necessarily distinct or mutually exclusive. Although the boundaries between categories are a solid line, it might be better to consider them blurred and overlapping. In addition, authors do not always express their conceptions of literacy as explicit definitions. Sometimes it was necessary to imply an understanding from more general narratives, standards, models and/or frameworks. In this spirit then, the framework is used in the following sections to categorise a selection of literacies and literacy types. The choice of literacy to review was mainly based on two factors: the frequency that the literacy was retrieved during the 2014 search and the efficacy of the literacy to illustrate the particular perspective.

Before illustrating the use of this framework, it should be pointed out that other mutually exclusive dimensions could be used. For example, Addison and Meyers (2013) three approaches to information literacy[2] could be combined with Lankshear and Knobel's (2007) conception of traditional, paradigm and peripheral literacies to produce a potentially interesting three by three framework. Alternatively, Street's (1984) distinction between autonomous and ideological literacies could be combined with Bawden's (2001) often-cited classification of information-related literacies as "skill-based literacies", "information literacy" and "digital literacies" to produce another

	New literacies		
	Conventional literacies <i>No new "technical stuff" or "ethos stuff" (Lankshear and Knobel, 2007)</i>	Peripheral cases <i>Just new "technical stuff" (Lankshear and Knobel, 2007)</i>	Paradigm cases <i>New "technical stuff" and new "ethos stuff" (Lankshear and Knobel, 2007)</i>
Autonomous literacies <i>Literacy as a cognitive ability (Street, 1984)</i>	Autonomous-conventional perspective	Autonomous-peripheral perspective	Autonomous-paradigm perspective
Ideological literacies <i>Literacy as a social practice (Street, 1984)</i>	Ideological-conventional perspective	Ideological-peripheral perspective	Ideological-paradigm perspective

Table II.
Complete literacy framework identifying six perspectives of literacy

two by three framework. However, the particular framework illustrated here was considered more effective at distinguishing salient differences between literacies and literacy types.

Autonomous-conventional perspective (Table III)

Typically, those literacies that have been reconceived or have received greater interest due to the ubiquitous nature of the internet and the explosion in accessible information are autonomous-conventional. Essentially, they are about being literate. Literacies that are autonomous-conventional do not necessarily relate to digital technologies. Many conception of “information literacy” could be categorised as autonomous-conventional.

Within HE at least, information literacy is one of the most discussed conceptions of literacy (Bawden, 2001) due in part to the interest of librarians (Barry, 1997). The analysis above discovered that around one third of all recent publications that discuss literacy in relation to digital technologies, focus on information literacy. The term was originally coined by Zurkowski in 1974 (Webber and Johnston, 2000), with its roots in information science and bibliographic/library instruction (Johnston and Webber, 2003) and developed from broader conceptions of library literacy (Bruce, 1997; Bawden, 2001). Discussions have frequently focused on information literacy’s relationship with the skills agenda, in particular IT or computing skills (Bawden, 2001). Although its roots can be traced back before personal computers, more widespread interest in information literacy did not occur until after the appearance of the web and as a reaction to the perceived increase in the “heterogeneity and complexity of information, information resources and information structures” (Špiranec and Zorica, 2010, p. 141).

Hepworth (2000) argues that there have been two main approaches to information literacy that parallel Street’s (1984) autonomous and ideological models of literacy. The first approach relates to the identification of discrete skills and attitudes that can be learnt and measured. Hepworth (2000) states that this has been the most common approach to information literacy, being primarily concerned with cognitive abilities. The second approach, typified by Bruce’s (1997) Seven Faces of Information Literacy model, is concerned with how individuals experience and make sense of their world (see ideological-conventional perspective). Of the first approach, Bruce (2004) highlights four models/standards of information literacy that have had a significant impact within education:

- Eisenberg and Berkowitz’s Big6 information skills.
- Doyles’ attributes of an information literate person.

Table III.
Literacy framework identifying the autonomous-conventional perspective

	New literacies		
	Conventional literacies	Peripheral cases	Paradigm cases
Autonomous literacies <i>Literacy as a cognitive ability</i>	No new “technical stuff” or “ethos stuff”	Just new “technical stuff”	New “technical stuff” and new “ethos stuff”
Ideological literacies <i>Literacy as a social practice</i>	Autonomous-conventional perspective		

- ALA and AECT's information literacy standards for student learning.
- The ACRL's information literacy competency standards for higher education.

The Big6 (Eisenberg and Berkowitz, 2003) information literacy model has gained popularity in US schools and some HEIs (Bruce, 2004). It divides information problem solving into six discrete stages (task definition, information seeking strategies, location and access, use of information, synthesis and evaluation) and numerous sub-stages. Although Johnston and Webber (2003) describe it as a “rather mechanistic approach to information literacy” that encourages a “recipe approach to information literacy”, others feel the approach has advantages in the context of training (McClure, 1994). Doyle's (1992) model used Delphi research techniques to facilitate discussion between a wide-ranging group of US business, government and education information experts. She concluded that information literacy is “the ability to access, evaluate, and use information from a variety of sources” (Doyle, 1992, p. 2) and that an information literate person possesses ten cognitive attributes including recognising the need for information and the uses information in critical thinking and problem solving. Both standards identified by Bruce (2004) were devised through consultation between information professionals and educators. The Information Literacy Standards for Student Learning (ALA and AECT, 1998) is aimed at US schools and of less relevance to this paper. The ALA Information Literacy Competency Standards for Higher Education arguably contains the most quoted definition of information literacy (Spitzer *et al.*, 1998; Webber and Johnston, 2000), defining it as a set of abilities that individuals require to “recognize when information is needed and have the ability to locate, evaluate, and use effectively the needed information” (ALA, 2000, p. 2). Their standards were conceived as a response to “rapid technological change and proliferating information resources” (ALA, 2000, p. 2) in contemporary society where “unfiltered formats” raise questions about the “authenticity, validity, and reliability” (ALA, 2000, p. 2) of information found. The ALA standards have influenced many information literacy frameworks and models. Their emphasis on competencies is apparent in most frameworks and models (Spitzer *et al.*, 1998; Webber and Johnston, 2000), including the SCONUL Seven Pillars model of information literacy popular in UK HE (Boon *et al.*, 2007). Like the ALA standards (ALA, 2000, p. 2), this model was motivated by concerns about undergraduates having to increasingly consider aspects of provenance, accuracy, ownership, copyright and the reliability of material obtained via the internet and the increased potential for plagiarism (SCONUL, 1999).

Autonomous-peripheral perspective (Table IV)

The autonomous-peripheral perspective includes those literacies that are essentially about being literate, relate directly or indirectly to digital technologies, and where conceived due to the ubiquitous nature of the internet and the explosion in accessible information. However, the underlying cognitive abilities required would not be considered fundamentally new. Typically, regulatory and policy agendas have promoted an autonomous-peripheral perspective of literacy in the form “digital literacy” (e.g. European Commission, 2000, 2007, 2010), “media literacy” (e.g. EurActiv, 2010), “digital media literacy” (e.g. Ofcom, 2009) and more recently “media and information literacy” (e.g. UNESCO, 2013). These literacy types overlap considerably and tend to be used by others interchangeably (Bawden, 2001; Ofcom, 2009).

Arguably, many autonomous-peripheral conceptions of literacy have their origins in Gilster's (1999) conception of digital literacy. He saw this as an extension of the

traditional concept of literacy and “[...] the ability to understand and use information in multiple formats from a wide range of sources when it is presented via computers” (Gilster, 1999, p. 1). Whilst this definition stresses the potential breadth of his conception of digital literacy (not just the internet), most of his book is firmly centred on the issues around the increased use of the internet, the consequences for literacy education and the additional competencies required: “The most essential of these is the ability to make informed judgements about what you find on-line” (Gilster, 1999, p. 1).

Digital literacy has also been an on-going inclusion theme of the European Commission’s (2000, 2007, 2010) vision of an e-Europe and i2010 where digital literacy is defined as “the confident and critical use of ICT for work, leisure, learning and communication” (European Commission, 2007) using the term “ICT” as a synonym for a “computer” rather than some broader conception (e.g. Andrews *et al.*, 2002). However, more recently the European Commission has shifted its attention from a technical competencies conception of digital literacy, to media literacy as a critical literacy defining it as “the ability to understand and critically evaluate different aspects and content of the media” (EurActiv, 2010). Conversely, within the UK, there has been a move away from media literacy to a greater focus on digital literacy. For example, Ofcom’s previous stress on educating the public to be media literate was overturned by the Digital Britain report which instructed Ofcom to emphasise the digital aspects of media literacy, with the aim of “equipping everyone to benefit from Digital Britain” (BIS and DCMS, 2009, p. 235) and ultimately to be “digitally media literate”. This they define as “the ability to use, understand and create digital media and communications” (Ofcom, 2009, p. 5) and imply that those who are digitally media literate have the highest level digital life skills, describing them as digital media “creators” and “pioneers” who might be “online entrepreneurs” or “social media experts” (Ofcom, 2009, p. 18).

Paralleling developments within UK and Europe, UNESCO has also refocused its understanding of what it means to be literate in the twenty-first century. UNESCO previously considered media literacy and information literacy separately, but has since assimilated these two literacies with news literacy, television literacy, film literacy, computer literacy, internet literacy, digital literacy and social media literacy and coined the term “media and information literacy” or MIL for short (UNESCO, 2013). The underlying motivation for promoting MIL as a human right is to empower individuals as opposed to promoting a protectionist and regulatory agenda with governments

Table IV.
Literacy framework
identifying the
autonomous-
peripheral
perspective

	New literacies		
	Conventional literacies <i>No new “technical stuff” or “ethos stuff”</i>	Peripheral cases <i>Just new “technical stuff”</i>	Paradigm cases <i>New “technical stuff” and new “ethos stuff”</i>
Autonomous literacies <i>Literacy as a cognitive ability</i>		Autonomous-peripheral perspective	
Ideological literacies <i>Literacy as a social practice</i>			

worldwide. In addition to restating previous media and information literacy empowerment rationales related to freedom of expression and information, UNESCO perceives that new social media platforms have created a virtual second world which demands new competencies and understandings to effectively exploit opportunities and minimise the associated risks. However, rather than defining MIL, UNESCO focuses on key learning outcomes stating that “the myriad of definitions of information literacy, media literacy and other related literacies, which lead to confusion” (UNESCO, 2013, p. 13). They want MIL to be understood as a composite concept that unifies many literacy types and also encompasses knowledge, skills and attitudes. The aim of subsequent MIL policy and strategy is to “enhance the creation of knowledge driven, inclusive, pluralistic, democratic, and open societies [...] [that] are crucial for the survival of modern governance and global citizenship in the digital world” (UNESCO, 2013, p. 12).

Autonomous-paradigm perspective (Table V)

The autonomous-paradigm perspective includes those literacies that claim to have revealed new ways of being literate, typically due to the affordances of Web 2.0 digital technologies. These include conceptions termed “information literacy 2.0” (Špiranec and Zorica, 2010; Tuominen, 2007) and “metaliteracy” (Mackey and Jacobson, 2014). Prensky’s (2008) claim that “programming literacy” is the new literacy of the twenty-first century is also considered.

According to Špiranec and Zorica (2010) and Tuominen (2007), the emergence of Web 2.0 technologies has afforded new ways in which individuals interact with information. Users have moved from being passive recipients of information to being information producers, creators and co-creators. For Špiranec and Zorica (2010), entirely new types of information resources, information seeking behaviour and user expectations have emerged. For Tuominen (2007), Web 2.0 technologies have caused an “erosion of the information context” where users find it increasingly difficult to determine the authority of what they read. Both claim that new literacies are needed to deal with these changes and propose that classical information literacy with its emphasis on acquiring abilities to ethically seek, use and create information, needs to evolve to encompass Web 2.0 technologies. They encapsulate these new abilities as information literacy 2.0. However, Špiranec and Zorica (2010) and Tuominen (2007) differ in their views about the user abilities and techniques required for this new environment. As information and knowledge are increasingly socially produced and

	New literacies	
	Conventional literacies	Peripheral cases
	No new “technical stuff” or “ethos stuff”	Just new “technical stuff”
Autonomous literacies		Paradigm cases
<i>Literacy as a cognitive ability</i>		New “technical stuff” and new “ethos stuff”
Ideological literacies		Autonomous-paradigm perspective
<i>Literacy as a social practice</i>		

Table V.
Literacy framework identifying the autonomous-paradigm perspective

distributed, Špiranec and Zorica (2010) claim that there is a need to move away from this inherently objectivist view of information seeking, to one that is more constructivist, one that recognises the participative and multimodal nature of Web 2.0. Hence, social relationships become the most effective method of accessing information. Tuominen (2007), however, proposes individuals, groups and organisations judge the trustworthiness of sources using “new” information literacy skills and with the support of “socio-technical filtering systems”. Tuominen (2007) states that the “basic goal of these systems is to recreate or reconstruct the social context of information” that has been eroded by many Web 2.0 technologies. Tuominen (2007) envisages information literacy 2.0 as being about both effectively using these social filtering systems and being collectively involved in their development using Web 2.0 techniques like reviewing, commentating, tagging or rating.

Mackey and Jacobson (2014) are also concerned that many conceptions of information literacy fail to capture the information-related competencies required for Web 2.0 and other new media environments. However, unlike Špiranec and Zorica (2010) and Tuominen (2007) conceptions of information literacy 2.0, Mackey and Jacobson (2014) claim the solution involves more than extending the scope of information literacy, but to reframe it as an overarching and unifying “metaliteracy”, one that is the foundation of many literacy types (in particular media literacy, digital literacy, ICT literacy and visual literacy), supports the goals of others (in particular cyberliteracy and information fluency), and has critical thinking and collaboration within new digital environments at its core. Central to their argument is the notion that information literacy is a capability rather than a set of competences. Metaliterate individuals are capable of applying a set of core competences to any information environment, whatever the media type. Reminiscent of SCONUL’s Seven Pillars of Information Literacy (SCONUL Working Group on Information Literacy, 2011), they cite being able to:

- (1) understand format type and delivery mode;
- (2) evaluate user feedback as active researcher;
- (3) create a context for user-generated information;
- (4) evaluate dynamic content critically;
- (5) produce original content in multiple media formats;
- (6) understand personal privacy, information ethics and intellectual property issues; and
- (7) share information in participatory environments.

Paralleling UNESCO (2013) and others view that information literacy is a core capability for lifelong learning, Mackey and Jacobson (2014) claim that metaliteracy’s focus on producing and sharing information are also significant lifelong learning activities within social media environments and online communities.

Prensky (2008) proposes that programming will be the new literacy of the twenty-first century and will increasingly differentiate those that simply consume pre-packaged applications from those that use programming to increase the affordances offered by digital technologies. Whereas previously, computer programming had been restricted to an elite of “nerds”, Prensky (2008) claims that recent technologies enable any user to easily programme a digital device. It is this new

potential that makes programming essentially a new literacy. It requires abilities that were hitherto beyond the scope of the general population. He envisages a literate and elite younger generation supporting those who have failed to recognise or utilise the power of programming. For Prensky, this literacy is:

[...] the ability to make digital technology do whatever, within the possible one wants it to do – to bend digital technology to one’s needs, purposes, and will, just as in the present we bend words and images. Some call this skill human-machine interaction; some call it procedural literacy. Others just call it programming (Prensky, 2008).

This broad conception of programming includes any procedural interactions with digital technologies, from editing the HTML that makes up a web page to programming in a low-level web programming language like PHP. Unlike Prensky’s controversial, but well-cited notion of a population composing of digitally natives and digital immigrants (Prensky, 2001a, b), Prensky’s proposal that programming is the new literacy of the twenty-first century, has not attracted the same amount of attention.

Ideological-conventional perspective (Table VI)

Those conceptions of literacy where social practices are central, but are not necessarily related to digital technologies, might be termed “ideological-conventional”. Bruce’s (1997) pioneering and Lloyd’s (2009) avant-garde information literacy research, are representative of this perspective and presented here. Many sociocultural perspectives of information literacy (e.g. Wang *et al.*, 2011; Limberg *et al.*, 2012) might also be considered ideological-conventional. Finally, the New London Group (Cazden *et al.*, 1996) multiliteracies conception is considered due to its impact on education.

At a time when academic library organisations were promoting information literacy definitions, frameworks and skills lists with the aim of informing curriculum and educational initiatives (autonomous-conventional perspective), Bruce (1997) adopted a more ideological-conventional perspective and focused on how experienced information users experience information literacy. She argues that students need to experience information literacy in similar ways, reflect upon their experiences and apply their subsequent learning to new information situations. To develop an understanding of how experienced information users experience information literacy, she drew upon higher educators in two Australian universities. Seven ways or “faces” of information literacy were identified. Information literacy was seen as:

- (1) [...] using information technology for information retrieval and communication.
- (2) [...] finding information located in information sources.

		New literacies		
		Conventional literacies	Peripheral cases	Paradigm cases
		<i>No new “technical stuff” or “ethos stuff”</i>	<i>Just new “technical stuff”</i>	<i>New “technical stuff” and new “ethos stuff”</i>
Autonomous literacies				
<i>Literacy as a cognitive ability</i>				
Ideological literacies	Ideological-conventional perspective			
<i>Literacy as a social practice</i>				

Table VI.
Literacy framework identifying the ideological-conventional perspective

- (3) [...] executing a process.
- (4) [...] controlling information.
- (5) [...] building up a personal knowledge base in a new area of interest.
- (6) [...] working with knowledge and personal perspectives adopted in such a way that novel insights are gained.
- (7) [...] using information wisely for the benefit of others (Bruce, 1997).

Whilst information technology figured in all users' experiences of information literacy, its importance varied from being incidental to absolutely central.

More recently, Lloyd (2009) applied a sociocultural theoretical approach to the information experienced by ambulance officers. In doing so, she illuminated attitudes and competencies related to information and information literacy hitherto undiscovered. By interviewing trainees at various stages of their training, she revealed fundamental shifts in the information practices of the officers. For example, at the beginning of their training, officers valued sanctioned texts, instructors' demonstrations, instructors' stories, peer critiques and the use of the manikin. Although artificial, officers considered this information safe, predictable and trustworthy. As their training progressed, their reliance on textual sources decreased and tensions were identified between the trustworthiness previously trusted information sources and their on-the-job experiences. There was an increased reliance on the practical experience gained during real emergency calls and on the information provided by selected practitioners, particularly the stories they told. Like Bruce's (1997), by focusing on information and information literacy as a practice, Lloyd's conception of information literacy is more ideological-conventional than autonomous-conventional, although their conclusions have implications for students' learning and what it means to be information literate.

The New London Group's conception of multiliteracies (Cazden *et al.*, 1996) is widely cited within the educational literature relating to literacy and has been influential in changing conceptions of literacy within pre-university education (Lankshear and Knobel, 2003; Rodríguez Illera, 2004). The Group stresses two fundamental changes in society that the concept of multiliteracies responds to: first, the recognition that there are fundamental differences in the way people now use technologies; and second the diversity of culture and language within an increasingly global community (Leu *et al.*, 2004). Their conception of multiliteracies comprising four components that each highlight a particular social-cultural dimension. These were summarised by Cope and Kalantzis (2000) as: Situated Practice, where users draw upon their experiences; Overt Instruction which recognises that teaching ultimately involves communicating others' "thinking and understanding" frameworks; Critical Framing, which recognises the unequal power relationships within any communication; and Transformed Practice, where the products of students' efforts might influence their own social futures. Together, they form the rationale for the Group's notion of Design that requires students to consider a richer understanding of semiotics than traditional authoring (Gillen and Barton, 2010). Within the New London group's Design framework, being literate is seen as involving a set of literacies that emerge "as individuals from different cultural contexts encounter one another within different communication technologies" (Leu *et al.*, 2004, p. 1587). Literacies related to digital technologies are just one of many

literacies that individuals need to develop in today's society including multimedia and workplace literacies.

Ideological-peripheral perspective (Table VII)

The ideological-peripheral perspective typically includes those conceptions of literacy where social practices and digital technologies are central. However, the underlying concepts and practices would not be considered fundamentally new. This section focuses on Livingstone's conception of internet literacy (Livingstone, 2003, 2008; Livingstone *et al.*, 2005; Livingstone and Görzig, 2014; Livingstone and Helsper, 2010; Livingstone and Smith, 2014; Livingstone and Thumim, 2003).

Towards the end of the early twentieth century, it was rare for the term "internet literacy" to be used formally, with most uses being confined to informal interactions (Bawden, 2001). When it did appear in the literature and elsewhere, it referred to finding, evaluating and publishing information on the web (e.g. Yahoo! Inc., 2002; Hofstetter, 2005). More recently, the term has become more widespread and increasingly conceptions have emphasised students' internet-related social practices, primarily in an attempt to better identify students' internet-related needs. Livingstone (2003, 2005) is one of the main proponents of this approach, influenced by her research into adults' media literacy (Livingstone and Thumim, 2003) and then children's and students' internet-related behaviour (Livingstone *et al.*, 2005; Livingstone and Görzig, 2014; Livingstone and Smith, 2014). As stated earlier, this led her to question the rhetoric surrounding students' supposedly high levels of internet-related abilities, particularly their ability to evaluate internet sources. In 2008 she returned to some of the students previously surveyed, all of whom were then approaching university age. She found that whilst their internet use had evolved, their internet-related abilities had not (Livingstone, 2008). Whilst UK Children Go Online's headlines (Livingstone *et al.*, 2005) have focused on the pre-university students' skills, the studies also considered students' internet-related social practices more generally. In addition to the technical and skills-based dimension to internet literacy already implied, Livingstone proposes two other dimensions. First, she identifies a situational dimension to internet literacy where students' practices and skills must be understood in terms of the particular activity, the technology being used, the interface's design and how institutions shape the interactions taking place. That is, being internet literate cannot be understood as a neutral technical skill. Second, she identifies a context-independent dimension to internet literacy, where certain internet competencies

	New literacies		
	Conventional literacies	Peripheral cases	Paradigm cases
	No new "technical stuff" or "ethos stuff"	Just new "technical stuff"	New "technical stuff" and new "ethos stuff"
Autonomous literacies <i>Literacy as a cognitive ability</i>			
Ideological literacies <i>Literacy as a social practice</i>		Ideological-peripheral perspective	

Table VII. Literacy framework identifying the ideological-peripheral perspective

become valued or are disapproved. In contrast to some other forms of literacy, internet literacies have tended to emphasise the critical aspects of print literacy due to the dominance of text on the web. Overall she concludes:

[...] young people's internet literacy does not yet match the headline image of the intrepid pioneer, not because young people lack imagination or initiative, but because the institutions that manage their internet access and use are constraining or unsupportive (Livingstone, 2008, p. 110).

Examples of institutional constraints include the emphasis media companies place on violating copyright infringement from illegal music downloading and how educational institutions are increasingly instigating plagiarism procedures (Livingstone, 2008).

Ideological-paradigm perspective (Table VIII)

Those conceptions of literacy that focus on fundamentally new social practices might be described as ideological-paradigm. Typically, they have come about because of new digital technologies. This section considers Lea's JISC funded research into students' "digital literacies" (Lea, 2009; Jones and Lea, 2008; Lea, 2013) and Thomas *et al.*'s (2007) influential conception of "transliteracy" might be described as ideological-paradigm.

Various organisations have attempted to gather and present data to describe people's use of digital technologies, including the internet (e.g. Pew Research Center, 2014; Office of National Statistics, 2014). However, Lea (2009) and Jones and Lea (2008) JISC funded research aims to correct this omission by illuminating how people actually use technologies in their social and academic lives, in particular how students construct their digital texts within their multimodal lives and studies. By focusing on literacy as a social practice, they avoided focusing on digital technologies and their associated affordances common in many peripheral and current conceptions of digital literacy (Lea, 2013) and highlighted new textual practices. In addition to confirming previous research which suggested undergraduates use a diversity of technologies in their social lives, they found evidence that students are skilful consumers, producers and users of a substantial range of digital and hybrid texts and technologies. Students were using these texts and technologies in hitherto undocumented ways. However, they found little evidence that this diverse range of capabilities and competencies were used for academic-related work. For example, students' use of social networking sites was more often for "affective, supportive work around completing assignments, rather than focused curriculum-based discussions" (Lea, 2009, p. 16). It appeared that undergraduates "create explicit demarcations between personal and curricular spheres of activity and

		New literacies		
		Conventional literacies	Peripheral cases	Paradigm cases
		<i>No new "technical stuff" or "ethos stuff"</i>	<i>Just new "technical stuff"</i>	<i>New "technical stuff" and new "ethos stuff"</i>
Table VIII. Literacy framework identifying the ideological-paradigm perspective	Autonomous literacies <i>Literacy as a cognitive ability</i>			
	Ideological literacies <i>Literacy as a social practice</i>			Ideological-paradigm perspective

practice” (Lea, 2009, p. 17). Jones and Lea (2008) postulate this resistance to blurring social and academic activities is at odds with many university strategies to bring academic and social life literacies together. More recently, Lea (2013) has commented that little has changed: higher education is still associating digital literacies with competency-based agendas without considering recent substantive evidence, theories and frameworks into how students and their teachers use technologies.

According to Thomas *et al.* (2007), the term literacy is too narrowly conceived as reading and writing text whereas most meaning-making activities involve multiple literacies, across multiple media types and making multiple demands upon users’ attention. They claim a new conception is required to encapsulate, what is in effect, a process that started millions of years ago when hunter-gathers began working together to hunt for food. They coined the term “transliteracy” and defined it as “the ability to read, write and interact across a range of platforms, tools and media from signing and orality through handwriting, print, TV, radio and film, to digital social networks” (Thomas *et al.*, 2007, p. 2). They claim that transliteracy is not new and has existed for hundreds of thousands of years. However, recent digital technologies, in particular the internet, have afforded novel ways of being transliterate and revealed old transliteracy practices hitherto not realised. They cite various digital fiction projects where tens of thousands of authors collaborated to write and design a multimedia novel. There have been previous collaborative novel writing projects, but social networking tools and digital technologies have scaled-up the process beyond anything that could have been envisaged in the past. Another key branch of transliteracy, is concerned with the ways in which people manage different media and modes of communication in their everyday lives. Despite the ubiquitous nature of such activities, little is known about this transliteracy. Web 2.0 technologies have added an additional level of complexity and heightened the need to further research.

Discussion

Lankshear and Knobel’s (2007) conception of traditional, paradigm and peripheral literacies, and Street’s (1984) distinction between autonomous and ideological literacies, are two dimensions that were found useful when comparing and categorising literacies. As stated above, the boundaries between the six categories or perspectives is best considered blurred or overlapping, rather than fixed and rigid. This raises certain issues. For example, when do paradigm literacies become peripheral literacies? That is, when does new technological stuff[3] and new ethos stuff[4] become not so new? Lankshear and Knobel (2007) have also grappled with this problem. To some extent, the answer lies in the question. What is new now will inevitably become old. A literacy classified as paradigm now will become peripheral later. Peripheral literacies will eventually become traditional literacies. The framework is best perceived as time dependent. Any literacy classification is relative to the time the classification took place. Furthermore, classifying a conception of literacy or a literacy type as autonomous[5] or ideological[6] was also problematic. When authors describe the literacy practices associated with their conception of literacy (aka ideological perspective), it is inevitable that they will also make statements that imply some judgement of those literacy practices observed (aka autonomous perspective). For example, when Lea spoke of the digital literacy practices of the undergraduates she studied, she commented that, “The sheer breadth of texts and practices which these undergraduates were engaging with was extraordinary” (Lea, 2009, p. 18). This is not only a comment about undergraduates’ literacy practices but could also be viewed as statement about what it is

to be someone who is digitally literate. That is, digitally literate undergraduates should use a diversity of digital texts and practices. Ultimately, classifying a particular conception of literacy as being more ideological or autonomous is a matter of judgement based on a thorough understanding of the author's or organisation's intentions.

Conclusion

The previous section has demonstrated that the literacy framework can usefully be used to compare and contrast some prominent literacies that relate directly or indirectly to digital technologies. It has shown a wide variations, particularly in terms of the extent to which they are primarily concerned with new technologies, the extent to which they are essentially about new ways of thinking about literacy, and the extent to which they highlight cognitive abilities as opposed to social practices. Taken together, these literacies can be thought of as:

The abilities a person or social group draws upon when interacting with digital technologies to derive or produce meaning, and the social, learning and work-related practices that these abilities are applied to.

This definition captures the complementary nature of literacy as a cognitive ability and a social practice (Street, 1984), and, depending on the practice being considered, may be thought of as a paradigm or peripheral case of new literacies (Lankshear and Knobel, 2007). This definition also stresses a socio-technological perspective in that literacies can relate to, or be a property of, an individual or a social group.

Notes

1. The 2014 search consisted of searching the 2010 set of databases for records written in English since 1 January 2010 that contained `literacy` OR `literacies` in the title and `Digital` OR `Internet` OR `Web` OR `WWW` OR `Technolog*` in the abstract.
2. Addison and Meyers (2013) framework classified information literacies as being “1) information literacy as the acquisition of ‘information age’ skills, 2) information literacy as the cultivation of habits of mind, and 3) information literacy as engagement in information-rich social practices”.
3. A conception of literacy is about “new technological stuff” if that literacy would be nonsensical without the existence of digital technologies, including the internet.
4. A conception of literacy is about “new ethos stuff” if that literacy has very different values, priorities and sensibilities than the literacies we are familiar with.
5. Autonomous literacies are independent of the context it operates in and more amenable to quantitative-type assessments.
6. Ideological literacies cannot be detached from its context and more amenable to qualitative research methods.

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