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## Book review

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# Mills, K. A., Unsworth, L., & Scholes, L. 2022. *Literacy for Digital Futures: Mind, Body, Text*. New York: Routledge. pp. 274. ISBN 978-0367683177. £35.09. Pbk.

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Kathy A. Mills, Len Unsworth, and Laura Scholes are three literacy educators at the Institute of Learning Sciences and Teacher Education (ILSTE), Australian Catholic University. Their volume is presented in three parts: *Mind* and Materiality; *Body* and Senses; and *Texts* and Digital Semiotics (as stated in the title), and is relevant for educational sectors, especially literacy educators and students of digital media. This volume "assists new and seasoned researchers in rethinking dynamic changes in the materiality of texts and their implications for the mind and body. It also includes suggestions for educational and professional practice" (p. i).

The introductory chapter presents an overview of the book, including an outline of the new 'literacy', in which information and communication technologies (ICT) are moving beyond "mere substitution, augmentation, or even significant modification" of print-based reading practices into requiring "new forms of literacy curriculum and learning that were previously inconceivable (Puentedura, 2003)" (p. 1). The authors suggest that contemporary school students are becoming literate in part by using digital aids and devices outside school, in addition to the "elaborate manuals" used in conventional school literacy education (p. 1). Hence, the authors suggest that educators should move beyond "static text structures" (p. 5) and an emphasis on vision at the expense of other bodily and sensory inputs, to acknowledge the various modes of meaning-making which are increasingly prevalent in the age of mass media and the internet (p. 6). In order to allow teachers and students to fully acknowledge how different modes can interact, "converge with or complement each other", in multimodal texts, they need a "metalanguage – a language for talking about the meaning-making resources of the various modes" (p. 15).

Part One, chapter two argues that the move from print-based reading to decoding digital content has involved two shifts: a) shifts in processes of the mind and b) shifts in embodied experiences. The first shift has happened because certain features of print-based text, such as its "stability and linearity", can support the brain in decoding the text and allow—even demand—a particular kind of focused reading (p. 26). One key element of this kind of reading is the creation of mental images "rich in sensory content" which "support comprehension". The authors suggest that the more fragmentary, dispersed, and differently immersive process of digital reading is "more cognitively demanding" and likely to result in changes to mental image-making (p. 27). The second shift acknowledges that all human senses are involved in the "highly embodied experience" of reading (p. 28), and considers the implications of the move to digital reading environments and even Virtual Reality. Multisensory stimulation, interpersonal interactions, along with good self-regulation are the keys to new readers' digital reading comprehension skills. The authors conclude the chapter by outlining the pedagogical implications of these shifts in reading practices and suggesting strategies for developing deep reading skills in students immersed in a digital environment (p. 39).

Chapter three looks at the urgency of critically evaluating multiple sources in digital environments. The rise of fake news and "algorithmic bias" (p. 48) means that students need what the authors term "critical epistemic literacy" (p. 22) to evaluate sources and make informed decisions in the face of widely conflicting viewpoints, especially concerning socio-scientific issues. The ability to distinguish the relative trustworthiness of information is important. The authors outline three processes, drawing on Cho et al. (2018), for improving online reading: making judgements about information sources; monitoring searches so that readers critically reflect on the process of finding information; and regulating knowledge, whereby readers acknowledge gaps in their knowledge, seek to confirm the knowledge they do have, and actively seek out further sources of knowledge, both conflicting and complementary (p. 54). Other practical strategies for facing contentious socio-scientific problems are discussed, such as requiring teachers to reflect on their own epistemic stance and its impact on their pedagogical practices. Also considered is the potential impact of technological innovations such as the Internet of Things (IoT) on learning practices and classroom activities.

Chapter four argues that video gaming is an important digital literacy practice. The authors emphasise that video games engage complex cognitive skills: critical thinking and problem-solving. Video games are "epistemologically demanding", requiring players to hone their decision-making skills (p. 67). The authors give the examples of "epistemic games" (traditionally, instructional games designed to allow students to role-play professions, but arguably even including sandbox games such as *Minecraft* that can be used in instructional contexts to build disciplinary knowledge in areas such as urban planning (pp. 68-70)) and "serious games" (designed for "training or skill development in industries like education, health, medicine, science, the military, city planning, and engineering" (p. 70)). They also point out the value of multi-player games, where a successful player must possess integrated skills in managing simple to complex games with varying numbers of players. In an educational context, game-based learning can be utilised to support students to develop the skills for real-world problem-solving. The chapter closes by discussing the ongoing critical issues, tensions, and debates surrounding the use of video games in an educational context.

Part Two, chapter five begins with a focus on sonic literacies, then goes on to consider the role of the "lesser" senses of smell and taste in digitally mediated communication. The aural experience of digital media is important to the new literacies' "body-mind-world nexus" (p. 86). The authors point out the increase in multi-sensorial media, as well as the links between olfaction and memory, scent and social interaction, and smell and writing. The links between gustation and literary experiences, and the potential of new gustatory technologies for creating multisensory media, are also shown in the chapter. A discussion of the implications of this "sensory turn" (p. 99) for classroom learning and multimodal or cross-modal literacy practices closes the chapter.

Chapter six discusses traditional multimodality and the impact of new digital media on literacy practices. The authors consider both haptics, which is important in literacy practice, and locomotion, which is important in the design of virtual reality media. Different kinds of haptic interactions (handwriting versus typing on a keyboard, for example) result in different kinds of cognitive processing: one study found that students absorbed information from a lecture more deeply when handwriting, while typing resulted in an increase in quantity and verbatim accuracy of recorded information but saw less conceptual application of the recorded knowledge (p. 108). Many educators see the potential for haptics in digital literacy and digital media practice to assist children in meaning-making with language, in the same way that video games can serve as an interactive literacy practice because they draw on the users' knowledge of "narratives, decision-making, critical literacies, multimodal texts, and gaming paratexts" (p. 112).

Chapter seven describes new digital environments, such as Virtual Reality (VR), Augmented Reality (AR), and Mixed Reality (MR), which support multisensorial interaction. VR is fully immersive, while AR and MR support interactions with both virtual and real environments. These technologies can be used in the classroom because AR has been linked to improved kinaesthetic, spatial, and visualisation skills, critical thinking, and active participation in learning (p. 138). In addition, VR technologies in education are becoming more prevalent due to their immersive meaning-making capabilities, which include "virtual painting, manipulating three-dimensional models, reading interactively, and many other ways of using information and sign-making" (p. 139).

Part Three, chapter eight is about infographics and scientific literacy. Infographics are associated with digital multimedia communication in the 21st century, most recognisably as "image–language ensembles" that often contain one or more images (photographs, diagrams, graphs, maps, cartoons, etc.) (p. 147). The authors outline five strategies, or "5Cs", namely contextualizing, comprehending, connecting, comparing, and constructing, to promote "students' critical interpretation and effective creation of infographics within the context of scientific literacy education" (p. 168).

Chapter nine explores advancing animated story composition through coding. The authors suggest that the "impressive literary quality of coded, vibrant narratives created by school-age children" demonstrates the "potential of integrating coding and literacy" (p. 192). Popular block-coding platforms like *Scratch* have helped children to learn the changing literacy skills of the digital world of 21st-century communication at an early age (p. 192).

The final chapter discusses digital interactive literature (DIL), noting that students growing up in these digital environments have access to an increasing variety of DIL, including originally print-based stories such as the Harry Potter story world, "which is available not only as novels and films, but also as multiple video games and even now as augmented reality games" (p. 196). Here, the magic interactivity utilizes 2D or 3D illustration and non-immersive or immersive reality. The challenge of using DIL is to combine multimodal storytelling with the possibilities of new digital technologies.

In conclusion, this book is a well-written and timely contribution to literacy studies, with particular resonance for information literacy (IL). The authors address emerging issues in future-focused literacy studies: mind, body, materiality, multimodality, and their implications. "Practical practice" and "Recommendations for research" sections are available at the end of every chapter to help teachers support effective learning. The book's utility to well-informed practitioners is evident, despite the fact that it is ultimately most useful for researchers and academics and may assist many dissertation students.

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