

Challenges to Augmenting Literacy in the Digital Environment

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Abstract: Integrating *data literacy* skills into school curricula for a data-literate society extends the span of '21st-century skills' assumed to be essential in school education for over two decades. Due to rapid digital advancements, however, the full scope of these skills remains unclear. This short paper explores data literacy skills in education, placing initial emphasis on discerning facts from data in a digital world increasingly shaped by AI. Dialogue is also highlighted as a critical element that augments *digital literacy* in challenging reliance on search technologies. Critical thinking, decision literacy, and data literacy are identified as all mutually informing.

Keywords: digital literacy, data literacy, decision literacy, skills, digital competence

1. Introduction

The contemporary global era of rapid technological revolution and global interdependence underscores the imperative to develop new competencies to make sense of the world and engage positively with it. Consequently, it is imperative that making sense of the world in ways that enable the next generation to engage and contribute positively necessitates the development of new competencies. Despite these imperatives, research indicates that curriculum updates are slow to reflect technological advances or respond to crises (Charland et al., 2021; Twining et al., 2021).

This short paper outlines a research agenda focused on *data literacy* within the rapidly changing digital environment and its relationship with *digital literacy* and *multi-literacies*. The research question guiding this investigation is: *In what ways can data literacy augment literacy and numeracy as a contemporary foundation of formal education, given the complexities of datafication and the digital environment?*

2. The 'New Literacies'

The evolution of educational curricula now includes digital and data literacy alongside traditional skills, reflecting their importance in modern education. Frameworks like the OECD Learning Compass 2030 (OECD, 2019) and the UK's National Data Strategy (DDCMS, 2020) highlight developing student agency and transformative competencies. The digital revolution has expanded literacy to encompass information, computers, and digital literacy. Information literacy, emerging in 1974, foregrounded critical thinking and ethical awareness. Computer literacy gained prominence in the 1990s, integrating numeracy skills and quickly evolving into the broader digital literacy construct. Data literacy emerged with the emergence of 'big data' and the rise of data-driven decision-making. It is now crucial for learners to protect their data in the age of surveillance capitalism (Zuboff, 2023). This involves media literacy and critical thinking to empower informed decision-making. Data literacy, however, remains a 'developing discourse' despite its significance, given the pervasiveness of data points in contemporary society (Smith & Storrs, 2023). Figure 1 represents a good example of how data literacy is now being considered.

Expressing information and data through visual formats has become common today and is characterised by cutting-edge digital technology. We are expected to efficiently comprehend intricate information and identify regularities, irregularities, and tendencies when

data is exhibited in diverse forms, including diagrams, charts, and visual representations involving skills of *perceiving*, *interpreting* and *comprehending* (Kirk, 2019) (Figure 2).

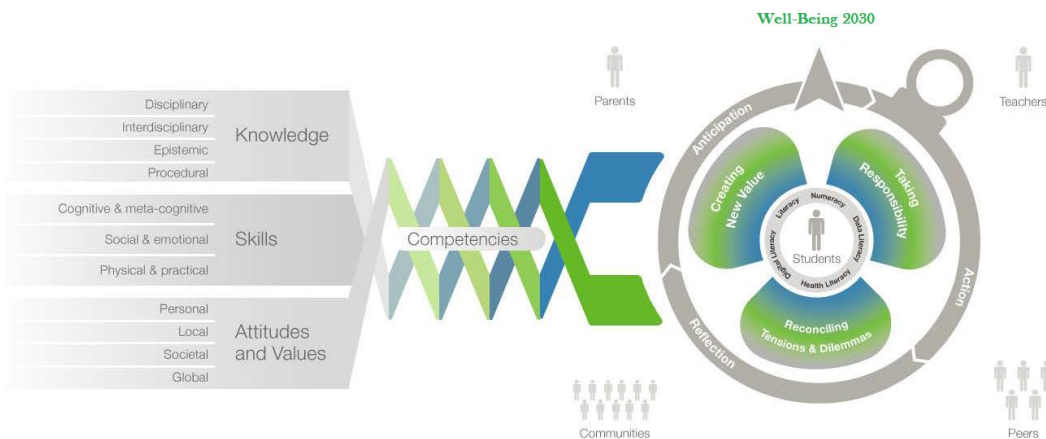


Figure 1: The OECD Learning Framework 2030 (OECD, 2019)

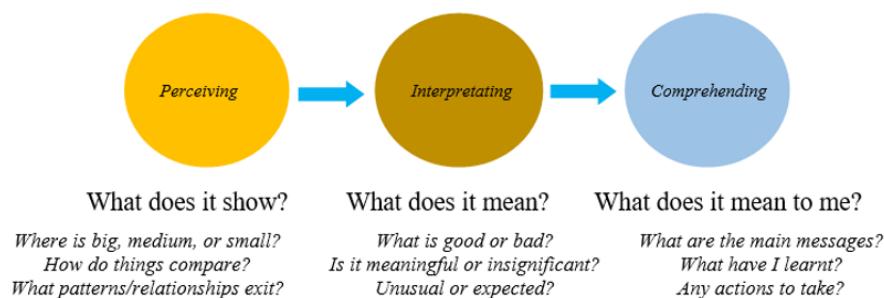


Figure 2. Three Stages of Understanding Data Visuals (Kirk, 2019, p34).

In Figure 2, perception is a sense-making exercise that is fundamental to the other two components. Empirical data shows that changing visual representations can effectively regulate, impact, and influence our perceptions (Breitmeyer, 2009; Shimojo et al., 2001). These challenges give rise to the need of Data Visualization/ Data Visualization Literacy.

Consequently, *decision literacy* skills are being proposed (DEF, n.d.). Several schools are teaching this as part of their curriculum. For example, in Benson (in Omaha, Nebraska), decision science is interspersed throughout the school's curriculum during all years of the high school experience (Finkel, 2009). The aim is to provide skilled judgment formation and decision-making, enabling students to form accurate judgments and make better decisions over four learning domains (Alliance for Decision Education, 2023) – as depicted in Figure 3.

Social media use, initially for connections and news, now faces misinformation, pseudoscience, and propaganda, often amplified by AI. The problem magnitude can be gauged as, of April 2024, 5.07 billion active users are on social media (Statista Search Department, 2024). Privacy and security concerns include data breaches, identity theft, and exploitation of personal information. Algorithms can spread harmful content, raising the need for data literacy to address decision-making flaws such as overconfidence and biases. Understanding social media algorithms and privacy issues is crucial for promoting well-being and healthier online interactions.

3. Conclusion

The rise of Generative AI and tools like ChatGPT presents numerous challenges and opportunities for education. These technologies require new skill sets: navigating with critical thinking and dialogue utilising AI. Proficiency in data literacy is crucial for informed decision-making. The educational landscape is evolving to include personalized learning paths facilitated by AI, marking a shift from traditional search-focused learning to dialogue-based

inquiry. Understanding data models and literacy subskills are essential for making informed decisions. Today, personal data is often used to manipulate actions and beliefs, highlighting the need for data literacy in school education. Although some areas are integrating it, its role in curricula varies. This short outline offers scenarios and some key considerations for designing a more robust educational data literacy framework.

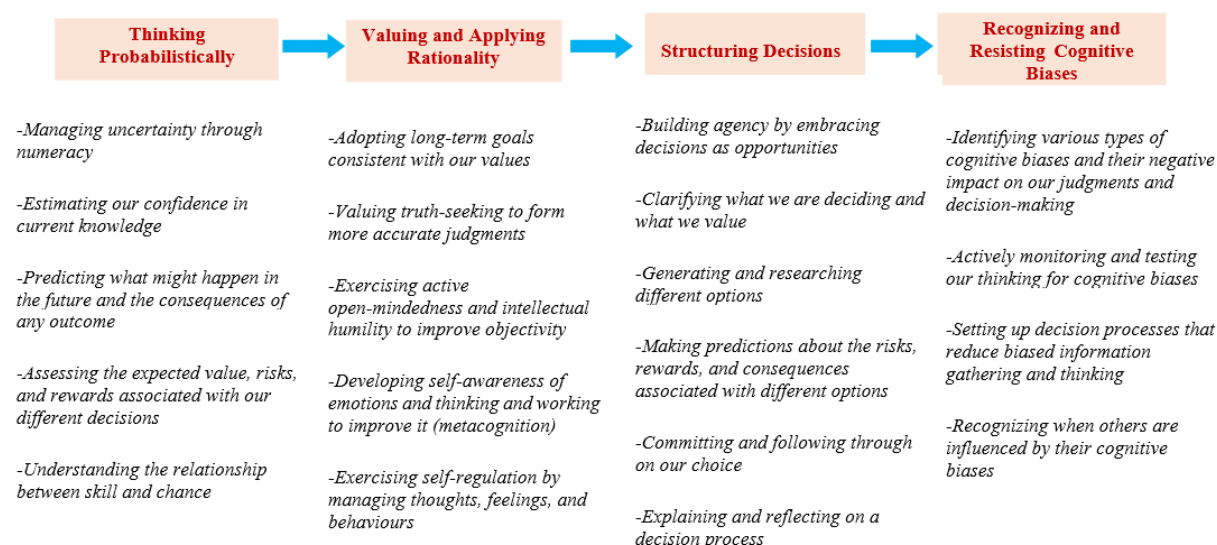


Figure 3. Learning Domains of Decision Literacy (Alliance for Decision Education, 2023)

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