What should 'digital literacy' look like in an age of algorithms and AI?

Children and young people have long been expected to develop digital skills and knowledge relevant to the technologies of their time. During the 1980s this took the form of 'computer literacy' and 'computer skills' such as learning basic programming commands and how to format floppy disks. In the 1990s, attention turned to 'internet literacy' and 'web skills' such as navigating hypertext and building web-pages. The 2000s and 2010s then saw the rise of 'cyber safety' and '21st century skills' such as online communication, creativity and collaboration. Most recently, we have seen calls for 'media & information literacy' skills relating to dealing with viral content, misinformation and fake news.

While the terminology might change, all these different 'digital literacies' are driven by a common aim of supporting children and young people to become informed, imaginative and savvy users of technology. As such, the DigiGen project is understandably interested in exploring what forms of digital literacy might be relevant to new generations of Europeans, and how digital literacy programmes can be developed for schools, families and other settings.

Rethinking digital literacy for an age of algorithms and automation

We are now beginning to see arguments that digital technology is entering a new phase that requires us to start thinking about 'digital literacy' in markedly different terms. Whereas digital literacy efforts to date have focused on supporting young people to become better users of technology, the most significant digital technologies during the 2020s are likely not to be technology 'used by' people per se. Instead, the most influential and insidious digital technologies over the next few years are likely to be technologies that are 'used on' people.

We are talking here about the rise of data-driven automated technologies – what is often referred to as 'automated decision-making', algorithmic and 'AI' technologies. These are all systems and software that sit in the background of our everyday lives – monitoring, tracking our actions and movements, extracting data from our devices, and then using this information to make decisions. Algorithmic systems are already a common feature of young people's lives – dictating which targeted advertisement appears when a toddler watches a YouTube video, or perhaps whether a school leaver gets accepted to study at their preferred university.

As such, this calls for rethinking what might have been previously talked about as 'digital literacy' as a form of 'algorithmic literacy'. Some components of this might include:

- recognising when data-driven automated systems are being used;
- having a basic understanding of how these data-driven automated systems work – what Tania Bucher describes as an 'algorithmic imaginary';
- knowing how to ***work with*** algorithmic systems – for example, writing with a natural language processing tool so that it helps (rather than hinders) your creativity;
- knowing how to ***work around*** algorithmic systems – for example, using obfuscation tactics to avoid dataveillance;
- recognising when human input and outsight is required – for example, knowing when to override an automated decision, or push back against algorithmic bias and automated discrimination.

Developing these new understandings and awareness are important for a number of reasons. On one hand, it is noted that employers are beginning to include familiarity with data and AI as a required employment skill across a range of general occupational areas. Much more importantly, dealing with algorithms is becoming a crucial part of contemporary citizenship. For example, Frank Pasquale talks about the importance of public education in order to counter the emergence of a 'black box society', where automated decisions are made that citizens are certainly not part of, and usually not aware of.

Indeed, developing these new forms of algorithmic literacy is important if we are to avoid the emergence of new forms of digital inequality and disadvantage. Recent studies highlight the danger of algorithmic understanding being patterned strongly by socio-economic background. Thus, as with any form of digital literacy, *all* young people need to be supported to ensure that algorithmic and automated technologies work in their interests (and not against their interests).

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Building algorithmic literacy in young people – so what now?

Of course, supporting the development of algorithmic literacy presents a challenge to families, educators, youth workers, and anyone else who works with children and young people. Algorithmic understandings and awareness cannot be simply taught in the same ways that one might be taught basic coding skills or how to choose safe passwords. Instead, these are issues that teachers, parents and youth workers need to 'co-learn' *with* children and young people. Algorithmic literacy is a complex and opaque area, where even computer scientists and software developers responsible for developing these systems can be unsure how they actually work. So, this is an area of education that requires adults *and* young people accepting that they all have lots to learn, and then being comfortable learning about it together.

There are already some interesting examples of what these literacy-building activities might look like. For example, there are some great practical examples of educators working with young people to develop toolkits that can support their algorithmic awareness – such as University of Toronto's 'The Algorithmic You' project. Similarly, there are some simple examples of students being supported to develop understandings of how search engine algorithms shape their research, background reading and eventual writing – with students then using these insights to rethink how to engage differently with search strategies and results. Above all, it is important that young people do not encounter algorithmic literacy as a dry abstract concept, but as a dynamic way to actively engage in shaping their digital futures.

Alongside the obvious benefits of being able to better navigate digital systems, the development of algorithmic awareness might well lead to direct democratic involvement in the politics of the digital age. In short, algorithmic literacy is likely to be an increasingly important part of digital citizenship in the 2020s. Take, for example, recent cases of UK school students protesting against algorithmic injustices related to automated exam grading, and young people in Ireland protesting against algorithmic targeting of body image and mental health messages on social media. All told, algorithmic activism looks set to be a key part of young people's lives throughout the 2020s and beyond. These are definitely topics for everyone in the DigiGen community to continue thinking about over the next few years.

Notes

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