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DIGITAL EDUCATION

The need for digital intelligence

The 'digital intelligence quotient' aims to prepare children for the dangers of the online world.

BY DALMEET SINGH CHAWLA

Children between the ages of 5 and 16 typically spend more than six hours a day in front of a screen. That rises to around eight hours for teenage boys, according to a 2015 report[1] from the UK-based market-research agency Childwise. But spending so long online may impair their ability to recognize emotions[2] and could expose them to cyberbullying and sexual exploitation.

"I find that quite scary," says Gemma Derrick, a higher-education researcher at Lancaster University, UK. The American Academy of Pediatrics echoes this concern and recommends[3] that children spend less than two hours a day with screens.

But instead of minimizing children's exposure to the dangers they may face online, one initiative is trying to build up their digital resilience, teaching children how to deal with those challenges. The 'digital intelligence quotient' (DQ) helps to provide 8- to 12-year-olds with the skills they need to thrive in the digital economy. Some schools already teach children to use digital technology by integrating computers and tablets into the classroom and teaching them how to code. They should also teach them how to use it safely, say DQ's supporters.

In 2015, Yuhyun Park, who devised the concept of the DQ, founded the DQ Institute, a think tank that aims to prepare children to be safer online. It is often assumed that technology has closed the digital divide and addressed social inequality, but Park's research suggests otherwise. A report[4] released by the DQ Institute in 2018 studied nearly 38,000 children aged 8–12 in 29 countries and found that more than half are exposed to cyber risks such as cyberbullying, video-game addiction, sexual grooming and sexual behaviour. Children in developing countries are 1.3 times more likely to be exposed to cyber risks online than those in more tech-savvy nations. The report found that 47% of children experienced cyberbullying, 11% were addicted to video games, and 10% had offline meetings with people they met online. It says that 390 million children will be at risk by 2020.

In 2017, the DQ Institute launched a plan to roll out DQ programmes to more than 100 countries by 2020. The primary target will be schools and education ministries in countries experiencing rapid digital transformations.

The DQ project has joined forces with some big names, including Google, Twitter and the United Nations children's charity UNICEF, and it has received government funding from Singapore and Mexico. The goal, says Park, is to help governments understand the level of digital citizenship among students and teachers, and to help them develop their own DQ curriculum within three years.

In South Korea, UNICEF is supporting the introduction of DQ in schools to help children manage their screen time and boost their critical thinking and technology education. "Korean children spent too much time on screens," says a representative for UNICEF Korea, and that results in a lack of both sleep and physical activity. UNICEF Korea says that DQ skills are associated with critical thinking, which is essential for science education.

ONLINE SAFETY

The DQ has similarities to the intelligence quotient (IQ), emotional quotient (EQ) and social quotient (SQ, the ability to respond effectively after reading a person's behavioural cues and emotions). All of these are needed to navigate the digital world, says Park.

A child's DQ score is calculated from categories that are considered essential to a safe and healthy digital life. The test uses a game-like atmosphere to evaluate how well children understand the importance of their digital identity, privacy management, their online footprint, critical thinking, digital empathy, cybersecurity, cyberbullying management and screen-time management. Much of the information online is unfiltered and uncensored, so DQ programmes aim to provide children with an internal filter, says Park. They teach children how to evaluate online information, avoid dodgy websites, check multiple sources and identify trustworthy sites.

As with IQ, the average DQ is 100 with a standard deviation of 15. A DQ score above 115 is excellent, and children below 85 are considered at risk. A high DQ score means that children are well prepared to use technology responsibly. Park says that a child with the average DQ score of 100 has a 56% chance of being exposed to cyber risks, but increasing the score to 110 decreases the risk to 40%. Raising it to 120 cuts the risk to 28%, she

Yuhyun Park founded the DQ Institute to help children learn the skills they need to stay safe online.

says, and raising it to 130 cuts it further to 18%.

Park says that digital intelligence consists of three components: online citizenship, creativity and entrepreneurship. Online citizenship gives a student the basics needed to operate in the online world ethically, safely and responsibly. Creativity enables them to turn ideas into reality by using skills such as coding and robotics, and entrepreneurship helps them turn a creation into something with economic or societal value. So far, however, the DQ team has developed a test for only the citizenship level, says Park.

INTO EDUCATION

Although DQ tests can be completed at home, Park thinks that teachers can help by monitoring the child's progress, answering questions and consolidating learning after completion of the programme. In a 2016 pilot study, some Singapore schools incorporated DQ into their curriculum. Some children completed the programme on school computers with teacher supervision, whereas other schools let children do it at home without input from teachers. Students at schools that were more involved achieved higher DQ scores.

Samson Wong, who teaches information technology at Man Kiu Association Primary School in Hong Kong, says that the DQ programme in his school "provides comprehensive information and useful skills to instruct our children how to use the Internet wisely and safely".

The number of jobs that rely on technology will increase, so schools have a responsibility to teach students how to use it safely and responsibly, says Sandeep Atre, founder of Socialigence, a company based in Indore, India, that runs online courses and workshops on social and emotional intelligence. "DQ will be the most logical choice for us as society to roll out in schools and colleges," he says.

Some schools in Singapore already teach DQ as part of the cyber-wellness curriculum, and in Australia it falls under the technology syllabus. Other schools use it in their ethics and character-development classes, says Park.

Maimoonah Abdul Malik, cyber-wellness coordinator at Endeavour Primary School in Singapore, says her school uses DQ because it is a good way to teach digital citizenship. But she would like to see "different age groups of students cover different skill sets and attain mastery of all skill sets by the time they graduate from primary school".

Alexander Ray Johnson, technology coordinator at the American School of Bombay in Mumbai, would like a DQ programme tailored for high-school pupils. "All those same skills need to be taught and re-taught and reviewed as the students get older," he says.

Some aspects of digital intelligence may be useful for other purposes. Critical thinking, for instance, is essential for those studying science, technology, engineering and mathematics (STEM). "Scientific thinking and critical thinking are inseparable," Park says. Derrick agrees: "If they can develop this skill early, it will be easier for them to consider a STEM career."

Critical thinking will help children succeed in STEM, says Sonia Livingstone, a social psychologist at the London School of Economics. "I am hopeful that kids' enthusiasm for technology — especially in its more creative, expressive and participatory forms — could be harnessed by schools and non-formal learning sites, including online, in ways that will transfer to STEM learning more widely," she says.

In 2017, Livingstone and colleagues wrote a report[5] for the UK government exploring the opportunities and risks faced by children online. "The report showed that the risks generally affect only a minority of children, but so, unfortunately, do many of the opportunities," Livingstone says. "If the online world is really to stimulate STEM learning, especially going beyond rote learning and the provision of one-way information, then children must be much freer to explore, experiment and engage with the online world."

Some people are concerned, however, that parents and teachers will become complacent if a child has a high DQ and treat it as a substitute for parental control. "If they say I don't need to restrict my child's screen time any more because they've got resilience, that's a bit worrying," Derrick says.

She thinks it will be more effective to restrict children's access to social media, which seems to be the gateway to problems online. She adds that social-media providers should take more responsibility for protecting the information of younger people who are more at risk. Some schools and colleges have banned computers in the classroom, but Atre thinks that banning technology in schools is only a temporary fix.

A TIME OF CHANGE

Park agrees that limiting children's access to the Internet and social media in such a hyperconnected world will be difficult. Instead, she says, we need to equip children with the skills they need to be resilient in the digital world, and that's where DQ programmes can help.

How effective DQ is depends on whether it is used appropriately, says Jason Nurse, a lecturer in cybersecurity at the University of Kent, UK. "I think DQ has great potential for change and digital empowerment in children as well as adults," he says.

But Whitney DeCamp, a sociologist at Western Michigan University in Kalamazoo who has studied how violent video games affect behaviour, doubts that the problem DQ is trying to solve is as big as Park suggests. He is concerned by the "alarmist language" of the DQ Institute's report. He also thinks the DQ categories are too broad, so less-risky behaviours are lumped into the same category as more-harmful ones. For instance, he says, a child visiting a site with sexual content may be placed in the same category as one talking to strangers online about sexuality, even though the latter is far more risky. DeCamp says it may be more useful to look at the DQ categories separately, rather than as a combined score.

The digital world is evolving quickly, points out John Mayer, who studies emotional intelligence at the University of New Hampshire in Durham. While we introduce measures such as the DQ, artificial intelligence and augmented and virtual reality are creating environments that humans have never experienced before. Including DQ education in schools could help children navigate this complicated new world, but education needs to keep up with the pace of change in society, he says: "There are very few pieces of this puzzle that are holding still." ■

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1. *Connected Kids: How the Internet Affects Children's Lives Now and Into the Future* (Childwise, 2015).
2. Uhls, Y. T. *et al. Comput. Hum. Behav.* **39**, 387–392 (2014).
3. American Academy of Pediatrics *Pediatrics* **132**, 958–961 (2013).
4. *Outsmart the Cyber Pandemic* (DQ Institute, 2018).
5. Livingstone, S., Davidson, J., Bryce, J. & Batool, S. *Children's Online Activities, Risks and Safety* (London School of Economics, 2017).