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# In Finland, We Make Each Schoolchild a Scientist

Teaching research skills and encouraging inquiry from the earliest ages can build social resilience to misleading information.

**M**uch of the conversation around misinformation and mistrust focuses on messengers and message systems. Some emphasize that policymakers and scientists must communicate more effectively, others that social media platforms must moderate content and revise their algorithms. The topic that is neglected is how individuals decide what information is trustworthy.

For most of the twentieth century, information was mediated by librarians, disciplines, experts, journalists, and others who determined which sources and details were valid and which were not. By contrast, members of today's society have all been entrusted with the responsibility to carry out that incredibly important task without really being aware of it. Just type a keyword into a search engine, and you'll get thousands of answers in the blink of an eye, with little sense of who is behind them or what their intentions are.

The challenge of modern life, then, is to navigate through these choices while filtering out misleading information, which has risen exponentially. I, and many other Finns, have come to believe that schools and education can help meet this challenge. Since 2017, when rankings began, Finland has earned the top spot in media literacy among European countries. These scores (derived from scores on press freedom, civic engagement, public trust, reading competency, and scientific literacy) are taken as a measure of resilience to fake news. Included in this measure is the fact that Finland also scores well in science in international student achievement assessments.

## Every child a fact-checker

Kindergarten may seem like a counterintuitive place to fight “fake news,” but Finland arrived at this approach by necessity. In 2014, at the time of national and European elections, the country observed an increasing flood of Russian propaganda, medical disinformation, climate denialism, and other misleading online content. That year, the Finnish nonprofit Faktabaari launched to provide fact-checking information about the elections. But it was quickly apparent that the service was inefficient, as so many more people access misleading content than relevant fact-checking material. The better route was to teach people to be their own fact-checkers, with a program of digital literacy.

As a director of a school in Helsinki with more than 800 pupils aged 5 to 18 years, I was excited to collaborate. A new Finnish curriculum was launched in 2016 with an element called “multiliteracy,” which involved making sure children could competently navigate online media and social platforms. We realized quite quickly that fact-checking concepts and methods could be adapted to the school environment to support the new curriculum. Since 2017, as a pro bono expert, I have been leading Faktabaari EDU, a project that extends fact-checking skills into the classroom. In math lessons at my school, kids learn about how statistics can be deceptive; in history, they study propaganda campaigns from the past. Even folklore, in which the wily fox tries to trick his victims, reinforces the idea that active critical thinking should be a regular part of ordinary life.

We soon discovered that children enjoyed playing Sherlock Holmes when fact-checking the claims teachers gave them to be verified. After some trial and error, the teachers building the curriculum boiled down complex fact-checking methods into three fundamental questions: Who's behind the information? What's the evidence? What do other sources say? These questions are folded throughout the curriculum, across subjects, and there is continuity from year to year. Young children may learn to tell the difference between a mistake and a hoax, while older students may undertake more advanced projects on elections and threats to democracy.

To be sure, in some ways Finland is an outlier. Our resilience is partly cultural, but it has been developed intentionally during recent decades, in part because education is seen as part of collective civil defense. Our population is highly educated with strong levels of trust in other people, public news sources, and civic institutions. Since the 1980s, educational standards have required Finnish teachers to have a master's degree, which means they are all familiar with the research process. These teachers bring a culture of research into their classrooms and are empowered to design activities around students' ideas rather than relying on rote lesson plans.

In addition, Finland's education system reflects deep cultural values. International visitors to my school have been surprised to see that, in early childhood education, pupils spend nearly half of the day outdoors, in the school yard or in the nearby forest, exploring and having fun. According to the Finnish national curriculum for early childhood education, children have the right to play, to learn through play, to enjoy what they learn, and to build a sense of themselves, their identity, and the world according to their own starting points. Students in our classrooms are expected to think and to enjoy thinking. In secondary education, students have lessons in separate science subjects—but with the same hands-on experimental spirit.

### Creating Sherlock Holmeses by the million

It would take a lot of time to copy the Finnish approach fully, but a host of experiments in the European Union and beyond suggest that the basic idea can be replicated. The European Commission Expert Group, on which I serve, has explored how education and training initiatives can tackle disinformation through digital literacy in schools throughout Europe. We have produced a report and practical guidelines for teachers and other educators on tackling disinformation, which include activity plans and insights on how to create student-centered approaches. One of the central challenges is that teachers need training, guidance, and support as well as ways to measure the effectiveness of these lessons.

Although much work remains to be done in developing an evidence-based curriculum, the evidence is accumulating that these interventions are effective. A study conducted in 2019 with nearly 500 high school students in a US school district found that just a half-dozen 50-minute lessons could help students demonstrate appropriate skepticism of online information. One exercise asked students to look at a tweet of a child supposedly in Syria lying between two mounds described as his parents' graves. (In fact, the child was in Saudi Arabia posing for an art project between piles of rocks.) Students received credit for noting that the post did not identify the tweet's author and for questioning what the image really showed. Another exercise involved tracking a website's sponsor to an oil company.

Wealthy countries are not the only ones that can use these interventions. A cluster-randomized controlled trial in Uganda found that a series of nine 80-minute lessons given to 10- to 12-year-olds could help them assess claims about health treatments. (Schools in the program received two days of teacher training in the curriculum, a textbook, teacher's guide, and other materials developed in consultation with Ugandan teachers.) A commentary in *The Lancet* praised the program for showing such education was possible “even in resource-poor settings with large student to teacher ratios.”

But this kind of curriculum is far from mainstream. A recent Stanford University-led study that resulted in the report *Science Education in an Age of Misinformation* brought together more than a dozen international experts, including myself, to consider the problem. One of our conclusions was that classroom instruction too often focuses on transmitting simple facts. Science educators have a new, critical responsibility to ensure that their students are equipped with skills that can guard them against pseudoscientific online claims.

In practice, that means science teachers should explain how knowledge is established in science, that science is committed to producing knowledge based on testing evidence, and that is why scientific knowledge can be trusted. The Stanford study recommended revisions toward this end in educational standards, curricula, and teacher training. Moreover, assessments must be revamped to test whether students can find flaws in scientific arguments and evaluate the credibility of sources.

Of course, schools alone will not eradicate misleading information or people's susceptibility to it. But teacher guidelines, focused curricula, and educational standards are an essential part of the solution. Society must pay at least as much attention to children's minds as to social media algorithms.

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