

THE CONVERSATION

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'You catch criminals with DNA': What kids know (and don't know) about genetics

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Children are getting their (mis)information about some scientific concepts from mass media sources. Genetics image from www.shutterstock.com

“DNA is your blood in you, we can use DNA as evidence if someone’s been stabbed. We can run tests in suspects.” (Girl, 12, central Queensland)

“DNA has to do with blood types and fingerprints, it helps to identify us. It can find out criminals and relatives.” (Boy, 10, outback New South Wales)

“DNA is blood. Genes is a part of you, DNA is your uniqueness inside you... you can be identified by your DNA and your fingerprints. If there’s a robbery, can get fingerprints, that’s DNA, and put them in the computer and find out who it is.” (Girl, 11, coastal South Australia)

These three children were among 62 children aged 10-12 interviewed [about genes and DNA](#). For subjects not taught until much later on in the curriculum, these primary school students clearly know something about these complicated scientific concepts – even if their knowledge is limited.

But if they're not getting their information from school, then where are they getting it? And do schools need to start teaching these concepts earlier?

Learning gaps

The new [Science curriculum](#) first mentions genes and DNA to 15 year-olds (Year 10). Children aged 10-12 are considered concrete thinkers, and thus unable to cope with abstract concepts such as genetics.

Yet today's children are surrounded by the mass media. The children interviewed in the study mentioned were a sub-sample of 141 who completed a mass media survey. The results showed that on average they spent five hours and ten minutes of their daily non-school time exposed to one or more forms of the mass media, including over 800 hours of TV in a year.

Genetics play a prominent role in many TV shows, newspapers, and magazines. And it's clear the science education system has not kept pace with the changing world of children today. The notion that children's more diverse life experiences might make them less concrete thinkers than children in the 1950s (when the [underpinning work by French Psychologist Jean Piaget](#) was done) has not been considered by curriculum writers.

[Genetics education research](#) worldwide shows that the current one shot teaching of genetics at ages 14-15 is unsuccessful. The literature reports misconceptions and failure to reach adequate levels of understanding.

Too much too young?

Yet alternative approaches are only recently being sought. There is a groundswell of educators willing to consider introducing core concepts into primary school to provide firm foundations upon which high school science can build.

A genuine interest led 27% of the children interviewed in this study to research genes and DNA for themselves resulting in detailed knowledge. For example Willis (not his real name), an 11-year-old boy, gave full descriptions of DNA sampling from hair follicles, and how to take a biopsy for cancer. Such clarity would be unlikely if he was unable to grasp the concepts and process this information to construct a coherent framework in his mind.

Willis was not the only knowledgeable one. All but one child knew humans would have genes/DNA, with 89% knowing information about DNA and 60% knowing about genes. DNA was linked to crime-solving by 77% of the interviewees, and to family relationships (paternity, adoptions, and finding unknown soldiers) by 65%. Willis was one of 31% interested in links between DNA and disease.

These findings show many of the children were ready and wanting to learn about genes and DNA.

From the results of the study, it's clear TV is a major source of their information – 80% of the children said this is where they learnt about DNA and genetics. Most were very savvy about where, correctly apportioning the amount of information about DNA to particular TV shows. Perhaps shockingly, 79% of the children watched crime shows rated for ages 15+ of which NCIS was their overall favourite, followed by Bones, The Mentalist, and then CSI.

CSI is often blamed in the media (for example, the debate over [the CSI effect on jurors](#)), but in this study, it wasn't all CSI's fault. Rather than a CSI effect on children's knowledge, I found a more general "crime show effect".

Mass effect

Undoubtedly, the mass media provides information in compelling and powerful ways. Few schoolteachers could replicate these methods in their classrooms.

In one study, a group of researchers showed the movie [The Core](#) to middle school students alongside many learning experiences about geology. They found the students best [recalled the information in the movie](#). If one movie showing had so much effect, the effect of repetitive viewing is likely to be greater.

So, rather than trying to beat Hollywood at its own game, teachers (and parents) could work with what children might be learning from mass media. After all, these shows are getting them interested in science, so why not use that interest to "round out" their knowledge?

For example, half the children in this study thought DNA was limited to blood, fingerprints, saliva and other forensic samples. DNA is found in these body parts but that knowledge needs completing by explaining DNA is in nearly all cells in the body; these are just the parts easily obtained for testing.

This study opens debate on several fronts, from parental control over children's TV viewing to whether primary teachers should have conversations about TV and genes and DNA with their students.

What do you think? Is it time for genetics to be taught earlier? Should parents pay closer attention to what children watch? Please leave your comments below.