

Can a children's TV show change clichés?

A STUDY ON GIRLS AND STEM ISSUES BEFORE AND AFTER WATCHING *ANNEDROIDS*

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This article summarises the findings of a reception study in Germany. 187 children watched 2 episodes of *Annedroids* and were surveyed before and after the show on their knowledge and attitudes regarding girls and STEM (Science, Technology, Engineering, and Mathematics).

"Girls and robots do not really go together." When being confronted with this cliché only 14 % of the 90 German girls between 7 and 12 years disagreed totally. By contrast, the survey reveals different results in Canada and the US: 53 % of the 155 girls strongly disagreed with the statement. The stereotype that girls are not good or even interested in STEM issues is a common belief worldwide, and prevents girls from developing interests and attractive job perspectives in these fields (Shapiro & Williams, 2012). Even if they feel interested and talented at younger age, it is difficult for girls to overcome these imposed gender stereotypes from later school-age on (Cvencek et al., 2011). The various factors that contribute towards these sexist beliefs are complex and include unintended messages from parents and teachers, cultured everyday life rituals, available role models in these fields, and symbolic messages that STEM topics are a "naturally given" strength of boys. Media, especially children's leading medium – television – could play a key role by breaking this stereotypes. Unfortunately, for the most part, chil-

dren's television further contributes towards these stereotypes; in children's TV and family films, female characters rarely use technology (Götz & Lemish, 2012) or represent a professions in the STEM field (Smith et al., 2012), and the few exceptions of women in the roles of scientists are stereotyped and sexualised (Dudo et al., 2011).

Inspired by this finding and its presentation at the PRIX JEUNESSE International festival in 2010, J.J. Johnson, a producer, scriptwriter, and director from Canada, created a TV series with a girl lead who is both curious and highly competent in STEM-topics: *Annedroids*.

Each episode across the 4 seasons features 22 minutes of live-action combined with CGI animated characters around the 11- and later 12-year old Anne (who invents androids) and her two friends (see J.J. Johnson in this issue).¹ The show focusses on STEM issues and clearly has a very unique gender concept – but is it working? Can a show for children open up perspectives towards STEM issues, especially for girls grown up in a German environment that does not foster this idea? The study by the International Central Institute for Youth and Educational Television (IZI) investigates this question.

Method

In the study, children between 7- and 12-years-old (n=187) in Germany watched two episodes of *Annedroids* (episodes 1 and 5). Before and after screening the programme, they were tested on their level of knowledge (of topics presented in the episode) and their attitudes towards technology and gender.² The same method was used with children in the US (n=203) and in Canada (n=98) in the summer of 2015.

Children enjoyed *Annedroids*

Overall, the show is received extremely well in Germany – 88 % of the children assessed the program as "super" and 99 % stated they would watch the show again. Notably, these results are exceptionally positive compared to a range of other studies of this kind the IZI had carried out on current programmes, and even better than *Annedroids* ratings from the USA and Canada.

Scientist Anne is particularly popular among girls, Nick among boys

When asked about their favourite character in the show, nearly six out of ten girls named Anne (58%). As reason for their preference, girls particularly frequently cited Anne’s interest in science and her inquiring mind: “Because she does a lot with technology and I like that. Boys are not the only ones who can handle technology” (Olga, 9 years). Anne (Ill. 1) is seen as highly intelligent and competent, with a positive aura and full of creativity and ingenuity: “She is nice and resourceful and she invents things” (Erika, 9 years). Many of the girls (44%) and every tenth boy feel that “Anne is a bit like me”, a good starting point for identification.

listed this character as their favourite “because he has a cool voice and is able to talk” (Nathanael, 9 years) and “[Pal] wants to know a lot” (Marietta, 9 years). Some children preferred the female android Hand in particular “because this character is strong and is the biggest” (Gustav, 10 years).

How Annedroids expands children’s knowledge

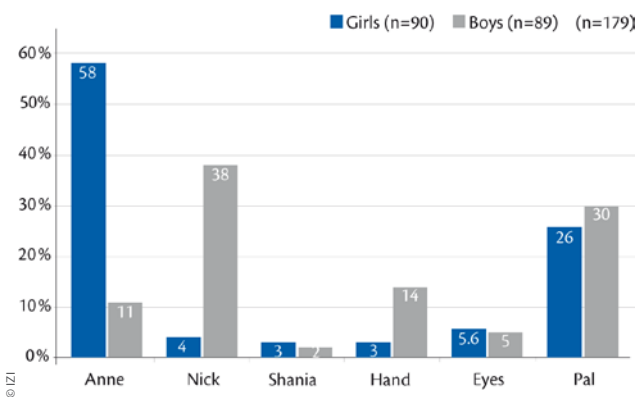
Nearly every episode of *Annedroids* tells a story about a specific STEM topic. The two episodes we used for this study dealt (among others) with laser light, lightning rods and how sound travels. Children’s learning was evaluated using multiple choice questions before and after the show was viewed. All

participating children gained knowledge. For example, knowing how laser light travels increased from 50% correct responses in the pre-test to 76% after watching the episode where Anne and her friends use laser lights to secure their area. Girls

after the screening. Similar results emerged in response to the question of whether knowing a lot about the topic of technology is important for the future. The series encouraged a more positive view of technology in this sample for a third of the children. Presumably, the series familiarised them with the concept of technology and thus they recognised its practical everyday value.

In international comparison, girls from the US and Canada started with an increased interest in technology. After watching *Annedroids* their interest also increased, but by a significantly lower amount (approx. 10 percentage points). Distinguishing the comparable attitude towards technology after viewing *Annedroids* between the girls growing up in North America and Germany provides evidence that a show like *Annedroids* might help to balance some cultural deficits.

After watching the series there is a clear rise in the affinity for construction and crafts in regard to career perspectives.³ Statements concerning career aims as a beautician or hairdresser or as a “star” on stage are markedly reduced. However, no significant change could be found in girls’ future perspectives in computer-related fields. This could be due to the fact that *Annedroids* primarily presents STEM issues as something to build and try out. Although Anne often uses computers to do so, the process of coding is not shown as main part of invention, particularly in the episodes chosen.



Ill. 2: Favourite character in the show

Nick, the 11-year-old black boy new to Anne’s neighbourhood, is very popular among boys. “He is cool” (Timo, 12 years) and able to deal competently with technology. A majority of boys and some of the girls see similarities between themselves and Nick’s character; and there is absolutely no evidence that for the Caucasian-white children Nick’s dark skin is an obstacle to identifying with him.

Besides the human characters of the show, the android Pal who has recently been brought to life, was received particularly well in the German sample of children (Ill. 2). Nearly every third boy (30%) and every fourth girl (26%)

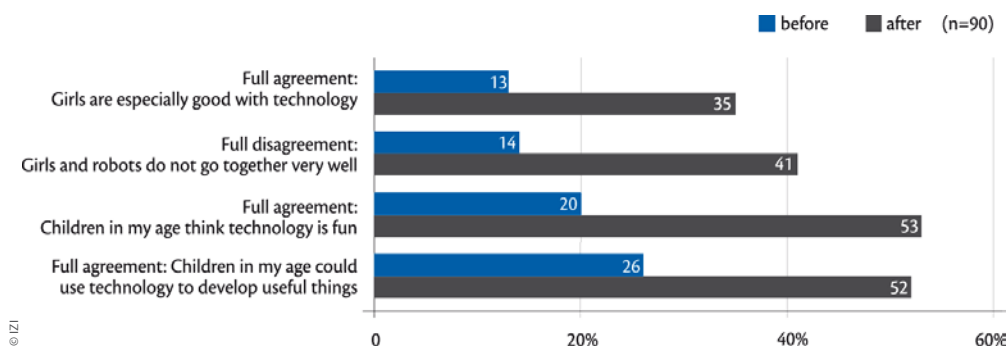
in particular benefited from this way of learning facts in the STEM area. Overall, girls started from a lower level of knowledge, but nearly matched the boys’ level after watching the two episodes.

Where Annedroids changes children’s attitude to technology

Do children at this age enjoy technology? Before viewing *Annedroids*, only 20% of girls in Germany “strongly agreed” with this statement, but the value rose by a third to 53% afterwards. A similar increase in interest was seen among boys, although the boys started at a level almost twice as high as girls (with 39%), which increased to 68%

Where Annedroids changes children’s attitude to gender stereotypes concerning STEM

Before viewing *Annedroids*, when confronted with the gender and technology stereotyped statement, “Girls do not like to play with technology”, only 16% of children in Germany strongly disagreed with no significant difference in age groups or genders. Gender differences, however, appear after watching *Annedroids*. The programme’s impact



Ill. 3: *Annedroids* has a positive impact, especially on girl’s attitude towards technology

But even if they received a mere glance that they might enjoy playing with technology and inventing things, it is a progress and worthwhile telling stories in the field of STEM with a well deliberated gender concept.

is emphasised by the fact that 36 % of the girls strongly disagreed with the statement after the screening of the two episodes, while the boys’ attitude remained basically unchanged. Again, the study revealed clear cultural differences: In North America, girls in particular disagreed strongly with the statement (72 % “strongly disagree”), and after watching *Annedroids* this value increased to 77 %.

The same tendencies were found with statements like “Girls and robots don’t really go together”, where the strong disagreement rose after watching the show, especially among girls from 14 % to 41 %. After 2 episodes of *Annedroids*, at least 4 of 10 girls could imagine that girls and robots mesh with each other (Ill. 3). However, the children in Germany still lag far behind the values in North America, where 7 of 10 girls think that girls and robots could fit very well after viewing the show.

Conclusion

Watching a show like *Annedroids* has a positive impact on the attitude towards technology. It fosters the idea that technology is something to enjoy and have fun with even at their age and that knowing a lot about the topic is important for the future. Children also gained knowledge on the STEM facts that are interwoven in the story. By watching stories featuring kids using technology to create useful things in everyday life, children viewers can

be inspired to do the same and learn relevant facts explained or discovered in the show’s episodes.

Annedroids has had a positive impact on gender stereotypes, but mainly for those viewers mostly restricted by the cliché: girls. Not all girls changed their attitude, but some did. It appears that statements such as, “Girls do not like to play with technology” or “Girls and robots don’t really go together” are particular gender stereotypes which *Annedroids* helped to deconstruct.

The study also revealed the strong impact of different cultures – in a more obvious way than we expected. Compared to the participants in North America, the children in Germany had a markedly lower level of basic technical knowledge and a less positive attitude towards technology. Unfortunately, they also lag behind those in the US and Canada concerning their gender equity and the remoteness of technology for girls. However, after viewing two episodes of *Annedroids*, German girls’ openness towards technology and potential career perspectives in the STEM area improved – while the boys often stuck to their prejudices.

Of course, this study is just a snapshot of knowledge and attitudes of children and no sustainability of changed knowledge or attitude is surveyed. It might be that the German girls are already back to their distance to technology and gender clichés towards STEM issues.

NOTES

- ¹ The series is produced by Sinking Ship Entertainment, in association with broadcasters TVOntario, SRC and KiKA, premiered on Amazon Video in 2014 in the UK and US, and TVOkids and in Germany in 2016.
- ² The questionnaire included both open and closed questions. In addition, the children drew pictures of what they particularly liked or disliked about the show.
- ³ Prior to viewing the show, only 43 % of girls could imagine building or constructing something with their hands. After watching the show, this number rose to 60 %.

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