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I like *Dino Dan* “because it was pure fantasy”

A reception study with preschool children

An IZI study with 59 preschool children in Germany considered the question how children understand the TV series *Dino Dan*, and what knowledge and attitudes towards research they take from it.

A normal day in a Canadian town. Dan is sitting on the porch reading a book for his homework. Suddenly a huge Brachiosaurus appears on the street in front of the garden, its long neck stretching into a treetop. As the prehistoric creature is standing in the middle of a residential area, the contrast with the parked cars shows vividly and impressively how big the dinosaur actually is. Dan is delighted that the Brachiosaurus, which is the subject of his homework, has appeared.

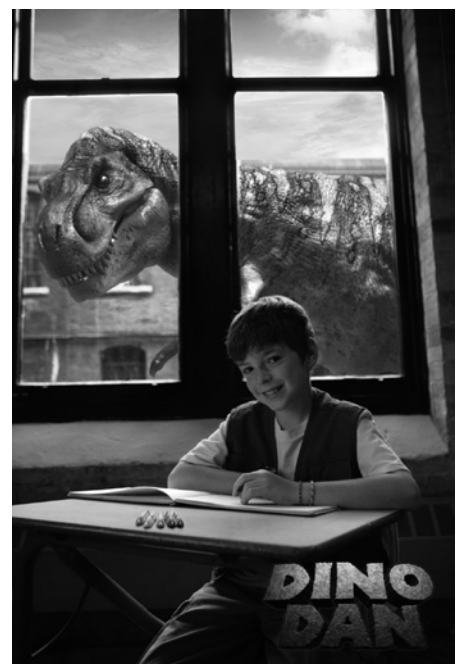
Dino Dan, initially produced for Noggin (USA) and TVO (Canada) and later sold to over 15 countries,¹ tells stories from the everyday life of the 10-year-old protagonist Dan Henderson. Dan’s whole life revolves around dinosaurs, he knows all their names and details, draws dinosaurs and writes about them, and at school, too, he raises the subject of dinosaurs at every suitable and unsuitable opportunity. He is so fascinated by these prehistoric creatures that he can see them – and so can the viewers. This is a live-action series, featuring real children in a Canadian town, and – thanks to CGI-/3D computer animation – life-size dinosaurs (cf. ill. 1). Facts relating

to the subject of dinosaurs are integrated into the plot. In one story, for example, we are told that the Stegosaurus can change the colour of its bony plates to communicate how it is feeling and to defend itself during attacks.

The premise of the series is that only Dan, his dog and the viewers can see the dinosaurs. How do preschool children understand this actually fairly complex concept, and the stories? Do they gain knowledge from the series? We investigated these questions in an IZI study.

The study

On 4 consecutive days, 59 children aged between 3 and 6 watched 2 of the 10-minute episodes of *Dino Dan* per session, i.e. a total of 8 different episodes. Before and after watching the episodes the kindergarten children were questioned individually about the programme, their knowledge about dinosaurs, and their attitudes towards research, learning and fantasy. The interview was supported with picture cards and dinosaur figures, to show and re-enact the plot of the programme. These served as age-appropriate communicative tools enabling the kindergarten children to show their knowledge and recall of the stories and relationships (cf. ill. 2). All the viewing sessions were recorded on video. Using picture-in-



Ill. 1: The live-action series *Dino Dan* features real children in a Canadian town and animated life-size dinosaurs

picture technology, the programme being viewed is embedded into the video recordings of the children and analysed for attentiveness and interaction in relation to the plot.

Dino Dan has huge appeal

The show is very well received by the children interviewed. They clearly have fun watching *Dino Dan* (cf. ill. 3), which they also rate very positively in the interviews. 4 out of 5 preschool children described the programme as “really good”, the boys



Ill. 2 and 3: Ben (4 years) presents what he learnt and remembered from the stories (left). “Now the real show begins, yeah!”: 3- to 6-year-old viewers enthusiastically watch the opener of *Dino Dan* (right)

(86 %) somewhat more often than the girls (75 %). Among the 5- and 6-year-olds the “really like” rate is actually 100 % and 93 % respectively, i.e. “excellent”. A number we have never seen before for any other programme.² In short: *Dino Dan* is a success!

A core element of content for the children is clearly the dinosaur theme: “Because it was so cool with the dinosaurs” says Jana, aged 4, explaining why she really liked the programme. The dimensions are a source of particular fascination (“the huge one with the long neck” – Paul, 4 years), and the fact that different dinosaurs keep appearing, looking authentic and carrying on quite normally in everyday life. The older kindergarten children also enjoy the knowledge gains: “Because you could see what the dinosaurs looked like and what they were called” (Jacqueline, 6 years).

Favourite characters: Dan and his ideal mother

The children’s favourite character is Dan. Dan’s unusual ability to see dinosaurs everywhere is not described or presented as “crazy” in the narrative or by the children or the teachers in the programme. His imagination is what gives meaning to the stories and the experiences around which the stories are built. Three quarters of the children interviewed think it is “really good” that Dan imagines so many things. And somewhat more than 80 % of the kindergarten chil-

dren interviewed are of the opinion that Dan’s friends also think it is really good, or a little bit good, that he always imagines a lot of things. The premise that each member of the group is accepted, not teased or put down (by teachers either), is an appealing fantasy for the young viewers and gives positive feelings about the viewing.

Another element which makes watching the programme very enjoyable for preschool children is the character of Dan’s mother. A single parent and a police officer, she is always understanding and supportive of Dan’s ideas and concerns. She thinks up a fantastic dinosaur treasure hunt for his birthday, and encourages his scientific curiosity, but also sets reasonable limits, e.g. when it comes to tidying his room. For the children in front of the television, she is the embodiment of the ideal mother. Almost two thirds of the 3- to 6-year-olds interviewed think it would be “great to have a mum like Dan’s”.

At the same time, many preschool children would not necessarily like to be Dan. And yet the preschool children very much enjoy watching the stories about his fantasy worlds, and imagine being part of the story.

Which stories are remembered best?

Of the 8 episodes watched, the stories best remembered were those in which children, as active agents, find out something about dinosaurs – in (from

a child’s point of view) spectacular everyday events. Take for example the episode about Dan’s birthday. His mother has prepared a dinosaur treasure hunt for him and his friends, leading first to the birthday piñata and then to the birthday

cake shaped like dinosaurs. A very attractive story for children, with a clear narrative line and a wish-fulfilment fantasy, in which the kindergarten children have plenty of opportunities to join in and guess the answers. Another story which was not only attractive but also offered particularly valuable learning gains for the younger children is an episode in which Dan finds out why a Stegosaurus changes the colour of the bony plates on its back (cf. ill. 4).

In the episode “Moody Dino”, a reptile expert visits the class and shows a real chameleon, which the children are allowed to hold and touch. Soon someone asks why the animal does not adapt its colour to match the shirt of the person holding it. This picks up on children’s previous knowledge, and the assumption that changes in colour serve to camouflage the animal is disproven through practical/experimental experience.

When Dan and his friends feed the chameleon, it changes from beige-brown to blue-grey, as the change in colour is partly connected with the animal’s emotional mood. This surprising knowledge gain is now transferred by protagonist Dan into his everyday life, which is shaped by dinosaur fantasies: he carries out his “Dino Experiment 120”. Armed with his experimental equipment – a fishing rod, an apple and a recording device –, he investigates the question: “Did a Stegosaurus change the colour of its plates to show its mood? I’m gonna use my apple to find out.”

He lures a Stegosaurus with an apple on a fishing rod. When he repeatedly pulls the food away from the prehistoric creature, its plates turn red with annoyance.

Screenshots from *Dino Dan* © Sinking Ship Entertainment, Canada

Ill. 4 and 5: Children learn from *Dino Dan* facts e.g. about the Stegosaurus (above), especially when built in a story which focuses on a child as an active agent like Dan (below)

When the dinosaur finally gets to eat the apple, they turn blue again. This leads Dan to the explicitly formulated insight: “Amazing! The Stegosaurus does change the colour of its plates to show its mood! Dino Experiment 120 closed.”

When another dinosaur then threatens the Stegosaurus, it changes the colour of its plates again. Dan draws the conclusion: “Ooohh! The Stegosaurus is changing the colour of its plates to tell the Spinosaurus to back off! ... It worked, the Spinosaurus goes away. So a Stegosaurus does change the colour of its plates for defence. Just like Jim said. Wow!”

This tells a story of learning, in which Dan answers his question in a self-directed way through experimentation and observation. A story in which the preschool children are cognitively and intellectually engaged throughout. There are various aspects here which connect with their own world of experience: children as protagonists, school as a familiar setting, the prior assumption which is evoked, and the chameleon. Through the successful linear storytelling from a familiar concept – which, astonishingly, turns out to be false – to a learning path self-directed by a child, the viewers are cognitively and emotionally in-

involved throughout. This is also evident from the learning gain: on the day after seeing this episode (and watching 3 other episodes), three quarters of the preschoolers interviewed remember that it was the Stegosaurus that could change the colour of its plates.

A few children can also explain why it changes its colour:

“When it’s angry and it’s distracting the dinosaurs, then its plates turn red.” (boy, 4 years)

“So that it can show its feelings.” (girl, 5 years)

“To defend itself. Because when it turns red, the other dinosaurs think it’s got fire [...] and then they run away.” (boy, 6 years)

It is not the words of protagonist Dan that they are reproducing here, but a connection which they deduce using previous knowledge and their own narrative constructions. Understanding stories and deriving learning gains from them is an active process. If a television story succeeds not only in being well understood, but also in having its main messages remembered, this is evidence of a successful story structure (cf. also Fuhs et al., 2012).

Where children get a little bored

There are also moments in the programme in which the preschoolers are visibly less emotionally and cognitively involved. This is the case when the programme is too didactic and fact-oriented. The analysis of the recorded viewing sessions shows, for example, that when adult experts lecture on facts, as talking heads in front of the class (and thus in front of the viewers), without seeking to interact with the children in the class, the child viewers increasingly turn away and yawn, obviously waiting for something interesting to happen.

Nor do they remember what the experts have said in these cases – even if they use hand puppets and talk about dinosaur excrement. Even a hand puppet is a talking head, and other studies have also shown that talking heads dramatically decrease attentiveness (cf. Götz, 2009).

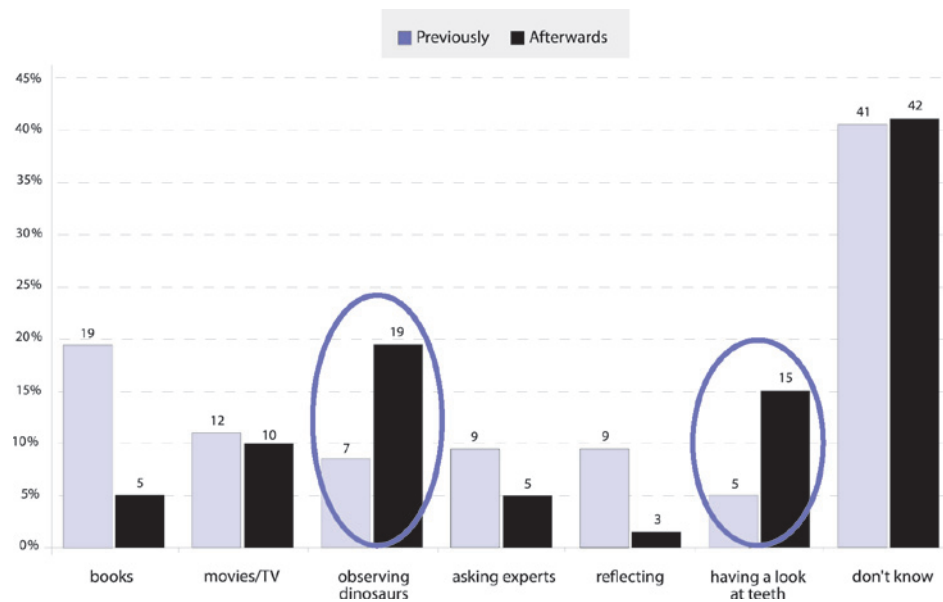
It is not only the adults who are a little boring in some places. When series hero Dan and his friends deliver too much “talk” and too much expert knowledge, the attentiveness of the younger viewers in particular (3- to 4-year-olds) also decreases markedly. Here, the story changes its mode of address. While *Dino Dan* is essentially a story in which viewers in front of the television can follow a learning experiment, engaging mentally and emotionally, the programme becomes, in (just a few) places, a didactic lecture about things which the younger children are unable to remember anyway. For the older preschool children it can still be interesting; here the fascination of expert knowledge on dinosaurs is what counts. But for the younger ones the story offers a space of reception in which they cannot connect with the content, and where the talk goes over their heads. They switch off mentally and wait for the next thing they will be able to relate to, usually the next appearance of a dinosaur.

All the children, however, give the programme their full attention when the stories are shaped by the activity of child characters (cf. ill. 5). Enthusiasm is on their faces when they look for clues for the cake with Dan and his friends at the birthday party, or when they explore and discover the many parallels between today’s animals and dinosaurs on a visit to the zoo.

What is needed is an age-appropriate narrative which meets children at their current state of knowledge and, using a clever and reliable mode of address, leads them in the direction of greater knowledge and a positive emotional experience.

Children learn dinosaur facts and “learning how to learn”

One thing that children get out of the *Dino Dan* stories is facts about the dinosaurs. For example there are the names of the prehistoric creatures; these are most easily remembered if the name is cleverly built into the story and given emotional resonance. Names were recalled less well if different words were used within the episode (e.g. Brachiosaurus and Long-neck), or if the names of the prehistoric animals were only mentioned by Dan in passing, without being emotionally integrated or part of the story. As in a study on learning through stories, based on the example of *Caillou*, it becomes clear how important the right interplay between content, dramatic structure and learning content is (cf. Unterstell, Götz & Holler, 2012). The children also gain specialized knowledge about dinosaurs, knowledge that Dan has appropriated through his experiments in the stories, e.g. that “the Stegosaurus [...] can change colour” (boy, 6 years) or “that the T-Rex can’t grip all that well” (girl, 6 years). Another thing that some of the children get out of the programme, however, is techniques of knowledge acquisition, the so-called metacognitive skills (cf. also Reich et al., 2009). When asked in the interview “How do you find out what a dinosaur has eaten?”, children most often answer, before watching the programme, “look it up in books” or “look on TV”. After 8 episodes of *Dino Dan* the proportion of children who also mention other methods increases. Alongside receiving and repeating knowledge by looking things up in books or watching specialist programmes, they now see exploring things for themselves or going on their own journey of learning as possible ways of acquiring knowledge. In order to find out



Graph 1: “How do you find out what a dinosaur has eaten?” The children’s answers before and after watching 8 episodes of *Dino Dan* indicate that *Dino Dan* fosters metacognitive skills

something about dinosaurs, one could also “observe dinosaurs” or “look at their teeth” (cf. graph 1). This is exactly what Dan did in the series. Now one could of course argue that placing one’s hopes in the observation of dinosaurs is not a particularly helpful approach in everyday life. Transferred to the acquisition of knowledge in general, however, the realization that research-oriented observation can lead to insight is extremely valuable. In this sense, the programme fosters metacognitive skills, in some children at least, by means of stories showing various learning pathways.

Stories which encourage children to explore ...

Before and after viewing the 8 episodes, the 59 kindergarten children were asked questions about their attitudes towards “research”. This included their personal view of whether they could imagine that “children [also] like learning difficult things”, or “can find out and discover things which nobody has found out before”, and whether there was a gender difference here. Before the study, a quarter of the kindergarten children could not imagine at all that children might

like to learn difficult things. After 4 days and 8 episodes of *Dino Dan*, this dropped to just 1 in 10 children. The stories clearly showed them that children like to engage with complex facts, if the topic interests them. Some girls in particular are certain, after the study, that children really like to learn difficult things. Similarly, when asked whether children of their age or slightly older are good at discovering and finding out things, around a third of the children say “not at all” before the study. After the study this number also drops to 1 in 10 children. The conclusion is obvious: there is an increase in (self-) confidence about the fact that children of their age or slightly older can also learn and research difficult and complex things. The story of a boy who competently pursues his passion for dinosaurs and his investigation of these prehistoric creatures changes presuppositions about children’s abilities, and thus encourages them to research and learn. Dan is – even though the story takes part in a fantasy-enriched world – a real character. As found in other studies this offers a greater learning opportunity than stories with pure fantasy characters (Richert et al., 2009).

... especially boys

A clear gender difference emerges, however. A quarter of the girls change their assumption about whether children can find out things that nobody knew before from “not at all” to “a bit”, but not to full agreement. With the boys, the proportion of those shifting from “not at all” to “definitely” rises by a fifth. It is mainly boys who come away with the certainty that children are good at exploring things. After all, this is what the programme clearly shows: a boy investigating the world. Girls are also present, but the focus is on Dan as the researcher who finds out new things.

Now it might be argued that this is the gender-specific assumption which accords boys in general – even at kindergarten age – more skill in carrying out research. In answer to the explicitly gender-specific question “Do boys or girls enjoy exploring things more, or is there no difference?”, just over 60 % of all the children assume that this makes no difference. Over half see no difference between boys and girls – at least when explicitly asked. There are also, however, those who do have marked gender assumptions: 2 out of 10 girls (but none of the boys) think that girls are better at research. Just over a third of all the children assume that boys enjoy exploring more; 4 out of 10 boys think this, and 2 out of 10 girls. Thus for some, indeed a quarter of the boys, the series exactly reflects their prior assumptions: it is boys who explore the world. This makes it all the more astonishing that, after 8 *Dino Dan* stories, some of the boys change their assumptions in favour of girls. Unlike most other children’s series, *Dino Dan* features a girl who sometimes has more detailed knowledge about dinosaurs than Dan: his friend Angie, a very keen dinosaur researcher. Just showing girls who research competently and appropriate knowledge can change the images in some viewers’ minds. And yet the role division is still very clear here.

Dan takes centre stage, and Angie is a subordinate character, who often misses the most important things. The premise of the show is that only Dan (and his dog Doug) can see the dinosaurs. So whenever a dinosaur comes into the picture, Angie has to disappear. As a result, she never makes any ground-breaking discoveries, and this is probably the reason why girls are significantly more hesitant than boys to change their opinion about whether children can find things out.

Gender representation in children’s television programmes is important! If boys are in the role of researchers, this encourages all children in their perception of what children can do – but boys much more so than girls.

Only 6-year-olds grasp reliably who can see dinosaurs in the show

Finally the question is: “How do kindergarten children understand the basic concept of the programme? Who do they think can see the dinosaurs in *Dino Dan*?” Among the 3-year-olds, just 1 in 3 children thought that only Dan could see the dinosaurs, among the 6-year-olds it is 8 out of 10. With increasing age comes greater understanding of story structures of this degree of complexity. Just over a third of children think that everyone can see the dinosaurs. Sometimes with the additional argument, “I can see them too”, which is of course true. And the question remains: is it even important what mental concept the children have about who can actually see the dinosaurs on the street in this series and why? What is relevant, however, is that the programme offers children a successful learning space which they really enjoy: as 6-year-old Eva says, explaining why she really likes *Dino Dan*, “because it was pure fantasy”. ■

NOTES

¹ According to the information on the homepage of *Sinking Ship Entertainment* (retrieved from http://www.sinkingship.ca/series_dinodan.html, [26.03.2013])

² Over 20 programmes were examined with the corresponding question and age-group.

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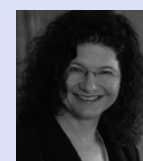
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