

When children learn from children's television

RECEPTION STUDY ON THE EFFECTIVENESS OF KNOWLEDGE PROGRAMMES ON ECOLOGICAL SUSTAINABILITY

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A reception study with 195 German pupils investigated how children deal with educational programmes for sustainable development on television.

"Worldwide, more than 200 million tons of plastic are produced every year. We use much of it only once and then simply throw it away. The problem is: plastic doesn't rot like wood, for example, it lasts for centuries. In everyday life, plastic is super convenient, but our gigantic consumption has now become a real problem for the environment – and also for us humans."

With this introductory description, presenter Tobi addresses topics of great relevance to society in the episode *Der Plastik-Check* (The Plastic Check) of the children's science programme *Checker Tobi* (BR). Alongside justice and climate change, sustainability and resource consumption are just 2 aspects that have been increasingly heard in the public debate for decades, especially in the face of visible problems, and that determine our future, but above all that of children. Therefore, it is important to interest children in issues of sustainability and to enable them to orient their actions in such a way that present and future generations have good living conditions. Education as "Education for Sustainable Development" (ESD for short) can significantly support these requirements (Michelsen et al., 2013; Overwien & Rode, 2013).

CORE ELEMENTS OF ESD AND THE OPPORTUNITIES OF CHILDREN'S TELEVISION

The goal of Education for Sustainable Development is "to enable people to recognise problems of unsustainable development and to act in such a way that generations living today and in the future have the chance to realise a 'good' life in social, ecological, cultural, and economic terms" (Michelsen et al., 2013, p. 16). Globalisation processes bring about significant changes for everyone. Children and young people in particular are sensitive, for example, to the dangers of serious environmental changes or to the poverty that is widespread worldwide. They need to acquire the necessary skills to enable them to orient themselves in a globalised world and develop their own values and attitudes. In this context, the guiding principle of sustainable development should be an important reference point of the learning area "Global Development" (KMK/BMZ, 2015).

In concrete pedagogical practice, this means, for example, promoting empathy and mindfulness through experiencing nature, which communicate natural diversity and vitality. Community and self-organization are promoted, for example, during mountain tours, during which, of course, no trash is allowed to remain

"on top." In theatre work, for example, the view of the whole is trained as children narratively comprehend the effects of their own actions on others. In the context of school, measuring energy or water consumption or finding out where certain foods come from are important basic elements of ESD. In doing so, questions critical of consumption always resonate and awareness should be directed to the question: What do I really need to lead a happy life? (e.g. Michelsen et al., 2013)

Television is still the leading medium for children. It shapes their inner images of, e.g., foreign countries (Götz, 2006); it is often the first time they encounter other cultures, gain factual knowledge from children's programmes, construct connections for themselves, and form guidelines for their future actions (Holler et al., 2013). Children in Germany spend an average of almost 90 minutes a day watching television, which is the longest regular unit of time in their leisure time apart from meeting friends, doing homework or studying (mpfs, 2017). Accordingly, children's television would have a great opportunity to promote education for sustainable development. There are diverse offerings on the topic of "ecological sustainability" in children's programming. But do they succeed in initiating educational processes in children?

MEDIA ANALYSIS

In the first step of the study, in 2014, in a cooperative project between the IZI, PRIX JEUNESSE Foundation and Engagement Global ("Promoting global learning through children's and youth television"), one programme each from the serial formats *Checker Tobi* (BR), *pur+* (ZDF), *Die Sendung mit der Maus* (WDR), *neuneinhalb* (WDR), *logo!* (ZDF), *Löwenzahn* (ZDF) and *Erde an Zukunft* (KiKA) were selected that deal with the topic of waste and/or plastic. Qualitative content analysis was then used to determine which potential educational approaches the programmes offer for ESD.

- Does the programme find ways to make the topic meaningful and emotionally engaging for children?
- Can it convey knowledge in the area of facts and connections of ecological topics and initiate new thinking skills?
- Does it promote action competence by making decisions recognisable, offering decision-making arguments and making individual opportunities for action clear?
- Does it allow those affected to have their say, does it clarify the idea of intergenerational justice, or can it even convey basic principles and guidelines for sustainable living and action?

It turns out that all programmes try to convey certain facts. *Checker Tobi*, for example, conveys that 5 billion plastic bags are used in Germany every year, and *logo!* shows how waste is separated. In some programmes, didactic guidance is used to encourage new ways of thinking, as in *pur+*, where it is made clear that a cell phone contains valuable raw materials such as copper that have to be recycled, partly because natural resources will be depleted in the foreseeable future. Some programmes try to suggest options for action, such as the programme *neuneinhalb*, in which awareness is raised and tips for

a plastic-free life are given, or as in *Löwenzahn*, where a week without waste production is exemplified. In rare cases, those affected are given a voice, such as in *Erde an Zukunft*, where children share their ideas for a more sustainable future. Often, however, the basic principles of ESD, such as "living well instead of having much" or "enough for everyone forever" are not obviously included and the clarification of intergenerational justice is missed. This is surprising in view of the young target audience, which has to live with the consequences of our current actions and for whom the consequences will be much more concretely visible.

Nevertheless, it is clear that various educational approaches are offered in the programmes. However, a reception study by IZI on the effectiveness of knowledge programmes on ecologically sustainable action for children investigated whether these really promote education for sustainable development.

THE STUDY

A total of 195 German pupils aged 6 to 11 were filmed watching various programmes or excerpts from the programmes.

- 93 children saw contributions from the children's magazines *neuneinhalb*, *Checker Tobi*, *Erde an Zukunft* and an explanatory piece from the children's news programme *logo!*
- 102 children saw a different compilation with contributions from *pur+*, *Die Sendung mit der Maus*, *Löwenzahn* and another explanatory piece from *logo!*

Before and after, the 6- to 11-year-olds were asked in individual interviews about the appeal and basic issues of ecologically sustainable action. In small groups, they watched the programmes. Immediately after the reception, they were asked to draw a picture of the scene from which they learned the most. With the help of an "after"

questionnaire, they were asked about the increase in knowledge and the change in attitude. This was followed 3 weeks later by another guided interview to find out whether the children's knowledge, attitudes, and actions had changed in the long term. Among other things, it was investigated what the children took away from the contributions and what action consequences they drew from them. In addition, a targeted study was conducted on the presenters. The recordings during the reception were evaluated with regard to the degree of attention and visible reactions such as comments, laughter or disgust.

In the following, the results are summarised in terms of which specific sequences proved to be particularly successful in terms of attention and ESD and what can be concluded in principle for learning with television.

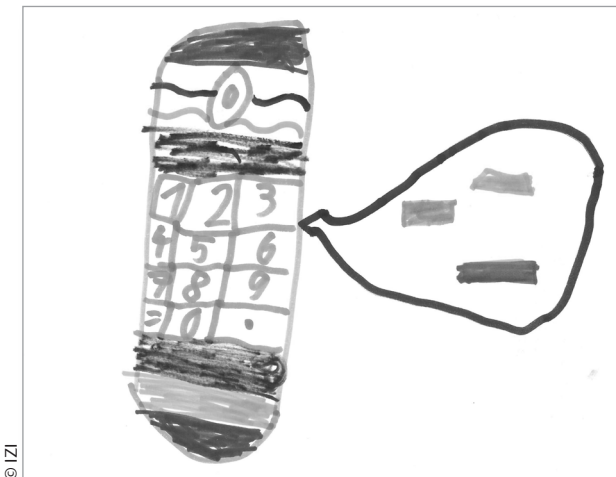
WHAT DOES IT TAKE TO MAKE LEARNING POSSIBLE?

Attention

Children focus their attention on things that are meaningful to them. If programme content can connect to familiar things, the likelihood of interest increases. What is needed, therefore, are links to what children know, what they enjoy and what interests them. In the context of the reception study, various such typical points of connection emerged.

Children like to see children

A consistent pattern of attention is that when children see other children on the screen, their attention is initially high and can then remain high or decrease, depending on the content. This was very clearly shown in the programme *Erde an Zukunft*. If adults speak or presenter Felix speaks longer monologues in the studio, a number of children look away bored. But when children and their wishes are the focus,



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Ill. 1: For Patrick (8 years), the mobile phone was an attractive point of contact

viewers are highly attentive. In the after-test, too, it is often the scenes with children that are painted. The episode *Eine Welt ohne Müll* (A World Without Garbage) begins with the girl Merle and her wishful thinking about a future without garbage or the possibility of simply dissolving garbage. Based on this future fantasy of one child, the episode addresses the question, "Is it possible that we will produce less or even no rubbish in the future?" Many children remember this particularly positively and also draw and describe it, for example 10-year-old Katharina: "The one with the girl, the one with the future, that she wanted that, that there wouldn't be so much rubbish anymore." Dennis (age 7) therefore also rates *Erde an Zukunft* as the best programme, "because the kids are allowed to speak their minds." In *Erde an Zukunft*, children present their own future utopias for a common coexistence and living together on our planet. Allowing those affected to have their say on the subject of ESD and involving children in creative solutions for the future has therefore paid off here.

Animals often guarantee attention

As in other studies on attention in knowledge programmes (Götz, 2004; Holler, 2013), it was again shown here that animals are particularly attractive to children. In the context

Another example of a successful link to the everyday world of children is connecting to their special interests, i.e. things that they particularly value. For example, the topic of cell phones as "treasure in the trash" was very well received by *pur+*, attracted a lot of attention and was well memorised (Ill. 1). When asked what she liked best, Sabine (age 9), for example, answered: "What I liked best was when they took the mobile phone apart." Using the cell phone as an example, the children were very clearly taught which valuable and finite raw materials, such as copper, can be found in cell phones, and that they can be recycled and should not be thrown away. This topic also showed a high learning gain. Almost two thirds of the children (64%) did not know before the reception why copper is such a valuable material for us. Immediately after reception of the programme, two thirds (67%) of the children were able to answer the question correctly. And even 3

of this study, this was particularly evident in the example of the dog Keks, the second protagonist from the programme *Löwenzahn*. He had an incredibly high attractiveness value for the children and was mentioned and painted very frequently.

weeks after reception, 2 thirds of the children interviewed still know why copper is valuable, such as Emma (age 7): "Because you can build cell phones and telephones with it but you have to be very quite good at dividing because the scientists think it will run out in about 50 years."

Targeted design

Children memorise particularly well when the design of the programme specifically involves them and caters to their perceptual preferences.

Attractive objects

Close-ups and details

Children pay attention to close-ups and details, while long shots and non-specific images tend to be unattractive to them. Children tend to be "detail



Screenshots from Die Sendung mit der Maus © WDR



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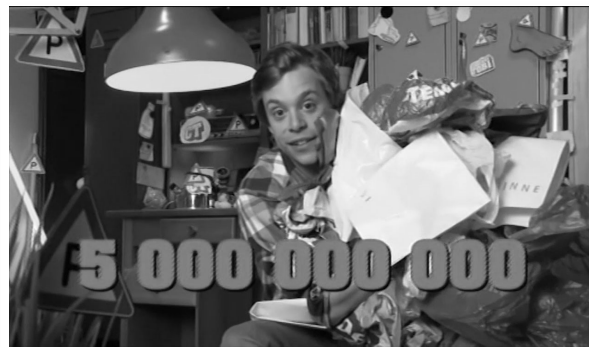
Ill. 2-4: In *Die Sendung mit der Maus* children can see in detail the process of sorting out the rubbish

RESEARCH

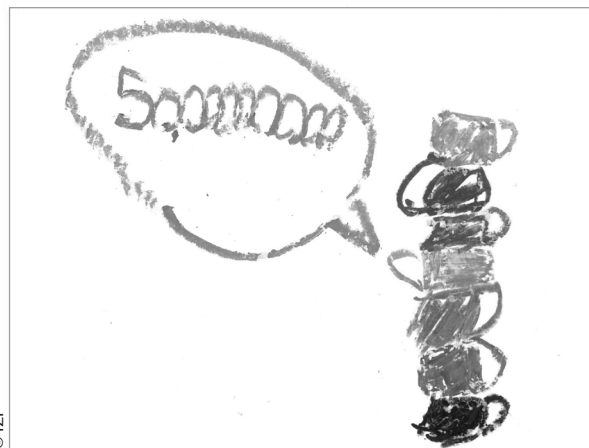
seekers” who want to look closely. That takes time and appropriate camera work. In *Die Sendung mit der Maus*, for example, children enjoy being able to watch very closely, supported by close-ups and slow-motion shots, how combustible plastic particles are separated from the rest of the garbage in large sorting machines in order to produce an alternative fuel to coal (Ill. 2-4). Accordingly, 8-year-old Phillipa particularly enjoyed this programme, “because you could really see this station, where the garbage was processed, and they showed it really well.”

Surprising facts in strong pictures

High attention, visible reactions of astonishment and good memorisation can be achieved by surprising facts, especially if they exceed the previously imaginable dimensions of the children. The programme *Checker Tobi* is a prototypical example of this. The presenter Tobi reports: “We waste a lot of plastic day after day with ever new plastic bag. In Germany alone, an incredible 5 billion bags are used every year. That’s a 5 with 9 zeros.” In parallel, first “5 billion” then “5,000,000,000” is superimposed as script at the bottom (Ill. 5). To further emphasise this fact, which is astonishing for children, a huge mountain of bags is finally shown and presenter Tobi is shown next to it as a small person who, to demonstrate the unbelievable ratio, becomes smaller and smaller: “I wouldn’t look so small compared to the mountain of bags, and I wouldn’t look so small, but this small!” Finally, Tobi,



Screenshot from Checker Tobi © BR



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Ill. 5-7: Presenter Tobi illustrates the number of plastic bags consumed in a striking way

now barely recognisable, asks in a squeaky voice, “Can you still see me? Hello, down here!” (Ill. 6) The children not only find this moment very funny, they also react with amazement to the high number of plastic bags and have memorised this surprising fact, which was didactically very cleverly designed and initiated in a variety of ways (Ill. 7).

Before the reception, only one third of the children knew how many plastic bags we consume in Germany per year, but directly after the reception, it was over 90%. Even 3 weeks after

the reception, 75% of the children surveyed still know this.

A dramaturgy that involves emotionally

Children like to be emotionally involved in the story, they want to think and experience. A prototype for this in the study was an episode of the programme *neuneinhalb*, in which reporter Johannes takes on the challenge of doing without plastic completely for 2 days. This self-experiment “Life without plastic – Johannes tries it out” appeals to many children in particular. 9-year-old Thorsten describes it as “very interesting (...), how he did the test to see if he could manage without plastic.”

The basic concept of the show is already set up as an experimental question: “Can you live without plastic?” This stimulated the children to think along and further. In the reception, the children actively followed which and above all how many things Johannes had to part with for his project. Several children showed an astonished expression

on their faces or expressed surprise when they realised, for example, that CDs and DVDs or clothing (polyester) are also made of plastic. They memorised particularly well the scenes close to everyday life that show how exhausting life without plastic can be. While shopping in the supermarket, the reporter seems to have found a supposedly plastic-free packaged buttermilk. Some children here already suspect that this cannot be true, and comment during the reception, “I don’t believe it!” When Johannes learns at the cheese counter

that, due to hygiene regulations, he is not allowed to simply take cheese home in a plastic-free glass container he has brought with him, quite a number of children are stunned to the point of astonishment. A successful dramaturgy has been found here that repeatedly activates children in different ways to think and empathise. This is particularly worthwhile for Education for Sustainable Development. The children follow how Johannes himself experiences what it means to live plastic-free. And he does so in all consequence: Since the reporter initially does not succeed in finding a replacement for his plastic toothbrush, he has to go to bed without brushing his teeth – a moment that is greeted by the children with a mixture of joy, disgust and astonishment. On the second day, while shopping, Johannes finally discovers a wooden toothbrush. The authenticity of the self-experiment and the demonstration that a sustainable lifestyle is not all that easy help to initiate new ways of thinking and options for action. For example, many children take away from the show how necessary plastic can be in everyday life or how they could be more sustainable with plastic. Even 3 weeks after the reception, they are still thinking about it, for example 10-year-old Amelie: "Because you also saw that you can replace things, that it doesn't mean I can't live without plastic, because he showed us that you can also live without plastic."

Even if it sometimes seems a bit strange to adults, a direct invitation to guess along is very attractive for children. In *Erde an Zukunft*, the children's knowledge was expanded in a didactically interesting way. In a guessing game in which the children acted as experts and were able to actively participate in thinking about how long a plastic cup takes to rot, the moderator Felix appears somewhat help- or clueless. He does not manage to decide in time for one of

the offered answers. The stimulation of interactivity works extremely well with the children. The reception analysis shows that they guess along with the moderator, who doesn't know the answer, or they are ahead of him with their knowledge and are happy that they have found the right solution.

Problematic: Experts and talking heads

However, there are also moments in the programmes when the children are visibly less emotionally and cognitively involved. This is especially the case when experts speak and explain things with their expert knowledge (Götz, 2009). The evaluation of the reception recordings in the picture-in-picture procedure shows, for example, that when adult experts talk about facts and procedures as talking heads or are clearly lecturing, the children increasingly turn away, yawn and obviously wait for something more interesting to finally happen again. In *pur+*, for example, presenter Eric meets researchers who use a special drilling method to search for raw materials in ancient landfills. After sorting the waste from the boreholes, which is quite attractive for the children, one of the experts explains the future viability of such boreholes and makes projections – one of the moments that are rather uninteresting for children and in which they start to get bored.

In *Checker Tobi*, an operating engineer explains the procedure at an oil production pump and lectures on the finite nature of oil resources. Attention in reception wavers here, especially when the expert speaks, and the presenter Tobi does not establish contact with the children through eye contact or interposed questions.

However, it is not only the experts who are a bit boring at some points. Even a very likeable presenter who, as in *Erde an Zukunft*, explains things in a studio without doing anything is

ultimately a talking head and has a hard time getting the full attention of all the children.

WHAT IS A GOOD WAY TO LEARN?

Broadening horizons through visualisation

In the programme *pur+: Schatz im Müll* (Treasure in the Garbage), the presenter Eric visits, among others, researchers who are searching for resources in the soil of a former landfill site. At the beginning, a trick technique is used to illustrate how underneath a seemingly natural, grass-covered mountain lies a landfill where garbage has been stored for years. Faded-in years illustrate the different layers of rubbish. Here, the children's perspective is surprisingly broadened, and they learn "that the rubbish is buried in the ground and then there is another layer and another layer" (Andrea, age 7).

Through the vivid explanation in *Die Sendung mit der Maus* about the production of substitute fuel from waste, the children not only memorised child-like, unfamiliar words such as "fluff" (abbreviation for "flyable fractions" of secondary fuels¹), but they also gained new knowledge about the fact that there is such a thing as large "magnetic machines" (Tibor, age 7) for separating waste in the first place.

The children also expanded their contextual knowledge, for example, regarding recycling and alternative resources, like 8-year-old Lisa: "The rubbish you can't use anymore, you burn it and then you don't need coal."

Strong images and strong sequences

Checker Tobi featured visualisations of facts or abstract concepts, such as the "5 billion plastic bags" (see above) or the "plastic vortex", which had a special explanatory value for the children and



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Screenshot from logo! © ZDF

III. 8-9: Marius (10 years old) has painted, what he took away from the logo! programme as a concrete option for action: The shopping basket is a sustainable alternative to the plastic bag

were perceived as enlightening and impressive. With the help of a model consisting of 5 test tubes filled with water and coloured paper scraps, which he arranged on a map of the world, Tobi demonstrated the accumulation of waste in the world's oceans. Using a stick, he moves the water in circular motions, referring to a whirlpool of water like when water runs down a bathtub. This is a sequence that is particularly informative for children, as it uses a clear image that is reduced in its complexity to give them a lasting understanding of a non-concrete con-

cept. Most children (75%) do not know what a plastic swirl is before the reception. Immediately after the reception, more than half of the children (53%) can describe exactly what a plastic swirl is. Even 3 weeks after reception, 60% of the children still remember what a plastic swirl is. Like Armin (age 9), "A plastic whirlpool, it's a whirlpool in the ocean that sucks in other trash and then it gets really big over the years and there are 5 plastic whirlpools." Many children even reflect critically on what they have learned and relate it to other knowledge they have acquired about the harmful consequences of plastic. For example, Armin (age 9) reflects the following 3 weeks after the reception "that if you throw the plastic in the water, then animals will just

eat it, and maybe we will have plastic in the fish fingers."

Emotional charging

Emotions are central to any learning process (Götz, 2013). In addition to various humorous moments in the programmes, the reception analysis surprisingly also showed that there was a visibly high emotional reaction (disgust) of the children when they saw a large load of residual waste being tipped off a rubbish truck in *Die Sendung mit der Maus*. This led to a consistently very high level of

attention and particularly good memorisation of details. For example, even the 6-year-olds still remember the various things like "old cups" or "dried flowers" that were found in the residual waste and had to be sorted out in order to recycle the waste into secondary fuel.

Orientation sets by "significant others"

Children take their cue from the protagonists and presenters of programmes. In the study, for example, the ingenuity and deeds of protagonist Fritz Fuchs from *Löwenzahn* surprise and impress the children. To win a bet, he recycles trash in a special way in the episode *Kampf der vollen Mülltonne* (The Battle of the Full Rubbish Bin) and makes works of art out of trash: pinwheels out of plastic bottles, shoes out of newspaper, dog toys out of old socks as well as a mousetrap out of cans. Korbinian (age 8) thought it was particularly great "that he made new things out of all that". Fritz Fuchs is the connecting figure. Together with him, the children think about the problems and then learn from him, as an explainer, the solution to specific problems or possible solutions. They can then look at these in turn. Attention during the reception is outstanding continuous and the children gain options for action for reusing and avoiding waste from Fritz Fuchs' actions. Learning is made possible here because the actor actively and consistently stands for an attitude. For example, Bele (age 9) tells us in the interview, "That thing in *Löwenzahn*, I thought that was good, what you can do with trash if you're willing."

Concrete options for action

An explanatory piece on the children's news programme *logo!* uses the example of Lara and her family with characteristically animated figures to explain how trash can be avoided

in everyday life. For example, it is shown that by using a breakfast box for snacks or a shopping basket, less waste is generated by plastic bags, which take a very long time to rot. The children take away a surprising number of facts and a lot of contextual knowledge from the short piece (Ill. 8 and 9). Children find it particularly valuable that *logo!* not only explains to them what they have already heard, but also gives them completely new ideas and offers them concrete possibilities of what children can do to act in a sustainable and environmentally conscious way. The 9-year-old Emilia also evaluates the *logo!* contribution with all its options for action for children as particularly positive, "because they showed the examples and I then also understood it well and I then also imagined it and that was not something that 'the world' can do about it, but what we, i.e. what you yourself can do about it as a little one, as a small world, so to speak". Three weeks after the reception, some children report having passed on to others the options for action they had gained for themselves. For example, 8-year-old Christina discussed with her parents afterwards "that we don't use so much plastic and stuff like that and only use cloth bags or cloth bags for shopping and also don't buy so much plastic."

SUMMARY

The reception study shows that children take something away from the programmes. They have gained expertise in the area of ecologically conscious action. For example, they can better classify words like "recycling" and know how many plastic bags we consume. Many children have recognised connections, for example how long a plastic cup takes to rot, what plastic is made of and that our resources are valuable and finite. The basic questions posed by the pro-

grammes encouraged the children to think along and think further, which meant that what was shown was particularly well memorised. They gained concrete options for action and demanded them (at least from their parents). Many of the children also gained or were confirmed in a favourable attitude in terms of ESD. For example, for some children, paying attention to the environment and reducing their ecological footprint has become more relevant. Also, 3 weeks after the reception, the children describe a change in their own behaviour (e.g. avoiding waste) and show a higher sensitivity and increased awareness of ecologically sustainable actions.

Accordingly, contributions are of high quality in terms of attractiveness and learning gain if they allow for links to the children's living environment and different approaches to a topic. Children memorise facts more easily if the content is skilfully prepared and placed in a context that makes sense to them. This can be a connecting character, but also a successful explanation with appropriate visualisation. It is also important to involve the children, to give them a voice and to show their examples. In this way, even complex topics can be experienced and grasped, and new ways of thinking can be initiated that contribute to rethinking one's own decisions for action or considering new options for action.

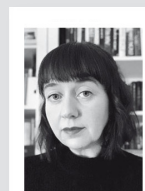
NOTE

¹ Cf. for example http://www.hamburger-wirtschaft.de/html/hw2008/artikel/17_innovation_umwelt/08_09_26_abfall.html [18.06.2017].

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