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How to make people make a change – using social labelling for raising awareness on sustainable manufacturing

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Abstract

Raising awareness on sustainable manufacturing, especially when it comes to low qualified target groups, remains a challenge. After a decade of considerable campaigning work, the majority of German population still does not understand the holistic concept of a sustainable development, let alone its manufacturing aspects. More effective communication methods are required. The main challenge lies within stirring people's willingness to gain knowledge and to actually consider it when making behavioral choices. In the reported research, the socio-psychological concept of social labelling is introduced as a method for raising the awareness on sustainable manufacturing of non-professional target groups and for triggering durable behavioral change. A social label is largely independent from actual knowledge, attitudes or behavior; it rather enforces attributed personal traits. A field experiment, in which the influence of social labelling on the awareness and behavior of young recipients of an informational event has been measured, has verified the method for the purpose of sustainability communication.

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1. Communicating sustainability – why and how

Sustainability has become an urgent requirement for the future well-being of life on earth, considering the limits of resources and growth as well as the unequal distribution of wealth. Although sustainable development is a major issue in political and economic debates worldwide, the concept has not yet reached the majority of people. A significant shift of paradigms towards sustainable consumption and production is not in sight.

Considering the global scope of the sustainability challenge, especially with regard to emerging countries' populations, the target group, which must be convinced of the sustainability paradigm contains about seven billion people – consumers and stakeholders. Only if we succeed in reaching the majority of humans there will be a true chance for a sustainable development [1]. The Organisation for Economic Co-operation and Development and the United Nations agree on education being the main resource for awareness raising in this matter [2]. Awareness raising is considered to be the starting point for behavioural changes. A special focus of the Agenda 21, the UN development program for the 21st century, lies in children and teenagers as target groups since they will be the stakeholders of tomorrow. However, teaching sustainable development has proven more difficult than expected.

1.1. What people know about sustainability

In Germany, the programs "21" and "Transfer-21" have been set up as local forms of the Agenda 21 from 1999-2008 in order to improve sustainability teaching at German schools, with moderate success. Half-way through the program, the participating schools were asked to identify the most promising classes and study groups for a survey [3]. About 50 % of those most promising students said they still did not understand the term "sustainable development" after they had been taught the subject. As many said they did not know what

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they themselves could do for a sustainable development. In 2005 only 5 % of all German schools offered any activities with respect to sustainability issues, many of them not in the form of teaching [2].

This rather depressing statistic was reflected in a preliminary study that the authors conducted in April 2012, asking 15 girls aged 10 to 12 about sustainability and environmental protection, using guided interviews. The participants took part in educational experiments on renewable energy resources at the Technische Universität (TU) Berlin and most of them were above-average students. Out of those 15 participants only one girl said she had heard the term "sustainability" before but could not explain what it meant. Environmental protection had been covered more broadly in classes and within the girls' families, so that they offered a much broader and more detailed knowledge about problems as well as possible measures than when asked about sustainability. However, the understanding of sustainability grows with increasing age and educational level. This was shown in another survey carried out by the authors that accompanied a scientific youth competition at the Production Technology Centre Berlin. More than 50 % of the 49 participating students aged 9-19 years could put a meaning to the term "sustainability" when answering a questionnaire. All of them had a distinctive educational background. But even their understanding of the term's scope often remained one-dimensional, usually ecology-centred.

This ignorance is not confined to school children. According to a bi-annual representative survey conducted on behalf of the German Federal Ministry for the Environment, only 43 % of the Germans had heard the term "sustainability" before in 2010 [4], after it had been part of the political agenda for more than a decade, as can be seen in Figure 1. Still, this was considered a success, for in 2004 only 22 % of the respondents had had any associations with the term. Other studies show, that out of those who have heard the term before, only 50 % connect it to environmental issues and such of development [5]. The other 50 % had less concrete ideas of what the term might actually mean. More recent polls conducted by the market research agency GfK state that the acquaintance of the general public with sustainability terminology has increased [6]. In the 2012 poll with 1.000 random participants, 25 % of the questioned adults had never heard the term "sustainability" before. In 2014 it was 14 %. As before, 50% of those who had heard of sustainability before felt sure to know it. So, 43 % of the grown up population thought they were familiar with the term in 2014. Understanding of the overall concept and awareness for its multiple meanings in everyday life, however, has remained low. Again, environmental aspects are strongly associated with sustainability whereas social aspects are widely neglected. Only about 4 % of all participants associated the term with future-oriented behavior in more than one sphere, e.g. ecology and economics and society.

Germany can be considered a nation with an elaborate educational system and easy access to information for almost everyone. How can it be explained that after 15 years of intensive efforts to communicate sustainability through federal institutions and broad media coverage only 43 % of the people feel they understand the term "sustainability" and no more than about 4 % associate it with future-aware behavior?

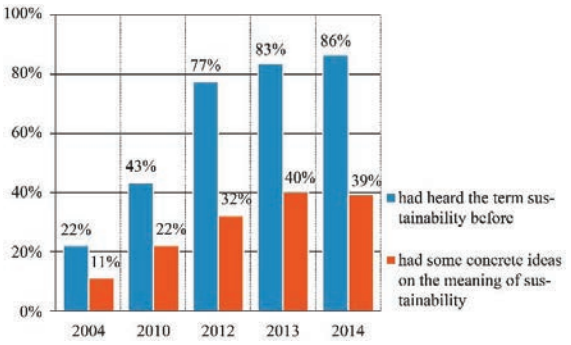

Fig. 1: Average Germans' acquaintance with the term sustainability over time

1.2. From simple to complex

It is important to note that while the term "sustainability" is not received easily within the population, its rationales are widely respected in German society. Inter-generation and international fairness are mainly morally accepted concepts [5] as well as the need for resource efficiency, the threats of pollution and climate change, and so on [4].

Why then is it so difficult to communicate the term and implement it in general education, e.g. schools? One major cause clearly lies in its lack of ability to mobilize people as well as in the complexity of the concept itself. Up to the 1990s, the public debate that later turned into sustainability communication, still had a clear environmental framing. Fueled by catastrophes such as in Bhopal and Chernobyl with strong media coverage, environmentalism became a social representation, an element endowing social groups with identity [7]. This showed in political activism, broad framing in educational institutions, the media and the private sphere alike, and a sheer explosion of well-designed information and teaching materials. In short: It triggered strong reactions in civil society and central ideas got well implemented in people's thinking, as is considered necessary for a sustainable development today. Yet the phenomenon was not repeated when the debate turned from environmentalism to sustainable development after the United Nations Conference on Environment and Development in Rio de Janeiro, 1992. There, social and economic concerns were added to the agenda of environmental threats [8]. However, this did not result in an increase in private activism or a reception of higher urgency due to the extra threats to well-being, although it could have offered a broader field for identification. On the contrary, when the concept of sustainable development as a multi-perspective issue was introduced, a strong trend of "de-dramatization" [5] set in, which constantly increased for a decade. The challenges and possible measures were communicated and regarded as less immediate and rather

long-term in their effects, which resulted in reduced short-term mobilization.

Another obstacle to communicating sustainability is the concept's complexity. The term is often criticized as missing clear outlines and being used inconsistently [5, 8, 9]. Measures can increase sustainable development and reduce it at the same time, e.g. when a turn towards environmental friendly products and more selective consumption patterns leads to job cuts, unemployment and higher poverty rates at the production site. How can that be? The dominant model of sustainable development used today is that of the three pillars of sustainability that became popular around 1995, saying that sustainable development is only possible when all three spheres – economic, social, and environmental – are equally addressed. The model was the attempt of a super-framing that could combine the diverse perspectives and claims that competed for leadership within the sustainability discourse in the beginning of the 1990s [9]. It made way for cooperation and strategic alliances where beforehand there had been only excluding competition. It was a concept that everyone could agree upon. The other side of the coin is that a concept, which is broad enough to contain contrarious perspectives, must naturally be inconsistent and therefore lack clear outlines.

Educational sciences were not left unmarked by the sustainability debate [10]. Official programs such as "Lokale Agenda 21", the German national implementation of the UN guidelines for sustainable development, transferred a lot of its responsibility to schools [2]. Teachers were expected to impart a kind of knowledge regarding sustainability on their students that would result in preferable behavioral changes of the youth [10]. As in most politically introduced communicative instruments, teaching sustainability was widely reduced to mere information provisions mechanisms [11]. However, psychological and sociological studies proved that mere knowledge does hardly affect the way people behave. Even the correlation between attitudes or intentions and behavior is rather small [5, 7]. The educational studies answered this challenge to traditional teaching methods by referring to a holistic concept of education not as teaching knowledge but competencies [10, 11]. The term "Gestaltungskompetenz" [*] received a pole position in educational expectations. To achieve *Gestaltungskompetenz* teachers shall impart not just knowledge and soft skills to their students but also attitudes and even preferable behavioral patterns with regard to a sustainable development. One such method could be an approach called "social labelling".

2. Rousing readiness by social labelling – a study

The socio-psychological theory of planned behavior states that behavior follows intention, and intention is based, among others, on the assumption of how other people will judge one's behavior [12]. This influence called "subjective norm" is considered to be the strongest influence on planned behavior, and it is right there, where social labelling comes in as shown in Figure 2.

Fig. 2: Concept of social labelling

Studies from the same field have shown that the way a person acts is mainly conform with that person's self-perception. The relation can be that self-perception influences how the person acts and also that an analysis of earlier behavior implies to a person who he or she "is" [13; 14]. This self-perception, however, is not established entirely autonomously within a person's mind. As a social being, humans construct their ideas of their surroundings and themselves influenced by a complex network of social relations and cultural settings. Furthermore, this perception is not static but can change over time and according to the context. Therefore, a person's self-perception can be influenced. One way of doing so is by applying "social labels" [15; 16]. Social labels are desired attributions openly ascribed to someone disregarding his actual behavior or character traits in order to change his or her self-perception.

The project Public Awareness (PA) of the Collaborative Research Centre (CRC) 1026 on "Sustainable Manufacturing – Shaping Global Value Creation", sponsored by the German Research Foundation (DFG), aims at determining how social labelling can be integrated into the general education system to promote sustainability. The idea is to influence the self-perception of students in such a way that they are more interested in the taught content and more willing to integrate the new attitudes into their cognitive repertoire as a basis for actual behavior.

Like the shift in teaching from mere information to competencies, social labelling is concerned with creating an overall atmosphere that prepares the learner for not just memorizing but applying the gained knowledge. Similar approaches have been undertaken by Tanner et al. [17] and DeBar et al. [18] with good results. However, they chose long campaigning durations with the same target groups and direct communication as cornerstones for their studies. This is not a realistic scenario with respect to school education, which deals with a specific topic only short-term, for few teaching units in a row, and often uses teaching materials that are designed by third parties, thus communicate indirectly. PA tested the method's effects in short-term interventions, that is singular educational events.

2.1. Experimental design

A field experiment was conducted in order to measure effects of the treatment in subjects' natural environments and to minimize effects of the context on the outcome. Participants were children aged ten to twelve. The sample was randomly divided in an experimental group and a control group. While both groups attended a lesson about resource consumption in and the manufacturing of mobile phones and protection of the environment in order to lift all participants on a comparable level of knowledge, only the experimental

[*] *Gestaltungskompetenz* is a German expression that describes the ability and competence to influence and drive prospective actions.

group received a social label as a stimulus to trigger awareness and behavior. Subjects' parents answered a questionnaire shortly before and two weeks after the treatment. This decision was made in order to lower effects of social desirability in answering the questionnaires. The questionnaire measured awareness and behavior of the children two weeks prior to answering the questionnaire. Both questionnaires contained the same items but some were introduced only after the treatment. Changes from before to after the treatment were measured inside the groups and subsequently compared between groups. Technically, the parents are subjects to this experiment and their children are the treatment, but for the purpose of this research, parents' answers are considered indicators for the effects of the treatment. Therefore, children will be referred to as subjects, participants or equivalent expressions. Accordingly, the social label will be referred to as stimulus or treatment. The time-span of two weeks that lay in between the application of the stimulus and the inquiry of shown effects can be regarded as medium-term, considering the cognitive performance of children of that age group.

Awareness was operationalized as the amount of environmental information consumed through media as well as the frequency of the children bringing up the topic of sustainability, asking questions about it, reading about it or expressing agreement with the message of the informational event. The behavioral dimension was measured both by soft items like the children making suggestions regarding consumption decisions or expressing willingness to get involved in environmental protection as well as concrete actions such as being more careful about switching off electronic devices and recycling. As multiplication effects are particularly interesting for triggering social change, a third dimension included questioning consumption decisions in their household as well as criticizing others for environmental-friendly behavior. The children's age as well as the parents' age, marital status, education and gender were included as control variables.

The treatment in this study was the application of a social label on participants, i.e. the manipulation of a subject's self-perception by another person. For this study, the social label defined the participants as sustainably acting individuals, where sustainability means the ecological dimension of sustainability.

In order to check for the assumptions described above, the following hypotheses were developed.

H1: children who received a social label are more likely to show changes in awareness than children who have not received the label.

H2: Children who received a social label are more likely to show changes in behavior than children who have not received the label.

H3: Children who received a social label are more likely to proselytize, e.g. try to convince others to behave more sustainably than children who have not received the label.

H4: When children show changes in one of the dimensions, those who received a social label are more likely to show changes in more than one than children who have not received a label.

2.2 Social labelling effects – findings

In order to define not only effects caused by the stimulus "social labelling" but also those induced by the informational event itself, effects between as well as within the two participating groups were evaluated.

2.2.1 In-Group effects

T-tests were executed for the single items inside the control group and the experimental group[†]. While in the control group four out of 16 children asked more questions about the environment, in the experimental condition seven out of 20 did so and two asked less questions. The result in the control group was significant ($p=0.041$) and in the experimental group marginally significant ($p=0.096$). In the experimental condition, three of the 20 subjects expressed more concerns about decisions in their household, while none did so in the control group. The effect in the experimental group was marginally significant ($p=0.083$). These results cannot yet confirm H1 but only show that the experiment per se had an effect on the children.

2.2.2 Effects between groups

The observed effects must be checked for dependency on the treatment through a one-way ANOVA. Even though there were no significant changes within groups concerning the criticism of other individuals, differences between groups are significant ($p=0.032$), where seven out of 20 subjects in the control group criticized more than before and none in the control group did.

No significant effect could be shown for elements in the dimension of awareness: even though a significant change was observed for the amount of televised information about sustainability consumed, it can be supposed that the subjects do not have great influence on broadcast contents. Therefore, this value is ignored.

Another one-way ANOVA was conducted for changes which can only be observed after the treatment. These changes include the children bringing up the topic more often than usual and the parents' estimation if interest in the topic has risen as well as the question if the child has changed attitude towards sustainable behavior.

It is shown that group of eleven children out of 20 in the experimental group talked more about sustainability compared to three out of 16 in the control group. This difference depends marginally significantly ($p=0.082$) on the treatment.

While single items of the dimensions of triggered change were shown to be significant, it must be verified if aggregated changes are still significant between groups. An index was created assigning the value "1" to the cases in which any of

[†] Control group and experimental group are two sets of participants in an experimental design. While the experimental group receives the treatment in order to measure their reaction, the control group's behavior is measured under the same circumstances, except that they are not being given the treatment. This way it is ensured that the behavior of the experimental group is in fact a reaction to the treatment and not to some other, accidental stimulus.

the elements of awareness, behavior or proselytizing respectively was positive and "0" to those where no positive change was observed. A one-way ANOVA checked for dependency on the condition, the results are shown in Figure 3.

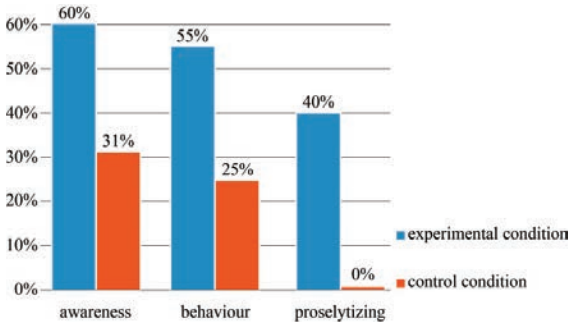

Fig. 3: Proportions of individuals with at least one positive change

Results for awareness and behavior are marginally significant (p=0.091 and p=0.073 respectively), for proselytizing very significant (p=0.003): even though the single elements in the awareness dimension were not significant, overall changes in the group were significantly higher compared to the control group. Therefore, H1, H2 and H3 are accepted.

In order to check for H4, sums of the above indices are checked for dependency from the condition by a one-way ANOVA. Multiplication functions are particularly desirable; therefore a new index is created where the single elements of the sum are weighted as follows:
awareness * 1 + behavior * 1.5 + proselytizing * 2.

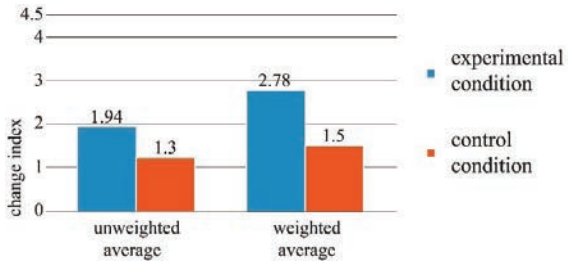

Fig. 4: Average of changes per subject with at least one positive change

In the experimental group, subjects who responded to the informational event showed on average 1.9 changes vs. 1.3 in the control group (p=0.028) as shown in Figure 4. For the weighted changes, subjects in the control group reached an average score of 2.8 while in the control group the average score was 1.5 (p=0.009). Therefore, H4 is accepted: especially, dimensions concerning actions and behavior were triggered much stronger by the application of a social label.

3. New approaches to communicating sustainability

It has been shown that in order reinforce desirable behavior, children can not only be conditioned when they behave desirably but behavior can be triggered in advance. When children are presented with a self-image which comprises said behavior, for instance, a person with a highly altruistic character helps people in need, independently from the self-image they had before, they tend to show desired behavior more frequently than children who are not labelled. The same is valid for awareness of issues treated alongside the labelling. In this case, when taught about sustainable manufacturing, children labelled as particularly conscious individuals on average had absorbed and elaborated more knowledge on the resource consumption, energy efficiency and sustainability of consumer goods than children who were not labelled but had received the same information. Furthermore, a social label positively influences the disposition to influence others towards desired behaviors. Finally, the probability that behavior, awareness and the readiness to influence others are shown together in one individual is dramatically higher for labelled individuals than for unlabeled individuals.

Since the social psychology of social labelling is not restricted to young learners, the findings have the capacity to revolutionize sustainability teaching in general, also in the industrial sector. Qualification and training on the job will benefit from social labelling just as much as primary education. Its objective is to open up people's minds, to make them more willing to absorb offered content. Therefore, standards need to get developed that allow broad application of social labelling in common teaching scenarios and that allow their integration into classic teaching materials. Social labelling is not a teaching method itself. It is an add-on; an add-on that allows already existing methods and materials to meet the target that they have been failing continuously for more than a decade.

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