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What do we know about Sustainable Development in Vocational Training, or what do we think we know?

I will start with the shortest, humorous description of the central problems of sustainable development.

There's two Earths meeting in space.
 Says one: "How are you?"
 Says the other,
 "Quite well, in general, ... but the people."
 "Oh, don't worry – that goes away!"

General remarks

With a population of at present 6.5 billion people, we are soon approaching 10 billion people - with a growth curve that, from 2030 - grows exponentially to infinity!

The basic question is how these people can be serviced and fed, how much resources, food, water, energy, etc. are needed, how they can be produced / manufactured and distributed fairly, and reasonably.

We know that the ecological footprint of world consumption already far exceeds the surface of a planet

We also know that the rapid growth process poses almost impossible challenges to humankind's Science and Technology Systems.

In the past, innovation processes developed over millions of years, evolution allowed humanity to evolve from one generation to the next and had time to adapt. Given this it could very well be, so the scenario of Professor Radermacher, that the speed to adapt to this rapid growth of people, to learn what they need to learn, is simply not sufficient.

We have already now an incredible acceleration of knowledge and technology. And in the future, the super-organism humanity is hardly in the position to generate the necessary innovations quickly enough, nor will individuals be able to cope with this acceleration.

The question we have to face today: Where do we stand in the field of training for sustainable development? What do we have in store? What do we know about the actual effects?

Do we have reason for optimism that vocational training and the way and means how inside "sustainable development" is organized, actually contributes to more sustainability in employment and in action, or have they been part of the efforts of the hamster wheel of our science establishment. A "wheel" which achieves high rotation speeds, but ultimately is a system of self-referential cultivation of futility which is holding the system back and prohibits development.

So what effects cause the efforts or measures in vocational training and which effects in learning are achieved in particular at the following levels:

- On the policy level, which has to put forward the political process and have to take care for the regulatory and financial framework
- On the level of memory and awareness and the level of action of organizations and institutions, which are in charge of administering that sustainable education structure, and at the same time have a door-guard function for everything "innovative".
- At the level of science, research and development it would be necessary to ask whether we have by now reliable data, and so empirically know more about sound effects and actual contributions of Vocational Training Research.
- And finally, at the micro level of trainees and students in vocational training at various operational and industry-wide institutions and on the level of further training we need to ask about the actual gain of competence and the options for alternative courses for action.

First it should be mentioned, that in the absence of an overall evaluation in this contribution we can only provide a first indication of an overall deficit area of cognition.

Let us first look at two areas and their basic data, which provide positive conditions for a successful vocational in sustainability, namely our populations' awareness for the

environment and for sustainability , and business strategies for the implementation of sustainability.

Population's awareness

The latest data from the Environmental Awareness Research [2](#), which is conducted every two years present in general a positive picture.

Environmental awareness has been growing in public perception since 2002.

When asking in interviews for the most relevant problems in Germany - with open answer option - 25% of the answers mention environmental protection (2002 there were only 14%).

Only the problems of unemployment with 63% range higher. Education policy, with 4% ranks 8. Social aspects / equity are mentioned by 20%.

Summing up the areas labor, environmental protection and education, this reflects the classical action and influence fields of vocational training for sustainable development.

The basic value orientations and attitudes in matters of environmental protection and sustainability in comparison with 2004 and 2002 have increased.

There is much agreement when it comes to the basic principles of sustainable development: environmentally-friendly resource consumption, generational justice and fair trade between rich and poor countries meet 82 to 89% approval.

The awareness of a sustainable way of life is pronounced as never before.

Two-thirds of the population are aware of their role as influential consumers and believe that their buying habits can significantly contribute to environmental protection.

One could assume that this increased environmental awareness is a consequence of increased environmental or sustainability education.

The authors of the study assume that the growing environmental consciousness is rather caused and fed by the increase of worries and anxieties that we are heading

towards growing environmental calamities.

People are well informed about climate change while 62% are little or not at all convinced that we have any chance to come to grips with the consequences of climate change.

70% feel that the government should do more about environmental protection.

It is also true that people with higher education tend to believe above average into the principles of sustainable development and are less inclined to transfer responsibility from the individual to society.

The more we develop a long views on the state of the environment, the worse is the verdict.

While the quality of the environment in the direct vicinity of ones own community is considered by 84% very good or good, the quality of the environment globally is considered by only 9% as very good or good.

On top of the scale of environmental political action is the independence from oil and gas through renewable energy and energy efficiency. For 59% of the population, this belongs to the most important environmental challenges, 87% want a consequent shift to renewable energies,

The majority (57%) are convinced that for energy savings depend on the consumer and its everyday behavior, 84% of respondents consider when purchasing household appliances energy consumption. Two-thirds are largely willing to pay higher prices for products, if they are less polluting / more environmentally friendly and pollute less.

Sustainability behavior of enterprises

Now about the relation of corporate behaviour to sustainability, which as a whole can be described ambivalent.

At least, in recent times, a monetization of environmental benefits or costs can be observed. The currency-language used is called Euro.

Along this line, the report of the British economist Nicolas Stern, former chief economist of the World Bank, on behalf of the British government, has calculated the costs of ecosystem services and their loss through environmental degradation.

His assumptions conclude that it is more cost-effective, the sooner action to combat climate change are taken.

Unless immediate actions are taken, the environmental damage would be close to 20% of world gross domestic product. That amounts to 5,500 billion Euros per year.

With about 1% of global economic output we might be able to stabilize the system or could at least secure more effective environmental protection.

Do companies adapt to the needs of sustainability?
According to a study of IFO every fifth company focuses and considers criteria towards sustainable development.

There are a variety of policies, mergers, commitments - from the Council for Sustainable Development, Organization for Economic Cooperation and Development (OECD) to the World Business Council for Sustainable Development, which have developed business guidelines for sustainable economies.

Das Konzept Corporate Social Responsibility (CSR) gilt als weltweite Grundlage für die Unternehmen um soziale und Umweltbelange im Dialog mit Stakeholdern einzubeziehen.

The concept of Corporate Social Responsibility (CSR) is regarded as the world-wide basis for companies to include social and environmental concerns into the dialogue with stakeholders.

In large companies, such as Bayer, Telecom, Unilever, BASF, staff positions at board level for Sustainability have been established.

The environmental management association BAUM committed itself to sustainable management. Programmes like "employee motivation for sustainability (Mimona)" and sustainability reports or Sustainable Value Reports of companies become standard practice in companies.

In a study published by BIBB (knowledge-map for Sustainability in Craft-associations) a multitude of sustainability instruments have been described.

In summary it can be stated, that at least in a substantial part of all companies – based typically on governmental regulations – major efforts to implement the guiding principle of sustainability have been made.

Thus, in general, vocational training finds good conditions and many options for connecting to the idea of sustainability.

The political process

Hardly any topic receives as much attention as "Education for Sustainable Development" from the supranational and national decision makers and organizations at the political level.

Based on Chapter 36 of Agenda 21, declared at the World Conference on Environment and Development in Rio in 1992, and the Johannesburg Conference in 2002, the United Nations have declared the years 2005-2014 the "Decade of Education for Sustainable Development" UN-DESD. A variety of policy decisions and declarations of intent can be understood as action and implementation frameworks, encouragement and legitimisation for robust implementation.

The German Federal Bundestag has in typically unanimous decisions taken solid positions in support of sustainable development. The administrative bodies in charge, namely the federal government procured relevant policies and measures. This includes more or less clearly also the field of vocational education.

The UNESCO Commission in 2004, in order to implement the UN Decade in Germany, has established a National Committee with nearly thirty representatives from all major sectors of the German education system.

Within a year, the "National Action Plan for Germany" has approved more than 60, more or less complex individual projects. About eight of these projects are concerned with vocational training.

A first evaluation of these measures has been completed (by Prof. Michelsen), but is not yet published.

With the purposes of a wide and effective networking and promoting the transfer of information, a "roundtable" with more than 100 representatives from all areas of education were established. Working groups have been formed which convene once a year on the occasion of the Roundtable gathering.

About the Working Group on Vocational Education and Training will be reported later in greater detail.

Several reports from the Federal Government and answers to questions from Parliament about Education for Sustainable Development provide information on the current state of implementation and on political perspectives.

The annual vocational training report of the BMBF training also includes a report on the state of implementation, but also further declarations of intent.

The KMK has designated 2007 on behalf of BMZ a "Orientation Framework Global Development". Vocational training is included as a separate chapter in the report.

Included is for example a programme for the development of competences in a concrete exploration and implementation measures.

In 2006, the Federal Ministry for the Environment (BMU) has started 2006 a training campaign for environmental professionals and renewable energy, and a report on "Training and work in the field of Renewable Energy".

The goals of sustainable development will be gradually embedded within the political consensus processes into the education and training systems. In the field of further education certified/recognized qualifications, additional skills and thus recognized training occupations (at the country level: Assistant for Renewable Energy) and training professionals, such as: Service-Technician for wind power. "

This cursory, incomplete list makes the following obvious.

The declaratory and implementation-oriented situation appears to be on the political level quite complex and diverse, especially with regard to the decisions and responsibilities between the federal and regional states, between ministries and between the social partners.

Little is known about the effects of these policy frameworks. Without any doubt, they provide the communicative and legitimation framework: The United Nations, the European Union, parliament and the government consider that education (and training) for sustainable development have to play a unique role and have allocated funds for research and implementation.

Nevertheless, there remains a gap between political will and administrative implementation, which should be investigated to explore the causes in a policy study of the overall process of dissemination between 1992 and 2014.

What do we know about research and development?

In this field of impact analysis, emphasis should be primarily on the implementation process at the scientific and design level.

Here we have to do with a considerable wealth of activities which are to the largest degree politically induced and financed, but we find also large commitments of individuals or are driven by direct practical requirements.

Thus, the political process, supported by public funds, initially gets its impulse from the research and development level.

In essence, these are model experiments of BIBB, which should be evaluated in their totality by impact analysis.

Additionally activities and funding schemes of other organizations, such as the Deutsche Bundesstiftung Umwelt (DBU), should be included.

As far as can be perceived from the perspective of the BIBB since about 2001 the following stages entangled in a system of research and development are distinguishable.

The process was initiated with feasibility studies and a process of dialogue, participatory screening of qualification requirements. Implemented were more than twenty stakeholder-conferences with selected vocational and interdisciplinary focus.

In each, 20-30 experts were involved; from businesses (shops), vocational training schools, associations and other organizations.

With the help of this procedure existing examples of implementing (good practices) and future alternative courses of action have been covered.

In a further step, they formed the basis for a total of ten scientific model cases taking place over 3-4 years in which practical and media materials have been developed and tested or will so in the future.

Research methodologically, with the intention to change the status-quo science-practice communications with some epistemological interests on the one hand and concrete improvement intentions on the other.

The impact analysis has to focus on at least two aspects, its impact of sustainability measures in their specific area of application and the effect of the theoretical construct of the methods with the question: what is the yield of the specific type of research for harnessing epistemological and practical change.

This requires a concerted overall evaluation of all model tests, including an examination of each project for example regarding the relevance and outreach of the results.

With the abolition of schoolbased model-experiments and model-tests of the BIBB in 2005/2006 the general issue of the sustainability of new research has to be revisited, which apparently has undergone a paradigm shift from design to evaluation and measuring.

Lastly there should be yet another research approach considered, which I would like to call a "subject-integrative scientific approach".

Taking up the example of the research-focus FONA with 23 collaborative projects for sustainable forest management, we can examine what effect and integrative project (BIBB) for vocational training has achieved.

In conclusion, it can be stated that the research methods, research content and results, as well as open research questions and desiderata do already outline clear options for future action, for example in the area of identifying funding-policies at the state-level. (see and compare the proposal for a program of the Federal Association of Vocational Training for Sustainable Development).

Given this background the results of a study to evaluate the state of research and research prospects under the title "Globality and Interculturalism as an integral part of vocational education for sustainable development (GinE) need to be assessed.

It is an empirical investigation in selected industries (construction, automotive engineering / mechanical engineering, hotels/restaurants/ tourism, healthcare, trade, recycling.

The case studies were to determine the occupational skill requirements and the

identification of explanatory correlations for changing contexts of professional curricula.

Status report training and work for renewable energies

Another research project directs the focus to training and employment effects in the context of the thematic area / topic "Renewable Energy".

The Wissenschaftsladen Bonn (ScienceLab Bonn) has produced on behalf of the BMU a status report on "training and work for renewable energy"

What do we know: Renewables are accepted and wanted by almost all political and social strata of society. They are technically feasible, and are, in addition to their resource efficiency, the central response to climate change. They are supported by the regenerative Energy Law **and** through marketing programs and grants totalling a sum of 5.7 billion Euro.

Employment effects are big: 214,000 jobs were counted in 2006, doubling these numbers by 2020 seems to be possible.

Since 2005 there has been a striking shortage of skilled labor, which only in part can be resolved through focussed training, education or the provision of training places.

81% of the surveyed enterprises tend to evade to the benefit of additional qualifications with recognized derees.

73% of respondents are calling for greater consideration of relevant content on existing training schemas and 27% even say that we need to develop special, focussed vocational training.

This study is a very good example of the positive effects of training and education for sustainable development. At the same time, the negative effects of a failed or misdirected education become obvious.

Here, a design framework and a coincidence of various policy and research areas becomes obvious.

This includes the "100 000 roofs"- program for market introduction to legal frameworks and subsidies, high-tech research in the field of sustainable energy, high employment effects, a high public awareness and willingness to "sacrifice", and also courses and training schemes and the integration into occupation-regulations, such as the "plant mechanic" in building technology, or the creation of new professions, such as assistant for Renewable Energy.

Good practice documentation

Nearly 120 examples of actual implementation of sustainability in schools, enterprises, non-educational and extra-educational educational facilities are documented on the sustainability portal of BIBB.

Under the slogan nothing is more visible than a good example, there is an underlying idea behind this collection, namely that once the idea that good examples speak for themselves, if disseminated, for example through the portal internet-site of the BIBB.

This is connected not only to the recognition" of the good practice establishments, and also to high expectation in the transfer of this practices.

The motto is: Learn from good examples. Or in other words, we know that sustainability is practiced in great diversity and have the conjecture, that these examples can actually be learned from, and that ties will be established between the implementers of good practices and interested persons or organizations on a virtual market of opportunities.

But is this really so?

The good-practice documentation of BIBB in 2006 had almost 1000 requests, the BIBB portal for sustainability had 5,100 requests.

Within the good-practice documentation the areas of construction and housing received 526 requests, followed by energy-sector 519, in the category sustainability in trade 390, and in Occupational Health and Nutrition 362 requests.

The least frequented subject area was mobility with 229 requests, which very well might be the case because mobility is not a typical industry term in the field of vocational

training.

So far we know what was going on on that site, but how should we interpret these figures? Is this number of visits large or small, when this good-practice documentation is visited 1000 times and what effects have been achieved. But this is hard to measure because the visitors could not be interviewed.

Alternatively, it would be possible, to at least question the content providers whether and how the sample-projects developed some lasting effects, and which direct benefits became visible from publishing at the BIBB internet site, or whether other schools or businesses or other training centers have approached and asked for advice, as a result of this publication, or even whether a cooperation or implementation assistance has developed.

In this context, an empirical verification of sustainability criteria seems to be feasible, when questions are asked which sustainability significance the examples actually had. In a random sample query, with ten examples from the good-practice documentation no one could recall that anyone has questioned or referred to the documentation or that an active transfer has developed thanks to the documentation.

Networks - A federal working-group (AG) for vocational training in the field of sustainable development.

The question is: what do we know about the extensive communication processes?

It is said that the principle of overall holistic interconnectivity is one of the key strategies for sustainability.

This is why also in the UN Decade for Education for Sustainable Development networking of active institutions and groups involved plays a prominent role.

In the context of a roundtable of the UN Decade a vocational training working-group was formed, which has met since 2005/2006 seven times.

We are talking here about activists and stakeholders, people responsible within the vocational education and training community, which can be described at the same time as protagonists for sustainability. Eventually comprised the list of those mentioned and invited 47 people.

Among them were 22 members, who had never managed to attend meetings of the

working group. Ultimately, there were 25 people which form the core of this group.

The group agreed on a letter of intent and identity, which agreed on close association to BIBB, and the formation of a virtual community to maintain the discussion between the working meeting. Activities included the acquisition for Decade projects, the preparation of large conferences, the establishment of regional sub-groups, and to develop strategies for a nationwide campaign or a program.

In a written survey to evaluate the effects of this networking group in early 2007 eight responses were received in return, which can be summarized as follows:

Benefits and Input/Costs were considered balanced by half of the respondents. For the other half the cost to income ratio is considered to be too high. Important inputs are acknowledged, but they are too often considered disparate and not sufficiently taken up.

The relevance of the work of the federal AG is primarily recognised on the (political) meso level.

Vocational-training needs to be positioned in the framework of the UN Decade, but must be considered to receive too little attention.

The financing should come from the public sector, possibly by the UN Decade
The objectives of AG are primarily to be seen as "strategic" and "structural".

The participants should continuously co-operate in an open network to work. The moderation of BIBB arises from its position as a "power promoter", if this function does not apply, another organizational form and connections seem possible.

The involvement of industry associations seem to be more important (and realistic) than the inclusion of individual shops.

International networking is desirable, but national mobilization is considered if questioned, has to be given priority.

The continued conceptual integrity has to be secured through the inclusion of the tabled strategy paper and the present proposal for an action program.

What do we know or what do we believe to know about these linkages? The belief to participate in a good course is high. But today we know that this networking with all the advantages which it certainly has, has yet to be seen as sub-optimal, under-efficient, capacity – marinal (with borderline value) chronically under-funded, open-in its-

outcomes and decisions.

From this, some should be drawn for the continuation of the process.

Summary

In this article, only some aspects of the overall theme of "vocational training for sustainable development" could be addressed.

Based on an increased awareness of sustainability in the public and a growing willingness of companies to engage pro-actively for sustainability issues, the questions of purpose and outcomes, effects and transfer of the introduced measures are more important than ever.

We are aware, that the Image of the Leitbild of sustainability can only be successfully implemented, if an accompanying competences in the context of vocational, professional performance/action at all levels, including that of management takes place.

Because of the complexity, vagueness and special situational dependence, activities often remain stuck in a pure economization, their nature-relation, in in oversimplification, or "shallow" awareness for quality, or simply in "good-willing" without concrete ends.

Statements and expressions of willingness in the political, administrative and corporate activity space of associations have in-so-far produced effects, as research and development, communication and networking programmes, and collections of good practices were initiated and implemented.

Little is known on the qualitative effect, especially about those who are at the end of the educational "value creation chain", the academic staff and ultimately the students and trainees. Clearly about these effects we know still too little.

There is evidence to suggest is that the protagonists of sustainability remain largely among themselves, a sectoral or regional exchange and transfer seems to be rather an exception.

Vocational training for sustainable development is considered a driver for modernization and understood as innovative impulse.

However, this seems to be still a gut feeling without reliable proof of effects, if we desist from single examples of individual saving of resources by apprentices in their

shops.

Already the study of environmental accounting from 1997 ⁴ criticized the dominance of subject-oriented teaching, the escape into the idyll of nature, fixed manners in teaching methods, the exotic flair of environmental education, the low level environmental awareness and the lack of financial resources. The central claim was to initiate a "cultural turn" in environmental education, and to include lifestyles, new product policies and overarching, inclusive organizational renewal.

In part, this cultural turning point - the example of renewable energies is a good example – is embodied in education for sustainable development.

But it requires a new perception of the possibilities of "cultural and creative sector" ⁵ for a fully applied and comprehensively educated sustainability.

Today, ten years after the initial study of environmental education measures, another run to scrutinize the sustainability effects of vocational training seems mandatory.

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