# The development of ESD-related competencies in supportive institutional frameworks

**Gerhard de Haan**

**Abstract**   Although Education for Sustainable Development (ESD) is a matter of global importance, the requirements and needs of people differ according to their regional circumstances. (Not only) in Germany—in keeping with the increasingly international focus of "output" evaluations—one dominant educational debate has centred on effective ways of mapping and understanding pupils' competencies. This article provides a Model of Competence for ESD in the formal education sector. This model aims to inform the organisation of teaching and to help assess the learning outcomes of pupils who have received instruction in issues relating to ESD. The competence model was developed and extended in connection with two German federal state innovation programmes which aimed to implement the concept of ESD in schools across the country.

**Keywords**   Education · Sustainable · Development · Frameworks · Institutional

**Résumé**   Développement des compétences relatives à l'EDD dans les cadres institutionnels de soutien—L'éducation au développement durable (EDD) est une question d'importance planétaire, mais les exigences et les besoins des individus diffèrent en fonction des conditions régionales dans lesquelles ils vivent. L'Allemagne (mais également d'autres pays), qui suit la tendance de plus en plus internationale aux évaluations des «résultats», mène l'un de ses principaux débats éducatifs sur les moyens efficaces de recenser et de cerner les compétences des élèves. Cet article fournit un modèle de compétence pour l'EDD dans le secteur éducatif formel. Il a pour but de fournir des données à l'organisation de l'enseignement, et de contribuer à évaluer les résultats d'apprentissage des élèves ayant

G. de Haan (✉)
Erziehungswissenschaftliche Zukunftsforschung (Educational Future Studies), Freie Universität
Berlin, Arnimallee 9, 14195 Berlin, Germany
e-mail: sekretariat@institutfutur.de; dehaan@zedat.fu-berlin.de

bénéficié d'une instruction sur les questions relatives à l'EDD. Ce modèle a été élaboré et élargi dans le cadre de deux programmes innovants de l'état fédéral allemand, qui visaient à concrétiser le concept d'EDD dans les écoles à travers le pays.

**Zusammenfassung**   Die Entwicklung von Kompetenzen der Bildung für nachhaltige Entwicklung (BNE) in unterstützenden institutionellen Kontexten—Obwohl Bildung für nachhaltige Entwicklung grundsätzlich eine weltweite Aufgabe ist, sind die Anforderungen und Bedürfnisse der Menschen in den unterschiedlichen Weltregionen unterschiedlich. (Nicht nur) in Deutschland findet im Einklang mit einem der dominanten erziehungswissenschaftlichen Diskurse eine zunehmende Konzentration auf Outputevaluationen i.S. der Operationalisierung und Messung der Kompetenzen von Schülerinnen und Schülern statt. Der vorliegende Artikel stellt ein Kompetenzkonzept vor, das im Bereich der formalen Bildung angewendet werden kann. Das Konzept der Gestaltungskompetenz zielt darauf ab, Lehr-Lern-Prozesse zu orientieren und möchte dazu beitragen, die Lernergebnisse von Schülerinnen und Schülern zu bewerten, die an BNE-bezogenem Unterricht teilgenommen haben. Das Kompetenzkonzept wurde im Rahmen zweier von Bund und Ländern geförderter schulischer Modellprogramme (weiter)entwickelt, die darauf abzielten, Bildung für nachhaltige Entwicklung in die schulischen Regelstrukturen zu implementieren.

**Resumen**   El desarrollo de las competencias relacionadas con EDS en los marcos institucionales de apoyo—Pese a que la Educación para el Desarrollo sostenible (EDS) sea un asunto de importancia global, las exigencias y necesidades de las personas difieren de acuerdo con sus condiciones regionales. (No solo) en Alemania, en concordancia con un creciente énfasis de la evaluación en el rendimiento y la productividad, uno de los debates educativos dominantes se está centrando en modos efectivos de mapear y entender las competencias de los alumnos. Este artículo provee un Modelo de Competencias en EDS en el sector educativo formal. Este modelo se propone informar la organización de la enseñanza y ayudar a evaluar los resultados de aprendizaje de alumnos instruidos en temas relacionados con EDS. El modelo de competencias fue desarrollado y difundido en conexión con dos programas de la República Federal de Alemania, delineados para implementar el concepto de EDS en las escuelas de todo el país.

**Резюме** Развитие компетенций ,связанных с образованием для устойчивого развития, в институциональных структурах поддержки – Несмотря на то, что образование для устойчивого развития является вопросом глобального значения, требования и потребности людей различаются в соответствии с их региональными особенностями. Делая все больший международный акцент на оценке результата, (не только) в Германии превалирует образовательная дискуссия об эффективных способах определения и понимания компетенций учащихся. В данной статье предлагается модель компетенции для образования для устойчивого развития в секторе формального образования. Данная

модель имеет целью предоставлять информацию организации об обучении и помогать оценивать результаты учебы учащихся, которые изучали вопросы, относящиеся к образованию для устойчивого развития. Эта модель комп-етенций была разработана и расширена в связи с двумя немецкими феде-ральными государственными инновационными программами, которые напра-влены на реализацию концепции образования для устойчивого развития в школах по всей стране.

## Introduction

Despite general consensus on the demand for sustainability, a highly controversial debate rages over concretising objectives, formulating priorities in acting, and developing related strategies. Should the first priority be to maintain biodiversity, to halt climate change, to reduce the consumption of resources? Or should the priority be to achieve a balance between poor and rich countries? Is economic development more important since it creates the conditions for more prosperity? Can we ask such questions, or should we insist on seeking a balance between all of these priorities? And can such a balance exist? The scientific and political differences inherent in these questions are considerable, and only few substantial integrative concepts exist (with the exception of: Kopfmüller et al. 2001).

However, despite all the differences about formulating the essential postulates and rules for sustainability, one thing stands out: in general, the discussion about strategies for sustainable development considers the following significant question: "To what extent are societies in the position to cope with the far-reaching and sweeping transformation that the concept of future-compliant development demands? That this cannot be accomplished without a far-reaching modification in the human way of life, without a major shift in our dominant patterns of production and consumption, and without a new orientation in planning and decision-making processes—and world-wide—is one of the most widely shared fundamental insights in the sustainability debate" (Kopfmüller et al. 2001, p. 33).

Where a major mental shift is primarily involved, we must encourage the processes for changing awareness among individuals—and this can only be accomplished through learning. In this context, major competencies are demanded from the individual in self-organising communication and participating in decision-making processes, such as the independent acquisition and assessment of information, the capacity for communication and cooperation, and far-sighted planning in linked systems. Chapter 36 of Agenda 21 therefore argues for a "new orientation in education for sustainable development", claiming that "in order to be effective, an education oriented towards the environment and development should focus on the dynamics of the physical/biological and socio-economic environment as well as on human (perhaps also intellectual) development, be integrated into every subject, and use formal and non-formal methods and effective means of communication" (United Nations 1992, Chapter 36.3).

The double nature of the demand-to-learn concepts for promoting sustainable behaviour leads directly to the concept of "education for sustainable development" (ESD). Since the mid-1990s, ESD has increasingly received attention in politics. It was from that date that a series of Federal State Programmes in Germany began. They aimed at the acquisition of competencies relevant for facilitating sustainable development in supportive institutional frameworks. The following focuses on (i) the model of ESD-related competencies and (ii) the institutional realisation of ESD in the German context.

## Learning sustainability

### Knowledge

According to representative studies on environmental awareness from the years 2002 and 2004, "sustainability" was a foreign word to just under 60% of the German population (cf. Kuckartz and Grunenberg 2002; BMU 2004). Children and young people in Germany often know very little about "sustainability", yet their attitudes, values and interests to a great extent reflect the idea of sustainability (Zinnecker et al. 2002; Hurrelmann and Albert 2006; OECD 2009). This is perhaps unsurprising: after all, the concept of sustainable development is about achieving greater inter- and intra-generational justice. We should not consume so many resources today, should not strain the ecological system to the extent that the ability of future generations to lead a good life is endangered. Sustainability is about achieving a balance between rich and poor countries, and rich and poor people. Economic prosperity should be linked to efficient methods of production and eco-friendly processes for manufacturing goods. Sustainability is about reducing energy consumption and using renewable energies; it is about intelligent forms of mobility and an eco-friendly lifestyle. The subject of sustainability therefore receives a great deal of support from children and young people in general.

Pupils from schools involved in the "21" programme, however, were well aware of the meaning of "sustainability". When asked whether they understood what was meant by the term "sustainable development", only about a fourth expressed uncertainty (the results here and elsewhere are based on the initial assessments of the final evaluation of the BLK's "21" programme; cf. de Haan et al. 2003; Rode 2005). The pupils in the "21" programme were far ahead of other children and youth because they knew more and could make better use of opportunities for taking action: three out of four pupils were able to assess whether products and services were sustainable. More than two-thirds believed they could convince others of the necessity of sustainable development, and more than 75% had learned what they can do themselves to promote sustainable development (de Haan et al. 2003; Rode 2005).

The following section introduces an approach which is designed to reduce the knowledge-action gap and to enhance the acquisition of applicable knowledge. The concept of *Gestaltungskompetenz* (shaping competence) is in line with the assumptions of this so-called "situated learning" approach.

Situated learning

The orientation towards models of competence corresponds to the principles of teaching and learning that promote the acquisition of intelligent, inter-connective, and application-related knowledge. In the programme, precedence was given to the concept of "situated learning" (Gerstenmaier and Mandl 2001): Situated learning is application-related, world-oriented and self-directed. It implies the active participation of the learner. The latest research on learning favours self-directed processes: self-guidance in the learning process results in more successful learning. For the construction of knowledge, the learning environment is a decisive factor. Competencies are most successfully acquired when learning takes place in a specific context. Further, vast areas of knowledge and behaviour are context-bound, i.e. they are linked to specific situations, problems and fields of action. Traditional forms of learning that focus on the acquisition of facts and terms rely on the prominent role of teacher instruction in the classroom. Such conditions put pupils primarily in a receptive role. Of course, even the teaching of abstract knowledge, i.e. knowledge not connected with social learning environments or complex everyday problems, can be productive and motivating to children and young people when it occurs in a manner that they find fascinating. In general, however, we assert that the reference that situated learning makes to one's own experience makes learning more subjective and this typically produces a greater motivation to learn. This is of particular importance if the learner is to develop an interest in the matter. It applies for *what* is done as well as for *how* it occurs (Weinert 2000).

With regard to the intention to enhance the acquisition of ESD-related competencies, we see that high standards have been formulated, and it has often been said that they cannot be achieved. As the findings of the summative evaluation illustrate, it would seem that the pupils in the BLK "21" programme thought otherwise. The programme's assessment report identified learning in meaningful contexts as the fundamental principle of the "21" programme (de Haan et al. 2003). From the survey, we know that, on average, 75–80% of all pupils believed they had learned how to look ahead, understand complex facts in the context of sustainability, work with others as part of an interdisciplinary team on problems of (non-)sustainable development, and evaluate various solutions to problems. According to the data from the pupils' survey, the "21" programme was also successful in introducing situated learning: around 80% of the pupils said that

- they had learned different approaches;
- the teachers trusted them to do many things on their own; and
- the lessons integrated their own experiences.

**ESD-related competencies**

Competence-oriented educational concepts focus on output, whereas conventional syllabuses and didactic approaches focus on input: the latter raises the question as to which subjects pupils should study in school. The output approach, however, asks

what problem-solving strategies, concepts and abilities for acting these pupils should have. It is only logical to think along these lines. After all, it does not help much to define what children and youth should be taught without defining what they should learn. If it is clear what should be learned, then children, young people, their parents and the educational administration alike can demand that the corresponding requirements be fulfilled. Another advantage is that the learning subject can be relatively freely selected, depending on pupils' previous experiences and motivations. This increases pupils' interest in the subject and their acquisition of skills, thereby preventing the mere accumulation of "inert knowledge" (Weinert 2000, 2001).

In this context, ESD specifically involves the acquisition of a number of sub-competencies subsumed under the term *Gestaltungskompetenz* (cf. de Haan and Harenberg 1999). *Gestaltungskompetenz* means the specific capacity to act and solve problems. Those who possess this competence can help, through active participation, to modify and shape the future of society, and to guide its social, economic, technological and ecological changes along the lines of sustainable development. *Gestaltungskompetenz* (de Haan and Seitz 2001; de Haan 2003b; Working Group 2007; de Haan et al. 2009) means having the skills, competencies and knowledge to change economic, ecological and social behaviour without these changes merely being a reaction to existing problems. *Gestaltungskompetenz* makes an open future possible that can be actively shaped and in which various options exist. Over the past four years, the concept of *Gestaltungskompetenz* has become more differentiated and enriched with examples of topics and methods. It now encompasses the following twelve sub-competencies.

Sub-competencies of *Gestaltungskompetenz*

*Gestaltungskompetenz* can be split into twelve sub-competencies, namely the ability to:

1. gather knowledge in a spirit of openness to the world, integrating new perspectives;
2. think and act in a forward-looking manner;
3. acquire knowledge and acting in an interdisciplinary manner;
4. deal with incomplete and overly complex information;
5. co-operate in decision-making processes;
6. cope with individual dilemmatic situation of decision-making;
7. participate in collective decision-making processes;
8. motivate oneself as well as others to become active;
9. reflect upon one's own principles and those of others;
10. refer to the idea of equity in decision-making and planning actions;
11. plan and act autonomously; and
12. show empathy for and solidarity with the disadvantaged.

As a reference framework for the characterisation of *Gestaltungskompetenz*, the OECD's concept of "key competencies" has been selected, as it is international in scope and also of great importance for education policy and planning (de Haan et al. 2009; Working Group 2007, p. 12; Rychen and Salganik 2001). Furthermore, OECD

conducts the PISA studies and sets international standards for future developments and comparative studies. The OECD study on key competencies and comprehensive educational objectives reveals sustainability's significance for the future. Three comprehensive educational objectives are identified that should guide every curriculum development: human rights, democratic structures and the orientation towards criteria for sustainable development. These objectives provide a normative basis for the lives of individuals and society: whereby "basic principles of human rights, democratic value systems, and postulated objectives of sustainable development (i.e., integrating environmental protection, economic well-being, and social equity) can serve as a normative anchoring point for the discourse on key competencies, their selection, and development in an international context" (OECD 2002, p. 26).

The OECD key competencies are divided into three categories: one category contains key competencies for the "interactive use of tools" such as knowledge, media and resources; a second category brings together the key competencies for "interacting in socially heterogeneous groups"; and the third states the competencies required for "acting autonomously".

The twelve sub-competencies of *Gestaltungskompetenz* can be brought in line with the three OECD competence categories as follows:

| Classical competence terms | Competence categories in line with OECD (2005) | Sub-competencies of *Gestaltungskompetenz* |
|---|---|---|
| Subject and methodological competence | Interactive use of media and methods | T1 Gather knowledge in a spirit of openness to the world, integrating new perspectives |
| | Ability to use language, symbols and text interactively | T2 Think and act in a forward-looking manner |
| | Ability to use knowledge and information interactively | T3 Acquire knowledge and act in an interdisciplinary manner |
| | Ability to use technologies interactively | T4 Deal with incomplete and overly complex information |
| Social competence | Interacting in socially heterogeneous groups | G1 Co-operate in decision-making processes |
| | Ability to maintain good and durable relationships with others | G2 Cope with individual dilemmatic situation of decision-making |
| | Ability to cooperate | G3 Participate in collective decision-making processes |
| | Ability to overcome and resolve problems | G4 Motivate oneself as well as others to become active |
| Personal competence | Acting autonomously | E1 Reflect upon one's own principles and those of others |
| | Ability to act within the wider context | E2 Refer to the idea of equity in decision-making and action planning |
| | Ability to form and implement a life plan and personal projects | E3 Plan and act autonomously |
| | Awareness of rights, interests, boundaries and requirements | E4 Show empathy for and solidarity with the disadvantaged |

The following describes the sub-competencies in detail (cf. de Haan et al. 2009).

Interactive use of media and methods

*T1 Gather knowledge with an openness to the world and integrating new perspectives*

means that pupils e.g. are able to:

- name the approaches and concepts of sustainable development in government policy and civil society;
- consider different perspectives and forms of knowledge (for example, scientific, received and everyday knowledge) in order to describe global and local (non-)sustainable development phenomena;
- consider information from different perspectives to evaluate different (non-)sustainable requirements for action and patterns of behaviour;
- describe and evaluate cultural and ecological diversity.

*T2 Think and act in a forward-looking manner*

means that pupils e.g.:

- are aware of research methods used in future studies (for example, scenario technique, planning games, future workshops), in order to analyse the problems of non-sustainable development and anticipate possible opportunities for sustainable development (in relation to their own lives);
- assess and apply the findings of future research in the drafting of sustainable development processes with regard to ecological systems, social justice, economic developments and political action;
- are able to recognise their own potential future needs and possible means of provision, and can describe the need for providing for greater social security in the future based on their own situation;
- are able to identify, analyse and assess examples of focussing on the present, starting from their own lives.

*T3 Acquire knowledge and act in an interdisciplinary manner*

means that pupils e.g. are able to:

- describe and explain the composition, functioning and development of the biosphere;
- describe and explain relations of interdependence for the characterisation of non-sustainable global development (e.g. by using the syndrome concept);
- describe overarching concepts of sustainability (e.g. strong and weak sustainability) and analyse the consequences of these concepts for future development;
- describe and evaluate aspects of globalisation and the perspectives of countries at different stages of development;

- describe and evaluate the differences between renewable and non-renewable resources and their use (e.g. renewable raw materials, fossil fuels);
- describe and evaluate concepts and visions of social justice;
- analyse and evaluate interdependencies between the environment, economics, conflicts, poverty and violence, taking account of historical causes and their consequences in the present.

*T4 Deal with incomplete and overly complex information*

means that pupils e.g. are able to:

- carry out stochastic operations with regard to sustainability and equity-relevant statements, based on their own lives;
- use heuristics to draw conclusions and develop subsequent means of action;
- analyse and assess the risks and hazards of non-sustainable actions.

Interacting in socially heterogeneous groups

*G1 Co-operate in decision-making processes*

means that pupils are e.g. able to:

- name and analyse different points of view concerning sustainable development and are able to deal with controversies in a discursive manner;
- understand and develop the prerequisites for rational planning, in line with their own lives;
- describe prejudices, racial or otherwise discriminatory stereotypes as well as forms of discrimination, and argue the case for rejecting these.

*G2 Cope with personal dilemmas in decision-making*

means that pupils are e.g. able to:

- assess the impacts of current actions, and plan and justify investments in their own future;
- assess the scope of current actions and come to decisions that future generations will benefit from;
- describe solutions for multi-criterial problems of decision-making that are based on diverse problem definitions and which feature competing objectives of sustainable development.

*G3 Participate in collective decision-making processes*

means that pupils e.g. are able to:

- express solidarity and concern for the future of humans and nature as common and societal tasks;
- demonstrate how cooperative problem-solving can take place in the development of strategies for action in the field of sustainable development;

- describe and demonstrate negotiation processes on aims and processes of sustainable development in the event of practical and political differences (e.g. in the form of planning games and mediation);
- constructively overcome differences of opinion and conflicts with regard to issues of (non-)sustainable development.

*G4 Motivate oneself and others to become active*

means that pupils e.g. are able to:

- describe their own and joint, successful learning processes in the context of sustainability, and demonstrate how these can be used for further learning;
- describe their own and joint motivations for participating in democratic decision-making processes and acting for sustainability;
- describe and assess forms of joint involvement in solidarity activities (e.g. against poverty, discrimination, environmental risks).

Acting autonomously

*E1 Reflect upon one's own principles and those of others*

means that pupils e.g. are able to:

- describe lifestyles which secure and foster sustainable consumption patterns, environmentally and socially acceptable mobility, leisure and health;
- know and assess production and purchasing criteria for products on the basis of environmental, economic and social considerations;
- discover and assess the underlying justifications, forms and effects of their own lifestyles and those of other people and societies on the living and working conditions of other people and on the biosphere.

*E2 Refer to the idea of equity in decision-making and action planning*

means that pupils e.g. are able to:

- assess and describe the effects and unintended side-effects of their own actions on others;
- identify conflicts with regard to inter-generational justice and provide examples of how to overcome these conflicts.

*E3 Plan and act autonomously*

means that pupils e.g. are able to:

- know and reconsider (a) their personal rights, needs and interests, describing their limitations with regard to the aim of achieving sustainable development processes, and (b) the rights and claims of others, recognising the ways in which they can stand up for the rights of future generations;

- demonstrate their own experience of autonomous planning and action through the realisation of a project on sustainability;
- design their own life plans from the perspective of sustainability, describe personal projects and identify what these entail.

*E4 Show empathy and solidarity with the disadvantaged*

means that pupils can:

- describe and assess individual, social, economic and political commitments to and involvement in (non-)sustainable development processes;
- describe the possibilities for showing empathy and solidarity with poor, disadvantaged and oppressed people and communities at both the local and global levels;
- describe the ways in which they can express empathy for nature and assess the various approaches through their own actions.

The definition of sub-competencies is one matter. Implementing institutional frameworks that allow teachers to act according to these expected learning outcomes is quite another. The following section provides information about the supportive institutional frameworks offered in the federal state innovation programmes mentioned above.

## Supportive institutional frameworks

The enhancement and acquisition of *Gestaltungskompetenz* were the main objectives of the federal state programmes, "21" and "Transfer-21". These aimed to integrate the concept of ESD into the everyday school routines. Efforts were made to process the programme's results in such a manner as to enable them to have a broad effect and be incorporated into existing structures. While the first programme—BLK "21"—was designed to concretise the didactical dimension of ESD and support the practical implementation of ESD in schools, the subsequent programme—"Transfer-21"—aimed at the continuation and advancement of the previous achievements.

In the course of these programmes, therefore, teachers, researchers and representatives of the federal state school administrations worked together to develop the following permanent consulting and supporting structures:

- Printed teaching materials for 56 lessons (each between 30 and 80 pages in length) and manuals were published as a means of highlighting major conceptual and structural problems in conjunction with ESD, e.g. collaboration with external partners, legal expertise on pupil companies, school programme work, designing supportive systems, school profile and the school programme's "sustainability". Furthermore, recommendations were developed in order to assist with the implementation of ESD.
- More than 100 facilitators across Germany participated in several programmes to gain additional qualifications. The target was to systematically and

extensively train a group of people during the transfer process so that they could conduct further education courses on the topic of ESD with confidence and cover all three dimensions: i.e. the thematic, methodical and innovative structures of co-operation (such as non-school partners).

- Collaborations with universities and state institutes were organised in order to harness teacher education for the transfer process. The integration of ESD into teacher education was deemed necessary because ESD—an interdisciplinary field with its own specific objectives, content and methods—had not yet been sufficiently integrated into further education or specialised education programmes.
- A journal and a webpage were developed, and proved to be important instruments for the dissemination of the programme's results; the aforementioned teaching materials and manuals could be downloaded free of charge; and an electronic newsletter was distributed to more than 1,500 people, informing them of ongoing efforts and progress.
- Finally, the dissemination of results was helped by collaboration with networks such as GLOBE and Environmental Schools in Europe.

After both programmes officially ended, most of these forms of institutionalisation were continued by integrating them into German UN DESD activities (e.g. newsletter, webpage). In the course of these activities, the Standing Conference of the Ministers of Education and Cultural Affairs of the Länder in the Federal Republic of Germany (KMK) recommended establishing a collaboration with the German Commission for UNESCO (KMK/DUK 2007).

## Summary and discussion

The model of *Gestaltungskompetenz* centres on defining sub-competencies which are designed to inform ESD-related teaching and the assessment of learning outcomes. Although ESD is a global task, the approach introduced here offers a fairly western European view on "relevant" learning outcomes. Yet the implementation of ESD varies from one region to another in order to take account of regional distinctions within educational policies, different curricular conditions and the local societal demands of education. Nevertheless, *Gestaltungskompetenz* is a heuristic tool that has the potential to inform the evaluation of ESD impacts elsewhere, and although the model arose from innovation programmes which centred upon formal education, *Gestaltungskompetenz* is considered to cover "universal", generic competencies. As such, it might well apply equally to the evaluation of outcomes derived from informal and non-formal learning processes. Further studies will have to be undertaken to prove both the informative character the model is designed to have for teaching (do teachers/educators refer to the model when they come to plan their lessons?) as well as the empirical foundation of distinct sub-competencies and their development. One might argue that the empirical foundation only covers the measurable outputs of ESD—and ESD undeniably has many other, less measurable facets, including attitudes, affects, attitude-based actions, and so on. I agree with

these objections and would like to address them here with a quote that has been attributed to Albert Einstein: "Not everything that counts is measurable".

# References

Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit [Federal Ministry for the Environ- ment, Nature Conservation and Nuclear Safety] (BMU). (1997). *Auf dem Weg zu einer nachhaltigen Entwicklung in Deutschland*. Special report by the German Federal Government in the context of the special session of the UN General Assembly on development and the environment in New York. Bonn: BMU.

Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit [Federal Ministry for the Environ- ment, Nature Conservation and Nuclear Safety] (BMU). (2004). *Umweltpolitik. Umweltbewusstsein in Deutschland*. Berlin: BMU. http://www.umweltdaten.de/publikationen/fpdf-l/2792.pdf.

de Haan, G. (1998). Schlüsselkompetenzen, Umweltsyndrome und Bildungsreform. In A. Beyer & A. Wass von Czege (Eds.), *Fähig für die Zukunft* (pp. 17–48). Hamburg: Krämer.

de Haan, G. (2003a). Bildung als Voraussetzung für eine nachhaltige Entwicklung. Kriterien, Inhalte, Strukturen, Forschungsperspektiven. In J. Kopfmüller (Ed.), *Den globalen Wandel gestalten. Forschung und Politik für einen nachhaltigen globalen Wandel* (pp. 93–113). Berlin: ITAS.

de Haan, G. (2003b). Bildungsstandards und Kompetenzen der Bildung für eine nachhaltige Entwicklung. *DGU Nachrichten, 27*.

de Haan, G., & Harenberg, D. (1999). *Bildung für eine nachhaltige Entwicklung. Gutachten zum Programm*. Booklet no. 72. Bonn: Bund-Länder Konmmission für Bildungsplanung und Forschungsförderung.

de Haan, G., Kamp, G., Lerch, A., et al. (2009). *Nachhaltigkeit und Gerechtigkeit*. Berlin: Springer.

de Haan, G., Rode, H., & Giesel, K. (2003). *Bildung für eine nachhaltige Entwicklung in der schulischen Erprobung: Strukturen, Motivation, Unterrichtsmethoden und –inhalte*. Report on the First Evaluation of the Transfer-21 Programme. Berlin: Institut für erziehungswissenschaftliche Zukunftsforschung der FU Berlin.

de Haan, G., & Seitz, K. (2001). Kriterien für die Umsetzung eines internationalen Bildungsauftrages. Bildung für eine nachhaltige Entwicklung, Parts 1 and 2. *„21". Das Leben gestalten lernen*, 1(1).

Deutsches PISA Konsortium [German PISA Consortium]. (2001). *PISA 2000: Basiskompetenzen von Schülerinnen und Schülern im internationalen Vergleich*. Opladen: Leske + Budrich.

Gerstenmaier, J., & Mandl, H. (2001). *Methodologie und Empirie zum Situierten Lernen*. Research Report. Munich: University of Munich. http://epub.ub.uni-muenchen.de/archive/00000245/01/ FB_137.pdf.

Hurrelmann, K., & Albert, M. (2006). *15. Shell Jugendstudie, Jugend 2006. 15. Shell Jugendstudie: Eine pragmatische Generation unter Druck*. Frankfurt: Fischer (Tb.). http://www.shell.com/home/ content/deu/aboutshell/our_commitment/shell_youth_study/2006.

Kopfmüller, J., Brandl, V., Jörissen, J., et al. (2001). *Nachhaltige Entwicklung integrativ betrachtet. Konstitutive Elemente, Regeln, Indikatoren*. Berlin: Edition Sigma.

Kuckartz, U., & Grunenberg, H. (2002). *Umweltbewusstsein in Deutschland 2002*. Opladen: Leske + Budrich.

Kultusministerkonferenz & German UNESCO Commission (KMK/DUK). (2007). *Empfehlung zur Bildung für nachhaltige Entwicklung in der Schule*. Bonn: KMK/DUK. http://nachhaltigkeit. bildung.rlp.de/fileadmin/user_upload/nachhaltigkeit.bildung-rp.de/Downloads/070615_KMK-DUK- Empfehlung_BNE.pdf.

Organisation for Economic Co-operation, Development (OECD). (2002). *Definition and selection of key competencies (DeSeCo): Theoretical and conceptual foundations. Strategy paper: An overarching frame of reference for a coherent assessment and research program on key competencies*. Neuchatel: OECD.

Organisation for Economic Co-operation and Development (OECD). (2005). *Definition and selection of key competencies. Executive summary*. Paris: OECD. http://www.oecd.org/dataoecd/47/61/350 70367.pdf.

Organisation for Economic Co-operation and Development (OECD). (2009). *Green at fifteen? How 15-year-olds perform in environmental science and geoscience in PISA 2006*. Paris: OECD. http://www.oecd.org/dataoecd/52/12/42467312.pdf.

Rode, H. (2005). *Motivation, Transfer und Gestaltungskompetenz. Abschlussevaluation des Programms „21". Final evaluation of the Transfer-21 Programme*. Berlin: Verein zur Förderung der Ökologie im Bildungsbereich.

Rychen, D. S., & Salganik, L. H. (2001). *Defining and selecting key competencies*. Seattle: HOGREFE.

United Nations. (1992). *Agenda 21: Earth summit—the united nations programme of action from Rio*. http://www.un.org/esa/dsd/agenda21/res_agenda21_00.shtml.

Weinert, F. E. (2000). Lehren und Lernen für die Zukunft—Ansprüche an das Lernen in der Schule. *Pädagogische Nachrichten Rheinland-Pfalz, 2-00*, 1–16.

Weinert, F. E. (2001). Leistungsmessung in Schulen. Eine umstrittene Selbstverständlichkeit. In F. E. Weinert (Ed.), *Leistungsmessung in Schulen* (pp. 17–31). Weinheim: Beltz.

Working Group of the Transfer-21 Programme. (2007). *Guide: Education for sustainable development at secondary level. Justifications, competences, learning opportunities*. http://www.transfer-21.de/daten/materialien/Orientierungshilfe/Guide_competences_engl_online.pdf.

Zinnecker, J., et al. (2002). *null zoff & voll busy. Die erste Jugendgeneration des neuen Jahrhunderts*. Opladen: Leske + Budrich.

## The author

**Gerhard de Haan** is the Professor for Educational Future Studies at the Free University of Berlin, Germany. His extensive research and development projects focus on Education for Sustainable Development, particularly on the modernisation of the school system. His research is also concerned with social constructivism, knowledge societies and knowledge societies. He is a member of various journal and research advisory boards, and is the Chair of the German National Committee for the UN Decade on Education for Sustainable Development.