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Introduction

What does 'learning' have to do with 'sustainable development'? A lot, apparently, judging by the numerous publications addressing both concepts together. However, even a brief scan of this vast body of literature makes it clear that it covers a very broad range of topics. Learning may focus on values, knowledge or skills for sustainable development. It can take place in the formal educational system, through non-formal courses, or informally through a variety of interactions that do not explicitly aim at learning. The contributions by formal institutions of learning to sustainable development come in different shapes and sizes as well. Many advocate a more sustainable operational management of such institutions ('Greening the Campus'), in order to present a credible role model. Other authors engage in lengthy discussions about the knowledge and topics to be included in courses on sustainable development, and the more radical contributions emphasise the need to transform the whole educational system to achieve 'sustainable education'.

This book focuses on formal learning in higher education curricula, with some digressions into aspects like primary education and learning in mixed regional networks of societal actors. The role of institutions of higher education in 'learning for sustainable development' has in recent years received considerable attention at policy level, both nationally and internationally. The United Nations have designated the 2005–2014 period as the 'Decade of Education for Sustainable Development', and UNESCO, which has prepared the implementation plan, stresses that 'higher education in particular occupies an important position in shaping the way in which future generations learn to cope with the complexities of sustainable development' (Higher Education for Sustainable Development Information Brief). In 2003, the European Environment Ministers signed a 'Strategy for Education for Sustainable Development', inviting 'all countries to integrate sustainable development into the education systems at all levels, from pre-school to higher education.' National strategies, action plans and implementation programmes on learning for sustainable development have been developed in many countries now, often addressing the role of higher education. Below,

we indicate how this book may contribute to the implementation of all these laudable intentions and plans.

Many of the publications on the issue of learning for sustainable development in higher education view the role of education in this respect as primarily instrumental. Education is seen as a powerful tool to create a type of responsible, 'green citizen', able to bring about changes in society to promote sustainability. As a consequence, there is a clear focus on the values and attitudes perceived as prerequisites for effecting the desired change in individual behaviour and social action. Needless to say, there is considerable debate about the exact nature of these 'sustainable' values and attitudes. Amidst the turmoil of this debate, the development of a didactic framework for 'learning for sustainable development in higher education' and the design of appropriate learning environments has been rather neglected. These issues represent the particular focus of this book.

Our point of departure is the diversity of views on what sustainable development is and how it should be brought about. We accept this diversity as a matter of fact in today's pluralistic society, and agree with the various authors who claim that a diversity of perceptions and approaches offers the best opportunity to find sustainable solutions. Nevertheless, this diversity is also a potential source of conflict when solutions have to be pursued collectively, and thus at the same time presents a serious threat to sustainable development. Whereas the complex nature of sustainability problems inevitably results in a diversity of perspectives, the key competence for professionals to successfully contribute to sustainable development will be their ability to think, communicate, learn and collaborate across the boundaries that divide these perspectives. We refer to this ability to cross boundaries of discipline, science, nation and culture as 'transboundary competence', and we view learning for sustainable development primarily as a process of acquiring this key competence. In this context, we prefer the term 'learning' to 'education', as it centres on the learner rather than the educator, and the aim is to broaden rather than to change the students' perspectives, and to allow the students to develop and build upon their personal values and motivations, individual preferences and prior experience.

Our concept of transboundary competence is closely related to Wals and Corcoran's idea that the essence is 'making an effective contribution to society by going beyond the boundaries', when reflecting on the kind of competence that is needed to contribute to sustainability (Wals and Corcoran,

2004). Whereas their book did not cover specific educational approaches to the role of academia in developing this competence, the present book presents such an approach, founded on the concept of competence-based learning. In the philosophy of competence-based learning, 'learning-by-doing' is central, and in the case of transboundary competence this means, for example, that we need learning environments in which students work on sustainability issues in multi-disciplinary or multi-national groups. In traditional learning environments, group work on projects in cross-boundary contexts is difficult to achieve. It requires bringing students from different disciplinary, national and cultural backgrounds repeatedly together in the same place and at the same time. E-learning environments provide an almost ideal solution to this problem, as the modern ICT tools they exploit allow communication independent of time and place.

The Open University of the Netherlands (OUNL) has been given a national mandate to contribute to innovation in higher education, and is an internationally acknowledged frontrunner in the field of competence-based forms of e-learning. The OUNL School of Science has more than a decade of international experience in the development of such approaches in the area of environment and sustainable development, for example in the course entitled 'European environmental science: towards sustainability', the 'Global seminar on environment and sustainable systems' and the 'European virtual seminar on sustainable development'. Until recently, our experiences were incompletely documented and scattered over various publications (e.g. Ivens et al., 2002). Given the importance of competence-based e-learning approaches to learning for sustainable development, we thought it was time, in this Decade of Education for Sustainable Development, to integrate our views and findings into a more accessible publication. The book is written in an open and concrete style, and is intended to be of practical use to a wide audience of practitioners in higher education. The examples are mainly drawn from our study programmes in Environmental Sciences, but as the aim is to make 'specialists' competent to contribute to sustainable development rather than to deliver 'sustainable development specialists', we expect that the approaches we present will be useful to a broad range of degree programmes in higher education.

The book is organised as follows. Chapter 1 formulates a perspective on the implications of today's globalised, knowledge-intensive society and the challenge of sustainable development for the organisation of learning

processes and education. The three subsequent chapters (2–4) analyse trends in the fields of research, policy and technology with respect to sustainable development. Based on these analyses, new competence requirements for professionals are indicated and suggestions are made as to how development of these competences may be stimulated in higher education. Chapter 5 synthesises the suggestions from the previous chapters and identifies key competences for sustainable development. The characteristics of learning environments in which these competences can be developed are formulated, and a coherent didactic framework is proposed.

This framework is specified in the next chapters (6–9), describing educational projects that were mainly developed, implemented and evaluated by the OUNL School of Science, often in collaboration with international partners. Chapters 10 and 11 describe innovative initiatives from higher education to contribute to learning for sustainable development by actors outside the field of education and at lower levels within the educational column.

Whereas the previous chapters focused on the development and implementation of specific learning environments, chapter 12 addresses the issue of implementing learning for sustainable development at the institutional level. This chapter discusses how quality assessment can support initiatives in higher education for sustainable development and presents a concrete assessment tool.

The book ends with an evaluation and perspective on ‘innovative learning for sustainable development’ (Chapter 13), and a reflection on the contents of the book by the editor of the series (Epilogue).

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