

**Multi-Actor Learning  
for Sustainable Regional Development  
in Europe: *A Handbook of Best Practice***

by

Andrew Barton & Jana Dlouhá (editors)



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# INTRODUCTION

## **Introductory Message from Project Manager**

Global society is undergoing unprecedented social and technological change, and the physical environment we live in is facing inexorable transformation as well as a result of burgeoning climate change. Faced with these enormous challenges, there is a need to adapt conventional ways of learning to create knowledge and skills that can be applied to developing individuals and society in ways that are economically, socially, and above all, environmentally sustainable. In response, the importance of Learning for Sustainable Development (L4SD, sometimes also referred to as Education for Sustainable Development or ESD) is widely accepted, as is the need for lifelong learning, emphasised in Agenda 21 and integrated in a number of international declarations (UNECE 2005; UNESCO 1997; EU Sustainable Development Strategy 2006).

Three main challenges have been identified to address global learning needs: a) self-directed learning options for the development of competencies, b) transdisciplinary settings to make knowledge applicable and effective in real-life situations, and c) overlapping the boundaries of academic versus non-academic learning to achieve a holistic approach to lifelong learning. Over halfway through the UN Decade of ESD, exploration of an array of different activities and pilot testing highlighted networking and capacity building as the main priorities to strengthen the different approaches and to guarantee widespread impact. Hence, this was the focus of the Lifelong Learning Network for Sustainable Development (3-LENSUS).

3-LENSUS focused on the key issue of the 'knowledge triangle' of education, research and innovation for regional sustainable development. To strengthen networking for L4SD, the project laid

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an emphasis on, firstly, the structural aspects of networks, and secondly, learning collaboration, as both approaches are essential for achieving the collaborative development and transfer of innovative practice in L4SD. A L4SD network was developed by linking the Virtual Campus for a Sustainable Europe, Regional Centres of Expertise (RCEs) on Education for Sustainable Development, universities and local/regional stakeholders facing sustainable development challenges. This network has taken shape partly in the form of the successfully re-animated COPERNICUS Alliance (the European Network on Higher Education for Sustainable Development (<http://www.copernicus-alliance.org>) and partly via a web 2.0-based virtual learning space for RCEs (in Europe and elsewhere) that was being tested at the time of writing and which will have gone live by early 2011. While the virtual learning space was being designed and developed, a successful seminar programme was held for academic and non-academic participants interested in the RCE approach and possibly even in establishing a new RCE - a network of existing formal, non-formal and informal education organisations mobilised to deliver L4SD to local and regional communities. One of the concomitant aims of the 3-LENSUS project was to encourage the creation of new RCEs in areas of Europe where hitherto none had existed, and that was achieved through the imminent formalisation of the Central Macedonia RCE, and quite possibly a Czech RCE in 2011. In addition, to complement and enhance the L4SD network, an open electronic database was formed to collect and collate best practice cases in L4SD across Europe. The database also forms one of the key legacies of the 3-LENSUS project, as it will continue to gather other examples of L4SD practice (hosted in future by the COPERNICUS Alliance website) that can be shared with the wider L4SD community and inspire other stakeholders with their examples.

The other main pillar of 3-LENSUS - capacity building – focused on innovative development and evaluation of trans-disciplinary, multi-sector, and multi-stakeholder learning for innovation in sustainable development. In this respect, the registered L4SD

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database projects also play a vital role, as it is the selected examples of best practice from the database that comprise the real-life case studies section in this book, which aims to disseminate good practice for building the capacity of the L4SD community. The case studies go hand-in-hand with the development of best practice guides by the 3-LENSUS partners on e-learning methodology, transferable indicators for evaluating L4SD, networking between regional and higher education actors, and online network services, also reproduced in this book to serve, like the ongoing legacy of the virtual open warehouse of project examples represented by the electronic 3-LENSUS database, as inspiration for ongoing and future L4SD practice. Finally, a highly-successful final conference and workshop disseminating the project results was held at the University of Macedonia in Thessaloniki, Greece, in November 2010, attended by a diverse array of academics and non-academics. All the presentations made during the conference, as well as the chapters and case studies published in this book, are available on the 3-LENSUS project website ([www.3-lensus.eu](http://www.3-lensus.eu)).

The 3-LENSUS consortium and target groups are all multipliers in different areas: universities to students and staff and local communities, local enterprises to clients, non-governmental and governmental organisations to the general public. The activities of 3-LENSUS will ensure that the capacity building tools reach far and wide. The L4SD network established by the project connecting universities and other societal actors can and already is acting as a model for the Global Learning Space for Sustainable Development envisaged by the United Nations University (UNU) within the framework of the Decade of Education for Sustainable Development. Active collaboration with the UNU was undertaken while the communication and learning platform for RCEs was in its developmental and testing stages and it is expected that the space will have a global reach as a result.

In conclusion, the large amount and high quality of the outputs produced by the 3-LENSUS project testify to the highly

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productive work carried out by all the partners over the two-year life span of the project. It is our hope that its results and lessons learned will themselves prove sustainable over the long term by helping to raise awareness and strengthen ongoing efforts in Europe and the wider world to adapt the way we learn to meet the very real and critical challenges of living sustainably in a fast changing world.

Finally, word of thanks to the external evaluators, Dr. Zinaida Fadeeva, Associate Fellow for the Education for Sustainable Development programme at the United Nations University's Institute of Advanced Studies, and Dr. Jon Dron, Associate Professor at Athabasca University in the School of Computing and Information Systems in Canada, who did a great job in providing us with valuable comments, suggestions and advice.

Andrew Barton

3-LENSUS Project Manager



# Chapter One

## **In search of the knowledge triangle for regional sustainable development: the role of universities**

Maik Adomssent

### **Abstract**

In the following, meaning, role and interdependencies of education, research and innovation, which together form the so-called knowledge triangle, are analysed against the backdrop of the sustainability paradigm. In another analytical step, their contribution to regional sustainable development is highlighted. Last, but not least, the role of universities in communicating and producing knowledge, providing education and generating innovation is examined.

**Key words:** innovation; knowledge; transformation; education;

### **Innovation – a term with multiple meanings**

Looking at the vertexes of the triangle metaphor, innovation seems more than the others to have the character of a buzzword that is frequently used in close combination with knowledge. So, the first question is whether innovation can deservedly be described as nothing more than “the first global policy craze of the twenty-first century” (Steve Fuller, 2007) and, secondly, how innovation is discussed against the backdrop of sustainability.

A recent definition of innovation mirrors its origin in economics/economic sciences, stating that innovation can be seen as the “successful exploitation of new ideas” that may either be entirely new to the market or involve the application of existing ideas that are new to the innovating organisation or often a combination of both. Thus, ‘innovation involves the creation of new designs, concepts and ways of doing things,

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their commercial exploitation, and subsequent diffusion throughout the rest of the economy and society.’ (UK Innovation Report, 2003)

This description covers the most frequently used meanings of the term, encompassing ‘invention’ (the act of creating something new), ‘innovation’ (first introduction of new products, processes, organisational forms etc.), ‘adoption’ (taking on something new); and ‘diffusion’ (process of spreading something new and making it acceptable) (Kristof, 2010).

Furthermore, two different innovation models have to be taken into account: While the ‘Schumpeterian’ innovation (Schumpeter, 1934) originally strictly referred to the process of achieving technological improvements that can be characterised as radical and trend-breaking, ‘Usherian’ innovation (Usher, 1929) tends to be gradual and incremental and is facilitated by the learning process that occurs through cumulative experience (Weaver et al, 2000). Since breakthroughs also have a genealogy traceable to earlier discoveries, both forms of innovation can be seen as complementary (Figure 1).

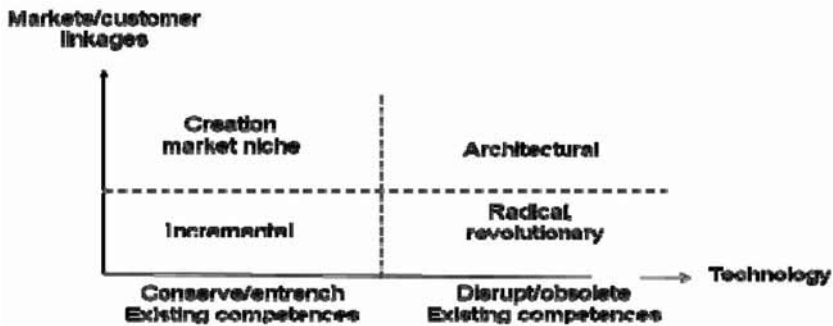
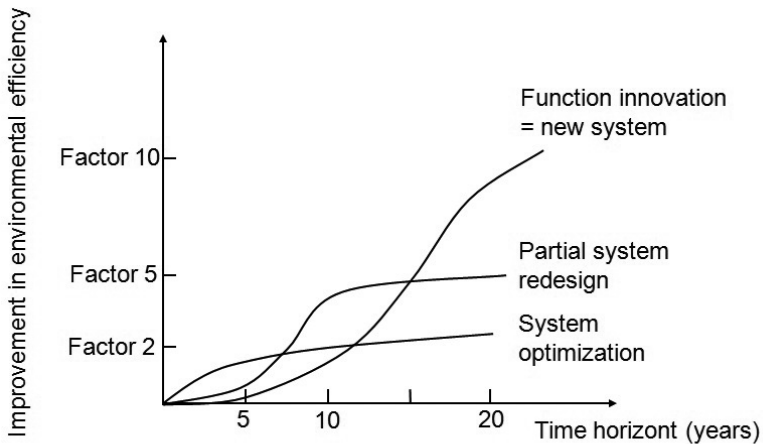


Figure 1: Typology of innovation (source: Abernathy & Clark, 1985)

Until now, innovation research has been dominated by the economic mainstream. Sustainability-related activities mainly refer to the ecological dimension of sustainability, whereas conceptual amalgamation with economic and social dimensions only stands at the beginning (von Hauff & Jörg, 2010). With

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regard to environmental policy, improvement in efficiency is discussed at different levels: while factor 5 seems to be reasonable to achieve by optimisation or redesigning parts of the system (equaling the evolutionary understanding of innovation), factor 10 may only be realizable by system innovation in a revolutionary sense (cf. figure 2).



**Figure 2:** System optimisation versus system innovation  
(source: Weterings et al, 1997)

Path-dependency is an issue to be discussed here, since societal ability to innovate and for structural change under sustainability aspects is mainly important in sectors where institutional, societal and physical realities/circumstances (pre-)determine future developments (Stirling, 2009). This deep-rooted incrementalism in normal innovation processes is the reason why many authors see systemic approaches not only as reasonable but imperative for the development of more sustainability futures (Meyer-Krahmer, 2002).

By comparing theories of innovation, one more point is relevant with regard to sustainable development. It is striking that older theories of innovation seem to be based more on control (e.g. of ideas, of knowledge, of data, and of intellectual property rights),

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while newer theories of innovation tend to comprise a wider scope (cf. Wilbanks & Wilbanks, 2010). This “open source model of innovation” (Alakeson & Sherwin, 2004) has worked its way into many spheres in recent years and is exemplified by approaches such as

- *open innovation* in a networked environment: addressing the ability to use the world outside as an institution to generate internally useful knowledge (cf. Chesbrough, 2009);
- *user driven innovation*: innovation comes from being close to the problem; in this case the knowledge required to innovate is “sticky” and does not move far from the user (cf. von Hippel, 2005);
- *distributed innovation*: addressing collaborative communities like networks where individual actions “snap together” into coherent group performances (Lakhani & Panetta, 2007).

All examples denote a significant shift in perspective on innovation (and related policies) – from focusing solely on technology to increased consideration of “softer” innovation factors such as organisation, qualification, communication, mentalities, attitudes and behaviour. This leads to core principles of knowledge communication (including education) and knowledge production.

## Knowledge for transformation

Innovation is steered by paradigms that guide both knowledge creation and objectives for improvement. Knowledge itself is regarded as the foundation for discovery and innovation as well as for coping. Thus, converting knowledge marks a fundamental challenge for sustainability. But knowledge has always been a crucial dimension for the transformation of human society. What is new, however, is the notion that within contemporary societies, “knowledge acts on knowledge” (cf. Sales & Fournier, 2007).

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‘Knowledge is now being applied systematically and purposefully to define what new knowledge is needed, whether it is feasible and what has to be done to make knowledge effective. It is in other words applied to systematic innovation.’ (Drucker, 1993: p.42)

All processes and domains of knowledge are intimately tied to powerful communicative relationships. Thus, communication acts as “the main catalyst for reflexive creativity, through training and diffusion, exchange, recombination, integration of knowledge and innovation” (Sales et al, 2007: p.4). In the course of this paper’s focus, one has to be reminded that the concrete realisation of all these communicative propulsions needs to be broken down against the backdrop of the sustainability paradigm. Due to the fact that equity is the most fundamental axiom of sustainable development, it is indispensable to take an in-depth look at it.

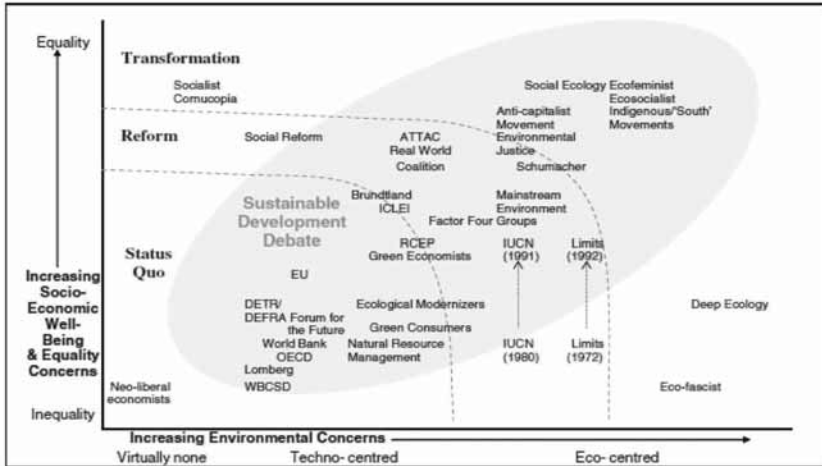
In this context, Haughton’s (1999) summary of the ideas of sustainable development in five principles based on equity is instructive – especially with regard to “procedural equity”, meaning that people have to be treated openly and fairly.<sup>1</sup> These principles may help to give clarity to the ideas of sustainable development by linking human equity to the environment, and at the same time providing a useful basis for evaluation of the different trends of sustainable development. That critical comparison of related interpretations and constructs is quite a reasonable thing to do, is shown by Hopwood et al. (2005). By mapping out different trends of thought on sustainable development, quite diverse priority settings come to the fore (Figure 3). Although their findings should not be carved in stone, at least their rather optimistic statements that “most conceptualisations of sustainable development call for the wide possible participation in public choices, also with reference of ideals of democracy, equal opportunities, and emancipation”

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<sup>1</sup> The other principles encompass inter- and intra-generational equity, geographical and interspecies equity (Haughton, 1999).

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(Späth, 2008: p.227) has to be questioned – for instance with regard to (regulation of) ownership of knowledge and related products.



**Figure 3:** Mapping of views on sustainable development  
(source: Hopwood et al, 2005)

Finally, epistemological features of knowledge have to be taken into account. On the one hand, its cognitive component is rather obvious, but it holds important social functions, too, meaning that it is used for various purposes and in a number of contexts (Hemlin, 2001). Concerning the issue of sustainability, this leads to scrutinizing the way knowledge is produced. In view of the interpenetrations of society and science, different “new” forms of knowledge production have been discussed (e.g. “post-normal science” (Funtowicz & Ravetz 1993); “Mode 2” (Gibbons et al, 1994); “post academic science” (Ziman, 1995)), all stressing the necessity of interactive knowledge production via transdisciplinary approaches where science cooperates with non-academics.

Hence, knowledge producing organisations are targeted as in another famous approach, in line with the aforementioned ones: the triple helix development model, where universities –

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in cooperation with industry and government – are assigned to play an innovative role in society and are active in translational research and community development. With its core elements “free flow of people, ideas and innovations”, triple helix interaction represents to some researchers not only the heart of knowledge-based development but also the necessary preconditions for innovation and sustainable development (Dziah & Etzkowitz, 2008). The crucial role for universities in (new forms of) knowledge production is taken a step further in the following, focusing on the embedded nature of higher education institutions in regional development contexts.

### **The role of universities – broken down to the regional level**

In terms of geographic scale, regions have an optimal size for successfully implementing sustainable development: small enough to be of direct interest to residents and large enough to involve key stakeholders in the planning and decision-making processes, thus possessing critical mass for creative solutions. As a result, regional approaches feature an increased feasibility for utilizing “systems thinking” at the regional level. Thus, universities can contribute to regional sustainable development mainly by:

- bringing in their own institutional management practice (improvement of energy efficiency, introduction of environmental management systems, etc.);
- serving as sources of technical expertise (technical and cross-disciplinary issues such as global climate change),
- accomplishing their cultural mission – reaching beyond skills development toward employability by promoting ideals and critical thinking skills for a well-functioning democracy.
- acting as leaders during their work with local authorities and other societal stakeholders when setting up and implementing regional sustainability plans (cf. Zilahy & Huisingh, 2009; von Zeijl-Rozema & Martens, 2010).

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Apart from their possible role as gatekeepers, spokespersons, or independent monitors, higher education institutions (HEIs) should become bridging institutions or intermediaries, working toward a “conscientisation” of regional or local problems by designing processes for public participation in research (Bodorkós & Pataki, 2009). But in order to let such participative and deliberative techniques for production and use of knowledge become fruitful, it is necessary that all participants – including academia – be engaged in self-reflexive assessments of their own knowledge production practices, as well as in relation to those of the other participants (cf. Mickwitz & Melanen, 2009).

Apparently, the transition of traditional HEIs, incorporating the classic ivory tower focus on disciplinary development, towards a culture that strengthens the link between academia and other actors in regional sustainability initiatives by democratising research processes, providing communicative space and tools for a democratic change, and transformation of power relationships, is not at all an easy undertaking. Again, this transition at societal level is nothing less than a system innovation with many stakeholders involved, each with their own perceptions of the future, values and preferences, strategies, and resources. Characteristically, system transitions are multi-actor processes unfolding over long timescales and, as such, architectural innovations are writ large (Elzen et al, 2004). So, once again it has to be stressed that regional contexts tend to be quite promising requisites for change, and are first and foremost a close link between circulation and institutional change (von Hauff & Jörg, 2010).

Anyway, regional innovation systems may only develop in a co-evolutionary way, by reason that extensive forms of interaction and collaboration involve fundamental change. In other words, transition and transformation processes are utterly impossible without learning – on the individual, organisational, and societal levels.



### Learning for change

When looking at societal accommodation processes towards sustainable development, the communicative interplay between the individual and society as well as intermediary authorities is instructive (cf. Figure 4). At the individual level, citizens develop skills and play a role in society leading to sustainable behaviour by acquiring new knowledge and new skills. By contrast, the institutional level is characterised by learning organisations which try to improve the quality of their own structure and performances in sustainability by setting new priorities, and implementing new procedures and new practices. As far as the societal level is concerned, a learning society can be understood as the sum of the learning processes of different organisations and individuals with their own perspectives in which there is a cumulative effect and that taken together create new agendas, new partnerships, and new ways of interaction and participation (Goldstein, 2005).



**Figure 4:** Communication and learning for sustainable development: Co-evolutionary interplay of a multi-level system (source: author)

To permit societies to become sustainable, it is important to unlock as many forms of knowledge as possible, which means combining the traditional knowledge that exists alongside modern knowledge

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with scientific knowledge. This allows existing “below-the-radar-innovations” that remain mostly isolated and unconnected despite otherwise reasonably robust informal knowledge networks to link up with more sustainable subsets of knowledge (Wamae, 2009).

As a matter of fact, there are two sides of education for sustainable education that can be seen as complementary:

- Learning *for* sustainable development: By both facilitating changes in what we do and promoting (informed, skilled) behaviours and ways of thinking, where the need for this is clearly identified and agreed.
- Learning *as* sustainable development: By building the capacity to think critically about (and beyond) what experts say and testing sustainable development ideas, as well as by exploring the contradictions inherent in sustainable living (Vare & Scott, 2007).

The relationship between educational outcomes and social change then can be seen in a two-fold way, where learning leads to change either by establishing and communicating *facts* or by offering *tools* to facilitate choice between alternative futures. Or, thirdly, *open-ended* learning is strived for by making it understood that what is (and can be) known in the present is neither adequate and nor can desired end-states be specified (Gough & Scott, 2003).

## Concluding remarks

With regard to the realisation of the knowledge triangle, collaboration has to be seen as a predictor of success. The powerful role of communication often lies in its ability to let previously unrelated ideas merge, wherein innovation will occur. At the same time, the weakness in the relationship between development activities and knowledge production is one of the sources of the persistence and consequences of unsustainability and underdevelopment (cf. Dzisah & Etzkowitz, 2008).

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Sustainable development and innovation are steered by paradigms that guide knowledge creation and objectives for improvement. Thus, for the co-production of knowledge and related education and learning activities to occur, the principles of emerging sustainability science are compulsory, and among those principles the following core elements of participatory research are important: appreciation of different forms of knowledge, awareness of complexity, irreducible uncertainty, disputed values and the plurality of perspectives of different stakeholders, and the presence of an extended peer community who take part both in the quality assessment of the research process and in the production of scientific knowledge (Bodorkós & Pataki, 2009).

As a matter of fact, all the aforementioned extensive forms of interaction and collaboration might be encouraged and facilitated by information technology, which, through this process, might also entail some transformative impacts. Universities will certainly play a crucial role in new systems of knowledge production – just as they always have.

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## Chapter Two

### **Critical perspectives from the literature review on the contribution of universities to regional sustainable development**

Dr Benjamin Karatzoglou

#### **Abstract**

Universities have been consistently considered significant contributors to the pursuit of regional sustainability initiatives for almost two decades. The composite nature of sustainable development has made universities critical partners in all relevant efforts, always in firm collaboration with other local actors. An extensive number of articles presenting relevant university experiences has been published in academic journals worldwide. In the following overview of this literature the typical content of such articles is presented. This content involves the motives and barriers, the critical issues confronted and the best practices devised by university actors. A selection of representative articles follows which makes evident that there is a flourishing literature with case-study type articles. The paper argues that the descriptive nature of the published cases, applied in different contexts and internally evaluated, can be inspiring and encouraging for future peer efforts. But their value-added will be maximised when the case-study research is instrumented and the findings standardised and objectively measured to improve comparability of results and easier implementation to benefit future actors.

#### **Introduction**

The Brundtland Commission Report, “Our Common Future”, emphasised the importance of cooperation among the various stakeholders at the regional, national and global level as a precondition toward a sustainable future (WCED 1987). The Rio

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Declaration on Environment and Development presented the goal of 'establishing innovative equitable global partnerships through the creation of new levels of cooperation among States, key sectors of societies, and people' (UNCED 1992). Agenda 21, released at the Rio Summit, addressed the potential of the scientific and the technological community to make an effective contribution to the decision-making processes concerning the environment and development, and stressed the role of academia in such an effort (Zilahy and Huisingsh 2009).

The need for extensive collaboration among diverse partners to effectively pursue SD originates from the three dimensions of the term, namely the ecological, economic, and sociocultural. The transition to a sustainable society should be seen as an innovative evolutionary stride. The holistic approach, necessary to attain this transition and simultaneously serve all three pillars, calls for a development marked by an increased complexity.

Higher Education Institutions (HEIs) have been generally considered significant contributors to the promotion of sustainability. This recognition has been recorded in numerous declarations such as the Halifax and the Talloires Declarations. Regional universities in particular are expected to closely engage with local communities in networking and productive partnerships, amplifying the capacity of a region to self-organise and operate, and leading to mutually beneficial outcomes. In the following chapters we present the contribution of universities to sustainable regional development as recorded in the relevant academic literature. The presentation includes the role of partnerships and networking in the effort to pursue SD; the motives, constraints, and conditions which favour or hamper strong regional engagement for universities; the practices applied, the difficulties met and the measures employed to overcome these difficulties; and the Regional Centres of Expertise (RCEs) as examples of innovative institutional networking mechanisms. Then we describe the methodology used to carry out this study. Finally, we provide an overview of



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the literature on learning for sustainable development (L4SD). The paper concludes with a discussion and critical analysis of the scope, strengths and weaknesses of these case studies which elicits certain suggestions that can potentially enhance the usefulness of the literature for future interested parties.

### **The contribution of Universities to regional sustainable development**

The importance of HEIs to their local economies has been acknowledged from a macroeconomic perspective since the 1970s with the rapid expansion of the university and college sector in Great Britain. The new millennium witnessed a lot of effort “seeking to take the *region* as the focus and examine how different HEIs and kinds of HEIs with a presence in a region combine and collaborate, compete or cooperate, in the regional interest” (OECD, 2005). Empirical evidence from many countries reveals that regional development supported by HEIs is of a high and rising importance especially under competitive global pressures. More specifically, HEIs are expected to add value to a region by offering:

- a range of tangible identified benefits such as population growth, employment opportunities, enhanced local GDP, housing demand and spin-offs.
- flexible and innovative regional responses and contribution to the transformation of the area into a ‘learning region’ and to the growth of a local ‘knowledge economy’ (Keane and Allison, 2000).

In the context of this article regional sustainable development is approached in terms of the existence, creation and strengthening of formal and informal linkages among regional partners for the pursuit of local common economic, environmental, social, and cultural goals (Holtta 2000). The eminence of the HEIs’ actions, and thus the value they add to regions, closely correlates with their ‘embeddedness’ in the local economy and activities, as well as their

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ability to monitor and respond to internal and external changes by generating and managing relevant information and knowledge. Lundvall and Johnson (1994) have acknowledged two different types of 'knowledge': formalised, codified, 'official' knowledge which can be measured and 'patented'; and tacit informal knowledge which is socially constructed and embedded but too ill-defined to be captured or transferred in a standardised way. Unfortunately, universities primarily 'generate' and manage codified knowledge while it is the tacit knowledge that can produce innovative ideas and endow peripheries with a competitive edge. This observation explains why regional excellence is not a function of institutional thickness but rather of the level of interaction and mutual awareness of a common purpose among the local stakeholders and provides an explanation of the poor responsiveness of universities to regional needs (OECD, 2007).

The literature review discloses that all authors highlight very similar ways in which universities can contribute to regional SD (Arbo and Benneworth, 2007; Stephens et al, 2008). Most typical suggestions include:

- A change in the universities' own management practices, for instance their involvement in recycling schemes, energy efficiency initiatives, or the implementation of an environmental management system (EMS);
- Promotion of integration, synthesis, critical reasoning, and system-thinking skills, supporting students and researchers beyond skill development to cope with the future multi-disciplinary complex challenges of sustainability
- The assumption of a leading role in coordinating, promoting, and enhancing the engagement of local authorities and other societal stakeholders to design and implement regional sustainability plans by acting as sources of technical expertise.

The literature abounds with examples of good practices and effective alliances established between universities and local actors. Fewer published articles refer to barriers to change, collaboration

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failures, incentives and disincentives for engagement, or suggested performance indicators. The barriers described in the literature typically include organisational factors, such as the lack of incentives, inadequate financial resources, and shortage of time for members of the faculty because of other higher priorities. The low appreciation of outreach activities within academia provides another explanation of the limited interest of faculty members to engage in multi-disciplinary RSI work which does not pertain to their immediate research interests and thus does not deliver scientific credit. All these barriers result in a situation where the potential to cooperate is not fully realised.

However, the focus – and the value-added - of this paper lies in the success stories found in the literature, including avoidance of past mistakes and the establishment of an inventory of good and innovative practices used by universities to stimulate learning for SD. It becomes evident from the literature review that hardly any effective effort has been undertaken in the past by individual universities. The establishment of networks and alliances with other local actors has become the sine qua non for success. Thus, the next chapter (5) presents and comments on the characteristics of networking for sustainability with the emphasis on the role of universities and the Regional Centres of Expertise (RCEs). Chapter 3 presents the methodology used for the selection of representative case studies from the literature. An overview of these studies follows, accompanied by an evaluation of the case-study method capacity to allow generalisation of the findings. Finally, the conclusions section summarises the findings and highlights the changes needed in recording the best practices to better support successful future initiatives.

### **Networking for sustainability: the role of universities and RCEs**

The need for networking becomes indispensable in any case where a relatively large number of small actors aim at a target which cannot be attained in isolation. An overarching trait of

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networks is that they connect actors from different public and private sectors of society, sparking the prospect for creative ideas and innovative patterns of action but, simultaneously, increasing the challenge and difficulty of achieving synergy and interaction among the participating actors. The idea of a sustainability network is used in this context to indicate a group of actors leading towards sustainable development in all, or any, of its dimensions (Halme and Fadeeva, 1998).

The increasing complexity of collaborative efforts to pursue SD calls for the aggregation of the elementary units (partners) to form larger and larger units while moving from local to global. The parameters that define the complexity of the overall structure relate to the number of actors in the system at each level, their diversity, and the density and intensity of interactions among the group members (Wallner, 1999). Country-related disparate socio-cultural and legislative contexts may encourage dissimilar collaborative environmental responses in terms of membership, structure and priorities (Lahusen, 2000). Networks can be categorised in many different ways, depending on the criteria used, which involve their functional area, the type of activities, the actors engaged, the exchange variables, the structure and organisation of networks, and the intensity of the connection. The plethora of criteria and their potential combinations confirm that no two networks will ever be identical. Thus the optimisation of the operations of such a system cannot be dictated from the 'outside' or take the form of a generic optimum network structure providing common 'ready-to-use' solutions. Rather, it must be internally developed on an ad hoc basis through self-organisation and defined in connection with regional conditions.

Though negative experiences and poor performance from collaborative efforts are just as usual as positive ones, they are not equally celebrated! Negative experiences originate from the aforementioned network problems and may result in difficulties in reaching an agreement, a long time needed to achieve a goal,

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unsatisfactory performance, and internal conflicts between the partnered actors. Establishing *centres of expertise* that will align the interests and the potentials of the regional actors, coordinate their efforts, and develop capacity for managing pending issues is a critical enabling approach for collaborative self governance (Fadeeva, 2004).

Early in 2000, Professor Hans van Ginkel, Rector of the United Nations University (UNU), Tokyo, pioneered the concept of the RCEs as a strategy for translating the UNESCO led ‘Decade of Education for Sustainable Development 2005–2014’ (UNU, 2005) global goals in the context of local communities. The RCE objectives resulted from the observation that ESD would be more effective if a carefully developed and implemented curriculum were built from *regional units*, infusing and engaging local partners. The term ‘*units*’ in this context involved all actors committed to offering formal education to all age levels – from primary school to post-graduate studies, as well as those offering non-formal education and informal tutoring. The widening of the scope should be offset by the restriction of the geographical scale of the RCEs in order to optimise performance and focus on local problems and issues. Thus, the term *region* in this case became centre-defined rather than border-defined (Van Ginkel, 2008), and refers to an area where people have solidarity in economic, social, cultural, and environmental terms and can get together in a relatively easy manner.

Virtual global learning spaces (GLS) can be created by networks of connected and collaborating RCEs to allow the sharing of information, knowledge and experience, as well as a comparative analysis between the differences and similarities of regional problems faced and solutions suggested. At the same time each, an RCE can participate in local thematic networks acting as a knowledge building block used in alternative ways. The key principle for any RCE is self-organisation aimed at mobilizing as many partners as possible. Universities are typically the backbone of RCEs while the latter establish a

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natural framework for helping universities and other HEIs overcome academic introversion and assume a meaningful role in the local society. RCEs are expected to establish and strengthen horizontal and vertical links among partners providing different levels of all kinds of education and narrow the communication gap between educators and scientists. Their early transformation from a local network, *delivering* ESD to the local communities, to an active partner *exchanging* knowledge and contributing to local sustainability, predicated the wide approval and world expansion of RCEs, and led to the need for the establishment of geographic and thematic networks. This new role of actively learning organisations demands that universities compromise their traditional institutional structure and priorities, overcome compartmentalisation of knowledge, undertake action-oriented research, and link theory with practical collaborative R&D projects. The intention and capacity of universities to assume this new role holistically and effectively will determine their role and performance in developing an integrated and effective approach to ESD.

The analytical presentation of sustainability networks and more emphatically of the RCEs themselves is affected by the fact that the literature abounds with descriptions of best practices of L4SD efforts, the vast majority of which has been undertaken by such alliances. Universities design, coordinate, and lead the relevant initiatives but their efforts are inspired or blocked, enhanced or limited, blessed or condemned, by the inherent network characteristics described above.

## Methodology

The term 'overview' in the theme implies that this report does not claim to exhaustively cover all the relevant literature. We have included references from studies under different national systems of education only as a source for comparison of the common problems they face and the best practices they devise. We have omitted articles emphasizing education management,

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highly technical or purely econometric studies on the impact of higher education and academic research on regional performance. Our literature review mainly draws on a selection of European and North American publications in English, presenting data on European, American and some Asian universities' regional initiatives because of language barriers, limited time and available resources. In the widely varied sustainability literature one can distinguish two main branches of studies (Stephens and Graham, 2009):

- Empirical and descriptive studies of specific approaches, strategies, initiatives and actions taken by certain HEIs, operating independently or within a network/RCE. This branch contains the great majority of articles and includes presentations of the development, implementation and assessment of individual programmes by universities worldwide as well as suggested 'best practices' and performance indicators. The literature review of such articles demonstrates a lack of cohesion and a lack of solid theoretical underpinning in addition to a certain degree of repetition and redundancy.
- Prescriptive studies suggesting that universities play a more prominent role in the pursuit of sustainability and providing direction on the optimal policy processes, implementation and evaluation for transition to the new role.

The study has mostly focused on descriptive L4SD projects covering formal, informal, and non-formal learning according to the official definitions suggested by the EU-DG Education and Culture. It has included activities benefiting any of the three pillars of SD with the emphasis on interdisciplinarity. The Scholar Google network (<http://scholar.google.com>) was employed to ensure that the articles used were peer-reviewed and published in academic journals. Admittedly, large presentations of case studies were found in special thematic journal issues and in selected Compendiums and Best Practice Guidebooks, published by international organisations (for instance UN-DESD, 2005;

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OECD (Arbo and Benneworth), 2007; GHK, 2008; Garlick and Pryor, 2002). The very small number of references (1-10) to the available articles deterred the use of the citation index as an impact indicator to support the choice of the most influential cases. Over 100 articles went through desk review. The main elements examined involved the actors, stakeholders and beneficiaries engaged in the initiative; the background of the problems confronted; innovation and good practices applied; key output and value-added; and the explanatory variables for success or failure. The major findings from the entire literature review are introduced below and a selection of indicative articles follows presenting the critical issues confronted and best practices devised by actual university actors.

### **An overview of the literature on the role of Universities in Learning for Sustainable Development**

The literature on university engagement in the pursuit of regional SD can be categorised in two main components: articles that provide conceptual frameworks for the analysis of this engagement; and case-studies that apply such frameworks in specific cases and comment on certain aspects of the implementation. Most of the authors seem to believe that introducing sustainability initiatives in a region is a problem that calls for a solution. Therefore, they approach the issue in an instructive, problem-solving way. The Deming cycle can be used for the taxonomy of the relevant literature. The Deming cycle is the standardisation of a problem-solving approach in a highly dynamic environment and consists of four steps: Plan, Do, Study and Act (Evans and Lindsay, 1993). The 'Plan' stage consists of studying a situation, gathering data, and planning for improvement. Articles presenting the motives and counter-motives, barriers and limitations to universities to engage in regional sustainability efforts, as well as the criteria according to which they choose partners, set priorities, and develop plans can be classified in this category. The 'Do' stage involves the implementation of the plans, in this context the activities



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performed by each university in its effort to execute its plans. We combine the last two stages 'Study and Act' in one which entails the measurement and analysis of the effectiveness and efficiency of the 'Do' stage activities and involves issues such as indicator development, benchmarking, best practices, and feedback techniques. The literature is rich with case-study type articles related to the activities issue but is weak in exploring the Plan and Measurement issues (Gunasekara, 2006)

The most challenging - and valuable - aspect of the application of case study research is to move the investigation from a descriptive account of 'what has happened in a special case' to a wider, worthwhile addition to knowledge (Rowley, 2002). Although case studies have been credited with offering insights that might not have been achieved with other approaches, they have also been accused of lacking rigour, objectivity (ibid), and solid methodology (Corcoran et al, 2004). Eisenhardt (1989) contends that case studies are particularly well-suited to new research areas when the existing theory is inadequate to provide answers to 'why' and 'how' questions, suggesting that the case-study method is ideal for the exploratory and descriptive nature of research into the university and regional SD relationship. The validity and reliability of the findings, as well as their ability to compare and generalise, are the main concepts that will determine whether the findings of the study will be assimilated into the field knowledge base.

Compendiums, providing details of selected 'good practices' on sustainable regional development initiatives undertaken by universities in partnership with local communities, have been produced during the last decade. Various criteria have been used by the authors to categorise the identified initiatives and measure the quality and depth of this partnership (Garlick and Pryor, 2002). Typically, such compendiums involve the names of the initiative and the partnering Institutions, a description of the projects undertaken as well as their quantitative and qualitative outcomes, and the success factors as suggested by the participating

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universities. Thus, though normally such compendiums are of a considerable size, their purely descriptive nature and the applied self-evaluation process limit objectivity and do not allow a comparative analysis that might add value and support future relevant initiatives.

Ferrer-Balas et al (2008) attempt to identify the key transformation aspects of seven universities towards sustainability, the transformation drivers and barriers, and a comparative analysis of the strategies used. The authors apply the three-dimensional Framework-Level-Actors (FLA) transformation analysis method and find that none of the three dimensions of change is predominant over the others. The main barrier was found to be the lack of incentive structure for promoting changes at the individual level and the main drivers for change the presence of “connectors” with society, the existence of coordination bodies and projects, and the availability of funding. Trans- and interdisciplinarity enhancement were considered strategic objectives, while transformative learning was found to be less present.

Zilahy and Huisingsh (2009) provide an overview of different theories behind university involvement in RSIs. The authors report on the insights obtained from responses to two questionnaire surveys they developed and used to gain a sound understanding of institutional motives for, and activities in, RSIs. The results helped the authors to make a series of recommendations to policy makers and university leaders on how to make progress toward academic involvement in RSIs more effective and efficient.

An important aspect of the implementation of sustainable development is progress measurement. However, performance evaluation and the design of sustainable development indicators (SDI) at any level of organisation is a complex task which necessitates the participation of all relevant stakeholders, including universities. The literature on this topic is rather limited.

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Ramos (2009) conducts a national survey to obtain data on seven regional SDI initiatives and analyses the particular approach applied by one of them, the Algarve region in southern Portugal. The author finds poor effort and a lack of configuration in the methodological approaches followed by the participating agencies. He contends that the role of academia can be valuable in aligning the efforts and standardising the outcomes of the measurement and reporting practices followed. He proposes that academia establish a cooperation protocol with the regional agencies, staff an academic and technical team, locate and promote interaction among stakeholders, and develop a regional assessment forum for monitoring surveillance and revision of the SDIs. Finally, he provides a list of principal components to assure the coherence of the development process of the SDIs.

Mickwitz and Melanen (2009) introduce the experiences of a successful project in the Finnish Kymenlaakso region where eco-efficiency indicators were jointly developed by academic experts and local decision-makers. The authors evaluate the circumstances under which the original indicators were developed and which has made it possible to maintain and effectively use the system ever since its launch.

Lehmann (2009) develops and applies a model of how academics and universities act as producers of human and intellectual capital. The author clarifies the linkages between the core activities of universities and their involvement in sustainability initiatives and concludes that a systematic engagement in outreach can benefit both internal university processes and their more traditional 'products': education and research. The author provides recommendations of how to effectively proceed towards these ends.

Bodorkos and Pataki (2009) elaborate upon the potential of Participatory Action Research (PAR) combined with the educational model of service learning to facilitate development

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in an underdeveloped region of Hungary. They provide a detailed account of how science can contribute to society through a PAR project designed to facilitate a bottom-up, micro-regional level sustainability planning and development process. They explain how the activation of local capabilities and local stakeholder networking through various small-scale projects and the co-production of a socially grounded rural development plan for the micro-region was possible.

Ferrer-Balas et al., (2009) use a conceptual framework based on systems transitions to assess the systems change potential of a university strategy. They describe a case study of the Technical University of Catalonia (UPC) where a participatory approach was used to design the new strategy of the university, compare this new sustainability strategy to two earlier versions, and conclude that the new approach can successfully facilitate system changes.

Evangelinos et al. (2009) describe the experiences of the regional University of Aegean, Greece, set up with the special objective of fostering development on five Aegean islands. They examine university practices and explore the limitations of turning the institution into a sustainable university by conducting a survey analysis investigating the perception of students regarding the concept of Sustainable Development and its implementation by the university.

Lukman et al. (2009) elaborate upon the example of the University of Maribor (UM) in Croatia. The authors propose a strategic approach to facilitate collaboration between UM, regional development agencies, the local community and industry. They identify the necessary elements of a successful learning partnership and argue that while stakeholders often undertake regional development initiatives, they are lacking in collaboration quality and their activities are not sufficiently inter-linked.

Wells (2009) concentrates on the limitations of university engagement in RSIs by introducing the case study of Cardiff

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University in Wales, UK. The author highlights the most important barriers to potentially successful outreach activities by HEIs and illustrates his experiences with an automotive cluster development project.

Chalker-Scott and Tinnemore (2009) describe the most important success prerequisites for community-based programmes, particularly high quality training, clear organisational structure and sustained financial resources. Based on the experiences gained from the successful USA-wide Masters Gardener Programme which engaged thousands of university staff and community leaders, the authors propose a revision of traditional outreach programmes which can be readily used in other similar schemes.

GHK (2008) has published a compendium of good cases in delivering ESD. The aim of this primary research was to prepare an inventory of innovative best practices for the purpose of stimulating the exchange of such practices in the future and enhance their effectiveness. The pioneering elements of the selected practices cover a variety of innovation types comprising innovation in the content, delivery method, institutional level, and network formation. The compendium uses a common template to present findings from thirty short-listed cases ranging from local to international projects, from 17 countries and covering a variety of public and private organisations in all three types of education. For each case, the compendium provides information on the approach applied, the innovative elements, the key successes and the project's transferability and sustainability.

A similar compendium was published by UNESCO (2007) with the recorded case-studies reflecting individual and institutional efforts to reorient curricula, programmes, practices, and policies to address sustainability at teacher education institutions in four different continents. The eight case studies show a broad diversity of efforts and include practices such as professional

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development for in-service teachers, curriculum revision at their training level, research with students in local schools, the greening of school buildings, creating a network of universities, starting a journal, and creating new undergraduate and graduate programmes. Again, a standardised template is used to present the characteristics of each case, innovative aspects, effects and impacts, constraints, success factors and perspectives.

Finally, Goodnough et al. (2009) describe the very successful initiatives of a small mid-western college, the Morris campus at the University of Minnesota, which include activities such as campus greening, curriculum development and research projects in the SD field. The case study focuses on how initial human and capital resources available to the university can be utilised to turn weaknesses into potentials and eventually strengths.

The rise of the RCEs rekindled interest and triggered the publication of an extended number of articles focusing on this topic.

Mochizuki and Fadeeva (2008) provide a historical overview of the RCE initiative, clarify the philosophy behind it, and describe the guiding principles for RCE establishment and operations. They indicate the need for HEI educators to take on critical roles through engaging in efforts to promote the DESD and describe the RCE initiative as a mechanism to facilitate the HEI response to sustainability challenges by improving collaboration among themselves as well as with other actors. The authors highlight the potential roles of HEIs to overcome the compartmentalisation of knowledge, link policy and practice, and share the most effective strategies and techniques through the use of information and communication technologies.

Dams et al (2008) describe the unique collaborative process initiated at the University of Regina in Saskatchewan, Canada, to develop a local RCE. The innovative aspects of developing RCE

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Saskatchewan were elaborated as a function of regional characteristics and features and of a unique flexible governance model. The paper provides a critical analysis of the governance structure, educational approaches and holistic interdisciplinary research supported by RCE Saskatchewan to find that the strength-based model applied, in conjunction with open, democratic, transparent in-person meetings and online discussion, has proven highly effective for establishing an organisation in which members have diverse expertise and affiliation.

Stefanovic (2008) describes the role that the University of Toronto had in establishing an RCE in Toronto, Canada. The paper describes the engagement of the two entities in the common effort and the reciprocal benefits they gained from it, details specific mutual support projects, includes a critical discussion of broader conceptual issues, such as the interpretation of “interdisciplinarity” and community “outreach” in a university setting, and concludes that societal and environmental benefits for the region exceed engagement costs.

Mader and Zimmermann (2008) present a case-study which describes the development process of the RCE Graz-Styria, discusses the challenges of establishing an RCE and illustrates how an RCE can face regional and global challenges by innovative actions. The conclusions elicited from the paper are that RCEs, apart from being critical partners to local sustainable development by fostering cooperation, knowledge exchange and awareness raising, can also support and enhance innovation and knowledge transfer between countries and continents.

Rikers and Hermans (2008) present the case of the cross-border RCE Rhine-Meuse, an initiative of two Dutch institutions whose activities reach across the German and Belgian border regions. The authors provide a comprehensive description of the establishment of a multi-national, multi-stakeholder collaboration network aimed at the dissemination of knowledge

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about ESD. According to the authors, the case of the RCE Rhine-Meuse shows explicitly the influence of the regional context on the development of the RCE and provides general notions useful for other regions interested in developing analogous initiatives. The authors acknowledge the difficulty they had in deciding the metrics and the benchmarks for measuring the effectiveness of the initiative, considering the fact that different RCEs use different reporting practices expected to serve the priorities of their regions, and call for the development of new tools for the collection of reliable data allowing comparative evaluation in the immediate future.

Masayuki et al (2008) present the Hyogo-Kobe RCE, describe the contribution of Kobe University as a model case and report an attempt to develop and implement a new ESD programme in higher education. Interdisciplinary collaboration was found to be essential in creating an innovative higher education programme and the university capitalised on preexisting activities and projects on ESD in the network formation process and in directing RCE activities towards participatory action research.

Axelsson and Sonesson (2008) open a wider discussion about the roles and responsibilities of universities in society using the RCE Skane, Sweden, as a leading example on how to develop new knowledge about ESD. Their paper describes the RCE partners, two major regional universities and three political organisations, and their vision, developed to include issues such as capacity for cross-boundary action, knowledge-sharing and civic education. The authors stress the vital role and contribution that the university management and exceptionally dedicated individuals can have, acting as forerunners and norm setters in the launching of the effort. Difficulties in distinguishing and measuring results are among the stated challenges, together with budgeting issues, time problems, process clarification and the poor involvement of the actors.



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Sanusi and Khelghat-Doost (2008) share the experience of Universiti Sains, Malaysia, in promoting a sustainable development agenda through its leadership role in the Penang RCE. They describe the institutional structure, the policies and programmes within the campus, and the activities carried out with the surrounding community to promote SD. The authors contend that the administration or even membership of an RCE network provides various internal and external reciprocal benefits including the transformation of the University into a renowned world class institution.

Filho and Schwarz (2008) describe the experiences and outline the activities performed by the RCE Hamburg, Germany. The authors provide facts and figures related to the site as well as a description of the region, of the structure and the activities that the RCE performs, and of its relationship with the various stakeholders. The paper shows that, if strong integral linkages with other local agencies of ESD can be established, synergies between RCEs and such actors can be achieved to the benefit of the institution's competence and credibility.

Boucher et al (2003) identify four tiers of engagement by universities in their region's development. Their findings draw on evidence from 14 regions in seven EU countries collected during an EU-funded research project into the role of universities in regional development (UNIREG, 2000, in Boucher et al, 2003) and show how the interactions between certain factors help explain variations in the depth and breadth of regional engagement by universities. Potential explanatory factors include competition among local universities; differences in international, national, and local orientations by type of university; the role of regional identity; and the importance of funding to steer regional engagement.

## Discussion on the literature review

The multidimensional and complicated nature of SD leads to the need for interdisciplinary approaches and transdisciplinary

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problem-solving processes to cope effectively with the composite SD issues. As a result, traditional uni-directional educational and research processes are of limited value by themselves and highlight the worth of substantial cooperation with local and regional communities in the engagement in relevant efforts.

The plethora of published articles in the recently emerged field of ESD demonstrates that there is much enthusiasm and interest within academia regarding its involvement in RSIs towards pursuing SD. The great majority of papers published on this topic are in the form of case-studies. Good examples abound and show some general patterns of ways in which academics and multiple regional stakeholders can collaborate effectively and efficiently.

An emerging question is then how useful these case studies can be for interested future partners. From the articles examined, it becomes evident that in each case there is a different initial state to the considered system, which is difficult to describe objectively. The target state is also insufficiently known and therefore the determination of the processes expected to link current and planned performance is vague and obscure. The great majority of the articles celebrate success stories, focusing on the activities implemented by the participating institutions. But no author has attempted to correlate the activities chosen with certain characteristics of the university and the region, such as the size, nature, type of faculties, or the degree of 'embeddedness' in the area. Meta-analysis of multiple cases studies is then the only tool which can disclose shared trends, patterns and heuristics, and correlate them to their contexts. In certain articles the distinction between planned and implemented activities is unclear and in very few articles do the authors specify the metrics they used to measure the successful operation of the HEI, demonstrating the urgent need for development of performance measurement indicators. There also seems to be an imperative need for a stricter conceptual

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and research methodology framework. For instance, a typical motive for (and benefit of) introducing SD in HEI operations is innovation, which many institutions claim to have achieved. Yet the authors do not clarify whether they are talking about marginal improvement and enhancement of the existing features and performance of the organisation, in which case it should be called adaptation (Bessant and Tidd, 2007), or about real radical, disruptive innovation, a breakthrough novelty which opens new frontiers in concepts, processes, and practices (Sunbo, 1997), and which deserves advertisement and celebration. The 'greening' of the curriculum has also been consistently included among the 'best practices' applied by universities to enhance their sustainable standing. Critical details to help the reader evaluate the impact of this decision are typically absent. Did the university introduce a new school, course, module, or just a chapter in its traditional curriculum? At the Bachelor's or Master's level? Did it hire fresh, specialised personnel for research and teaching? Was the course core or optional? If optional, how many students enrolled on it? What was the dropout rate and the course evaluation?

Even though no article was found to describe a pure failure case, organisational factors, such as lack of incentives and time, inadequate financial resources, limited creativity, low appreciation of outreach activities within academia, and an emphasis on other more traditional priorities, have often been provided by the authors as barriers which prohibit HEIs from realizing their full potential for cooperation with local stakeholders. Future authors should be aware of the fact that there are no 'good' or 'bad' cases in themselves; this is a normative rather than an actual distinction since all cases, if rigorously developed and described, can offer readers a valuable insight into the causes of success or failure of past projects and help them with the right design of future efforts. Fully developed, well-structured transdisciplinary case studies can play an extremely important role in initiating and supporting the reorientation of scientific research embedded in a complex, dynamic and uncertain social system (Steiner and Posch, 2006).

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The emphasis must widen to include not only the exclusively descriptive recording of 'best practices' activities but also information on the whole Deming cycle, i.e. the planning, feedback, measurement, and corrective action processes, as described above.

In summary, from the findings presented in the literature, it can be argued that there are many ways in which HEIs have improved local sustainability. They can continue to cope effectively and sustainably with the dynamic nature of this concept by changing their teaching paradigm, by developing social competencies, communication skills, and community relations, and by deepening their involvement in local and regional initiatives. However, there is a dichotomy of tensions when they publish their results. If the purpose of the publication is to address the internal need for contextual relevance and approval, the introspective description of past efforts and institutional practices can be sufficient. But if the emphasis lies on sharing these experiences to contribute to the improvement of institutional practices elsewhere, the emphasis should be on transferability and abstraction, and this choice would have implications for the way in which the case-study research was conducted, documented and shared. The instrumentation of case-study research and the standardisation of the published findings as suggested by certain authors would improve comparability and allow easier implementation of the findings within a new context with or without further adaptation. At the same time, an emancipatory approach, with no prescriptive guidelines, increases the levels of freedom with which the reader will reap new ideas, suggestions, implications and aspirations that could have been overlooked or missed. The ideal balance might be attained with the use of critical considerations for conducting case-study research (Corcoran et al, 2004), considerations that secure the capacity of the collaborative learning process to benefit both the actors involved in the process and those external parties who may be interested in distilling valuable knowledge from it.

## About the author

Dr Benjamin Karatzoglou is a 3-LENSUS project team member (see Annex One).

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## Chapter Three

### **Indicators for Reflection of Learning Processes in Sustainability Oriented Regional Networks of Cooperation**

Jana Dlouhá, Andrew Barton,  
Anastasia Litina-Papastathi, Lenka Pachmanová

#### **Context: regional learning for sustainability**

A vital measure for promoting sustainable development is regional cooperation of diverse stakeholders who increase their capacities through education. For sustainability oriented education at the regional/local level, different institutions should be brought together in a participatory learning process aimed at positive environmental and social change. The model of Regional Centres of Expertise (RCEs) has been developed on this principle – innovative platforms to share information and experiences and to promote dialogue among regional/local stakeholders through partnerships for sustainable development. They create a local/regional knowledge base to support ESD actors, and promote the major goals of ESD in a resource-effective manner (UNU, 2010).

The RCE concept was developed in 2003–2004 by the ESD team at the United Nations University-Institute of Advances Studies (UNU-IAS); Hans van Ginkel introduced it at the World Conference in Higher Education + 5 in 2003 (Ginkel, 2008). For practical purposes, it was proposed that RCEs constitute a “network of formal, non-formal and informal education and learning-related institutions that addresses the need for equitable partnerships between the combined expertise of communities, professions, NGOs and governments and creates an innovative platform for multi-stakeholder dialogue that enables diverse groups to interact, learn collaboratively and take collective decisions and actions towards SD”. The evolution of RCEs has been rapid: from 10 RCEs in 2005 to almost 80 in 2010.

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The main benefit of the regional networks is support for joint projects and activities and better coordination, sharing information, knowledge, expertise and experience between actors; RCEs contribute to developing innovative ways of collaboration among higher education institutions and other regional ESD stakeholders (Fadeeva, 2010).

### **Core principles of education and learning in regional cooperation**

According to the Graz Model for Integrative Development Processes (see Chapter 5, Networking and Interaction between Regions and Higher Education Institutions by Marlene Trummler, Clemens Mader, Friedrich M. Zimmermann, Elisabeth Görsdorf and Mario Diethart), regional processes towards sustainability are based on five principles – leadership, social network, participation, learning and research – which are the most important aspects in sustainable regional development processes. All of the principles are strengthened by an integrative approach which impacts the effects of the principles on each other. Education and learning are again strongly integrative with the other principles and imply sustainability as a learning objective (Mader, 2009).

Learning processes in sustainability oriented regional cooperation affect individuals as well as organisations, social groups, citizens and diverse stakeholders who are learning from each other, and external parties. They incorporate a transformative dimension (in which the role of the learning environment is encountered) and include connecting disciplines (i.e. interdisciplinarity); they are value oriented and feature local and global strategic decision-making. Education and learning in the regional context are both focused on developing competences and capacities necessary for sustainable development.

From a theoretical point of view, regional learning processes towards sustainability in RCEs could be perceived as the most

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significant global scale experiment in social learning yet created that incorporate a sustainable development perspective as a shared vision to be communicated and realised cooperatively (Glasser in Wals, 2007: 35–61; Ginkel, 2008). The learning processes occur on a individual level or organisational level or at the level of society (with a cumulative effect on both lower levels). Within the relationships of the learner and learning environment, interactions with other learners and learning society, the social dimension of the learning process becomes apparent – learning has to encounter an active, participative (cooperation) and communicative aspect and leads to a change. *Social learning* (a term defined by Albert Bandura and understood in many different ways; explained in Glossary, Annex 3) thus includes the possibility to influence the sustainability oriented transformation of learning individuals and a society as a whole (Wals, 2007).

### **The role of HE in regional cooperation**

As Hans van Ginkel (2008) illustrates, universities tend to be detached from the real world but countries and regions expect them to contribute to progress. However, the principle of having academic freedom in exchange for making meaningful contributions to society is often forgotten. The RCEs represent an effort to reassess the links of universities with the outside world beyond contract research or research grants: they cooperate with relevant civic or policy making organisations such as NGOs, local governments, and businesses. The network is built to extend the role of universities towards a *direct* positive and meaningful role in society so that they become one of the most important players in positive societal change – this should occur in addition to having sustainable development as a topic of academic study. Universities become agents in social learning processes, they invite people to learn cooperatively, over time, and from each other; to share experiences and respond collaboratively to local challenges (Ginkel, 2008). In the RCEs, theory and praxis are integrated to bridge the gap between

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knowledge, pro-SD values and real unsustainable actions, practices and policies.

### **Outline of the problem to be explored:**

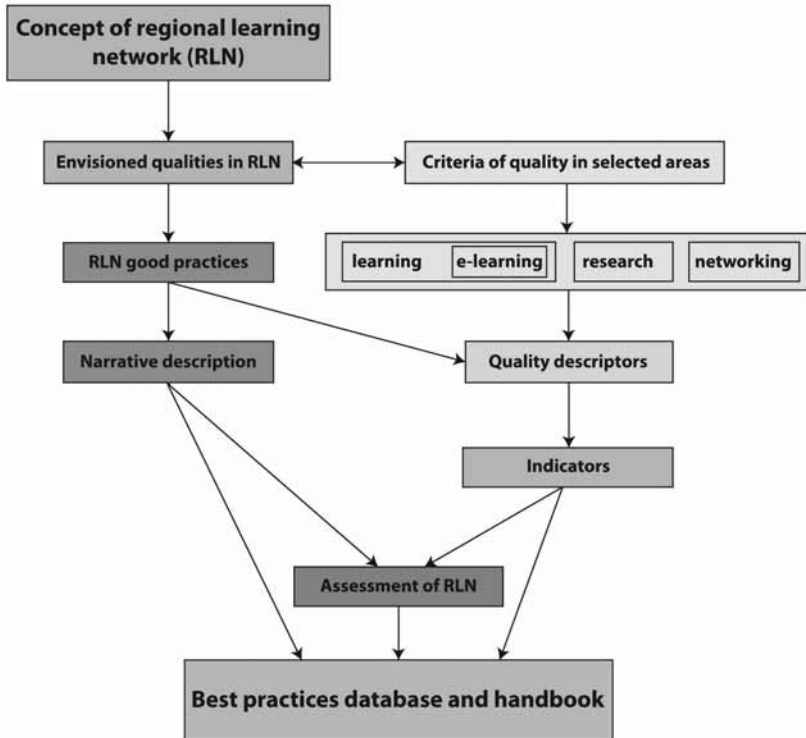
The aim of this article was to evaluate learning processes within learning networks on ESD, represented by the activities of RCEs, and also provide information on the outcomes of the 3-LENSUS project. Specific attention was paid to the role of universities that are leading partners of this cooperation with regard to learning processes in the region. The analysis had following practical goals – to assist in the development and further use of the database of regional projects (see Chapter 7, Database on Learning for Sustainable Development – analysis of the database projects by Marlene Trummler and Clemens Mader), to select best practices for wider dissemination, and to provide indicators for planning project goals and assessing the activities of the partners of regional cooperation. The indicators were designed for evaluation of specific phenomena of regional cooperation which could support development in this area and promote the regional and European learning networks for ESD.

The observed phenomena, which are important from the viewpoint of universities, included activities such as research, training and innovation realised in the region. To be sustainability oriented, specific themes, methods and forms of education/learning were considered as well. On the other hand, information on the impact of learning (innovative practices, environmental improvements and social change) was not available as most of the RCEs and other projects of regional cooperation included in the database were not yet at the stage of some “real outcomes” – sustainability transitions in practice. For our purposes, feedback about the learning *processes* potentially influencing transformation in the region and within universities themselves was the focus. We concentrated on its visible and easily “measurable” characteristics: information about involved learners, their characteristics and relationships etc. To sum up, we were looking for the success stories of universities in their

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regional roles and exploring relevant data that were accessible through the database and online communication.

Steps taken for selection of best practices in regional learning and development of relevant indicators are outlined in Figure 1 and described further on as a process of the indicators' development.



**Figure 1:** Selection of Best Practices in regional learning networks (RLN) – steps and methods

## Indicators as a tool for reflection of the sustainability oriented (learning) processes

### Background – what are indicators?

At the interface of science and policy, to document sustainability issues in a policy relevant manner but on a (scientifically) justified

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basis, indicators are being used to provide information necessary for the enforcement of policies, framework strategies and projects. (Hak, Moldan, Dahl, 2007). Indicators provide important new information about an issue, process or condition and to reflect upon it, and are used as an information resource for practical actions to realise a change. Indicators show how well a system is working, document the success of some project or strategy, and provide information about its progress, stages and best strategies to achieve the goal. They assist in planning processes, improve them, indicate progress achieved, help to exchange information about results and reflect the consequences of the action taken. Indicators are used as a method of evaluation; they serve members of the team and others directly involved in an activity for formative evaluation, and more generally, for external evaluators such as research, the public, or politicians, they document important parameters of change (they indicate, for example, the state of art of some environmental or educational issue; conditions of change envisaged by the project or strategy; outcome of the effort etc.). But in the case where policy transition is the focus, indicators should be used to assess the impact of associated concepts or strategies in terms of outcomes and processes in relation to the initial state and inputs, and they serve less as a tool for a “comparison” of institutions involved in those processes (Dlouhá, 2007).

In general, indicators can be interpreted as the elements of a system that may vary or change over time and can be used to assess processes such as learning in society (Tilbury, 2007). They enable individuals, institutions and society to reflect its transformation, and “learn and develop” in the area of ESD so that the region becomes a “learning region” (ECE, 2005).

### **The nature of indicators**

Indicators are as varied as the types of systems they monitor. However, there are certain characteristics that effective indicators have in common, and in general they should be



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relevant, easy to understand and interpret, representative and reliable. From a practical point of view, they need to be obtainable from reliable sources and available for reasonable cost. Methodologically, they must be based as much as possible on the available data. They also should be constructed only as fine-scaled as the (evaluation) question requires, and the simplest factor that can be measured and which provides an adequate response to the question should be used. Finally, the indicators should be used to justify policymaking (and thus influence change), and thus they should be accepted by society, including the social group undertaking the project or strategy (Janouskova, Marsak, 2008). By their character, indicators can be quantitative (absolute figures or ratios) and qualitative (description or rating), as appropriate<sup>1</sup>.

No single indicator or sub-indicator can indicate quality in its own right. Rather, it is the combination of indicators that describe the state of progress in, and the effectiveness of, the concept in use.

### Types of indicators:

Indicators are used to document implementation of a certain (ESD) strategy that is characterised by: (a) input measures, (b) a wide range of activities and (c) expected effects with regard to the implementation. Based on this input-outcome approach, different authors distinguish diverse indicator types, e.g. (UNECE, 2008b):

- **“Checklist indicators”** that provide information on initial measures taken in order to implement the concept
- **“Input indicators”** that take into account a broader spectrum of activities taking place ... (e.g. the amount of money

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<sup>1</sup> Qualitative indicators might be presented: (a) in a form of description; (b) by using rating with clear explanatory notes for each rate (e.g. 0 – SD concept not present ..., 1 – SD concept integrated into 50%....); (c) by using marks (e.g. +++ high; ++ medium; + low) (ECE, 2005).

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invested in the materials, the proportion of publicly supported research, etc).

- **“Output indicators”** provide information on the results of these activities (e.g. performance of trained teachers, number of businesses involved in ESD projects, ratio of educators who received training on ESD issues).
- **“Outcome indicators”** capture the possible impact due to the implementation of the particular strategy, especially its qualitative aspect in terms of values, attitudes and choices in favour of SD (e.g. learning outcomes resulting from ESD partnerships, community-based projects and business involvement).

Daniela Tilbury (2007) identified more comprehensive categories or types of indicators related to a specific target which are used, such as:

- **Baseline indicators**<sup>2</sup>: identify the status of the overall picture of the issue under examination
- **Context indicators**: identify the existence of support systems
- **Process indicators**: identify the existence of substantial processes and activities
- **Learning indicators**: promote learning and reflection on the issue
- **Output indicators**: assess outputs such as tools and learning resources
- **Outcome indicators**: assess outcomes related to changes or improvements that result from undertaken efforts
- **Impact indicators**: assess impacts that result from the efforts
- **Performance indicators**: assess the change in the status of the overall picture related to the issue in a region or country

In regional learning networks based on cooperation among diverse partners, indicators are needed as a part of reflective

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<sup>2</sup> To monitor the progress ... there is a need to describe the current situation. Baseline data shows the existing situation in relation to an issue at a certain point in time. (ECE, 2005)

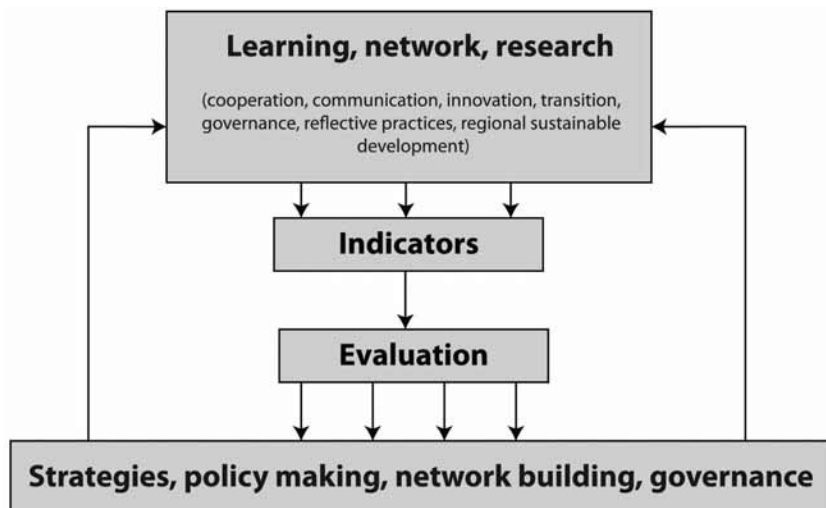
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learning (being its structural component: providing feedback similar to the “credits” or “marks” within the educational system); they should also contribute to raising the visibility, public debate and impact of the projects. For the 3-LENSUS project, the role of universities in the region was assessed from a process oriented perspective; an output or outcome oriented approach (although premature in some cases) brought some valuable information as well. With regard to long term vision of SD in the region – the potential or real change or innovation associated with social transition – we observed social learning processes started on the basis of an activity or project and their possible impact.

### **The 3-LENSUS focus**

In designing a specific indicator system, it is important to consider the specific goals of the assessment and criteria used to reflect major components of the system to be described (see also Shavelson, McDonnel, Oaks, 1991). In our case, the task was to develop qualitative indicators to describe educational activities offered through the Virtual Campus for a Sustainable Europe ([www.vcse.eu](http://www.vcse.eu)) and 3-LENSUS, such as competence development for critical thinking and a transdisciplinary approach to SD themes. But in the course of the project implementation, the efforts to develop an indicator set were more closely connected to the development of the database (that included learning for sustainable development and regional cooperation projects) and were aimed at evaluating or rather comparing the entries. Thus, our focus shifted towards learning processes within regional cooperation and selection of its best practices. We anticipated that the system of indicators should document progress towards the intended state, and support for change through reflection and receiving feedback on strategies, policy making, regional network building and governance – based on information about the impact of specific learning processes taking place at the regional level (see Figure 2).

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**Figure 2: Context of evaluation of social learning networks and processes within the (regional cooperation) projects included in 3-LENSUS project database**

### **Selection of indicator types**

Indicators for evaluation of the 3-LENSUS database entries were selected in three stages: first, ESD indicators that are available within the UNECE strategy (2008b) were considered. Then a rather comprehensive set of questions on RCE performance was developed, and finally indicators were constructed in close relationship to the design of database questions which enabled us to apply it to the database entries afterwards. The three stages are described as follows:

#### *1. ESD indicators*

ESD indicators are in theory related to the educational system and its properties, and are used to evaluate an educational system's performance, specifically, for example, to "compare national performances; measure effectiveness of innovation (programmes) interventions; assist self-evaluation of educational institutions and educational measures". The goal of ESD in this

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concept is to “achieve its legitimate position and reputation” within the educational system as a whole (Reid, Nickel, Scott, 2006: 3-4, 68). On the level of educational programmes, indicators are appropriate to assess their outcomes in terms of developed student competences (Dlouhá, 2009a, 2009b).

At the very beginning of the work on indicator development, the usability of the existing ESD indicator set (designed and tested for all levels of education to assess national performance on the ESD Strategy, see UNECE, 2008a) which is widely applicable in diverse cultural contexts was explored. Some of its definitions were found to be useful<sup>3</sup> but in general we identified many differences between the ESD concept and the learning processes taking place at the regional level: these processes occur beyond the institutional boundaries of educational system and do not

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<sup>3</sup> Terminology and categories used in the set of indicators follow the *Reporting format* developed by the UNECE Steering Committee on Education for Sustainable Development (ESD) UNECE, 2008a:

- Definition of the learning outcomes as *skills, attitudes* and *values* that support ESD (Sub-indicator 2.1.2)
- In higher education institutions ESD is addressed through: a) courses and disciplines, b) interdisciplinary courses, c) separate, specified SD courses or seminars, and d) stand alone projects implemented by the department, faculty or inter-faculty structures. (Sub-indicator 2.2.1)
- ESD implementation is a multi-stakeholder process – for higher education institutions this covers the issue of university “outreach” meaning a wide spectrum from regional integration, business cooperation and transdisciplinarity to eco-procurement and research-education-cooperation (Indicator 2.6)
- ESD implementation is a multi-stakeholder process, involving: NGOs; Local government; Organised labour; Private sector; Community-based; Faith-based; Media (Indicator 2.6, sub-indicator 2.6.1)
- Support for innovation and capacity-building in ESD practice – activities may include pilot projects, action research, social learning, multi-stakeholder teams (Sub-indicator 5.2.1)

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possess a systemic character (learning is a fluid continuum of causes and effects in open-ended processes rather than a well organised interplay of casual relationships between system components), and the desired outcomes or impacts are different. We realised that our priority is not evaluation of the educational system – of which ESD is part, even with specific goals and sometimes conflicting with prevailing values – but that we were trying to evaluate socially determined sustainability transitions promoted by learning. With regard to the learning process within the regional cooperation of different stakeholders it is necessary to take into account in particular: the dynamic and mutual character of the learning process; learning from the social context and through the interaction of social groups and stakeholders (which is characterised as social learning); and the network character of regional cooperation, etc. (Wals, 2007).

The conclusion was that ESD indicators are derived with regard to the potential transition of the educational system (national system, school system etc.) towards sustainability, and existing indicator sets (e.g. UNECE, 2008a) do not sufficiently take into account extra-systemic features: social learning processes, the regional SD oriented cooperation of universities, change or innovation outside educational systems, and research as a driving force. All of these are crucially important from the point of view of transition towards an RCE form of cooperation and with regard to selection of best practices related to this process (which was our concern). Some of the terminology from ESD indicators was used and the concept also inspired some of the categories within the future database, but as a guiding scheme it was finally rejected.

### *2. Outcome indicators – first database*

A second attempt and research design concentrated on the role of universities in the Regional Centres of Expertise and in multistakeholder organisations. Their traditional fields of activities (presumably being a basis for regional cooperation and engagement

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in sustainability issues) were explored<sup>4</sup>: expertise and training capacities, and know-how transfer towards local stakeholders. The research design was based on a first broad exploration of the field through an internet review, which elicited information about the various projects available. Extensive data were obtained and based on their analysis the number of institutions/projects included in the first database was reduced: we chose those that had significant output to show. Most of them were contacted (especially those projects that showed better organisation towards the RCEs) and asked for clarification about their output.

Having gathered all the material, the categories mentioned below were created and most projects were categorised in them based on their output. Thus the categorisation was not the outcome of an inquiry that could provide comparative data and no questionnaire was sent to those projects<sup>5</sup>. Data for outcome indicators were collected and assessed based on the described methodology qualitatively (the number of activities or extent of changes were not considered).

The following criteria were used for categorisation:

**ACTIVITIES of the university in the region (description – open question)**

**CONTRIBUTION of university to RCE (Yes/No):**

- Source of Technical Expertise (Research)
- Changes in University Practices and Acting as a Model of Sustainable Practices

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<sup>4</sup> Research was done by a member of the project team, Anastasia Litina-Papastathi.

<sup>5</sup> A relatively extensive questionnaire was constructed in the next stage: it appeared to be rather too extensive to be used practically (30 questions) and following discussions with partners it was replaced by the projects database in the next stage.

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- Coordination, Promoting and Enhancement of the Engagement of Local Authorities
- Transformative Education (Training)
- Community Awareness (Seminars - Conferences)

**WEBSITE info and CONTACT** completed the survey to serve as verification of the results.

Conclusion: the first version of the database was based on a review of web presentations and personal contact with the institutions providing them; it comprised 42 entries described in terms of activities, categories of outputs<sup>6</sup> and some additional information. Generally, all of the criteria were not specific and needed to be elaborated further, which was undertaken in stage 3.

### *3. Process and output indicators – database created by University of Graz team*

In the last stage, the experience of the first two stages was used and combined with the effort to build the 3-LENSUS Database on Learning for Sustainable Development (the technical environment for the database was developed by the Graz team, which also cooperated substantially on development of the database questions - described in Chapter 7).

## Development of indicators

When constructing indicators, at least four stages have to be undertaken: first the issue to be observed and its most

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<sup>6</sup> Following categories of contributions by universities were identified based on review of the outputs: Source of technical expertise - research; Changes in university practices and acting as a model of sustainable practices; Coordination, promoting and enhancement of the engagement of local authorities; Transformative education (training); Community awareness (seminars- conferences- events)



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important aspects should be found, an evaluation question formulated, then the indicator (or indicator system so that assessment would be more complex) should be derived and justified, and finally results (evaluation, reflection) used for change in the system observed.

Below is an overview of our indicators' construction from the stage of planning and qualitative description of the reality to the final outcome of the certified indicator that is constructed to provide a feedback on some practical phenomena. In developing any new indicator it is important to plan well and know that it is possible to go through all the steps necessary not only for its design, but also for testing and in particular for application in practice. Especially when deciding on the amount of the proposed new indicators for evaluating a particular area it is necessary to consider whether all these indicators should be used up until the 9<sup>th</sup> stage.

**Table 1:** Steps in the indicator design

Step	Theoretical description	Explanation	Practical example within the 3-LENSUS
1.	define INTENDED STATE in any sphere of human activity – sustainable development goals in a certain context as a framework strategy	normatively expressed characteristics of the INTENDED STATE in the context of the system under consideration	learning process towards sustainability innovations in the region which involve diverse stakeholders
2.	identify PHENOMENA that could indicate whether the intended state was reached and to	the identified PHENOMENA acquire a different quality on time scale or between elements of the	specific characteristics of the learning processes (transdisciplinarity, research

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**Table 1:** Steps in the indicator design

Step	Theoretical description	Explanation	Practical example within the 3-LENSUS
	which extent	system – could be compared	component, ...); documented change etc.
3.	identify DESCRIPTOR: find features characterizing the selected phenomena that could be analysed and/or assessed	a feature is a hidden attribute of the phenomenon – not yet indicator, only DESCRIPTOR	certain learning method or approach (theoretically- oriented learning, intercultural learning,...) that was really used, number and types of learners,...
4.	find a way to describe the feature qualitatively: develop METHOD of analysis or assessment	methodology should more or less precisely characterise the “essence” of the feature	sociological research: questionnaire using relevant QUESTIONS
5.	develop method to receive DATA: find “material” or environment where you will explore the selected phenomena and do the research	Carry out research to receive answers on your questions	receive ANSWERS in an open database filled in by representatives of sustainability oriented regional learning network
6.	INTERPRETATION: develop a scale to measure the	either define “borders” for intervals	Find solution to the problem: how to assign points to each

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Step	Theoretical description	Explanation	Practical example within the 3-LENSUS
	feature “quantitatively” <sup>7</sup>	encompassing certain quantities, or attribute numbers for qualities <sup>8</sup>	of the answers? Number of point for each item should have proper weight in relation to other items.
7.	TEST if the measured value fits with a description of the quality of the feature, explains the added value of a process or identifies the progress that we are looking for	use for real situation and ensure that the results are objective	use for real projects in the database and compare results for each evaluator
8.	purify your method and adjust the scale	adjust the border values according to the test phase; adjust proper weight to all of the items so that they could be compared relatively	according to different results for each evaluator
9.	now you have an INDICATOR – the evaluation tool serves as a	describe the validity of the tool, context, in which it could be used, limits of its	<i>in our case – insufficient data and number of evaluators</i>

<sup>7</sup> Data received from different sources, on different time scales etc. express relative progress towards intended state and should be used comparatively

<sup>8</sup> e.g. 3= high; 2= medium; 1= low

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**Table 1:** Steps in the indicator design

Step	Theoretical description	Explanation	Practical example within the 3-LENSUS
	methodology for its description (qualitative) or measurement (quantitative)	reliability, ways of interpretation etc.	<i>analyzing them so the indicators not developed to this stage</i>
10.	use the indicator practically in the context of the project	evaluate entries in the database to select best practices – and explain the choice as a decision (not only based on numbers)	results obtained permit selection of best practices
11.	<i>derive aggregated indicators</i>	<i>combine with other indicators describing similar phenomena</i>	<i>stage not passed</i>
12.	<i>make the method more valid</i>	<i>test by another tool</i>	<i>stage not passed</i>
13.	<i>derive general conclusions concerning methodology</i>		<i>stage not passed</i>

### Work with 3-LENSUS project database

A key outcome of the 3-LENSUS project was the creation of an electronic database to act as a virtual warehouse of Europe-wide projects related to Learning for Sustainable Development (L4SD). The database is designed to be self-sustainable beyond the lifespan of the 3-LENSUS project by acting as a freely-accessible platform for the exchange of information and examples of good practice for all practitioners of L4SD in Europe. Any learning

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network wishing to register its project details in the database had to show a project exhibiting the following characteristics:

- have a multi-stakeholder orientation, i.e. one university/ research institution and at least two other regional actors involved
- display an element of *regional* sustainable development
- be focused on lifelong learning

To submit a project, all that was required was to register as a user in the database and complete the questions in the online database form. Formulation of the form was undertaken in consultation with all 3-LENSUS partners and took account of the need to evaluate all projects through a series of indicators embedded within the form. The primary goal of these indicators for the purpose of the 3-LENSUS project was to assess all projects registered by a given date to provide a transparent basis for selecting the best examples of L4SD practice; these best practice examples were designated for publication in the public domain and are what accompanies this article in this book to serve as inspiration for similar projects.

### Selection of criteria

The criteria for LENSUS database and best practice selection were broadly discussed with partners and set upon the presumption that universities should play the key role in ESD projects and activities based on regional cooperation and networking. They were identified with regard to the following important aspects of university – regional cooperation in four areas:

1. Existence of **network**, partnership, regional cooperation  
Involvement of University & at least other 2 organisations – or existence of RCE
2. ESD and/or SD oriented **learning process** existing on regional level  
Part of the process might be relevant for e-learning

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3. A **research** component and/or reflective practices
4. Learning process results is aimed at some **innovation** or change

This corresponds to (3 out of 4) crucial elements identified within RCEs (Fadeeva, Mochizuki, 2005): collaboration (addressing the engagement of diverse actors; research and development (addressing the role of research and its inclusion in the regional cooperation); transformative education (contributing to the transformation of education or education system with regard to ambitions of the region for sustainable living). The fourth principle – governance (addressing issues of RCE management and leadership) – was not taken into consideration.

### Scale for quantitative interpretation

Having agreed to the type of indicators required for evaluation purposes, the 3-LENSUS partner responsible for the design of the indicator set then designed a simple value scale for each individual indicator that was transparent and could be easily applied by any partner to produce virtually the same result. As the indicators were of both a qualitative and a quantitative character, the values created were either numbers that corresponded to numerical answers in the database form, or a more subjective but simple 1-3 Likert scale to determine the quality and extent to which the pertinent question in the database form was answered. This draft design was then submitted to a sub-group among the project partners for peer review, resulting in recalibrations to ensure the qualitative indicator values were of equal weighting and the range of quantitative indicator values were more comparable to each other. A final design was then presented to all partners for endorsement. The weighting assigned to different indicators were thus part of a (common) decision, which stresses their normative character.

### List of indicators

Below is the list of the indicators used, the database question or

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statement to which each indicator was applied, and the value of said indicator.

The indicators not addressed in this exercise were the following:

Database indicator	Database question	Indicator value
1. Project title	Please enter the title of the project	1 = Title makes it clear what the project is about; 0 = unclear
2. Project objectives	Provide a short overview on the objectives and vision of the project (max. 800 characters). Please include a clear statement of how your project's sustainability is demonstrated.	3 = objectives are clear & understandable from an L4SD perspective, 2 = understandable but linkages between vision and goals not well defined, or not well described, 1 = not clear

### Social network characteristics

Database indicator	Database question	Indicator value
3. Number of involved stakeholders	Name the core project partners and their role in the project, including the type of institution by choosing one of them from the drop down menu. Note that the order of institutions doesn't have to be hierarchical. If there are more than five institutions involved, please name as many of them as feasible in the extra field below.	0 = less than 3 stakeholders 1 = 3 stakeholders 2 = 4 stakeholders 3 = 5 stakeholders 4 = 6 or more stakeholders

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Database indicator	Database question	Indicator value
4. Number of different types of institutions	Name the core project partners and their role in the project, including the type of institution by choosing one of them from the drop down menu. Note that the order of institutions doesn't have to be hierarchical. If there are more than five institutions involved, please name as many of them as feasible in the extra field below.	0 = university only or 1 other type 1 = university + 2 other types 2 = university + 3 other types 3 = university + 4 other types 4 = university + 5 other types
5. Target groups	Tick the group(s) targeted by the project: <ul style="list-style-type: none"> <li>• Pre-school children</li> <li>• School children</li> <li>• Children and teenagers (non-school activities)</li> <li>• University students</li> <li>• Elderly people</li> <li>• General public</li> <li>• Policy-makers</li> <li>• Administrators</li> <li>• Researchers</li> <li>• Businesses</li> <li>• Other:</li> </ul>	1 = 1 target group 2 = 2-3 target groups 3 = 4-5 target groups 4 = 6-7 target groups 5 = 8 and more target groups
6. Involvement of target groups	Indicate how the target group(s) are/were involved in the	1 = informing the target group (least advanced)



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Database indicator	Database question	Indicator value
	development of the project: by informing the target group(s), by consulting the target group(s), by involving the target group(s) in the design of the project, by involving the target group(s) in the decision making process	2 = consulting the target group (more advanced) 3 = involving the target group in the design (even more advanced) 4 = involving the target group in the decision-making process (most advanced)
7. Number of learners	Tick how many learners participated in the project in total. Learners may include both project partners and target groups.	0 = no answer 1 = 0-9 learners 2 = 10-49 learners 3 = 50-99 learners 4 = 100-499 learners 5 = more than 500

### Learning indicators – L4SD aspects

Database indicator	Database question	Indicator value
8. Number of learning approaches	Tick the kind of learning approach(es) that are applied in the project (several answers possible): <ul style="list-style-type: none"> <li>• Online learning</li> <li>• Collaborative learning</li> <li>• Practically-oriented learning</li> <li>• Theoretically-oriented learning</li> </ul>	one point per learning approach

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### Learning indicators – L4SD aspects

Database indicator	Database question	Indicator value
	<ul style="list-style-type: none"> <li>• Intercultural learning</li> <li>• Intergenerational learning</li> <li>• Project-oriented learning</li> <li>• Other:</li> </ul>	
9. Number of different types of learning interactions	Specify which learning formats and interactions have been used in the project and how many (max. 800 characters). Please be precise as in the following examples: three workshops over a six month period; an online discussion forum that remained active for two months and involved 20 participants; an online conference lasting three hours; formal classes held in a school building twice a week for a month	one point for each different type of interaction
10. Innovative aspects of learning	Provide some information about new and innovative approaches the project takes regarding ESD in comparison to standard forms of learning (max. 800 characters).	<p>1 = not clear</p> <p>2 = innovative aspects are described but not well justified</p> <p>3 = description of the innovative aspects of the learning is clear and well rationalised</p>

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Learning indicators – e-learning network characteristics focused on their social functions

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11. Online learning activities <i>OPTIONAL</i>	Name the online platform, learning management system or content management system that is used in the project (e.g. Moodle, Typo 3, website) & tick the online tool(s) that is/are being used in the project (several answers possible).	1 = website (less advanced) 2 = e-reading (more advanced) 3 = interactive environment (most advanced)
12. Purpose of online learning activities <i>OPTIONAL</i>	Describe the reasons and purpose of applying online learning activities in the project, and where you see the added value (max. 800 characters).	1 = inadequate information or not clear at all 2 = reasons and purpose are described but not particularly well argued 3 = reasons and purpose are clear and well argued

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Research indicators – reflection of learning, social and other innovative processes

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13. Research method <i>OPTIONAL</i>	Choose the research method(s) being applied in the project (several answers possible):	one point for each research method
	<ul style="list-style-type: none"> <li>• Interview</li> <li>• Questionnaire</li> <li>• Case Study</li> </ul>	

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*(continued)*

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Research indicators – reflection of learning, social and other innovative processes (*continued*)

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	<ul style="list-style-type: none"> <li>• Survey</li> <li>• Experiment</li> <li>• Action research</li> <li>• Observational research</li> <li>• Other:</li> </ul>	
14. Description of research benefits <i>OPTIONAL</i>	Provide information about the benefits of integrating research activities into your project (max. 800 characters), e.g. data for indicator development, etc.	<p>1 = inadequate information or not clear at all</p> <p>2 = benefits are described but not particularly well justified</p> <p>3 = benefits of research are clear and justified</p>

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### Sustainable development indicators

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15. Impact description: Social	Describe the impacts your project is seeking to achieve in the three dimensions of sustainable development.	<p>1 = inadequate information or confusing answer</p> <p>2 = impact is described but not well argued</p> <p>3 = Impact is clear and relevant to SD</p>
16. Impact description: Environment	Describe the impacts your project is seeking to achieve in the three dimensions of sustainable development.	<p>1 = inadequate information or confusing answer</p> <p>2 = impact is described but not well argued</p> <p>3 = Impact is clear and relevant to SD</p>

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### Sustainable development indicators

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17. Impact description: Economic	Describe the impacts your project is seeking to achieve in the three dimensions of sustainable development.	1 = inadequate information or confusing answer 2 = impact is described but not well argued 3 = Impact is clear and relevant to SD
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- Institutional changes (correspondents were , however, asked to place their projects within one of five categories according to the changes they were seeking to affect , of which one was “empowerment”, i.e. learning for sustainable development stakeholders to become active practitioners and participants in delivery and decision-making processes by means of building the capacity of their governance structures)
- Reflective practices within certain areas (correspondents were asked to reflect upon the nature of their “research” only)
- Some of the outcomes: the transition achieved in the social area (e.g. organisational changes in universities, institutionalised forms of cooperation etc.)

### Work with database entries

From the time the database went “live” in early March 2010 to the deadline for entry of projects for assessment purposes at the start of June 2010, a total of 26 projects were registered (the database remains open as an ongoing legacy of the 3-LENSUS project). Once the deadline for the registration of projects in the database for evaluation purposes was reached, one member of the project team undertook the task of applying all 17 indicators to all registered database projects. Following the application of the full indicator set to all projects, three other members of the 3-LENSUS project team also applied the indicators to a sample of the projects to test the results and underline the transparency of

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the evaluation process. They were found to correspond overall with the outcome of the first application.

There was some discussion between partners over how to differentiate between projects that answered the optional questions regarding eLearning and research and those that did not. These questions were included in the database form because an important outcome of the original project design was the promotion of innovative L4SD through eLearning and the role of institutional research in adding transdisciplinary value to L4SD projects. They remained optional questions in recognition that not all projects were likely to have both elements. Once the final scores were tallied, however, it was shown that there was no difference to project rankings whether points for the optional questions were included or excluded overall. What those questions did provide were examples of best practice in eLearning and research for L4SD.

### Evaluation

The maximum points that could be scored by a project to indicate its eligibility as an example of best practice was 75 (there was no set value for indicator no.9 *Number of different types of learning interactions*, but the maximum points awarded for this indicator was 10). The total points awarded to individual projects ranged from 22 to 56. The final selection of best practices example, however, was not based simply on those projects which scored the most points. To begin with, while every single project was assessed against the indicator set, for the purposes of fairness and transparency, any project registered by a 3-LENSUS partner institution was automatically ruled out of contention for selection as a best practice example. In addition, and as indicated above, project correspondents were asked to self-identify one of five categories which best represented the desired approach or outcome they were seeking to affect. The end result was that projects identified in four categories – regional development, multi-oriented learning

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approaches, multi-stakeholder involvement and empowerment – while no projects self-identified in the remaining category – transdisciplinarity.

Consequently, a total of six best practice examples were selected by the 3-LENSUS partners (the four categories above, plus eLearning and research) and the teams responsible for them asked to write up their case studies for the purpose of sharing their knowledge with the wider L4SD community. All project teams agreed to do so, apart from project that received the highest number of points for eLearning, whereupon the runner-up willingly agreed to write a replacement case study.

Finally, as 3-LENSUS sought to achieve a regional balance of best practice among its partners, two additional case studies were added to generate an overall pool of eight examples of good practice to share with RCEs and other L4SD networks through Europe.

## Discussion and conclusion

Within the 3-LENSUS project, the first steps towards reflecting on forms of regional cooperation of diverse stakeholders (with a special focus on universities) aimed at sustainable development innovations and change were undertaken. The following elements of regional learning were identified to be most important from a sustainable development point of view: **learning processes** with the potential to trigger change, related to **(reflective) research practices** and occurring within the **networks of cooperation** of diverse stakeholders (thus having a strong social dimension). The task of documenting these desired processes and features using specific examples, distinguishing their qualities (and scaling them) was undertaken in order to select best practices and make them publicly available for those who want to be inspired. In order to be objective in the selection procedure, a set of indicators describing (the hidden attributes of) the most important characteristics of learning processes in

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regional cooperation was developed, tested and used for the evaluation of database entries.

The developed indicators were used as an evaluation tool for selection procedure of best practices, and thus represent an experience to be built upon in further evaluation of the regional cooperation of universities, in particular together with other stakeholders towards sustainable development (an indicator model and policy instrument for further consideration).

### *Constraints of the method:*

- An attempt was made to describe a very complex issue by means of a small number of characteristics – it was not feasible to require respondents to fill in a very extensive database questionnaire. Some important features were necessarily missing. This was a problem when the selected best practices were elaborated further on and presented as case studies – in some cases they did not meet our criteria, which were rather implicit, especially with regard to democratic and multistakeholder dialogue within the learning process (the experience with the presentation of best practices at the 3-LENSUS Final Conference in Thessaloniki proved that some cases were not really oriented toward participatory regional processes)
- only a small amount of entries was analysed – this had an impact on validity
- the desired state was described as a process, not as an outcome – hence some of the questions were not specific enough

### *Outcomes:*

The outcomes included: an explorative study of possible indicators for regional learning processes, selection of best practices in this area based on their use, their narrative description by representatives of an activity/institution, the highlighting of specific points of interest in the explored



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field, presentation of these “stories” - selected case studies – at a joint meeting in Thessaloniki, the gathering of their representatives and exchange of experiences – hands-on knowledge of the problem. Experience with sustainability-oriented learning processes created through the selection procedure and face-to-face contacts was reflected upon and relevant know-how transferred to regional communities.

### *Lesson learned:*

An indicator concept is interesting from a theoretical, and very useful from the practical point of view: providing feedback for those directly involved in a project or an activity and expressing its overall (general) benefits to external observers - those who are interested in an issue and would possibly apply it in a different context. From a policy-making perspective the indicators could serve as a tool for comparing progress towards an intended final state, although rather they should be used as a research instrument that would point to some hidden attributes of the feature observed and thus highlight its importance (or neglect it) in future strategies and activity frameworks. The procedure designed within this project was based on the following principles and steps: reduction of a rather complex reality, selection of its most important characteristics (from a normative point of view), work with these characteristics in a reflective manner (receiving feedback on some theoretical constructs), and the creation of indicators and their use for more thorough understanding and detailed description. In a further exploration, the research or reflection procedure undertaken in this project should be objectified, made understandable and usable for the general (research) community – it should then lead to shared understanding of the ongoing learning processes related to sustainability oriented strategic or policy measures, and thus to their wider acceptance. In-depth analysis of the observed phenomena together with their causes and context, their description in a scientific manner so that the understanding of ongoing processes is reliable and could to a

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certain extent be generalised– all this is a core element of reproducing the experience on a space or time scale.

### About the authors

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## Chapter Four

### **E-learning Methodology for Regional Cooperation and Promotion of a European Learning Space in the Interdisciplinary Field of Sustainable Development**

Jana Dlouhá, Jiří Dlouhý, Andrew Barton

#### **Point of departure**

Problems of sustainable development are typically complex and in order to be applied at the different levels and areas of policy, and developed and implemented as effective strategies, engagement of diverse stakeholders is crucially needed. This includes (not only) research institutions and higher education institutes that could engage with future decision-makers and opinion-creators, but also involves regional partners from the business and private sectors, NGOs and other social spheres in current sustainability processes in their respective regions.

In the sphere of higher education, the ability to communicate and collaborate across the boundaries of a nation, culture and discipline is one of the basic competences required for sustainable development. A multi-dimensional approach that addresses both the academic community and local/regional actors and decision-makers is needed, and thematic networks of diverse regional partners are often built to cooperate on practical issues that require particular expertise and/or have a learning dimension. Because of this network character, the complex issue of sustainable development can be inter-related to the use of information and communication technologies (ICT) and tools, and virtual collaborative learning used as an ideal learning environment to develop trans-boundary abilities so that the participants experience differences in perspective in a very direct way and have to come to a joint solution of any given problem (Gregou, 2008: 6–7).

### Educational principles of change

The application of sustainable development principles in higher education (HE) brought new requirements for the outcomes of educational processes that often contrast with recent educational practices: for the development of key competences to deal with sustainable development a “new learning culture” is needed that enables a person to cope with complex situations, to act upon reflections, to make decisions, to take on responsibility and to consider ethical standards when taking action. The process of developing competences for sustainable development could be enhanced by interdisciplinary and multicultural dialogue (Barth et al, 2008: 35); the increasing need for social interaction and communication is also incorporated into strategic ESD policy documents that identify numerous competences in the sphere of “Learning to Live and Work Together” that could be described as a new “social learning domain” (see Table 1).

**Table 1.** Learning outcomes in the learning domains (UNECE, 2008)

<b>Competence</b>	
	Expected outcomes
<b>Learning to learn</b>	<ul style="list-style-type: none"><li>• posing analytical questions/critical thinking</li></ul>
Knowledge domain	<ul style="list-style-type: none"><li>• understanding complexity/systemic thinking</li><li>• overcoming obstacles/problem-solving</li><li>• managing change/problem-setting</li><li>• creative thinking/future-oriented thinking</li><li>• understanding interrelationships across disciplines/holistic approach</li></ul>
	Expected outcomes
<b>Learning to do</b>	<ul style="list-style-type: none"><li>• applying learning in a variety of life-wide contexts</li></ul>
Conative domain	<ul style="list-style-type: none"><li>• decision making, including in situations of uncertainty</li><li>• dealing with crises and risks</li></ul>

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### Competence

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- acting responsibly
- acting with self-respect
- acting with determination

#### Expected outcomes

### Learning to be

#### Affective domain

- self-confidence
- self-expression and communication
- coping under stress
- ability to identify and clarify values (*for phase III*)

#### Expected outcomes

### ***Learning to live and work together***

#### *Social learning domain*

- *acting with responsibility (locally and globally)*
  - *acting with respect for others*
  - *identifying stakeholders and their interests*
  - *collaboration/team working*
  - *participation in democratic decision making*
  - *negotiations and consensus building*
  - *distributing responsibilities (subsidiarity)*
- 

This social aspect of learning is also reflected by many authors and described from the perspective in which an individual learns in close association with his/her position in the world of social affairs. It was formulated as a “social learning” concept by Lave and Wenger in 1991 (see Cobb, Bowers, 1999: 35) and further developed into a model that stresses creative solutions and the application of theoretical knowledge in practice, critical thinking and development of action competence. It deals with and promotes the ability of an individual to act in the environment according to his/her intrinsic norms and customs (the term is further explained in the Glossary - see Annex 3).

The social learning concept that will be used further as an explanatory framework for the e-learning method was defined by Etienne Wenger (2000) as “a dynamic, two-way relationship

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between people and social learning systems in which they participate". The building blocks of social learning systems are called *communities of practice*, which are "social containers of competences that make up such a system". In this constellation, socially required competences are negotiated through the experience of direct participation (engagement in a joint enterprise requires that members of a community are able to contribute to it, to interact and mutually reflect on this interaction). Various forms of "belonging" to social learning systems are defined: engagement (doing things together); imagination (constructing an image of ourselves, our communities and the world); and alignment (our activities should be aligned with other processes, standards or requirements). Social learning then "combines personal transformation with the evolution of social structures" (Wenger, 2000).

### **E-learning in the social learning (and ESD) context**

Information and communication technologies (ICT) that are often considered to be efficient from a knowledge management point of view also have the power to support social interactions: new emerging technologies in particular such as Web 2.0 tools might be used for the networking of different social groups and to involve them in common (virtual) projects. Used in education, social web tools may change learning environments (virtualise them) and promote a so-called "learner-centred" design (of these environments) that is characterised by the greater autonomy of the learner; greater emphasis on an active approach involving creation, communication and other participative learning strategies; and development of action competences that are also prerequisites for efficient action (Allen et al, 2005). An example is wiki, where the actors can contribute adeptly to these environments while their motivation is maintained by a shared interest in achieving a common goal. Dynamic communities of learning are being formed with the help of Web 2.0 tools that support creative skills through focused discussion and cooperation, while at the same time the



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individuality of each student is respected and they are encouraged to generate their own content (Wheeler, 2009c). Learning in social networks is characterised by reorientation from the pure accumulation of facts to action in a dynamic environment (Downes, 2005) and thus is highly relevant for the development of competences in the field of SD. The opportunities for (new forms of) learning provided by these technologies are shown in the following case study.

### **Case study: social (e-)learning within a European university network**

At present, European universities provide opportunities for virtual student mobility in open spaces that could become a model for network collaboration on different levels of education (and beyond). Higher education (HE) networks for sustainable development, e.g. the Virtual Campus for a Sustainable Europe (VCSE, see [www.vcse.eu](http://www.vcse.eu)) are built upon an e-learning environment and offer courses on sustainable development for European higher education institutions. They provide opportunities for cooperation with students across Europe and create a space for virtual mobility between students and tutors of the partner universities, as well as between local “actors” in regard to sustainability issues (Dlouhá, 2008). In these cases, technology enables, facilitates and supports knowledge transfer between different actors and provides opportunities not only to address the various learning needs of diverse actors by use of (assorted) multimedia and ICT options, interact independently from spatial and time constraints and adapt learning processes and strategies to a regional context, but also to overcome institutional constraints. The latter is often crucial for communication across disciplinary and discourse boundaries, especially in the field of academia. For these purposes, virtual collaborative and communicative settings are both commonly used and highly dynamic (Görsdorf et al, 2008: 73–75).

Some of the HE learning networks for sustainable development are built upon regional networks of diverse stakeholders, thus

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demonstrating a close connection between academia and social players in communities of practice with a shared commitment to sustainability values. The most prominent model of such regional cooperation has been developed and supported in practice by the UN University under the concept of Regional Centres of Expertise (RCEs) (van Dam-Mieras & Rikers, 2007).

### **E-learning courses within the VCSE network**

The introduction of students into the academic discourse is traditionally based on knowledge transfer, research activities under the guidance of members already involved, and communication. The use of e-learning methodology in networks of universities and other stakeholders opens up the opportunity to stress this communication aspect: to apply the theory of “social learning” in practice; and to use the “communities of practice” model as the explanatory framework for learning processes taking place there. From this point of view, communication in the HE environment is based on specific principles of academic dialogue (associated with the peer review process where meaning and also quality is ensured by those involved), and the learning takes place through engagement (research activity, expert dialogue), imagination (reflection on one’s own role in the learning community, the way of involvement and its consequences) and alignment (with respect to authorities and accepted procedures) (according to Wenger, 2000). In the area of SD, the learning environment should be flexible enough to reflect ongoing shifts in the processes and customs of the real academic community occurring with regard to SD, such as increasing interdisciplinary communication.

The following practical considerations are based on the experience with a specific HE course held within a European university network (the Virtual Campus for a Sustainable Europe). The e-learning methodology is described from the course design stage, selection of the theme and subject, choice of educational goals and tools (relevant for e-learning), through the description of the learning processes, justification of

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requirements and their fulfillment, explanation of the roles of actors, to the assessment stage and evaluation of the learning outcomes and receipt of the necessary feedback.

### **Box 1:** The e-learning case study – MPG&SD course

The Multiple Perspectives on Globalisation and Sustainable Development (MPG&SD) course ran over the 2009/2010 European winter semester. The course was part of the international VCSE network and participated in by students from Germany and the Czech Republic. It was a distance learning course (fully e-learning) and the planned workload was 150 hours (5 credits). Twelve students successfully completed it of the 15 who enrolled. The Globalisation theme was selected due to its complex and interdisciplinary character that enabled students to explore it from different disciplinary perspectives – social, environmental, and economic, including natural resource management, etc., and because tutors were able to involve actors outside academia to discuss the theme with the students.

It was decided to use the social learning concept as an educational method in this HE course and so a model was developed that included social interactions vital for processes associated with communicative practice in academia and demonstrated in writing articles.

## Course design

As the first step, a “community of practice” model should be established to evoke social learning. The course design should include the following steps and principles:

1. Creation of the learning environment.
2. Establishment of social connections, and continuous reflection on interactions during the learning process.
3. Clarification of personal values at the beginning and negotiation of shared understanding throughout the joint activities.
4. Introduction of rules to be respected – based on academic procedures.
5. Initiation of learning processes & continuous reflection on them

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6. Selection of the joint enterprise to be actively explored in cooperation with all involved participants.
7. Design of assessment techniques that reflect upon benefits both from a student performance point of view and also from the viewpoint of the overall benefits to the learning community.
8. Reflection and communication on course outcomes and its evaluation – in a community of learners and researchers.

### Theme (subject)

The theme of sustainability studies should preferably be complex and interdisciplinary enough so that it can be perceived from different disciplinary perspectives, critically judged and communicated, and various actors can meet virtually to discuss relevant sustainability problems and processes within it. Apart from provision of relevant articles and teaching materials (grounded in different disciplines), problem-oriented tasks should be undertaken within the learning process and students should find their own information resources and methodological solutions for them. Some other learning goals (e.g. development of a value-based standpoint) should also be the subject of an individual learning path. Facing a diversity of discourses, students experience uncertainty but have to find a way forward – this method is highly relevant for work in the virtual environment, which is rich with information but otherwise lacking guidance and orientation.

### Focus (method)

Problem-oriented learning is a core principle in SD education and some authors apply (for the purposes of socialisation in the academic environment) the *academic literacy practice* approach where the student is directly involved in reading and writing within his/her discipline, through which he/she learns and develops knowledge about new areas of study relatively independently (Lea & Street, 1998). The process of academic

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writing represents a possible means of involvement in the academic community: using this approach, the expert dialogue (that forms the principles and methods of an academic discipline) should be modeled under controlled and supervised (tutored by teachers) conditions. The teaching method then is preferably mentoring; shared interest in learning results and products is expressed through the collaboration of all participants in a learning outcome in different roles (writers, reviewers etc.). The method of teaching/learning is closely connected with the role of the learning environment and consists of two approaches: online instruction and online communication.

### Box 2: Learning objectives

During a course, students have to develop three literacies – environmental & SD, academic writing, and ICT literacy. Environmental & SD literacy is related to the theme of the course and students have to learn about environmental problems and sustainable development policies very generally, and study the theme of their choice in more depth. Writing literacy is considered to be an important metacognitive skill necessary to carry out a written assignment. Students should proceed through all the stages of the academic writing process; their progress from one stage to the next is an important criterion for assessment (while their product is considered to be rather experimental, without extensive requirements in terms of scope and focus, it should nevertheless meet basic academic standards). ICT literacy is a prerequisite and also a byproduct of learning. Educational objectives include complex competencies in terms of “higher order thinking” and also development in other domains; action competency was the first priority, which in an academic environment means research. The rules and formal customs of research and academic writing had to be followed while stressing a creative and critical approach.

In the MPG&SD course, students’ written assignments which were the main products of the course were displayed in the students’ wiki space. Finally, the tutor compiled a Globalisation Handbook as a common virtual publication that is available for a future “generation” of students as a starting point (see Dlouhá, 2010).

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### Learning environment

In ESD, the role of the learning environment is important: it should stress interdisciplinary aspects of the learning process, and support active learning approaches and solutions. These goals can be achieved thanks to the more fluid character of virtual space, which offers different ways of going through content, its interactive character, and the multi-dimensional structure (hyperlinks opening successive themes). On the other hand, a virtual learning environment (VLE) used in e-learning may also be useful for knowledge management purposes: structuring of time, providing resources, and organizing requirements. All these goals cannot usually be achieved in a Learning Management System (LMS) only, and in practice many teachers use an LMS such as Moodle but combine it, at least partly, with the use of social web tools such as Facebook and Wikipedia etc. This is highly recommended, as in addition to the (rather restrictive) functions of LMS, a social web provides many opportunities for cooperation and creative involvement.

### Web 2.0

The social dimension of the learning process can be simulated well by using Web 2.0 tools, which are referred to as “social web”. It allows the creation, control (editing), and publishing of information by the users themselves in mutual cooperation and on a democratic basis (see Chapter 6 also). Web 2.0 is a common term for the new, emergent properties of the web, which unlike the original Web 1.0 (predicated upon a relatively passive use of the Internet) were created due to the need to connect people to sharing knowledge and experience, and also to provide new opportunities for teaching/learning. Social software<sup>1</sup> generally

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<sup>1</sup> This “includes popular applications such as blogs, wikis and podcasting; social networking sites such as Facebook and Myspace; services for foto- and video-sharing services such as Flickr and YouTube; familiar utilities such as RSS feeds, social tagging (e.g. del.icio.us), microblogs (e.g. Twitter), mashups

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allows users to read and contribute to the web space and demands active participation. Some of the tools that Web 2.0 provides offer a particularly suitable environment for collaborative forms of learning, where students are actively involved in the learning process. Learning can then take place in social interaction and dialogue where all participants, including teachers, collaborate, ask questions, develop arguments and conclusions jointly, and where all these actors are equally involved (this leads to a shift in the role of the teacher). Web 2.0 tools are thus potentially suitable for teaching, especially with regard to the broad spectrum of envisaged competencies: critical thinking, collaboration, an active approach and writing competencies, etc. (Wheeler, 2009b).

### Wiki

The most popular and easy way to use Web 2.0 tools are for example wikis<sup>2</sup> - a set of interconnected web pages that can be easily edited by anyone; they allow users to add their own content (similarly to forums, blogs and other Web 2.0 tools), and also permit other users to participate in content

(e.g. geotagging) and so on. Also multi-player games and simulations such as Second Life fall within the purview of Web 2.0, in that they capitalise on social dimensions and shared spaces characteristic of the social Web.” (Wheeler, 2008a). Web 2.0 offers numerous interactive options, e.g. wiki as social software based on participation enables tagging or labelling, voting, versioning, hyperlinking and searching, and also discussion and commenting (Schwartz, 2003). Wikis make possible collective work on an article, its presentation and discussion about content; and from a technical standpoint, this software provides numerous options for creating text, inserting pictures and graphs, linking with other sources with numerous hyperlinks, etc.

<sup>2</sup> The word ‘wiki’ is derived from the Hawaiian word for fast – in IT terminology wiki is fast, as well as user friendly and an easily publishable medium (Wheeler, 2009c).

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creation<sup>3</sup>. Specific to wiki software is its interactivity and openness for simultaneous collaboration on similar topics. Wikis are widely used for educational purposes throughout the world and are a natural tool for distance learning, enabling the creation of interactive tasks and also the publication of instructional materials – often having the character of a thematic encyclopedia. Used in education, this software application provides the freedom to create one’s own contributions and to apply individual learning paths.

Sometimes wikis are developed as common repositories of information and expertise needed to solve practical problems in the community. They can then contribute to the emergence of “communities of practice” – they support the successful operation of these communities, provide opportunities for interaction, support participation based upon democratic principles, and offer interesting content; if they are connected to the broader subject area, they shape the personal and community identity and interaction; and they become self-sustaining over time in terms of content. (Schwartz et al, 2003).

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<sup>3</sup> “What distinguishes wikis from other content management systems is the fact that the pages can be linked together and arranged entirely arbitrarily, are published in no time order or taxonomy or any other pre-defined hierarchy. ... Wikis can be conceptualised as spatial structures that are infinitely expandable.” In addition, Wiki editing resources are very simple and do not require knowledge of HTML language (which is relatively complicated), so users are able to work in this environment without any previous experience with creating web sites. Thus, the Wiki is a very flexible system of pages that offers the possibility of continuous modification and updating (development) and also contains numerous tools to track the history of these sites and compare their different versions (the possibility of comparing the various options and possible returns to the “historically older” versions of the text is important given the public nature of wiki space and the related threat of vandalism) (Duffy & Bruns, 2006).



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There is evidence that students involved in the learning process in a wiki environment share common goals and support each other – they work together in order to give each other advice or guidance (Wheeler, 2008a). Research undertaken into the usefulness of this method in education has demonstrated its potential to enhance the learning community. The result of work in wikis is higher student self-esteem (the increased possibility of discussion and self-expression), and improved critical evaluation of resources; students are more satisfied with their work; and in the process of learning, students become used to working independently without the direct supervision of an authority figure. The drawbacks mentioned in the reports are: lack of rules or work ‘etiquette’ as wiki editing does not recognise authorship; the relative lack of a structured process for writing and learning, and, in some cases, fear of experimentation in a public space. On the other hand, students often had to create an ad hoc strategy to overcome the uncertainties and difficulties of working in an unfamiliar environment. Improving the quality of pages created by students depending on the extent of their use of a wiki is the subject of further research (Wheeler, 2008b, 2009a, 2009b).

### **Box 3:** Learning environment in the MPG&SD course

The MPG&SD course was fully realised in a virtual environment and was based on the following e-learning strategy relevant for ESD at the university level: use of 1) a Moodle learning management system (LMS) for students’ basic orientation, instructions and technical (ICT) support, and 2) a wiki environment that follows the principles of social learning as an open space for students’ creative work on the course themes: they write their assignments, discuss their content and share their views there (already reported in (Dlouhá, Macháčková-Henderson, 2008; Dlouhá, Dlouhý, 2009)). The wiki environment was designed by tutors to stimulate metacognitive skills (writing manuals and instructions were available there), organise the writing process (the wiki contribution was described as a genre, to be written in successive and well defined steps), model an academic environment (it offered

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### Box 3: Learning environment in the MPG&SD course (*continued*)

space for discussions and a peer review process in the discussion part of the page) and it also provided evidence of the writing process (the history of the page for an analysis of the students' approaches). The major part of the work was done in wiki: students wrote their academic essay there and also communicated with each other regarding its content and quality (their essays and reviews remained there to be used by a future "generation" of students).

### Rules and requirements

In the given framework (derived from the "community of practice" approach and problem-oriented learning situations), students experience academic discourse through communication with members of the research community. This discourse is defined by the range of possibilities (freedom of choice of a research theme), rules (research ethics and norms of writing, respect for the critical procedures of a peer review, formal requirements) and limitations (the necessity to narrow the theme of interest and to proceed with discipline and efficiency towards justified conclusions) – and requirements placed on students are derived from its principles. The learning goals should reflect competencies required for active participation in the (academic, expert) dialogue; in an educational setting they should be demonstrated/assessed as the course outcomes in student portfolios (e.g. fora discussion contributions – in Moodle, student essays and mutual critical reviews thereof – in wiki) rather than via online testing which is then unnecessary (and also difficult to be evaluated fairly: cheating cannot be prevented in distance education).

### Learning processes

Learning processes in ESD should be open ended and constructivist, which is a part of self-regulated learning (a required assignment follows the independent student research into the theme of interest). The learning itself should have a reflexive (providing an opportunity for discussion in all stages)

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and transformative character: the selection of a theme should be based on students' personal values, while continuous research of the interdisciplinary subject and its critical perception (applying diverse perspectives) also promotes a change in their value system. Interactive learning processes with an impact on the learner as well as the teacher are an important aspect of this approach – the mutual influence of learners AND their teachers is the result of a shared interest in the final “product” and is manifest in its quality.

The role of communication is important – a negotiated standpoint among participants should be required, and the “outcome” of communication should be a joint decision on some (real or hypothetical) problem. The reciprocal peer review process is helpful as its results play a role in the negotiated quality criterion.

Evidence of communication and learning processes is available in the VLE and the relationship between them can be traced (in fora, and in the wiki environment – the discussion part or the page history) and this option serves as a resource for further research into learning processes that could be used for their analysis.

### **Roles of actors**

Learning in networks requires the involvement of actors in a relatively loose, formal or informal system of interrelationships with the objective of mutual knowledge and resource exchange (Görsdorf et al, 2008: 67). This also applies to the e-learning setting where all participants benefit from the information sharing, value clarification process, and mutual support in the achievement of the (more or less common) objectives. Teachers provide assistance for the students' work throughout their independent “research” process (they are mentors rather than instructors); they support interactive communication among participants (which is also possible with external experts), help to refine a critical approach, and stimulate commitment and

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mutual understanding on both sides. An important aspect of e-learning is that the learning environment plays the role of “actor” as well (see Box 4).

### **Box 4:** Research on the roles of actors in the MPG&SD course

In the MPG&SD course, the specific aims of the learning activities were reflected by the different and changing student roles within the process of learning (they were writers and reviewers). Also, the roles of tutors and external experts were not strictly defined – they acted as teachers, mentors, advisors, evaluators of the students’ work, but also colleagues (the peer review process was the main authority for quality assurance and applied to everybody involved). In e-learning, all actors are also in permanent interaction with the learning environment – it is often not only a resource base, but also a factor in changing their roles. As research conducted into the MPG&SD course materials proved, the electronic environment (the Moodle system) itself helped to monitor student activity, or control the quantity and timing of assignments handed in and thus influenced the performance of authority in the learning process. The overall conclusion therefore was that the status of teachers and hence the forms of their authority were shaped by the virtual learning environment which provided some almost invisible power and thus superseded some functions of the authority that teachers use in face-to-face interactions (Dlouhá M., 2010).

## The role of, and the tools for assessment

According to the educational theories, different factors that play a role in the learning process should be aligned: not only goals and content, but also task design and their assessment<sup>4</sup>. In higher education, many authors agree that the most commonly

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<sup>4</sup> Reeves (2006) declares that: “The success of any learning environment ... is determined by the degree to which there is adequate alignment among eight critical factors: 1) goals, 2) content, 3) instructional design, 4) learner tasks, 5) instructor roles, 6) student roles, 7) technological affordances, and 8) assessment.”

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misaligned factor is assessment and that “most assessment strategies tend to focus on what is easy to measure rather than what is important.” Best teaching assessment practices in higher education focus on “critical thinking, problem solving, creativity, curiosity, concern for ethical issues” as well as “breadth and depth of specific knowledge”. Paying attention to these factors is a requirement of an active, constructivist pedagogy, but in practice, assessment is in most cases based upon multiple-choice tests or academic essays (Reeves, 2006).

Overambitious evaluation goals in HE include not only assessment of outcomes, but also reflection upon the learning process itself by teachers and students themselves. Connectivist theory also stresses the ability to communicate with others and involves learning methods requiring interaction between individual student and group work. This aspect also places specific requirements on the evaluation process, particularly in the online environment (Jančařík, 2010). Assessment techniques comprise peer assessment, self-assessment, authentic assessment and other sophisticated methods. All this requires that students evaluate work of the same kind that they themselves are producing, and thus also obtain experience of realistic evaluation (Sadler, 2005). Besides this, they are aware of assessment criteria that are transparent and could be applied to their own performance.

### **Box 5:** Assessment in the MPG&SD course

The learning goals in the MPG&SD course were focused on the skills and competencies needed for self-regulation of the learning process, such as understanding, critical judgment, complex thinking (awareness of the interdisciplinary context), commitment (the values behind scientific work), and a constructivist and action-oriented approach (in theory and practice). Assessment goals were process, not outcome oriented; the assessment options were adjusted to these goals and closely related to the features and qualities of the articles and other texts produced by students – their essays and all other contributions in fora were carefully analysed at each stage of the course.

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For evaluation of the specific purposes mentioned above, new assessment tools have to be developed – such as evaluation rubrics<sup>5</sup> which represent qualitative assessment techniques that assess to what extent educational goals in terms of (sustainability oriented) competencies are demonstrated in the course outcomes.

### Feedback – student perceptions

Students' perceptions of the academic quality of courses in distance education are (according to relevant research) strongly associated with the *approaches to learning* that are adopted on those courses. For the success of e-learning, this kind of feedback is important and research methodology exists that enables predicative data to be obtained routinely (on a small scale sample of respondents)<sup>6</sup>. Research has proved that student approaches to

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<sup>5</sup> A rubric is a common assessment tool – if you search the term by Google you receive more than 15 mil. hits, a majority of which (from the first results) have educational connotations and many offer useful examples or even tools to develop your own rubric for your educational purposes. The definition of “rubric” on Wikipedia (2010) is the following: “A rubric is a scoring tool for subjective assessments. It is a set of criteria and standards linked to learning objectives that is used to assess a student’s performance on papers, projects, essays, and other assignments. Rubrics allow for standardised evaluation according to specified criteria, making grading simpler and more transparent. The rubric is an attempt to delineate consistent assessment criteria. It allows teachers and students alike to assess criteria which are complex and subjective and also provide ground for self-evaluation, reflection and peer review.”

<sup>6</sup> Psychometric measurement techniques based on questionnaires are available, such as the standardised Experiences of Teaching and Learning Questionnaire (ETLQ). A survey of student perceptions is typically based on a final questionnaire using a 5-point Likert scale (from Strongly Disagree = 1 point to Strongly Agree = 5 points), measuring the level of agreement or disagreement with statements on students' experiences (Richardson, 2009). A variety of tools for assessment are available from ETL Project pages: <http://www.etl.tla.ed.ac.uk/publications.html>

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learning<sup>7</sup> considerably affect learning processes in terms of their efficiency and have an impact on a student's final performance. At the same time, these approaches are not unchangeable. They depend on individual preferences, perceptions of the learning environment, motivations, the workload required and other factors – and their assessment opens up possibilities for influencing the learning process and the resulting student achievements through a change of the learning environment and through teacher interventions. The results can also be used for a summative assessment of the course while other methods, such as learning records (see Barth et al, 2008: 41) are more appropriate for its formative evaluation.

### **Conclusion – applied social learning concept in the HE e-learning method focused on SD competences**

The e-learning method presented is a model of the applied concept of social learning in the sphere of higher education with sustainable development objectives. In such a type of teaching/learning, students have to learn from the social environment with the support of an electronic environment. The manner of their involvement in the learning situation should follow the general principles of (communication in) the academic community of practice (and follows changes that occur in this communication with regard to ESD).

The applied “communities of practice” concept provides the opportunity to develop social competencies and interactions that are vital for reaching the objectives shared by the community members (learners). This concept should be elaborated more precisely for ESD in higher education as it

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<sup>7</sup> The *approach to learning* is defined as a combination of student motives and strategies and categorised as “surface”, “deep” and “achieving learning approach” (with respective motives and strategies applied in each of these categories – surface motives, surface strategies, etc.) (Biggs, 1987: 14–19).

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opens up the possibility of bringing about shifts in educational practices (and paradigms) with regard to the social functions of science and education, and, more specifically, take into account the interdisciplinary, complex and value-oriented character of its subjects and methods.

The e-learning method provides numerous tools to establish a proper virtual learning environment to achieve these educational goals – although it has not been possible to review all of them due to their enormous diversity and dynamic evolution. Courses held in a regional and/or international network of educational institutions were presented as an experience of the “community of practice” model applied in education. In this case, the virtual learning environment has a crucial role to play not only as an information management system, but also as an open social space where communication tools and means are available and to support network relations; it often plays the role of an “actor” itself. Social web tools could thus serve as mediator of the educational aims in the sustainability area: they are flexible enough to provide options for an active and creative approach, collaboration, and offer the possibility of interaction through which the roles of participants are often (re)defined. Moreover, they produce traceable evidence so that the learning processes can be continuously documented and reflected upon, and consequently analysed. For example, evidence of participants’ contributions in the forum discussion space offers the opportunity to observe the social aspects of “scientific” work and the principles of academic dialogue that are applied – distribution of authority, possibilities of communication across disciplinary boundaries, the added value of a multicultural environment, etc.

The virtual learning environment in particular has the potential for further exploration and more specific research questions could be posed: What is the role of e-learning in the context of sustainability-oriented education? Could the concept of situated cognition be applied to the e-learning situation? What are the possibilities of offering additional options and tools for active



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student work and communication, including across cultural, disciplinary and sectoral barriers? What are the assessment tools appropriate in this arrangement?, and many others.

The methodology of teaching through involvement in the (academic) community, and accepting and applying its discourse was a unique educational experience that was possible due to involvement in the e-learning environment of the multicultural and interdisciplinary international network of cooperation among European universities (VCSE). In the shared educational setting (albeit originally built on different principles), different perceptions of the theme and method of teaching/learning by teachers and students were common, which provided the possibility of critically reflecting on the teaching/learning objectives, methods and principles.

Application of new, socially relevant e-learning methods and tools represents a chance to follow up on changes in scientific discourse occurring with regard to sustainable development aims and principles in the practice of education – these changes include, for example, raising awareness of cooperation among diverse stakeholders (to create a transdisciplinary character to educational practice, i.e. by including those beyond academia), the application of value-based concepts in science, and joint work in networks of cooperation towards goals that are negotiated through dialogue. The e-learning method is an innovation of (higher) educational practice that can be more widely used and which, together with its technological gains, could thus bring democratic principles and sustainability-oriented goals also into the wider educational system, and not only at the HE level.

### About the authors

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## Chapter Five

### **Networking and Interaction between Regions and Higher Education Institutions**

Marlene Trummler, Clemens Mader, Friedrich M. Zimmermann,  
Elisabeth Görsdorf, Mario Diethart

#### **The vision behind ‘networking and interaction between regions and higher education institutions’**

Facing today’s challenges in social, natural or economic fields, they never only border the system of a single respective discipline, but rather they cross these borders and find influencing factors in all the disciplines of sustainable development. This fact poses a huge challenge for research, education, as well as society. The UN Decade of Education for Sustainable Development confronts universities throughout the world with a strong challenge as well as with new opportunities. Universities bear a distinct responsibility for the professional and moral quality of future leaders in society and the economy. There is therefore a need to take up these new challenges. As major contributors to research, universities have to tackle scientific questions that arise in connection with the transition of societies around the world towards more sustainable development paths. But universities are also significant societal actors; they shape their local, regional and national environments, and are therefore important actors for a sustainable future. We need a new start for a scientific discourse about the role of universities in the quest to interact with regional actors and to transform societies towards sustainable development.

Research needs to become more open minded and cooperative with other disciplines, but to really understand global and local challenges research needs to learn from those who are involved and have an impact on the challenge itself. On the other hand, society is facing complex challenges which reflect wider impacts

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than ever. To understand those influencing and impact systems, cooperation between society and research becomes more and more necessary. What we are experiencing is a new way of cooperation between regional and higher education actors. So called transdisciplinary research is not only cooperating across disciplines (interdisciplinary) but is creating a science-society interaction with a mutual learning process and takes up societal driven challenges for a cooperative solution-finding process.

In this paper, the authors concentrate on this networking within the framework of the 3-LENSUS project<sup>1</sup> and reflect this with three examples and ways of networking between regional and higher education actors. In a first subchapter, the 3-LENSUS Database on Learning for Sustainable Development is described and analyzed regarding its impact and the way its contributors and users network. Furthermore, the contribution points out the benefits of education and learning aspects within this database. The next contribution focuses on a seminar series concentrating on the interactive exchange between regional and higher education actors. Those seminars consequently focused on the interaction and communication between the two aforementioned actor groups. The experiences of those seminars relate in the final analysis not only to aspects of communication but also highlight the importance of participation in research and community development. Finally, in the third case study of this paper, the COPERNICUS Alliance - the European Network on Higher Education for Sustainable Development - is analysed and demonstrates how a European higher education network can contribute to more transdisciplinary research.

As a methodology for the analysis of those cases and how they support the vision of 3-LENSUS to contribute to Lifelong Learning for Sustainable Development by science-society networking, the Graz Model for Integrative Development

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<sup>1</sup> The project 3-LENSUS (Lifelong Learning Network for Sustainable Development) has been funded with support of the Lifelong Learning Programme of the European Union ([www.3-lensus.eu](http://www.3-lensus.eu)).

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Processes has been applied. This methodology has been chosen as the model reflects not only the actions but also the processes in particular behind the cases. Furthermore, it allows a structured approach for the benchmarking of activities.

### **The Graz Model for Integrative Development**

To assess the process of how the database, the seminar series as well as the COPERNICUS Alliance network contribute to the objectives of the 3-LENSUS project related to networking and capacity building for sustainable development, the Graz Model for Integrative Development (Graz Model) has been applied. In contrast to the usual project evaluation systems, the Graz Model is not based on quantitative indicators to measure the actual state of impact of a project. The Graz Model focuses instead on the process of how the project is being implemented and therefore how the effects of the project came to place and are being carried out by a shared leadership of actions – transformational change.

Essentially, the Graz Model, shown in figure 1, is based on the following five principles (Mader, 2009):

- a. Leadership & Vision
- b. Social Network
- c. Participation
- d. Education & Learning, and
- e. Research Integration

Each of those five principles have three hierarchical levels. Coming from a lower level to a higher and more integrative level, the principles overlap in their characteristics with each other and describe an integrative process towards transformative development.

- a. Leadership & Vision: Leadership is leveraged into the stages of:

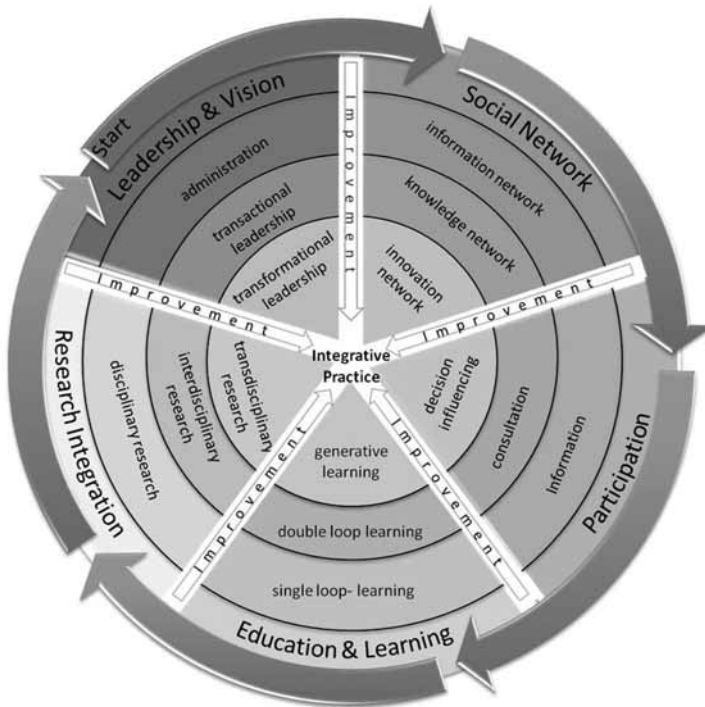


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- i. *Administration* where one is only following tasks but not being proactive.
  - ii. *Transactional Leadership* where one is taking proactive steps towards a vision and communicates this to the network.
  - iii. *Transformational Leadership* where one is building up a shared vision within the network and advancing towards innovative solutions via the active involvement of the affected people.
- b. Social Network is related to people who are affected by the process, as well as all relevant stakeholders.
- i. An *Information Network* simply aims to exchange information without following a common aim to combine this information.
  - ii. A *Knowledge Network* aims to combine information and follows a common aim. More trust towards each other in the use of one's knowledge is required.
  - iii. An *Innovation Network* follows a common vision, requires high trust towards each other and aims to pose new innovative solutions for coming challenges.
- c. Participation focuses on how all the people of the social network are involved in the process.
- i. *Information* is just a one way communication without reflection. People are informed without active involvement.
  - ii. *Consultation* involves relevant people by seeking interests and opinions but calls for a decision from the leader on how to react to the feedback.
  - iii. *Decision influencing* participation involves people in the leadership of the process and transforms a shared leadership with highly trusted people.
- d. Education & Learning: Education focuses on knowledge building activities that contribute to building a shared vision. Learning implies an ability to learn from one's experiences.
- i. *Single Loop Learning* only implies a reaction to one's activity, but does not affect learning to adopt the vision.
  - ii. *Double Loop Learning* also affects the adaptation of the vision, and

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- iii. *Generative Learning* requires the ability of systemic thinking to be able to adopt the vision and impact the whole system according to the learning.
- e. Research Integration provides the opportunity to find new solutions for existing and upcoming challenges.
  - i. *Disciplinary Research* only focuses on a single discipline.
  - ii. *Interdisciplinary Research* creates connections between disciplines and demonstrates systemic interrelations in-between.
  - iii. *Transdisciplinary Research* takes up challenges posed by the people involved and creates a mutual learning environment with interdisciplinary systemic understanding.



**Figure 1:** The Graz Model for Integrative Development (Mader 2009)

During an assessment, the vision of the process is taken as the basis for investigating how each of the principles is represented by various types of actions. Those actions can be reported and

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characterise the integrative approach of the process. A picture of the process is drawn by the model and the user may investigate opportunities for improvement and further development. Over individual periods of time a re-assessment makes sense to monitor the progress of development and to react according to the experiences.

In the following three outcomes of the 3-LENSUS project – the Database on Learning for Sustainable Development, the seminar series for sustainable development, as well as the COPERNICUS Alliance (the European Network on Higher Education for Sustainable Development) – are presented as well as evaluated on the basis of the Graz Model for Integrative Development.

### **Database on Learning for Sustainable Development**

Networking higher education institutions with a variety of both regional as well as learning networks represents the main focus within the 3-LENSUS project. The exchange of knowledge, know-how and experiences is an integral part of networks. A freely accessible online database, which was designed within the scope of the project aims to meet those networking requirements. The objective of the Database on Learning for Sustainable Development is thus to provide as much information as possible on ESD practice for sharing and exchanging among academic and non-academic stakeholders working in the field of sustainability. It contains a wide range of projects that deliver sustainable development and is divided into the following main categories:

- Regional development (developing a region towards sustainability)
- Multi-oriented learning approaches (learning processes addressing people from a range of backgrounds, e.g. intergenerational, intercultural or intersectoral learning)
- Multi-stakeholder involvement (comprises partners of at least three stakeholder groups, such as universities and research

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- institutions, both the public as well as the private sector; schools, or NGOs)
- Transdisciplinarity (deals with research processes where scientists and practitioners jointly work on solutions)
  - Empowerment (learning for sustainable development stakeholders to become active practitioners and participants in delivery and decision-making processes) (3-LENSUS Moodle, 2010).

The development process of the database started with a brainstorming session about the contents and possibilities of technical implementation in spring 2009. A first set of questions was created, which was discussed in close cooperation with 3-LENSUS partners and developed further. The questions covered aspects regarding project information, project description, the stakeholders involved, learning activities and the impacts on sustainable development. Requirements for the technical solution on the one hand were that the database should be incorporated into existing products in order to ensure greater coherence, and on the other hand that it should enable focus on a formal learning environment. Moodle was chosen as the best solution for meeting those demands. For internal testing, the database was online from January until February 2010. After some adaptations it went online for public use on 1 March 2010. Further restructuring and improvements were made in June 2010 to make the database more attractive and user-friendly. Two levels of users of the database were defined: viewers and project contributors. The database is accessible for public viewing. The latter who would like to contribute a project on learning for sustainable development first have to register and can then enter their project. An added project is then approved (or rejected) by an administration team that regularly checks new entries. This procedure was chosen to ensure the quality of the project database.

The database is linked to several other 3-LENSUS deliverables. On the one hand the database complemented the development

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of indicators (see Chapter 3), and established the basis for selecting cases for this good practice handbook as well. On the other hand, to guarantee continuity after the end of this project it will be integrated into the COPERNICUS Alliance platform.

Within the framework of the Graz Model for Integrative Development, the Database on Learning for Sustainable Development assumes two main functions: firstly, it serves as an information network, and secondly it provides education and learning tools. As an information network, the database presents a basic form of networks. The main motivation is to offer, share and exchange information on specific projects in the field of sustainable development. By way of contrast, the database is not targeted at cooperation, and hence does not necessarily require a high level of trust between the users. People view projects and/or contribute their own projects. They trust each other that the information presented reflects the truth, but at the same time they do not have to know each other. The database presents a platform for both higher education actors as well as regional actors to present their project activities, and to share their good practices, as well as challenges and experiences with other people interested in sustainable development. Consequently, the database also serves as a source for learning. People learn from each other's projects, beginning from project management, objectives and visions, the topics of the projects, personal experiences, how learning is integrated or what kind of methodologies are used. Based on such practical oriented information people who view the database may not only learn from the projects presented, but might even be encouraged to reflect upon their own projects and processes. The development process of the database itself was transparent and participative. Partners in the project served as consultants and could directly influence decision making. That open approach was of importance as the database was strongly linked to the other products of the 3-LENSUS project. Furthermore, such close involvement led

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to a higher identification with the product by all project partners and hence boosted the promotion of the database. The development of the database was often reflected upon and on the basis of testing and feedback it can be continually improved.

To sum up, the database presents a source for networking, support and inspiration and aims at broadening, strengthening and promoting learning for sustainable development.

### **Seminar series for Sustainable Development**

The 3-LENSUS seminar series on learning for sustainable development undertook the following task: it served as a knowledge network in the interaction between higher education and regional actors. Thus mutual learning and education took place, and at the same time new knowledge was also being created. The seminars' focus was on learning for sustainable and regional development. Furthermore, the Regional Centres of Expertise on Education for Sustainable Development (RCEs) were promoted as platforms to deliver ESD activities to local communities and regions within the framework of a global network. Within the seminar series, input statements were given and during the interactive parts topics were discussed and developed further, which led to new insights and perceptions. With regard to the content, the seminars dealt with the following topics:

- European and Global Networking for a Sustainable Development, focusing on partnership building and networking for sustainable development
- Establishment of RCEs & Communication of Sustainable Development, focusing on regional actors' collaboration and learning for sustainable development
- Regional Innovation for Sustainable Development, focusing on RCEs as incubators for regional innovation

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### - Open Virtual Learning for Sustainable Development.

In the following, the results of the seminar on 'Regional Actors' Collaboration and Learning for Sustainable Development', which took place at the Leuphana University Lüneburg in May 2009, will be discussed as an exemplar. 3-LENSUS project partners, representatives from RCEs as well as regional partners from RCE Hamburg and region interactively discussed how RCEs collaborate with regional partners and how they learn from and of each other. Thus the following questions were addressed:

- Which target groups could be addressed with regard to the purpose of »Learning with each other and of each other«?
- How can these groups be formed and activated for collaboration?
- How could the planned information and communication platform of the 3-LENSUS project foster these kinds of processes?

Regional Centres of Expertise act within both a regional as well as a global framework. To aspire to sustainable development a balanced social network is important. As RCEs have different organisational structures and topics they address, their approach to partner structures and target groups might be different as well (see Figure 2). The potential partners of RCEs are higher education and research institutions, schools and centres for continuing education, NGOs, public institutions, municipalities, businesses, as well as regional stakeholders. One task of RCEs is to serve as an interface between education, research, business and society. Hence participation and learning play a crucial role within the networks. The information and communication platform of the 3-LENSUS project can foster these collaboration and learning processes (see Chapter 6). A collective overview of the outcomes is provided in Figure 2 below.

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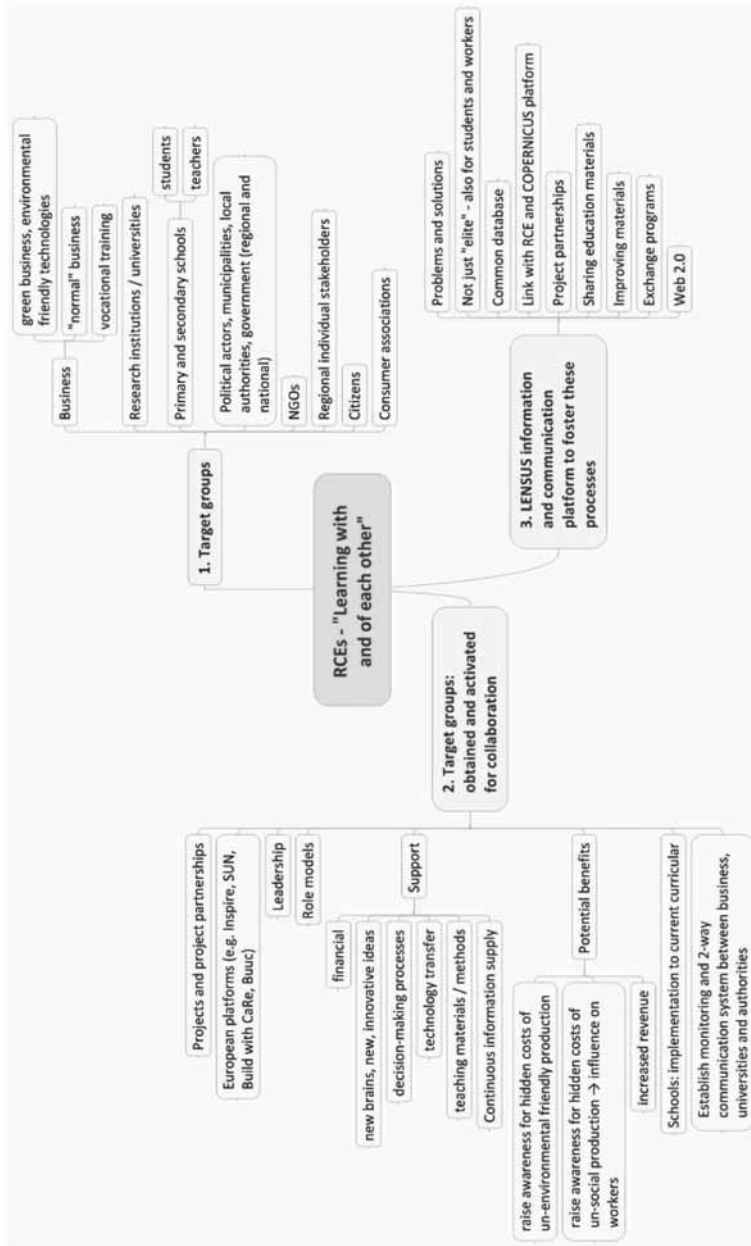


Figure 2: Seminar on RCEs and communication (Trummler, 2009)



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As this example shows, the seminars concentrate on the interaction and exchange between science-based expertise at higher education institutions and the experience-based expertise of local actors. This interaction and collaboration form the basis for knowledge networks and especially for transdisciplinary exchange within the Graz Model for Integrative Development Processes. The social networks of each seminar – regional co-operations such as the RCE networks in Austria, Germany and the Czech Republic were hereby addressed in particular – are characterised as knowledge networks. Compared to information networks such as within the Database on Learning for Sustainable Development knowledge networks not only focus on the exchange and allocation of information but also aim at cooperation between the actors involved (Mader, 2009). The level of collaboration and collective activities as well as the level of trust have increased compared to the information network. Actors in knowledge networks pursue shared goals and visions. Their exchange of knowledge is target-oriented. For these purposes the participation of all stakeholders within the network is essential. Besides information, consultations as well as decision-influencing take place. Experience has shown that in regional co-operations for sustainable development in particular participation plays a crucial role in relation to the success or failure of the network.

Another principle of the Graz Model that was integrated in the seminar series for sustainable development is education and learning. It is self-evident that the seminars were aimed at capacity building. During the seminars mutual learning took place – firstly, on the basis of input statements by both academic as well as non-academic experts, and secondly, by interactive workshop sessions. Participants exchanged their knowledge and experiences, learned from and with each other and created new ideas and new knowledge, which also formed the basis for a transdisciplinary research process. Figure 2 regarding RCEs and how learning takes place provides a good illustration of such a transdisciplinary approach. People coming from different disciplines and backgrounds jointly worked on current challenges of societal and regional relevance. Their influence and positions

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within the teams were equal and hence very participatory. Consequently, open, transparent and respectful discussions were possible – requirements for mutual learning processes. Besides acquiring new ideas, information and knowledge, participants also reflect on their own projects, aims, perspectives and learning in transdisciplinary processes. This circumstance characterises the added value of transdisciplinary research and learning.

### **COPERNICUS Alliance – the European Network on Higher Education for Sustainable Development**

As indicated in the 3-LENSUS project proposal, one aim was to establish a European network in the field of education for sustainable development. After intensive preparations the kick-off meeting of the COPERNICUS Alliance, the European Network on Higher Education for Sustainable Development, was held in July 2010. The Alliance aims to promote the role of sustainable development in European higher education to improve education and research for sustainable development in partnership with society and policy. Therefore it consciously considers and integrates approaches such as inter- and transdisciplinarity, participation and research. After an introduction to the COPERNICUS Alliance these factors and their role in connection with 3-LENSUS will be analysed according to the Graz Model.

The COPERNICUS Alliance is strongly connected to and based upon the COPERNICUS Charta that was developed in 1993 and signed by 326 universities by 2005. Committed institutions followed the Charta's principles, such as environmental ethics, education of university employees, programmes in environmental education, interdisciplinarity, dissemination of knowledge, networking, partnerships, continuing education and technology transfer. Since this was only a self-commitment without a concrete action plan, activities gradually decreased and finally wound down a few years ago.

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The 3-LENSUS project brought together a group of partner universities formerly strongly involved in COPERNICUS actions, so the opportunity was taken to revitalise the initiative as the COPERNICUS Alliance. 3-LENSUS gathered people from partner institutions to form a social network in order to eventually found the COPERNICUS network on the European level. It was therefore essential that people within 3-LENSUS built up trust towards each other and developed a common vision of the new network to be founded. Everybody was asked to give their ideas and expectations and to actively participate in the creation process, which consisted of several meetings where plans and next steps were continuously discussed and further advanced. These steps included exchanges with the International Sustainable Campus Network (ISCN) as well as with RCEs (Regional Centres of Expertise), as well as legal requirements such as registering the COPERNICUS Alliance as a NGO. Finally, the public was informed and invited to the kick-off meeting. The main goals of the COPERNICUS Alliance were jointly developed during this event, which was attended by 27 representatives from European higher education institutions:

- Policy: Promoting higher education for sustainable development in European policy
- Service: Disseminating tools for sustainability integration in higher education
- Outreach: Promoting sustainable development in European higher education
- Representation: Representing European higher education for sustainable development in international committees on ESD
- Networking: Exchanging and enhancing knowledge on education for sustainable development between European higher education institutions and student organisations that work for sustainable development (COPERNICUS Alliance, 2010).

As one of the first activities of the newly founded network, the COPERNICUS Charta of 1993 was redesigned and adapted to current needs. That process had a participative character and

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involved all members. Within the COPERNICUS Alliance, an innovation network applying transdisciplinary research was to be established. It was therefore important to have an interdisciplinary group of developers. The 3-LENSUS project involved members from different universities and fields of research which offered a solid basis to cover wide knowledge and competences. These multiple interests and contents are also to be found in the working groups that were defined within the COPERNICUS Alliance such as: 'Innovative Teaching & Learning', 'Implementation of Sustainability in Universities', 'CA Management', 'Policy Lobbying', 'Students' Involvement', 'Outreach', and 'COPERNICUS European Interdisciplinary Research on Sustainability (CEIDROS)'. While always keeping transdisciplinarity in mind, each working group aims to produce outcomes that are valuable for society while at the same time scientifically solid. 'Innovative Teaching & Learning' includes innovative approaches beyond formal learning such as e-learning. The working group 'Implementation of Sustainability in Universities' tries to develop evaluation and assessment tools based on research indicators that can lead to guidelines for implementation of sustainable practices in universities. 'CA Management' mainly focuses on internal participative issues, such as the organization of annual meetings of COPERNICUS Alliance members and the acquisition of new members. This is also important as far as 'Policy Lobbying' at the European level (especially within the European Union) is concerned and to achieve a certain outreach for sustainable development. Transdisciplinary research has to involve students as well; therefore a working group deals with activities for students and also invites them to join and cooperate. Finally, the working group 'COPERNICUS European Interdisciplinary Research on Sustainability (CEIDROS)' is doing research in cooperation with several institutions all over Europe. Each of these working groups consists of persons from different member institutions of the COPERNICUS Alliance who are willing to contribute. Thus the network offers the possibility for open participation which means that the COPERNICUS Alliance is both working for society and in collaboration with society.

### Conclusion

Networking in the interaction between regional and higher education actors was one of the main aims of the 3-LENSUS project. The Database on Learning for Sustainable Development, the seminar series for sustainable development, as well as the COPERNICUS Alliance network – besides other project deliverables like the European Learning Space for Sustainable Development – have made a contribution toward achieving this aim. These three outputs cover the following fields of science –society partnerships and knowledge exchange:

- Virtual platform for practitioners: the online database is about to become a globally accessible source for good practices in the field of learning for sustainable development and transdisciplinary actions. The platform is open to people who are at the beginning of their activities and provides models for inspiration as well as deeper knowledge and reports on experience for people who already have experience in transdisciplinary learning activities. The database is therefore an exchange platform for experienced as well as starting practitioners.
- Physical meetings between science and society: the seminar series focused on face-to-face intensive exchanges and involved both actor groups in intensive discussions and outcome-oriented workshops. Those physical meetings are essential for exchanging not only good practices but also to get a deeper insight into the motivation and visions of the participants' (academic and regional) activities.
- European Network on Higher Education for Sustainable Development: The COPERNICUS Alliance is a professional network for universities and NGOs as well as public and private institutions to build capacity for and have a policy impact on higher education for sustainable development. Research groups bring together researchers and practitioners from across Europe to build innovation for sustainable development in the European higher education area. The COPERNICUS

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Alliance combines the virtual as well as physical networking via an online platform as well as through annual face-to-face meetings.

Reflecting the Graz Model for Integrative Development, the combination of virtual and physical networking in institutionalised structures represents references in the principles of social networking, participation, education and learning, as well as research activities. Furthermore, all forms of exchange and capacity building platforms provide space for shared leadership by any actors who would like to get involved (in workshops, on virtual platforms or research networks). The three initiatives described therefore provide platforms and the capacity to react to sustainability challenges which require an interaction between global and local, as well as regional and higher education actors.

### Abbreviations

3-LENSUS	Lifelong Learning Network for Sustainable Development
ESD	Education for Sustainable Development
Graz Model	Graz Model for Integrative Development
NGO	Non-governmental organisation
RCE	Regional Centre of Expertise on Education for Sustainable Development

### About the authors

**Marlene Trummler, Clemens Mader, Friedrich M. Zimmermann, Elisabeth Görsdorf** and **Mario Diethart** are all 3-LENSUS project team members (see Annex One).

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## Chapter Six

### **Potential of social software to support Learning Networks for Sustainable Development**

Joop de Kraker, Ron Cörvers, Pieter Valkering,  
Martijn Hermans, Christine Ruelle

#### **Abstract**

Sustainable regional development is a participatory, multi-actor process, involving a diversity of societal stakeholders, administrators, policy makers, practitioners and scientific experts. In this process, mutual and collective learning play a major role as participants have to exchange and integrate a diversity of perspectives, interests and types of knowledge and expertise in order to arrive at innovative, jointly supported solutions. Web-based learning network services are promising tools to support such learning processes, both within and between regions. A characteristic of these network services is that they try to make optimum use of social software applications, also known as web 2.0 technologies, which enable a much more active and interactive way of learning. In this chapter we explore the potential of these new technologies to support learning in networks for sustainable development and present prototype designs of web-based platforms for an intraregional as well as an interregional network.

#### **Introduction**

Sustainable regional development is a participatory, multi-actor process, involving a diversity of societal stakeholders, administrators, policy makers, practitioners and scientific experts. In this process, learning plays a major role as actors have to exchange and integrate a diversity of perspectives, interests and types of knowledge and expertise in order to arrive at innovative, jointly supported solutions. The search for sustainable solutions to regional challenges can thus be viewed as a joint learning process. Learning in this context includes the acquisition of relevant new knowledge



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and skills or the adoption of new perspectives by individual actors, as well as the development of shared understanding and the co-production of new knowledge and solutions by a diverse group of actors. The first type of learning, with individual-level outcomes, we term here 'mutual learning' and the second type, with group-level outcomes, 'collective learning'. The need for mutual and collective learning to address sustainability challenges has led to a variety of alliances and partnerships of actors, commonly referred to as 'learning networks'. Learning networks aim at innovation through knowledge sharing or collaborative knowledge development. Often the participants are from the same geographic region (intraregional network), but there are also networks that focus on learning between regions (interregional network). In terms of participants' backgrounds, learning networks vary from the rather homogeneous with only representatives from industry included, to the very heterogeneous, with representatives from industry, universities, NGOs, consultancies, government agencies, local authorities et cetera (e.g., Halme, 2001; Guijt & Proost, 2002; Manring & Moore, 2006; von Malmborg, 2007). The networks are relatively formal with the participants often representing organisations, and physical meetings are important in establishing the connections in the network. This contrasts with the informal social networks that currently proliferate on the internet, where interactions are largely self-organising and virtual and supported by social software. According to learning technologists, the features and tools of these online social networks may be used to create more effective learning networks (Downes, 2007). Recent research in learning technology therefore focuses on the design of web-based services to facilitate the creation of learning networks and to support the participants with various functions for knowledge exchange and creation and social interaction (Koper, 2009).

This chapter reports on an on-going research project<sup>1</sup> which aims to explore the potential of social web-based tools and

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<sup>1</sup> 3-LENSUS - Lifelong Learning Networks for Sustainable Development, [www.3-lensus.eu](http://www.3-lensus.eu)

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services to support mutual and collective learning in networks to promote sustainable development. We first give a brief account of current trends in web-based services and how these could be matched with the needs of learning networks. Then we move from theory to application with the description of prototype designs of web-based platforms for an intraregional as well as an interregional network for sustainable development. We end with a few preliminary conclusions on the potential of social software to support these learning networks.

### **Towards learning networks 2.0?**

Web-based support for the exchange and creation of knowledge by participants in networks is not a new phenomenon in itself. Both formal networks, such as project teams, and informal networks, such as people with a shared interest, nowadays often support their interactions with e-mail and websites with file exchange options and discussion forums. In formal networks, however, rarely is any use made of so-called social software applications, which have become extremely popular among internet users in recent years. These social software applications have made world-wide web usage distinctly more creative, more participatory and more socialising than before (Blees & Rittberger, 2009). Hence the term Web 2.0, the 'new version' of the web. Weblogs and wikis allow web users to (co)create content, they can make their voices heard through rating and feedback systems, easily collect and filter information with RSS feed technology, and they can share their lives with others through generic social networking sites (Facebook, MySpace) and specialised applications for the sharing of news (e.g., Twitter), media (e.g., YouTube, Flickr), and favourite bookmarks (e.g., Delicious). Synchronous online group meetings are easily arranged with free audio or video conferencing applications (e.g., Skype).

Understandably, among learning technologists there is a strong interest in using the features and applications of Web 2.0 to design learning network services that foster creativity

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and collaboration, enhance interactivity and sharing, and stimulate participation and networking far better than the more traditional knowledge exchange platforms. As individual users of web-based social software appear to 'spontaneously' form online social networks and communities, these services may also support self-organisation, and thus enhance the lifespan of the learning network and reduce the costs of maintenance. The result would be 'learning networks 2.0', learning networks supported by Web 2.0 social software tools. According to Downes (2007), these tools have great potential to contribute to the four principles of effective learning networks: diversity, autonomy, interactivity and openness. Diversity in the points of view and types of knowledge and expertise of the participants is essential, as in a learning network each individual is in principle both a 'provider' and a 'consumer', thus enabling non-hierarchical mutual and collective learning. Also the principles of autonomy and interactivity contribute to this type of learning. Autonomy refers to the voluntary and self-motivated nature of participation and contribution of content in online networks ('the user is in control'). Interaction and exchange between these autonomous participants is obviously required for mutual and collective learning. Independent individual initiatives in participation and interactivity on the basis of shared interests are the foundations of bottom-up, self-organizing networks. Both autonomy and interactivity are greatly facilitated by current social software for producing, bookmarking, rating, annotating, tagging, sharing and discussing resources (Wigman et al., 2009). Openness, finally, is what makes diversity, autonomy and interactivity possible. Barriers to participating in the network, to contributing to the network, and to accessing web-based resources must be minimised. Again, social software greatly helps to achieve this goal.

A recent needs assessment regarding learning network design and support among practitioners in sustainable development from five European regions confirmed the great potential of Web 2.0-based services. In brainstorming sessions the principles of diversity, autonomy, interactivity and openness were specified into more concrete features such as services for multi-language

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technical support and translation, personalisation, matching of knowledge demand & supply, co-creation of texts and diagrams, networking, planning of events, virtual meetings, feedback, rating and recommendation. A restriction on the principle of diversity was imposed by the group's preference for theme-based learning networks for defined user groups rather than networks dealing with all issues of sustainable development. This is in line with Halme's (2001) rule-of-thumb that the participants of learning networks should be as diverse as necessary and as similar as possible. It was also concluded that the importance of the virtual component would depend on the geographical scale of the network and that a regional learning network should involve a blend of face-to-face and online interactions. The major challenges the group identified concerned the quality assurance of the knowledge provided and produced in the network and the incentives for continued, active participation of the members of the network. The first challenge, assurance of the quality of the knowledge, was considered to be a primary responsibility of the academic participants in the learning network. However, knowledge developed in a sustainable development project must not only meet scientific quality standards but should also be 'socially robust', i.e., meet the requirements of the societal stakeholders involved. For example, it was stressed that the learning network should produce understandable, relevant knowledge and practical solutions to real problems. By providing the learning network with web-based services such as rating and annotating functionalities, it may be relatively easy to organise 'extended peer reviews' (Funtowicz & Ravetz, 1993) that include the non-academic actors. The second challenge – incentives for active and continued participation – requires serious attention. Even though the transaction costs of virtual network interactions are much lower than face-to-face meetings, the benefits should still be significant and be made very clear. Insufficient benefits as compared to those of alternative activities form the largest obstacle for academics to participate in regional sustainable development initiatives (Zilahy & Huisingsh, 2009), and this will most likely apply to all other types of participants.

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**Box 1:** Functional requirements for the prototype platform to support the interactions in learning networks for sustainable development.

1. The platform is a hybrid framework, consisting of three parts:
  - a. Portal, a central network site with static information, news feeds and access to group and communities.
  - b. Intranet, with communities focussed on knowledge exchange discussion and collaboration.
  - c. Personal homepage and profile pages.
2. The platform must be adequately equipped to meet the needs of heterogeneous user groups.
3. The platform should be an open learning space, in different ways:
  - a. built on open source software;
  - b. free of charge;
  - c. easy two way integration with external (personal) web services or data;
  - d. multilingual, to be personalised by user.
4. The user and the social context in which he/she wishes to share and consume knowledge and information play a leading role.
5. The platform facilitates the connection of local contexts to global contexts (on sustainable development).
6. Knowledge in the platform is available through individuals ('profile') and through content (documents, links, embedded materials) that is made available by individuals within the network. This knowledge must be maximally accessible. The most appropriate method of making knowledge accessible is to 'BRATS' people, content and communities, where 'BRATS' stands for Bookmarking, Rating, Annotating, Tagging and Sharing. By tagging knowledge (items) a semantic knowledge network arises with its own individual taxonomy.

### From theory to application: design of a prototype

To support the interactions in learning networks for sustainable development, a number of functional requirements for the prototype platform were specified in interactive sessions with prospective users (Box 1). After a comparison including Liferay, Ning, Drupal and Sharepoint (Table 1), the social networking platform Elgg was chosen ([www.elgg.com](http://www.elgg.com)).

**Table 1:** Comparison of web-based networking platforms

	<b>Liferay</b>	<b>Ning</b>	<b>Drupal</b>	<b>Elgg</b>	<b>Sharepoint (2010)</b>
<u>Type</u>	Social office	Social platform	Content management system	Social networking platform	Intranet framework
<u>Topic</u>	Dynamic content, Enterprise, Site management	Communications, Dynamic Content	Dynamic content, Site Management	Communication, Dynamic content	Enterprise, Dynamic Content, Data management
<u>Open source</u>	+	-	+	+	-
<u>License</u>	GNU Library or Lesser General Public License	Commercial license	GNU General Public License	GNU General Public License	Commercial license
<u>Hosting</u>	Self hosting	Online service	Self hosting	Self hosting	Self hosting, Sharepoint Server
<u>Database environment</u>	Firebird/InterBase, HSQL, JDBC, Microsoft SQL Server, MySQL, Other network-based DBMS, PostgreSQL (pgsql), SQL-based, Sybase	MySQL, _	MySQL	MySQL	MS SQL Server
<u>Programming Language</u>	JSP, Java, JavaScript	-	PHP	PHP	.NET Framework

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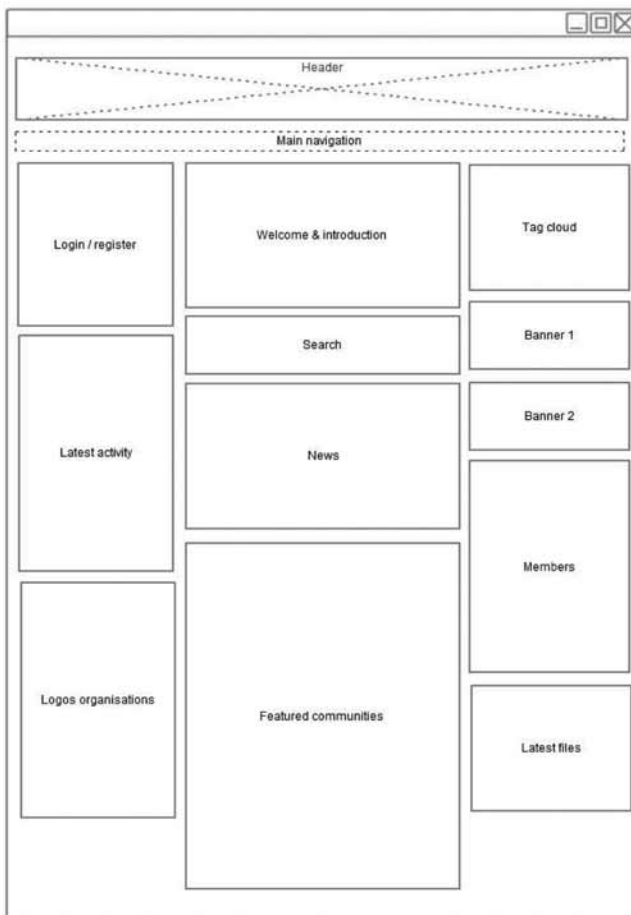
**Table 1:** Comparison of web-based networking platforms (*Continued*)

	Liferay	Ning	Drupal	Elgg	Sharepoint (2010)
<u>Web-based</u>	+	+	+	+	+
<u>Multi language</u>	+	+	+	+	-
<u>Social networking</u>	+	+	+/-	+	-
<u>Standard features</u>					
Messaging	+	+	+	+	+
Discussions	+	+	+/-	+	+
File sharing	+	+	+	+	+
Chat	+	+	+/-	+/-	-
<u>Web 2.0 features</u>					
Content co-creation	+	-	+	+/-	+/-
Voice	+	-	+/-	+/-	+
Profiling	+	+	+/-	+	-
Real-time communication	+/-	-	+/-	+/-	-
Information collection and filtering	+	+	+/-	+/-	+
<u>'BRATS' (3 max)</u>	+++	++	++	+++	+

+ Standard feature; +/- Add on / module; - Not available

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Broadly speaking, an Elgg-based social network consists of three parts: a central network site, communities, and members' personal pages. Typically for a network, these parts are interconnected. For example, the central network site is fed with information from the communities and member pages, and the member pages are fed by information from the communities and other member pages. The central network site functions as a portal: it provides general, public information and news and access to the communities and member pages through a log-in (Figure 1).



**Figure 1:** Wire frame of homepage of the central public site of the prototype platform



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The communities provide a place for focused knowledge exchange, discussion and collaboration. Communities provide functionalities like discussion forums, file up/download, blogs, photo and video galleries, and bookmarks. Access and other rights for the communities can be set at any desired level, ranging from public to very restricted. The member pages are of two types: (a) a personal home page ('dashboard'), which can be structured in terms of content, tools, and lay-out by the owner; it is like a personal portal, which serves to receive and send information from and to other web pages, and (b) a profile page, which can also be structured by the owner and it serves to make information about oneself available to others (experience, expertise, interests, ...). The owner determines which part of the information is available to whom in or outside the network. Whereas the profile is for consumption by others, the dashboard is a space for users to use for their own needs. Thus, an Elgg-based platform combines the functionalities of a portal, an intranet, and an online social network. A very broad range of plug-ins is available for specialised functions. The platform can be linked to one's e-mail account through a notification or digests function.

The platform must channel and streamline a continuous flow of information and communication between different groups of users. It is therefore important to define the future user groups and make their needs and expectations of the learning network platform as detailed as possible. The following user groups were defined: scientific experts, policy makers, professionals (non-profit), professionals (profit), citizens, and the general public (see Appendix 1 for a detailed description). Defining user groups is not only relevant for the design but also for future management of the learning network platform because the major difference with traditional platforms for knowledge exchange is the bottom-up approach. The user has control over who has access to his content, starts discussions, uploads files, documents, pictures et cetera, writes blog posts, sets up open

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or closed groups and shares content, creates dedicated communities, and connects to the social web, pushing content out and pulling content in with the popular social media. The learning network thus becomes a non-hierarchical, user-centred network: open, and structured bottom-up by groups, tags, bookmarks, interests, and context. This implies that a prototype design is at first necessarily rather general in nature, and can only be developed further in a stepwise fashion based on user requirements by the participants of a specific learning network. The next two sections describe the application of the prototype design to two real-life cases, an intraregional as well as an interregional network for sustainable development.

### **Prototype for an intraregional network: the SUN case**

SUN (Sustainable Urban Neighbourhoods) is a European Commission funded project for the Euregion Rhine-Meuse, which comprises parts of the Netherlands, Belgium and Germany. It is coordinated by the Local Environment Management & Analysis group of the University of Liège (LEMA), and comprises 17 partners: 7 cities/neighbourhoods, 4 universities and 6 agencies from the public and private sector. The project aims to generate a learning process across borders, between local government officials, neighbourhood inhabitants, professionals in neighbourhood renovation and community activities, and scientific experts in sustainable urban development (see Chapter 8g). The end goal of this regional learning process is to enhance the quality of life in existing urban neighbourhoods of the region in a sustainable way. The project has very concrete targets with respect to the neighbourhoods' economic development (establishment of new companies, creation of new jobs), living environment (development of green public spaces) and energy use (insulation of houses). The interactions between the participants are to a large extent face-to-face in small-scale meetings and larger-scale events. Virtual

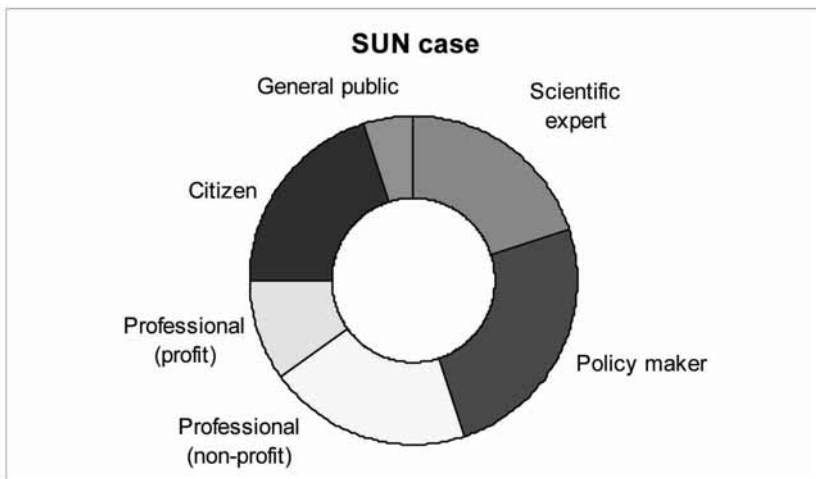
## Multi-Actor Learning

interactions are mainly through e-mail, an intranet with document storage facilities, and a website for the general public with project news and background information.

The most important characteristics of a web-based network platform for SUN are:

- The platform adds a new dimension of communication and interaction to the project.
- The focus is on the neighbourhoods, and less on thematic subjects.
- The interests of the user groups in the network are not very coherent, but rather diffuse; interests and commitment may differ between user groups, e.g., citizens are less interested in research knowledge on SD; they are specifically interested in activities and relevant developments within their own neighbourhood.

The consequences of these characteristics for the SUN-prototype are depicted in Figures 2 and 3.



**Figure 2:** Expected distribution of user groups of SUN learning network platform

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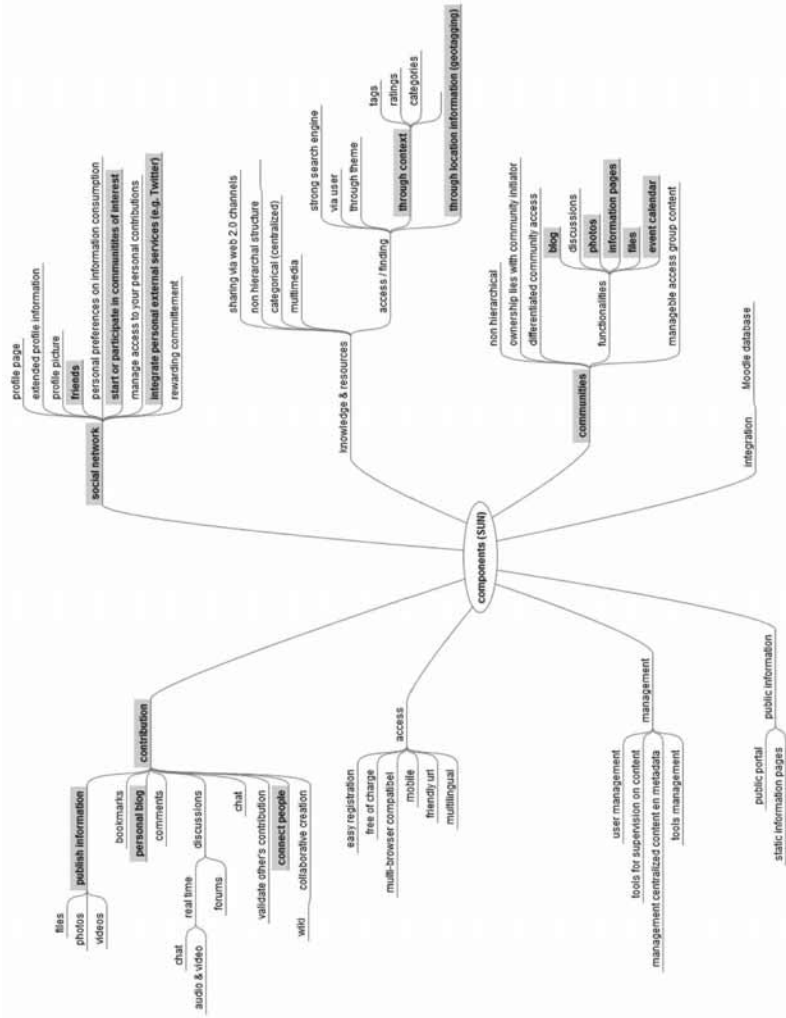


Figure 3: Learning network platform components, specifically relevant for the SUN-case (highlighted)

### **Prototype for an interregional network: the RCE case**

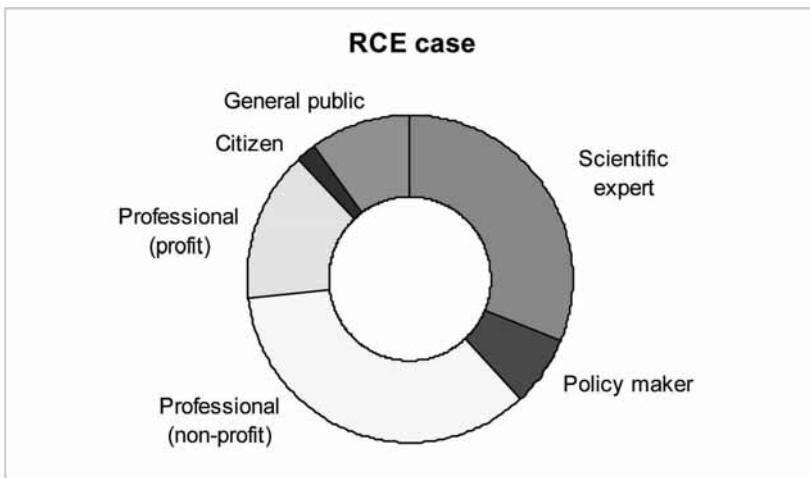
RCEs (Regional Centres of Expertise on Education for Sustainable Development) are regional network organisations, which aim to provide a platform for multi-stakeholder dialogues to share information and experience and seek ways to promote interdisciplinary and multi-sectoral collaboration for ESD (Education for Sustainable Development) at the regional level (Mochizuki & Fadeeva, 2008). The stakeholders include not only institutions from the formal education sectors, such as universities, but also from the non-formal education sector, such as museums, as well as local governments, NGOs and enterprises. By focusing on mutual and collective learning among the different stakeholders, the RCEs can turn from channels for one-way knowledge transfer into being dynamic regional learning networks for ESD. With the expansion in number, networks of RCEs have been established at a continental and global level. Until now the interactions in these networks have mainly been limited to face-to-face meetings (once a year) or e-mail exchange. However, from the very beginning there was already the ambition to establish a worldwide, web-based network of RCEs and their partners, the so-called Global Learning Space (GLS, Van Ginkel, 2006). The overarching objective of this GLS would be for the regional centres to learn from and with one another, building on interregional diversity. This could be achieved by sharing innovative approaches and exchanging good practices in ESD, combining resources for ESD, discussing common challenges, providing open, online knowledge for SD, and by designing and executing collaborative R&D projects in ESD.

The most important characteristics of a web-based platform for the RCE network are:

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- The platform adds a new dimension of communication and interaction to the network.
- The focus is on themes, (educational) resources and information exchange.
- This network has a high degree of cohesion, in general interest, passion and vision.

The consequences of these characteristics for the RCE-prototype are depicted in Figures 4 and 5.



**Figure 4:** Expected distribution of user groups of RCE learning network platform

### **Concluding remarks: the potential of social software**

Currently, the (learning) interactions in the SUN and RCE networks are mainly via face-to-face meetings, supplemented with (virtual) e-mail contacts. The premise of this chapter is that adding a strong virtual component to learning networks by providing a platform based on social software will enhance the

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interaction strength within the networks (Figure 6), and promote the diversity and autonomy of the participants, and openness of the network just as well. According to Downes (2007) this would result in more effective learning within these networks. Moreover, these principles bring the advantage of self-organisation. At the same time, however, they constitute certain risks that call for careful design decisions to manage them. In the SUN case, there are clear incentives for participation stemming from either a professional need or from a direct benefit as inhabitants of the neighbourhoods were included in the project. However, these should not be taken for granted, because the interests of the participants are highly diverse and the perceived benefits of active participation may not weigh up against the inevitable costs (scarce time). Discovering the shared interest of all participants in the SUN-project and giving it a central place in the design is therefore crucial. In the SUN-project, access to monitoring data on neighbourhood quality of life, combined with the opportunity to participate in the construction of indicators, in the definition of protocols and in the interpretation of the results could be this shared interest. In the RCE case, worldwide sharing of a wide array of ESD resources is a major objective. Diversity, autonomy and openness may then result in lack of oversight, quality and accessibility of these pooled resources. In this case, there may be a need to integrate a more 'top-down' structure, e.g. by prescribing categories or assigning quality assessment roles to platform administrators.

As such issues are not unique to the cases included in our study, but similar for many intra- and interregional learning networks, it is expected that the experiences gained in learning network platform design and implementation with these cases yield more general insights into the potential of social software to support regional networks for sustainable development.

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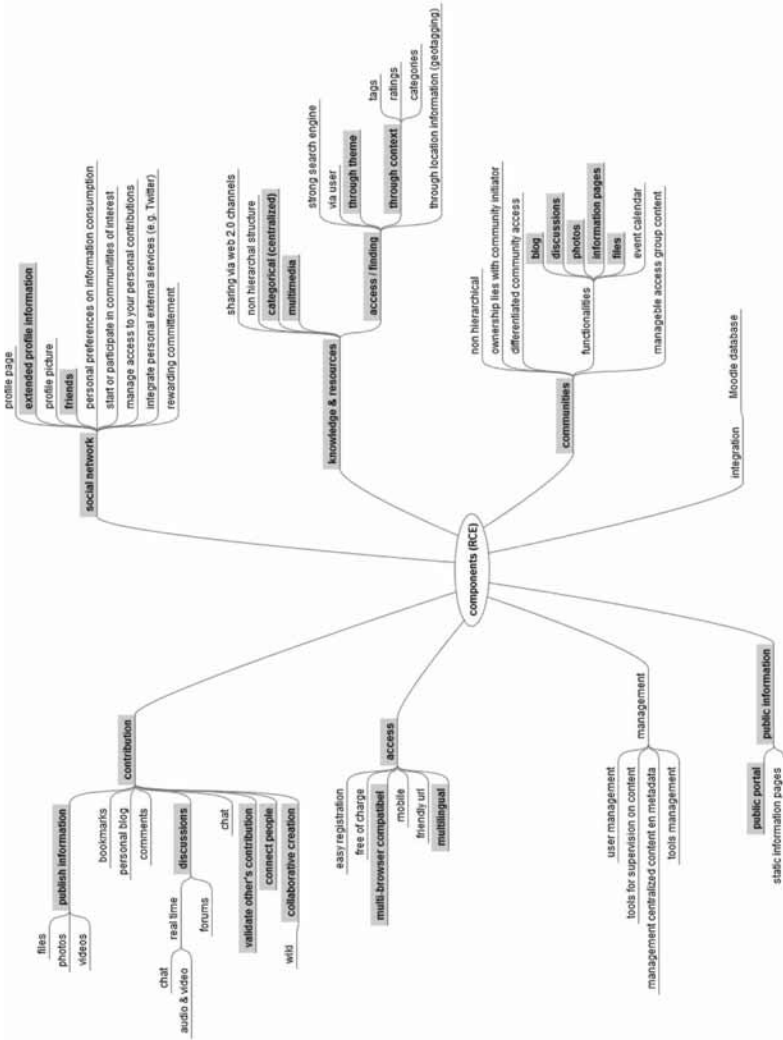
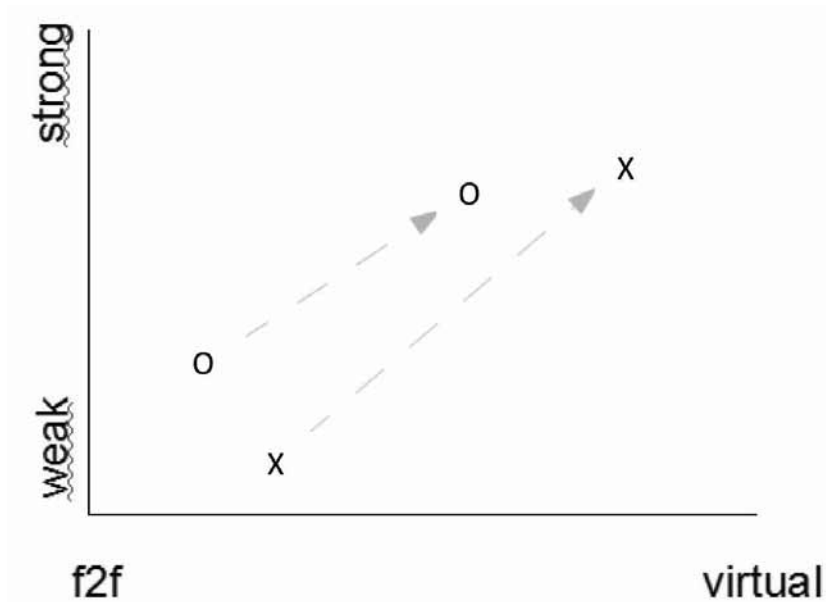


Figure 5: Learning network platform components, specifically relevant for the RCE-case (highlighted)





**Figure 6:** Transformation of RCE (X) and SUN (O) networks to blended learning networks, with a mix of face-to-face and virtual interactions.

### About the authors

**Joop de Kraker** and **Ron Cörvers** are members of the 3-LENSUS project team (see Annex One).

**Pieter Valkering** holds an MSc in physics and a PhD in Integrated Assessment. His research and teaching covers integrated assessment, integrated modelling, scenario analysis, sustainable water management and urban development. He participates in the SUN action surrounding the SUN platform, focusing on monitoring sustainable neighbourhood development and facilitating exchange.

**Martijn Hermans** has a BA degree in History from Fontys University of Applied Sciences. He has more than 10 years of experience in fields of e-learning and knowledge management. Currently he is Director of e-linQ, a project office that

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specialises in the use of ICT in education as an engine for innovation.

**Christine Ruelle** is a Senior Researcher at LEMA-ULg. She participated in several European and regional research projects relating on management of urban environments and on community involvement in this context. She is the coordinator for the overall SUN project, and also leads the SUN platform, with the aim of developing a long-term euregional learning network on sustainable urban neighbourhoods.

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### Appendix 1. User groups of learning network platforms for sustainable development

No.	User group
G1	Scientific expert
G2	Policy maker
G3	Professional (non-profit)
G4	Professional (profit)
G5	Citizen
G6	General public

#### G1 – Scientific expert

Characteristics / goals	<ul style="list-style-type: none"><li>• Wants most recent and relevant information quickly and clearly</li><li>• Wants to be personally addressed</li><li>• Visits the PLATFORM from work, but also at home</li><li>• Wants an easy to use website</li><li>• Shares own knowledge and information easily</li><li>• Wants to communicate with colleague scientists, but is also strongly interested in communicating in a multi-actor level</li><li>• Is well prepared to share his knowledge</li><li>• Shows ownership over his own contributions</li><li>• Is always interested in relevant information, knowledge and people</li><li>• Has no commercial interest</li><li>• Is community minded</li><li>• Is a frequent visitor</li></ul>
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	<ul style="list-style-type: none"> <li>• Is critical on quality of content, community profile and relevance</li> <li>• Has little time to spend</li> </ul>
Reason visit	<ul style="list-style-type: none"> <li>• PLATFORM can be an essential part of daily working environment, and is access to a network of people, knowledge, news and information</li> </ul>

### G2 – Policy maker

Characteristics / goals	<ul style="list-style-type: none"> <li>• Wants most recent and relevant information quickly and clearly</li> <li>• Wants to be personally addressed</li> <li>• Visits the PLATFORM from work</li> <li>• Wants an easy to use website</li> <li>• Shares own knowledge and information easily</li> <li>• Wants to communicate with other policy makers, but is also strongly interested in communicating in a multi-actor level</li> <li>• Is prepared to share his knowledge</li> <li>• Shows ownership over his own contributions</li> <li>• Is always interested in relevant information, knowledge and people</li> <li>• Has no commercial interest</li> <li>• Is community minded</li> <li>• Is a less frequent visitor</li> <li>• Demands high quality, validated, content</li> <li>• Has little time to spend</li> <li>• Is mainly regional oriented</li> </ul>
Reason visit	<ul style="list-style-type: none"> <li>• PLATFORM offers a relevant access to a relevant network of people, knowledge, news and information.</li> </ul>

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### G3 – Professional, non-profit

Characteristics / goals	<ul style="list-style-type: none"><li>• Wants most recent and relevant information quickly and clearly</li><li>• Wants to be personally addressed</li><li>• Visits the PLATFORM from work, but also from home</li><li>• Wants an easy to use website</li><li>• Shares own knowledge and information easily</li><li>• Is also strongly interested in communicating in a multi-actor level</li><li>• Is prepared to share his knowledge</li><li>• Shows ownership over his own contributions</li><li>• Is always interested in relevant information, knowledge and people</li><li>• Has no commercial interests</li><li>• Is community/network minded</li><li>• Is a frequent visitor</li><li>• Is critical of quality of content, community profile and relevance</li><li>• Has little time to spend</li></ul>
Reason visit	<ul style="list-style-type: none"><li>• PLATFORM offers a relevant access to a relevant network of people, knowledge, news and information</li></ul>

### G4 – Professional, profit

Characteristics / goals	<ul style="list-style-type: none"><li>• Wants most recent and relevant information quickly and clearly</li><li>• Wants to be personally addressed</li><li>• Visits the PLATFORM from work, but also from home</li><li>• Wants an easy to use website</li><li>• Shares own knowledge and information less easily</li></ul>
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## Multi-Actor Learning

	<ul style="list-style-type: none"> <li>• Is also strongly interested in communicating on a multi-actor level</li> <li>• Is prepared to share his knowledge conditionally</li> <li>• Shows ownership over his own contributions</li> <li>• Is always interested in relevant information, knowledge and people</li> <li>• Has commercial interests</li> <li>• Is community/network minded</li> <li>• Is a less frequent visitor</li> <li>• Is critical of quality of content, community profile and relevance</li> <li>• Has little time to spend</li> </ul>
Reason visit	<ul style="list-style-type: none"> <li>• PLATFORM offers a relevant access to a relevant network of people, knowledge, news and information</li> </ul>

## G5 – Citizen

Characteristics	<ul style="list-style-type: none"> <li>• Wants most recent and relevant information quickly and clearly</li> <li>• Wants to be personally addressed</li> <li>• Visits the PLATFORM from home</li> <li>• Wants an easy to use website</li> <li>• Is less interested in communicating on a multi-actor level</li> <li>• Wants to contribute actively to the website</li> <li>• If relevant, he is interested in joining communities</li> <li>• Is a non-frequent visitor</li> <li>• Has average time to spend</li> <li>• Has a personal interest in involvement, that is strongly linked</li> </ul>
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### Multi-Actor Learning

	to the context of the own local community
Reason visit	<ul style="list-style-type: none"> <li>• Participates as a local community member, especially interested in subjects and activities on sustainable development related to his/her own local living environment.</li> </ul>

### G6 – General public

Characteristics	<ul style="list-style-type: none"> <li>• Wants most recent and relevant information quickly and clearly</li> <li>• Does not want to be personally addressed</li> <li>• Visits the PLATFORM from work, but also from home</li> <li>• Wants an easy to use website</li> <li>• Does not contribute actively to the website</li> <li>• Is possibly interested in joining communities</li> <li>• Is a non-frequent visitor</li> <li>• Has little time to spend</li> <li>• Most likely, he/she is referred to the website through a search website.</li> </ul>
Reason visit	<ul style="list-style-type: none"> <li>• Is interested in specific project / network SUN, 3-LENSUS or RCE.</li> </ul>



# Chapter Seven

## **Database on Learning for Sustainable Development – analysis of projects**

Marlene Trummler, Clemens Mader

The exchange of knowledge and experiences, as well as sharing and collecting information about innovative projects promoting sustainable development in Europe is the aim of the Database on Learning for Sustainable Development, which was developed as part of the 3-LENSUS project<sup>1</sup>. The database is a source for networking, support and inspiration and aims at broadening, strengthening and promoting learning for sustainable development.

This paper describes the analysis of projects that were contributed to the Database on Learning for Sustainable Development within the first eight months period the database was online (3-LENSUS Moodle 2010). Twenty-seven European projects were registered within this timeframe from March until October 2010, which represent the data basis for this analysis. Projects within the database contain comprehensive information about the following issues:

- General information regarding the title of the project, website, start and duration of the project, as well as the location is provided.
- Project description: the second part deals with a description of the project related to its main focus and theme, objectives, methods of project implementation, experiences and challenges, the working language as well as some key words describing the project.

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<sup>1</sup> The project 3-LENSUS (Lifelong Learning Network for Sustainable Development) has been funded with support of the Lifelong Learning Programme of the European Union ([www.3-lensus.eu](http://www.3-lensus.eu)).

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- Involvement stakeholders: provides information about the lead partner and involved institutions, as well as the target groups, how they are involved and the number of learners that participate in the project.
- Learning activities: include two optional parts about online learning as well as research activities. Information about forms of learning, learning approaches, types of learning interactions, as well as innovative aspects and experiences about learning activities are provided. Online learning activities describe the purpose of including online learning in the project, and which platform and what kind of online tools, such as wikis, blogs or forums, are used. Research activities deal with particular research disciplines, research methods and the benefits of integrating research into the projects.
- Impacts on sustainable development: represent the last part that provides information about all aspects of sustainable development the project is addressing.

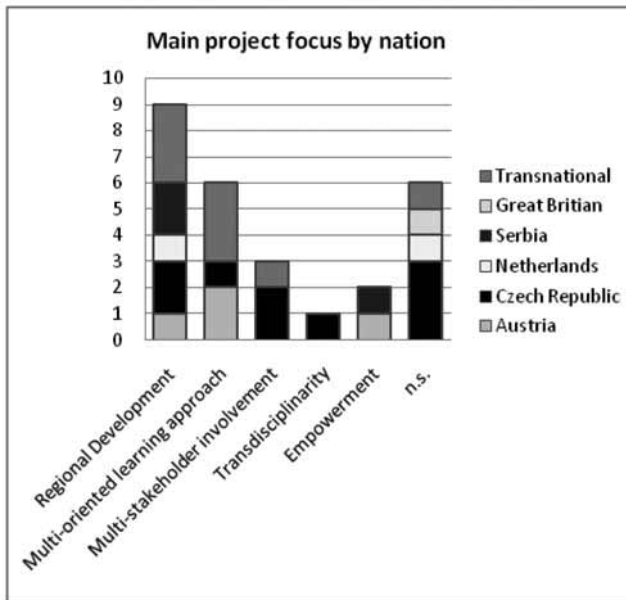
The entry form consists of quantitative as well as qualitative questions.

The results of the project analysis are discussed in the following section. Within the analysis all the information of the entered projects has been considered and interconnections have been made. In relation to the geographical scope, nine out of the 27 projects are located in the Czech Republic, eight are transnational projects, four projects are from Austria, three from Serbia, two from the Netherlands and one project has been implemented in Great Britain.

More projects within the Database on Learning for Sustainable Development focus on regional development (nine out of 27 projects) than any other category, shown in Figure 1 below. The second largest group within the database are projects focusing on multi-oriented learning approaches, where learning processes are geared toward people from various backgrounds and disciplines. As half of these projects take place at a transnational level, this leads to the assumption that international project

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teams are more varied and interdisciplinary. Projects addressing transdisciplinarity or empowerment are under-represented within this analysis. The relatively large number of projects that have not specified (n.s.) the main project focus (six out of 27) results from the fact that the question about the main project focus was added some weeks after the database went online. Some of the projects that were added in the beginning did not answer this question later.



**Figure 1:** Main project focus by nation, in absolute value

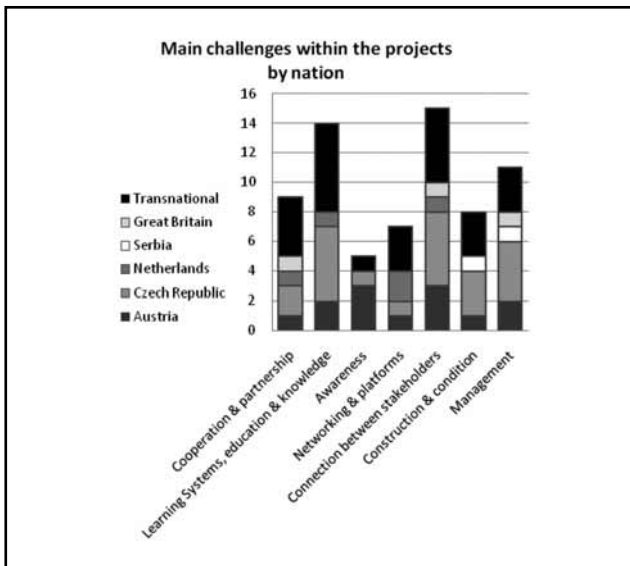
Projects within the Database on Learning for Sustainable Development do not only address success factors but also the challenges they face.

Experiences regarding project challenges provide huge potential for learning and reflection. On the basis of an open question, project contributors described the main challenges they face within the projects. The answers were then clustered (see Figure 2). Thus it appears that the connection and communication between

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stakeholders is seen as a main challenge. A total of 15 projects state that it communicating and discussing project deliverables is sometimes difficult to tackle. Another challenge that is described by 14 project contributors relates to their learning systems; the way they learn and reflect their

developments and how learning takes place within the project. Management issues have also been mentioned as the challenging parts of projects. Furthermore, it is apparent that transnational projects mention challenges related to partnerships and cooperation (four cases).



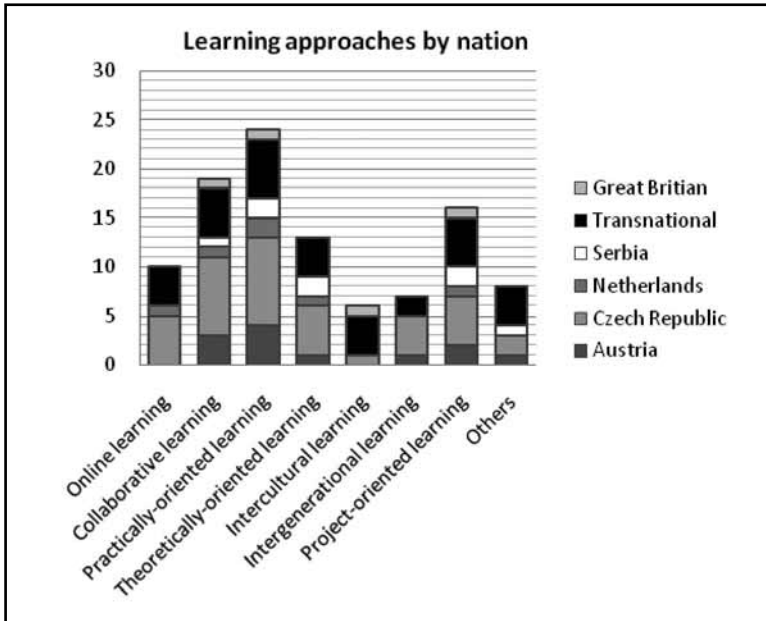
**Figure 2:** Main challenges within the projects by nation, in absolute value

As the database deals with learning for sustainable development, these aspects are highlighted in the following analysis.

When looking at aspects of learning approaches that are applied in the different projects (see Figure 3), it is obvious that practically-oriented learning is most commonly applied (24 cases out of 27 projects). Collaborative learning approaches (19 cases), as well as project-oriented learning (16 cases), are also widely used within

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the database projects. These learning approaches contribute to the sustainability objectives of the projects as they are application-oriented. It is remarkable that intergenerational learning as well as intercultural learning cannot be seen as a common learning approach.



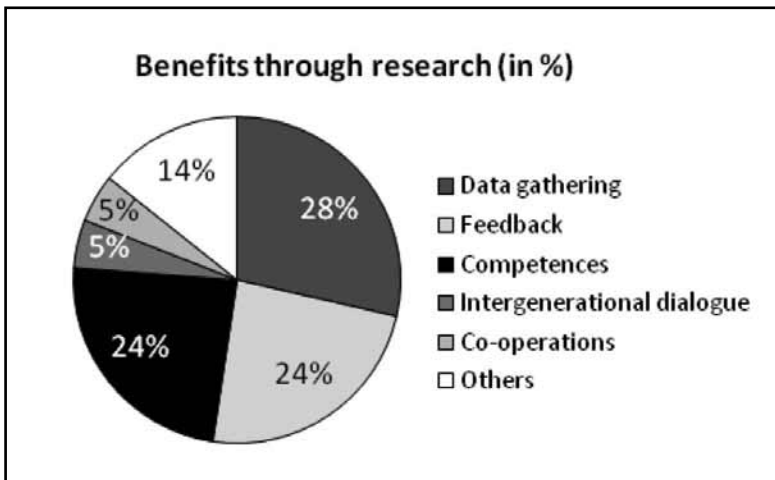
**Figure 3:** Learning approaches by nation, in absolute value

The integration of online learning activities is mentioned by twelve out of the 27 projects that have been entered into the database. The main purposes of applying online activities in the projects are the possibility of sharing information, as well as offering download areas where particular information and project results can be provided in a structured and clearly arranged way. Other reasons are the possibility for exchange and offering e-learning courses (six cases each). Online activities are furthermore used as tools for communicating and holding discussions (such as forums or chats), as well as for interactive learning activities such as games or videos (five cases each).

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The integration of research activities is indicated by 18 out of 27 projects. Eleven projects are related to education, while social sciences (seven cases) and natural sciences (five cases) are stated as well-established research disciplines dealing with sustainable development.

Almost a quarter of the projects mention the gathering of data and information as important benefits and the reason for integrating research into their project activities. For one quarter, research represents a good opportunity for evaluation and receiving feedback. This is mainly done via questionnaires, interviews and surveys. The acquisition of new competences and skills is mentioned by another quarter as an added value of research.



**Figure 4:** Benefits through the integration of research, in percent

The last part of the database deals with the impact projects have on sustainable development. Based on qualitative questions, information on the social, environmental as well as economic impacts has been provided. The information was clustered, as shown in Figure 5 below. Within the 27 projects, 46 aspects have been mentioned that have a social impact, 40 aspects deal with

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environmental and 47 with economic impacts. On average, each project mentions five impacts it has on sustainable development. As illustrated below, social aspects mainly deal with informing people and raising awareness regarding specific social issues (15 cases). Generating new and mutual knowledge, as well as educating people, represents another focus (13 cases). In regard to environmental impacts, the reduction of ecological destruction is mainly stated (13 cases). Awareness raising as well as the development of sustainable technologies are also mentioned as implemented activities related to environmental impacts. Eleven projects indicate a contribution to regional economic development as an objective related to economic impacts on sustainability. Furthermore, some projects aim at developing competitive advantages based on sustainability activities, acquiring sustainable economic thinking as well as fostering economic vitality.

Figure 5 provides an overview of the variety of impacts the projects in the database address. In addition, the relation between the three dimensions of sustainable development is well balanced.

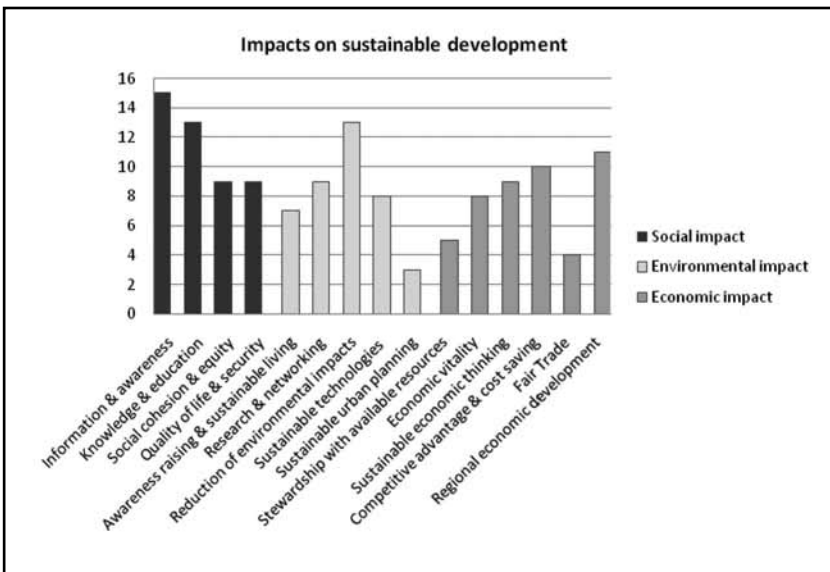


Figure 5: Impacts on sustainable development, in absolute value

## **Multi-Actor Learning**

This analysis provides a first insight into the cases contributed to the database. Inter- and especially transdisciplinary projects with multi-stakeholder involvement are still currently under-represented in research literature, but at the same time they provide a huge potential for future learning and capacity building for sustainable development. The Database on Learning for Sustainable Development makes a contribution to processes of learning from each other and gathers information on how projects progress, what challenges they face and how actors react on these challenges. It is therefore also quite impressive to see how actors recognise impacts on sustainable development as well as the benefits of their research.

We like to thank all contributors to the database as well as Eva Schett for support in the data collection.

### **About the authors**

Marlene Trummler and Clemens Mader are both 3-LENSUS project team members (see Annex One).

### **References**

3-LENSUS Moodle. (2010) Database on Learning for Sustainable Development: [www.3-lensus.eu/moodle](http://www.3-lensus.eu/moodle) [accessed November 2010]



## Chapter Eight

### **Case studies in best practice for learning for sustainable development**

As noted in Chapters Three and Seven, a key outcome of the 3-LENSUS project was the creation of an electronic database to act as a virtual warehouse of Europe-wide projects related to L4SD. When registering a project in the database, respondents were required to fill out a reasonably detailed questionnaire which was embedded with a series of indicators for subsequent evaluative purposes. Complementary to the database, a further 3-LENSUS outcome was the selection of a number of projects via a transparent evaluation process. Hence an evaluation was made of all the L4SD projects registered in the 3-LENSUS open database by June 2010. On that basis, a total of six projects were selected as examples of best practice in the fields of: regional development, multi-oriented learning approaches, multi-stakeholder involvement, empowerment, e-learning and research. The specific evaluation criteria are described in detail in Chapter Three. These six exemplars of best practice were supplemented with a further two projects provided by 3-LENSUS partners in the Netherlands and Greece to ensure the widest possible geographical spread of L4SD practice represented by the 3-LENSUS consortium. Hence there are a total of eight case studies whose stories are told in the following pages. More information about each case study and other examples of L4SD projects can be found at the open database at [www.3-lensus.eu/moodle](http://www.3-lensus.eu/moodle). The database remains open for new project registrations.

The case studies are:

- A. Transformative Regional Development (Austria). Category: Regional Development
- B. The ReSource Project – Turning Problems into Potentials (Multinational). Category: Research

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- C. Gender Mainstreaming in the Spatial Planning of Novi Sad (Serbia). Category: Empowerment
- D. Sustainability in Practice (Czech Republic). Category: Multi-Oriented Learning Approaches
- E. National Persistent Organic Pollutants Centre (Czech Republic). Category: Multi-Stakeholder Involvement
- F. Towards Research & Science (Czech Republic). Category: eLearning
- G. The SUN Project: Exchange, Learning, Virtual Learning? (the Netherlands and Belgium). Supplementary case study.
- H. Development of Common Environmental Training Activities Between Greece and FYR of Macedonia (Greece). Supplementary case study.

## A. Transformative Regional Development

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<b>Main features of the project</b>	
<b>Name of the project</b>	Transformative regional development
<b>Category</b>	Regional development
<b>Theme</b>	A new identity and a new regional awareness.
<b>Target groups</b>	Local population, local businesses
<b>Area of implementation</b>	A southeastern Austrian region in the province of Styria known as Vulkanland
<b>Leading organisation(s)</b>	Association for the promotion of the Styrian Vulkanland
<b>Author</b>	Michael Ober

### **Abstract**

Until a few years ago, the south-eastern Austrian border region was an economic backwater. Today, the region is enjoying an economic boom. The decisive factor for the turnaround was a regional development process that had its first beginnings in 1995. Suffering from low education, the lowest national income rate, no industrial development, no infrastructure (motorways, railways), little self-esteem and a lack of job opportunities, the border region was a region without any economic future. The initiators of the project wondered whether there was not another way of measuring progress, an alternative beyond highways, factories and structural assets. Thus, a few of them got together and started imagining a future built on different standards. Project groups sprang up and an educational institution was established. Thanks to significant research activities, the initiators came to the conclusion that thermal springs, mega-theme parks or similar enterprises would entail neither sustainable solutions nor future competence. Hence, the project group decided to turn their focus to their habitat – their region. To add value to and invigorate the living space, a new identity that would be representative, gain recognition and reinforce people’s self-confidence was sought. In 2001, a new

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identity, “Vulkanland”, was born, a node to the volcanic geology of the region. The vision throughout the entire development process was to transform a border region with limited prospects into an innovative, liveable region, Styrian Vulkanland, within a period of 15 years. In 2010, their vision seems to have been achieved: 79 municipalities in the districts of Feldbach, Radkersburg, Weiz, Hartberg and Radkersburg together successfully promote local, green, self-sustaining businesses. Yet the development process continues, heading toward a new, courageous and challenging vision. One of their aims, for instance, is to achieve energy independence by the year 2025.

### Key words

transformative development, visioning, regional development, Styria, municipal co-operation, process orientation, networking

### Introduction

Until a few years ago, the Styria region, a province in the south east of Austria bordering Hungary and Slovenia, was an economic backwater, a buffer zone between the prosperous west of the country and its former communist neighbors. Today, the province is enjoying an economic boom. The turnaround was generated partly by a broad-based regional development project that has brought together 79 municipalities to promote local, green, self-sustaining businesses. Together the 79 municipalities constitute the region known as Vulkanland, a node to the volcanic geology of the area. Spread over the districts Feldbach, Fürstenfeld, Hartberg, Weiz and Radkersburg, the region covers an area of 1,157 km<sup>2</sup> with a population of about 104,000 people (Statistik Austria, 2010). The name of the scenic area traces back to the extinct volcanoes which make the region rich in fertile soil and active hot springs. The geological evolution of the volcanism was formed in two temporary, chemically and genetically different periods. In a first volcanic phase, the immense Gleichenberger volcano with a cross section of 30 kilometres was shaped about 16 million years ago. In the second phase, which took place between 1.7 and 3.8 million years ago, the Stradner Kogel

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emerged. The landscape, lying in the foothills of the Alps, is dominated by smooth hills, which have been partly formed by volcanoes and many small rivers. The cultural and commercial development of the region emerged consistent with the terrain. The structure of the scenery today is characterised by the alteration of the population nucleus and its associated infrastructure and agricultural and forest working capacities. While the valleys represent the commercial centres with trade and handicrafts, the sunny hillsides are primarily used for cultivating vineyards from which excellent high quality wines are produced. In many places you can find a diversity of meadow orchards with, in part, very old fruit varieties. Only the monoculture in the valleys and southern slopes with their large cornfields are reminiscent of the former agricultural focus on pig breeding and mass production (Frohmann/Krotscheck, 2007; Fritz, 2006).



### Regional challenges

Due to the peripheral location and with it the related proximity to the persistently dangerous border in the east, the region has

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been confronted with militant conflicts since medieval times. Again and again residents had to restart and rebuild their lives after being raided by militant forces such as the Turks, the Kuruzzen or the Haiduken. The many defenses, but also the internal conflicts that incurred the severest economic and social strain, shaped the residents' character. A life of intense material deprivation and permanent shortages accompanied by persistent rebuilding and uncertainty demanded a certain robustness and patience (Krenn 1997: 11ff.). The historically affected strong emotional connection to their living space resulted in the emergence of a strong particular regional habitus (Kerschbaumer/Kobald 2003: 67). In a time of globalisation, the previously rather regressively interpreted regional habitus turned out to be an important and precious factor of success in the transformation process. The rural topography, as well as its distance from the economic centres of Graz and Vienna, made the region less attractive for industrial development at the end of the 19<sup>th</sup> century. That is why few infrastructural investments have been made since then. To this day, the region has not been connected to the national highway network. There is still no industrial settlement, no commercial centre and no high-speed railway connection to important economic metropolises. From a structural point of view, the region's level of infrastructural provision can be compared with those of America's in the 1940s. Until Austria joined the European Union in 1995, the border region was an economic backwater, offering a cheap workforce and food supplies for urban centres. It was the region with the lowest income rate and the highest rate of commuters nationwide. A region without pride or a living culture and low self-esteem, with an entirely absent natural feeling for regional strengths (Vulkanland, 2004). Considering the facts, regional planners and scientific experts labeled it a border region without any economic future. Their future forecasts in 1995 predicted a decline in population of five percent for the region by the year 2010. Not only was the economic situation depressing: the people in the region behaved as if they had no prospects. As a consequence, any emerging initiative tended to be shot down in

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flames in a culture of complaints and negativity. Supported by the capitalist system and their reduced “money talk”, the people remained in the belief that without money they could not instigate anything. Waiting for external help in the form of big investors and external guidance was seen as the only chance for the region to improve and thus escape from its precarious situation. One could come to the conclusion that the region’s initial position for a development project was very difficult.

### Objectives

In the start-up period, the project initiators were a few members of the present managing board. They not only had an ambitious idea for the project, they also designed the strategic plan and defined the sub-goals during the successive project phases. Currently, the managing board oversees and represents the project. It holds the position of inspiring project leader.

Strengthened by the strong belief that rural areas are able to determine their futures on their own, the project initiators developed a desire to imagine a future built on different standards. They turned the focus away from the apparently irresolvable deficits to the more and more visible strengths of the region. Increased knowledge, and with it a rejection of a way of thinking driven by purely material values, which however essential, should not dictate thinking 100 percent, allowed a new perception and mindset to evolve. The project’s objective was, along with a transformative process and a new brand for the region, to achieve the transformation from a devalued border region to an innovative, habitable region: “Styrian Vulkanland”. A sub-goal was to establish a new regional and economic positioning (quality of location) in order to become the best culinary and handicraft region of Austria. Another long-term objective was to become a region with quality of life and energy autonomy. Finally, the overall vision behind it can be summarised as the transformation of a former border region with few prospects into an innovative, habitable region - Styrian Vulkanland.

### Partners – Networking activities

The lead partner and at the same time funding body in the project is the Styrian government. Further types of institutions involved are rural communities with their political stakeholders and responsibility for the administration of the measures. Small businesses operate mainly as partners in the project and have authority over project implementation. Local inhabitants make up the wide base and are permanently involved as participants in the project. Other project partners are regional schools, universities, local associations and many more. Altogether there are currently about 10,000 people actively involved in the development process.

### Structure

The Association for the Promotion of the Styrian Vulkanland is the overall body of the regional development project. It is hierarchically composed of a plenum, a managing board, 16 small sub-regions and a wide base consisting of local citizens and entrepreneurs. The representatives (mayors) of the member communities together constitute the *plenum*. They ordinarily meet once every two years in order to vote and determine the strategic orientation of the association. The *managing board* is responsible for the strategic objectives and makes the decisions. It consists of two local members of the Styrian parliament, the head of the staffed office, an affiliate company that can be seen as the operative instrument, and about five to seven selected regional experts. Process implementation is carried out by the affiliated staffed office and by local process consultants, such as agencies of different application areas, e.g. energy, process engineering, advertising, knowledge or regional management. They act as extended arms of the staffed office, working flexibly on the development process. The managing board works together with funding agencies, public agencies, government agencies, special interest groups, etc. What is central and important for the structure is close contact between the level of



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decision-making and the level of process implementation in order to ensure mutually ongoing education. This design of the organisational structure allows an ongoing collective learning process.

### Funding

The regional development process was backed, among others, by European Union Structural Funds – Objective 2, LEADER II, LEADER +, INTERREG III A, INTERREG III B CADSES and Europe for Citizens. Funded by the European Commission’s Enterprise and Industry division, the organisation channels financing to private sustainable business projects and encourages businesses to develop local resources, skills and markets.

### Awards

In 2004, the regional development project won the *European Village Renewal Prize* with the theme “Breakup for uniqueness”. The *Eden Award 2008* was awarded for the region’s success in shaping the present while appreciating the past and the future. Nomination for the *Attersee Award 2009* was further confirmation for the successful path the regional project was taking.

## Approach / Methodology

### Background

*Devaluation* - Rapid global development and the one-sided focus on monetary and material values have left their mark on the people, their culture and their living space. Too many people regard today’s lifestyle as an unchangeable natural law. A consequence of this progress that first and foremost concerns peripheral regions is the massive devaluation of this living space and the demoralisation of the residents. The strategy of many countries in regard to their devalued peripheral regions was, and still is, to install a tourist lighthouse-project in order to mobilise

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these areas. This kind of strategy has in the past distracted regional managers from their regional responsibility towards hope and help from outside. The focus on external solutions grew so powerful that people's own strengths fell into disuse and regional deficits dominated regional planners' attention. The survival of a region was seen to depend solely on the establishment of a mega project. The efforts of its own regional businesses were neither taken seriously nor supported, as a solution was only seen as coming from outside the region. Maintaining this process of waiting and disregarding regional potential over many decades had the effect that mental paradigms with enormous long-term effects were produced, so that the transformation process became more and more difficult.

*The decision for a different future.* The initiators of the "Styrian Vulkanland" project no longer wanted to go along with the mainstream. The spur for an endogenous development was that even in peripheral areas a different future had to be realisable on the basis of human talent, their non-material values and their natural resources, as well as their economic potentials,. They started searching for solutions to enable them to succeed in affecting a return to their own living space - to their non-material and material values - within a manageable and affordable period. For this purpose it was necessary to conduct an in-depth analysis of the region. Besides today's over-emphasised facts, the most importance was placed on understanding the underlying and affecting paradigms that determine people's actions. To understand human actions, it was important to explore the causes, and based on that to transform the possible causes, instead of permanently dealing with problems.

*The false belief* that the more people possess and receive, the more satisfied they will be, in reality turned out to be the other way round. There was a simple formula: "The higher the GDP, the greater the prosperity". For a long time this unilateral objective of "material prosperity" was indeed attended by

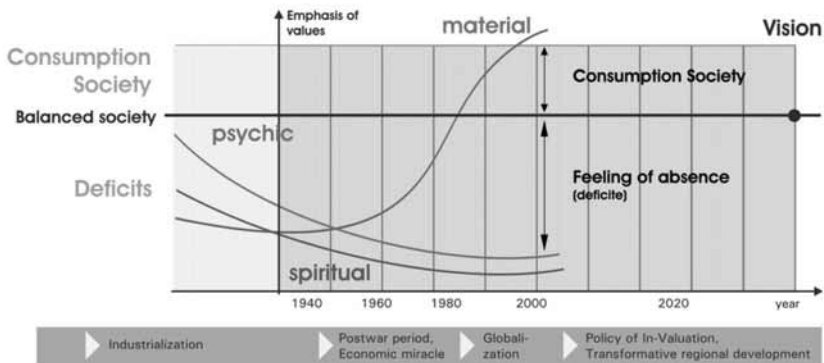
## Multi-Actor Learning

quality of life improvements. But quality of life is not only provided by material wealth, but also by non-material values. Material goods seemed to be able to replace nearly anything. In fact, however, since the 1960s, the more goods people have obtained, the less satisfied they have become. Today our society complains about its situation, and complains despite unprecedented levels of affluence. Therefore, as development pursuant to this “old” pattern would simply have initiated new situations of dissatisfaction, the regional actors in question had no intention of following this path.

*Impoverishment in times of material prosperity.* The condition described above was identified as new impoverishment in the midst of material prosperity. The insight: internal, spiritual emptiness cannot be replaced by external abundance. Increased options have debilitated our sense of orientation and our focus on essential things. The result: we do everything at the same time but in fact we accomplish nothing. External incentives dictate our life. The response to this losing sight of our target was to increase speed. This means that our modern life is dominated by tempo over direction, and quantity over quality. When we feel stuck, we increase tempo, so that the dynamic gives us the missing feeling that something is happening; direction is not important. Another aspect in this context is the *loss of perceptual capability* in relation to our immediate surroundings, a phenomenon that is reflected in the belief that only the large, the far away, the modern, the built-up, the other, is seen as desirable. The loss in perceptual capacity incurs an enormous devaluation of the self, personal talents and potentials, and of the immediate surrounding living space and culture. Along with the ensuing loss in perceptual capacity for the proximate, the sense of being connected is lost and an unconscious separation dynamic appears. People distance themselves from their living space, their culture and their rituals. They neglect their identity, their regional talents atrophy and finally they leave the region.

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Mass consumption of material values is not able to compensate psychic-spiritual deficits!



**Figure 1:** Inner emptiness (feeling of absence) in spite of enormous increases in material values (translated figure from: Kroscheck et al., 2007: 8)

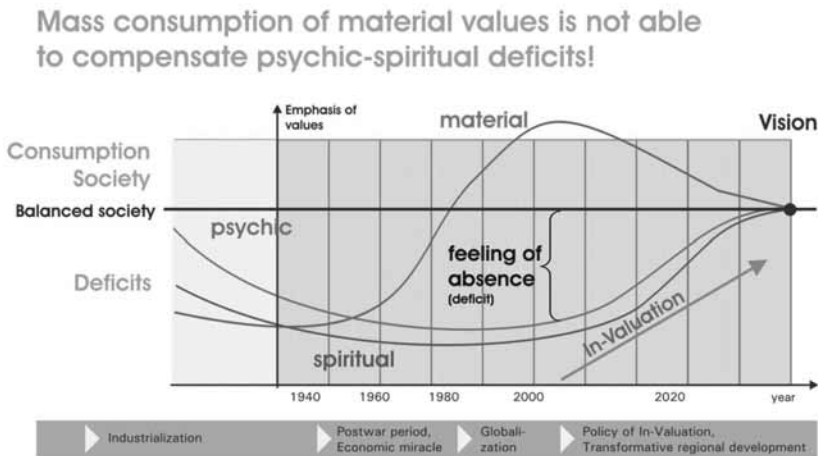
*False scarcity.* Despite exponentially increased material options, people seem to be infected with a deep inner dissatisfaction. Whilst our material scope has increased, our (spiritual) relatedness with our environment and ourselves has been disregarded. Not having attached importance to our non-material values, we suppose there is something missing in material values. The outcome is an overwhelming drive for more growth in a limited world. The attempt to allay the spiritual desire on a false path results in shopping binges associated with the “consumption society”. A consumption society without meaning and value produces senselessness and value-lessness (Krotscheck et al., 2007).

### New Insights

The solution investigated to overcome these feelings of insufficiency and dissatisfaction turned out to be a new policy of “in-valuation”. According to the initiators of the development project, “in-valuation”, a new word creation, was an essential component of the whole process. In the transformation context, it implies two key components. First of all there is the

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appraisal of existing values. It assumes that value and significance only arise through appraisal and esteem. Secondly, it postulates giving what already exists, for example a region with its natural resources, economic potentials, human talents and cultural heritage, a new future-oriented significance through a new, modern interpretation. The intense sense of identification arising out of this process recreates identity and restores authenticity. This specific feeling of identity and being connected with a living space enhances a society's ability to overcome the fake paradigms of a "consumption society" and "false scarcity/feeling of insufficiency". As Figure One illustrates, the in-valuation process brings our society back to a natural balance of material and non-material values. The recovered balance creates a new inner satisfaction, which is the solution to any successful sustainable development process.



**Figure 2:** To overcome the feeling of insufficiency through "in-valuation"  
(translated figure from: Kroscheck et al., 2007: .12)

## Transformation Process

Due to the background and new insights it became quite clear to the project leaders that the establishment of a mega-project

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would only be a temporary, short-term solution. That is why the project leaders opted for a more difficult and long-term path - a transformative process which required the participation of the regional population.

The first step was to address the issue: **Where are we now?** Next to hard facts, figures, and data, special attention was given to buried, soft, non-material values. In-depth research activities had turned the focus to the region's deficits in infrastructure and the economy. Non-material values that abounded were not subject to any assessment, and even worse, they were not considered worth dealing with. GDP was the only criterion that was supposed to determine the region's destiny. However, increased reflection of the living space during the in-valuation phase revealed more and more regional specifics. In-depth examinations uncovered enormous economic potentials and expertise in the fields of gastronomy, handicrafts and tourism. Knowledge about the deficits and strengths and the necessary endogenous development process required a bundling of forces and a focus on important common future themes. After the analytical phase, which opened everyone's eyes to the region's own potentials, a diversified civic participation process with topical task groups was aimed at understanding people's feeling for future potentials. Despite the large attendance, however, the outcome of the discussions was that without money nothing could be changed. The work groups highlighted how devalued the region was and how low the self-confidence of the citizens was. The missing belief in the people's own capacity to develop made any future discussion impossible. The project team realised that without a revaluation of the region, no development could happen. They therefore initiated a profound in-valuation process to channel the one-sided material focus and to move from extroversion towards inner values and endogenous development. The rediscovery of the ability to recognise the immediate proximity, people's own potentials and their own living space was thus of special interest. Moreover, it was important for the in-valuation phase to find a

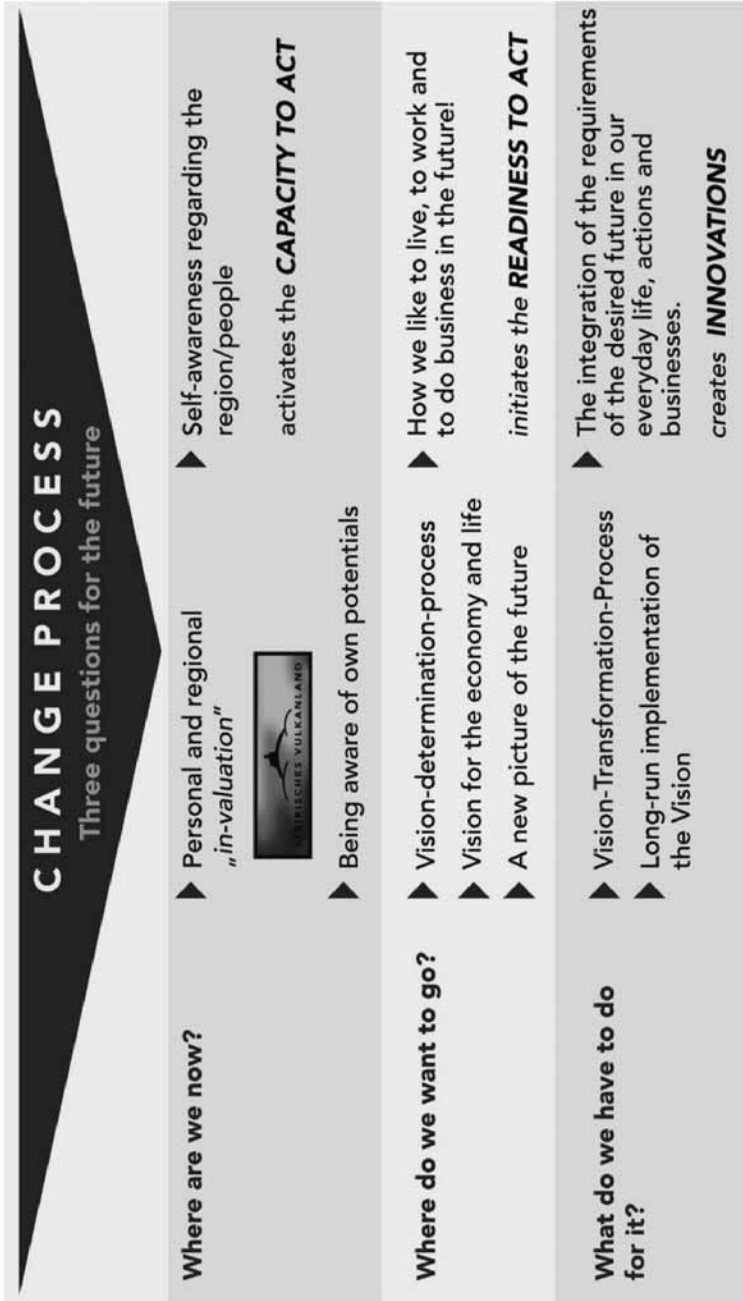
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strong medium of identification. It was found by renaming the region “Styrian Vulkanland”. The rediscovered self-awareness activated a **CAPACITY TO ACT**.

The next step was to answer the question: **Where do we want to go?** If a region has no vision to strive for, to mutually wish for that is worth achieving, then there is no motive to make a collective effort. If there is no vision, then there is also an absence of affiliated values. It is a strong vision that creates values. It is impossible to concentrate one’s energy when a recurring, powerful centrifugal force destroys any unification process. An absolute and strong vision initiates a **READINESS TO ACT**.

The last question that had to be asked was: **What do we have to do for it?** The vision that represented the overall framework of the target had to be broken down into several sub-goals. For the implementation of the vision it was of importance to integrate the requirements of the desired future into everyday life, actions and businesses. The transformation of the desired future induces a creative process in which **INNOVATIONS** are likely to grow. The concept of the transformation process is illustrated in Figure Two (Vulkanland, 2010b).

1994 – 1999 INITIAL PHASE – Regional actors realised that investment in regional lighthouse projects (thermal springs) did not bring about the economic blessing for the whole area that they promised. The economic situation improved only within a small circumference area around the thermal springs. The bulk of the area in-between went away empty-handed. A few of the regional actors got together and started to take matters into their own hands. Based on one community and 200 participants, a vast awareness raising and personality development offensive through formal learning activities such as seminars and lectures within the formal education system was initiated. First, local projects were used to practice self-contained development, to



**Figure 3:** Detailed stages of the development process & learning activities in the Vulkanland process (translated figure from: Krotscheck et al., 2007:7)



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develop ideas and to learn to work together with nearby communities. Finally, 14 communities together founded the first small-scale region, now with 1,200 participants. The implementation of the action programmes and concepts required a formal project team. An office and an educational establishment for public qualification were set up.

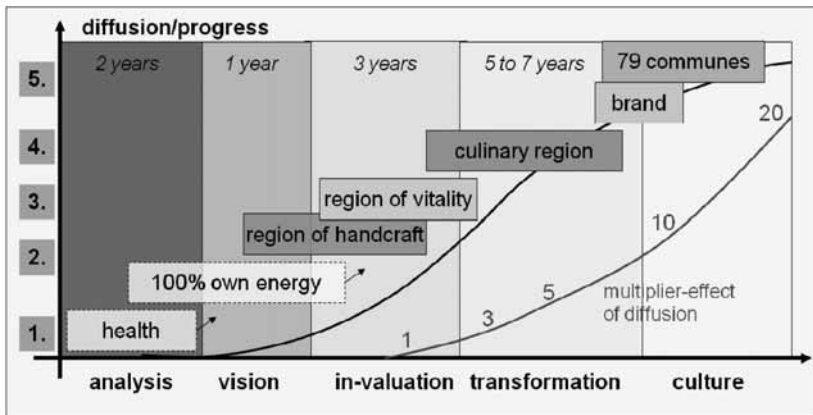
1999 – 2000 ANALYSIS PHASE – This was used for varied scientific analyses in the in-valuation process. With the aid of scientific experts the project team tried to explore the region's strengths and weaknesses. The aim was to find the region's fields of competence and with it its future positioning. Providing a holistic picture of the region, the focus was not only on hard facts and figures but also on soft factors such as mental attitudes, the prevailing mood, and non-material potentials such as talents, skills and values. In addition, ten workshops with different themes and 2,000 participants were held. Strategic projects for overall regional development were initiated. Positive media coverage about successful solution statements supported the upturn. Collective complaining and blame-mongering lost their drive. The return to a nurturing living space started to take effect.

2000 – 2002 VISION PHASE – More and more communities followed. Reclaimed values struggled for a new identity. For collective acceptance and with it the success of the whole process it was important to ensure a high identification of the population with the targets of the process and thus the region itself (Tischeret et al, 2006:51). A new regional identity, "Styrian Vulkanland", a node to the volcanic geology of the area, was established. At this time, the region comprised three districts with 66 communities and about 85,000 inhabitants. Eight future-themed workshops built the basis for a two-year ongoing idea generation process - not single mega projects, but area-wide action programmes were sought after. Culinary, handicraft and culture tourism turned out to be the future

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competence fields of the region. In conclusion, guiding values for an independent living, working and business culture were adopted. Knowledge management became an important learning instrument for future development and cross-regional networking.

2002 – 2005 IN-VALUATION PHASE – this can be seen as the heart of the transformation process. Its aim was to give the residents back their value and dignity. The readiness to act came to the fore from which a new future could be generated. This is the primary solution for any development. For this reason, the project team created a regional marketing concept, targeted at value adding messages. The messages and particular wording were applied in seminars, on posters, in the local media, as well as in motivational and inspirational speeches. An important statement throughout the process, for instance, was and still is “What grows in this region has value!”.



**Figure 4:** The single stages of the development process  
(translated figure from: Vulkanland, 2010a)

2005 – 2011 TRANSFORMATION PHASE – The transformation phase was used to integrate the shared vision in everyday life, actions, and economic activities. It demonstrates the ability to match the action with the word. For that purpose, the desired

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future has to be refined into many small sub-goals or actions and implemented step-by-step over a period of five to seven years. Workshops, seminars, speeches, networking, and other motivational and inspirational programmes support the implementation.

2011 – CULTURE PHASE – The culture phase can be seen as the time when the desired vision becomes reality. It is expressed in a new performance resulting from the whole process. Figure Four illustrates the individual stages of the development process and its rate of penetration (Vulkanland, 2004; Vulkanland, 2010a).

In-valuation encourages a new way of looking at life and living space. Without adding vast material values and new assets, the in-valuation of what already existed achieved an astonishing increase in both material and non-material value. New *values* lead to a new *philosophy*. Out of the newly attained philosophy emerged a new *language*. The creativity sparked off in this way gave rise to a new *design* and eventually to new *innovations*.

### Research activities

Throughout the process, different research disciplines such as education, social science, business, health and social welfare and quality of life have been addressed. In so doing, research methods such as interviews, analysis, questionnaires, surveys, and experiments came into operation. As an important benefit through research, knowledge management came to be designated. It provided insights and interpretations from the progress of the process. The results achieved allowed a constant refinement of future strategies in relation to the main vision.

### Project discussion

So far, this case study has highlighted only the success story and the apparently smooth course of the development project. At this point, however, the negative aspects of the process, such as constraints, criticism, opposition, and other difficulties the

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project leaders were faced with will be mentioned. The project discussion will include a list of the success factors and its innovative aspects. Moreover, project challenges will be addressed in this section.

### Constraints

It is generally true that profound transformations in most cases encounter resistance. This is natural human behaviour, as new approaches on the one hand destroy generally shared worldviews and on the other hand hold some uncertainty and unpredictable risks. That is one explanatory model as to why regional governments spend vast amounts of money on solving social and economic problems and thereby maintain the status quo, instead of investing in future development processes in order to anticipate and overcome present deficits. According to an interview with the managing board of the project, the following three constraints were seen as the most important constraints in the implementation of the transformative development process (Vulkanland, 2010b).

1. Integral regional development is a region's political mission and should thus be regulated by law and provided with a fixed long-term budget.
2. If a problem occurs, a lot of money is allocated for its reparation. However, for anticipatory development processes no money is provided.
3. The permanent struggle to achieve a minimum budget to carry on with the process involves a great deal of the management's time and motivation.

### Success factors

The success of Vulkanland depends among other things on keeping up momentum by promoting programmes that motivate the local inhabitants to participate in the project. For instance, the project group holds competitions to reward

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energy-saving projects. A transformative approach with an emphasis on a vision and in-valuation phase is the key success factor of the whole development process. Further innovative aspects of the project are:

- The broad participation of the regional population (104,000 people).
- Non-party cooperation between several communities in the region.
- The establishment of a network of cross-communal education and cohesion.
- Strong self-assurance due to self-awareness of own strengths and values.
- Concentration on regional strengths and focus on a fewbut fundamental future themes.
- Installation of a regional knowledge management and regional evaluation commission.
- A long term transformative “in-valuation” process (a least over a period of 10 years).
- Strong personal interest and commitment of the leadership/ managing board for the project

## Challenges

Challenges are a natural element and natural reaction in any process of change. These randomly arising phenomena are described as a form of creative stress. It is a highly energised condition that occurs when a status quo is going to be transformed into a desired future. In the Vulkanland case, the initial challenges turned out to be the active involvement of the local population and continuous funding. During the implementation, significant challenges were the cooperation of the 79 communities within the region, the profound and intense involvement with the region, as well as the ongoing process of implementation and communication of the shared vision. The most important challenge was and still is, to keep up momentum by promoting programmes and inspiring the participants.

### Conclusions

#### Results

The transformative development approach investigated and designed during the regional development project is a way of successfully transforming any peripheral region with limited future prospects into a region with a strong identity, a high quality of life and economic growth. Some evidence for the effectiveness and success of the approach are demonstrated by the latest economic data in 2009. The brand Vulkanland had, according to a comprehensive survey in 2008 (Vulkanland, 2008) a degree of brand awareness of 97%. Feldbach, the heart of the Vulkanland, was in 2010 the region with the highest rate of business start-ups (8.2%) throughout Styria (Wirtschaftskammer Steiermark, 2009: .25). According to a future forecast of Austria's demographic development, the Vulkanland region will be able to slightly increase its population, while by way of contrast, a good portion of other peripheral regions such as Murau, Mürzzuschlag, Leoben, and Judenburg are going to face emigration percentages of more than 15% by 2050 (ÖROK-Outlook, 2010).

#### Lessons learned

“Don't hesitate, be courageous and start imagining a future built on your ideals today, even if all the external experts around you paint a gloomy future for your region.” This is the lesson learned from the Vulkanland process. It is true that it is easier to complain about the present situation, but that will not change it. Moreover, it has to be borne in mind that this form of development is a process that takes time - a period of at least ten years. Furthermore, it is necessary to agree on a common shared vision that seems strong and attractive enough to be achieved. It will guide you like a compass and give orientation even in turbulent times. However, if you now think you can easily draw a

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straight line from the beginning to the desired target (vision) and strictly tick off the successive predetermined packages of measures, you will be disappointed. Setbacks and challenges are part of the process as operative sub-goals and milestones. Resolving them is a form of continuous learning, and is essential to acquire new insights and a deeper understanding of the process. Therefore, a vision can only be a framework that determines the way, but not how to reach it. This is important advice, especially in terms of regional development, as people need to have the feeling of being an important part of the whole process and being able to contribute to its shaping.

A last word of advice is: persevere even if you think the obstacles seem to be insuperable. It is a law of nature that the closer you get to achieving your objectives, the stronger the counter-movement will be (the law of cause and effect).

### **Impact on sustainable development**

**SOCIAL** - Value and dignity have been restored to a devalued habitat and its inhabitants. The “in-valuation process” brought about new awareness about the qualities of the region. Through the “transformation process” a new action and innovation readiness could emerge.

**ENVIRONMENTAL** - The relationship between the people and their environment has been restored and a new energy and resource awareness is emerging. For example regional production, short transport routes and local economic cycles.

**ECONOMIC** - The aim is to improve the regional value creation from the current 25% to 50% by the year 2020. This will be achieved through a refinement of local resources in the fields of energy, food, handicrafts, tourism, and through a boost in local consumption.

What is your key success innovation?

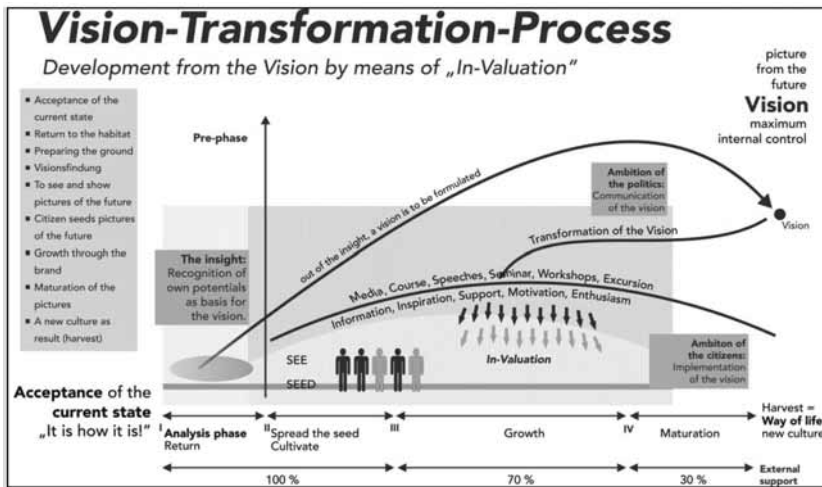


Figure 5: The “Vision-Transformation-Process” in the region Styrian Vulkanland (Krotscheck et al., 2007: ; translated)

The concept “*vision-transformation*” describes that phase in the process in which the liveable vision is integrated into everyday life and implemented over years step-by-step. This kind of integration succeeds through consistent and long-term awareness raising – as long as the modified perception leads to modified behaviour and results in a new culture. In the course of the vision-transformation a desire for the NEW arises. People start focusing their attention on the desired future and attempt to integrate the requirements of the wished-for future in their daily life, actions and economic activities. The outcome of this is a readiness to change and an intrinsic vision for each by one (Krotscheck et al., 2007).

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strong, vibrant and manifold regional economy that is build on a new economic culture, in which success is defined by its contribution to solve social, economical and ecological challenges.

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**B. The ReSource Project – Turning Problems into Potentials**

David Osebik, Jörn Harfst

**Abstract**

European mining industries have undergone radical changes in the last few decades. At the end of mineral exploitation, mining regions usually face big challenges concerning their economic, social and ecological futures. One chance to master this transformation process is the identification and sustainable utilisation of potentials left by mining industries. To show how the utilisation of natural and cultural potentials of former mining regions can help to manage difficult structural situations is the aim of the project ReSource – ‘Turning problems into potentials’, which is funded by the European Union’s Development Fund (EFRE) (INTERREG IVB).

The project includes seven mining regions in six Central European countries. By involving regions in different stages of post-mining development the project aims to create valuable learning effects between mining regions. Regional cooperation involves common initiatives and pilot investments. In order to support mutual learning effects and provide a comparative analysis, academic institutions from each of the participating countries are involved. Their task is to analyse the regional status-quo and support local strategy development. The academic work aims at the improvement of policies in and for mining regions on European, national and regional level through assessments, theoretical support and knowledge transfer between project partners and external stakeholders.

The paper shows how the project structure of ReSource supports joint learning effects and knowledge transfer between partners by elements such as interactive workshops, symposia, summer schools and joint thematic workgroups. It is argued that on the

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one hand such an approach offers important mutual benefits between partners, while on the other hand realising these benefits in a transnational collaboration remains a challenging task. In declining mining regions, where capacities to act are scarce and which are often marked by a close-knit constellation of actors, any intervention from outside is often seen as an unwanted factor that additionally stretches resources and provides little advantages for such regions. Therefore, one of the main aims in transnational collaboration has to be the establishment a trusting and committed working relation between all partners. Only a common understanding between actors from inside the regions and the external academic context can help to overcome reservations and create real transnational learning effects in order to to find innovative ways to establish a basis for the future development of post-mining regions.

**Key Words:** regional development; mining; mining regions; natural potentials; cultural potentials; integrative approaches; mining heritage; rehabilitation; strategy development

### Introduction

European mining industries have undergone radical changes in recent decades. These transformations have had a profound impact on many European mining regions and towns, which had been shaped by these industries for centuries. The end of mineral exploitation often meant de-industrialisation, high unemployment and out-migration, combined with an often difficult environmental legacy in the form of persistent pollution of water, soil and air in affected areas. Such regions and their inhabitants generally face enormous challenges to their economic, social and environmental futures.

Therefore, at the end of mining, affected cities and regions have to re-invent themselves. Across Europe, various efforts have been made to regenerate former mining regions. One chance to master this transformation process is the identification and

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utilisation of potentials left by mining industries: from mine water geothermal energy can be generated, stockpiles can be used for biomass production, facilities become living monuments, and mining traditions can be turned into tourist attractions. Creative concepts are needed as well as a change of strategies and sound investigation of feasibility.

The aim of the EU-project 'ReSource – Turning problems into potentials' is to show how the utilisation of natural and cultural potentials can help to manage the difficult process of change in former mining regions. In the project, seven mining regions from Germany, Austria, Slovenia, Hungary and the Czech Republic work together and jointly implement pre-investment studies, pilot actions, competitions and summer schools in order to establish sound fundamentals for sustainable post-mining development. The partners work towards transferable results, exchange of experience and other forms of collaboration in order to support post-mining regions to catch up in competitiveness and to move towards sustainability. Regional strategies are formulated and improved to generate innovative and sustainable post-mining development.

The success or failure of structural transformation processes after mining is often strongly linked to the actions of local and regional actors and their ability to exploit opportunities and potentials in such restructuring processes. It is therefore necessary to develop a conceptual approach to support the efforts of affected local authorities and regional initiatives. This is the main objective of the international research consortium that is involved in the ReSource project. The practical work in the regions is accompanied by a group of six academic institutions well-known for their national excellence in spatial development research and experience in post-mining issues. The institutions accompany the project with a comprehensive research agenda. The role of the researchers is to support, compare, and evaluate the strategy building and utilisation initiatives of the individual regions. The research is to stimulate the regional learning process in order to enable local actors to implement projects that use mining

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potentials in innovative ways in order to strengthen the overall development of these regions.

The research will culminate in recommendations to national and European policy makers through the creation of a strategy paper regarding the future of mining regions in Europe.



Figure 1: ReSource Project Partners

National approaches and experiences with structural change in mining regions differ widely across Europe. This is especially valid for the European Union's CENTRAL EUROPE programme space, where experiences from Western and Eastern Europe become intertwined. Utilisation of post-mining potentials also depends on national and regional contexts (e.g. end of mining), as well as national law and funding opportunities (e.g. energy policy). The partnership therefore deliberately involves partners from different preceding projects for easing access to existing knowledge. In this way the ReSource partners can make use from experiences and knowledge from preceding or running projects and different national context that investigate similar topics. Learning from these experiences, the ReSource project aims at the improvement of

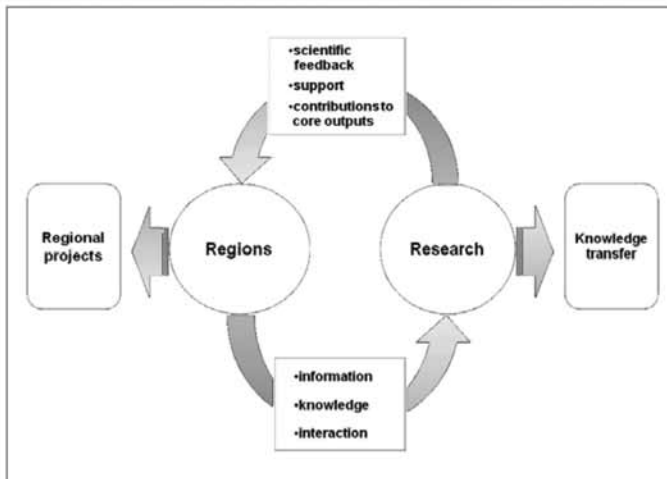
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policies in and for mining regions on European, national and regional level. The project is therefore funded by European Regional Development Fund (ERDF) in accordance with the European Union's objective 3 "territorial cooperation" (INTERREG IVB). The project is due to run from 2009 and 2011.

### Approach/Methodology

#### The Role of Research within ReSource<sup>1</sup>

Bringing together practice and research is in most cases somewhat difficult. To meet this challenge a lot of effort was taken to integrate these two fields in the project design and the accompanying scientific concept. In order to avoid a situation of two more or less separately acting working groups, a twofold design regarding the responsibilities and main tasks of the academic sphere was defined (Figure 2).



**Figure 2:** Twofold task structure of research within ReSource (Wirth, Harfst and Lintz, 2009)

<sup>1</sup> This chapter is mainly based on the project's scientific concept (Wirth, Peter, Harfst, Jörn, and Lintz, Gerd. "Scientific Concept of the ReSOURCE Project: "Roadmap". 2009.)

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In the nature of things, the main objective of science has to be the generation of transferable and open knowledge. As the field of research is renewal of former mining regions the academic partners are highly dependent on the information, experience and knowledge of regional partners. In turn the scientific group cooperates closely with actors in the involved regions to contribute to the core outputs and furthermore to the overall development process.

As shown above, the generation of knowledge represents the main task of research within ReSource. The focus of investigation primary lies in the finding, assessment and valorisation of natural and cultural post-mining potentials, as well as in regional framework conditions (actors and interplay of change) which finally determine the overall development process. The results of the academic work are constantly provided to the partner regions (symposia, workshops, informal meetings etc.) and to a broader public (press releases, public conferences, etc). In the end, all of the project results will be published in a handbook to provide a theoretical and practical basis for sustainable renewal of declining mining regions.

Generation of knowledge is not supposed to be the only task of the scientific working group. Each institution is to support the development process of its partner region actively by contributing to thematic working groups, regional workshops, symposia and projects.

### **Knowledge Transfer**

Sharing knowledge and experience among ReSource participants and with external stakeholders can be seen as the project's most important effect. As the potentials and problems of former mining regions are very similar all over Europe, the transferability of results and solutions seems to be promising.

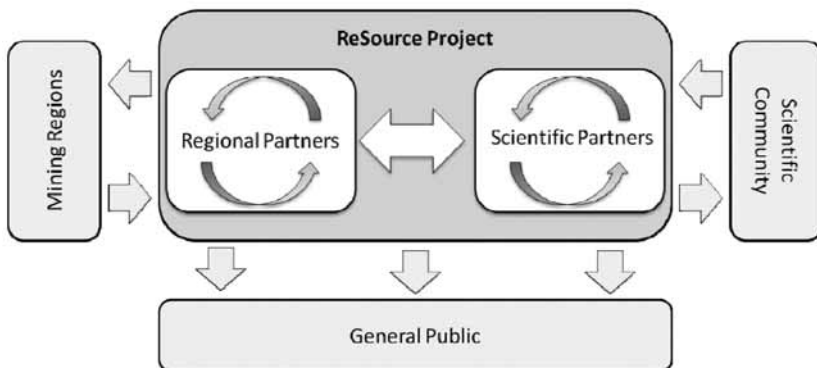


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The project therefore aims at two major levels of knowledge transfer (see Figure 3):

- knowledge transfer within Resource
- knowledge transfer with external stakeholders

Besides the above described interconnection between scientific and regional partners, the exchange of knowledge and experience between these two groups provides big opportunities. For the academic partners the joint development of research strategies, where each partner brings in their customary methodology and special knowledge, broadens the scientific horizon and raises the quality of outputs significantly. Beyond that, each of the six participating institutions gains access to a pool of information and data which otherwise would have been unavailable for them (e.g. through language barriers, lack of personal contacts). Bringing together regions from five different countries also holds a lot of potential. Although all of the regions have similar problems and potentials they can be divided into different development stages. This provides a good basis for mutual support, exchange of experiences and further cooperation. Feasibility studies, pilot projects, joint events and summer schools are the main activities supporting post-mining regions to improve competitiveness and to move towards a sustainable regional development.



**Figure 3:** Knowledge transfer within ReSource

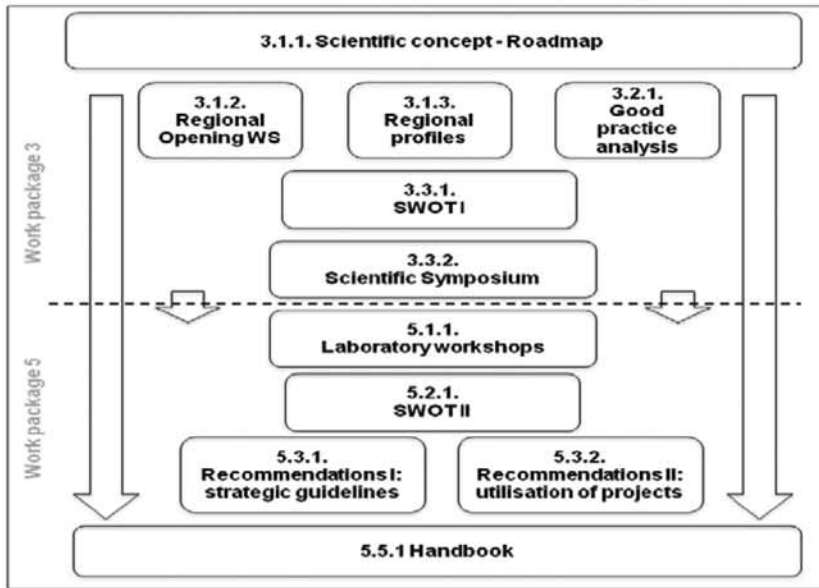
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Concerning the external knowledge transfer, three stakeholder groups are the focus of the project communication strategy. Generated knowledge and practical experience is mutually shared with other mining regions and mining networks, as well as with the scientific community. This openness to these very specific target groups is manifested in several collaborations with other projects (e.g. COBRAMAN, REMINING) and networks (e.g. EURACOM, MINEC) dealing with the revitalisation and rehabilitation of former or declining mining regions. In addition, ReSource wants to raise public and political awareness about regional development in post-mining regions.

### **Research Activities**

The general scientific agenda is divided into two sections with different foci (see Figure 4). In Work Package 3 the status quo in the partner regions (Regional Opening Workshops, Regional Profiles and SWOT I) and the Central Europe programme space (Good Practice analysis) is under examination. After the Regional Opening Workshops, which marked the starting point of cooperation between the scientific and regional project partners, the Regional Profiles provided a systematic and comparable analysis of all participating regions. After this fundamental work step, a good practice analysis of successful projects as well as centres of knowledge using natural, cultural and other post-mining potentials took a look at the situation beyond the project. Using both, the internal view of the Regional Profiles and the external view of the Good Practice Analysis, the SWOT I analysis completed a detailed picture of the regions status quo. The results of this detailed gathering of data and information about the use of post-mining potentials all over Central Europe were presented to the broader public in an international scientific symposium at the “EUREGIA Fair” for local and regional development in Leipzig (Germany) in 2010.

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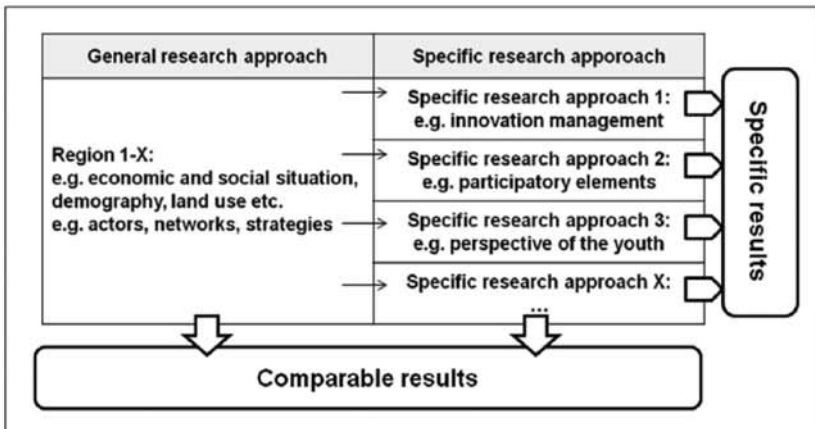
**Figure 4:** General research actions and outputs in ReSource  
(Wirth, Harfst and Lintz, 2009)

Using the elaborated results of the previous step, Work Package 5 concentrates on strategy development and general recommendations (strategic guidelines, utilisation of projects). All of the ascertained results will then be published in a handbook, which will be one of the two core outputs of academic partners in ReSource. The second core output forms a dynamic best practice internet knowledge base containing the collected cases in the previous work package as well as incoming additional cases. This database gives a detailed overview of the valorisation of post-mining potentials in the Central European programme space. Additionally, it is to ease access to existing knowledge and experience for declining mining regions in the future.

Besides the general research actions, the scientific group also makes use of the specific competences and specialisations of partner institutions. This is manifested in the so-called specific research approaches accompanying the above described work

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packages (see Figure 5). Each academic partner works on a special aspect of the interplay of change (e.g. policy integration, participation of young population, strategic destination management etc.) in former or declining mining regions to enrich the overall investigation.



**Figure 5:** Specific Research approaches accompanying general research approach (Wirth, Harfst and Lintz, 2009)

## Project Discussion

The potential for former mining regions to overcome their often problematic mining legacies and to establish a development path towards sustainable futures often depends on the specific framework conditions of such places.

On the positive side former mining regions are often places with good infrastructure (housing, higher education facilities, transport connections etc.) left over from the times when these places experienced growth conditions. This infrastructure could be an important stepping stone in the utilisation and development of sustainable post-mining potentials, such as for example mining tourism or renewable energy production. Another important factor is the usually strong and tightly-knit network of actors in such regions. When key regional actors are

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able to join forces, this often means good access to external funding for such regions and is an essential element in creating a new development path.

On the other hand, mining regions are often not in a situation to support creative and sustainable solutions for future development. Generally speaking, former mining regions face various economic, social and environmental challenges after the end of mining activities (i.e. unemployment, outmigration, pollution). The problems often block new development options as poor image and incomplete rehabilitation of former mining sites create unfavourable conditions for new investment. These multiple issues tend to overwhelm local actors and paralyse existing networks at the end of the regional development path. The existing networks can also become harmful to the development in such regions, as they are often unable to allow new actors with new ideas into the process of regional development (“lock-in” effects). Such regions face the danger of becoming caught in a circle of dependency on financial support from external sources and a nostalgic worldview where the mining traditions form a part of a back-looking attitude towards the “good old times”. In this respect it seems important to mention that it is unrealistic to assume that any (short-term) restructuring might lead back to unemployment and the growth level of the peak-time of mining. A deep and long sighted process of restructuring as well as a purposeful “shrinking-smart” process is therefore necessary to establish a realistic starting point for sustainable regional development.

Overall, the specific success factors in the use of post-mining potentials depend on such specific regional conditions, as well as national framework conditions (i.e. regional and energy policies). Some regions have managed to cope better with the outcomes of structural change than others, as the specific factors/framework conditions determine in many cases regional development and adaptability. In this context the constellation of local and regional actors is an especially important factor.

### Success factors of ReSource

In its project outline the ReSource project is the first project with a systematic and comprehensive investigation into the utilisation of post-mining potentials in the Central Europe programme space. The project involves regions from different development stages of structural change, i.e. still active or just recently closed mining, as well as regions in the stage of “phasing out”. Through this the project offers a unique chance of a knowledge transfer to and from regions of “mining-generation” and “post-mining generation”.

Learning from past projects with a mining background (REVI, REKULA, READY) the project design focuses on regional capacity building for innovation and change. In order to achieve these aims, it places special emphasis on mutual support and exchange of experience between partners (region-region, research-regions, research-research) in order to create learning effects for all participants. Such learning effects between research and region, for example, involve providing benchmarks for development processes (good practice, regional profiles and SWOT), as well as joint strategy development.

Instruments to achieve this learning process are regular project workshops, which give additional input to partners (communication) and ensure an exchange of results and regional experiences. Three thematic working groups involve regional and academic partners with a special interest in issues such as renewable energy production, cultural potentials and integrated (planning) approaches. Additionally, academic workshops ensure the regular contact of research partners and the development and progress of the joint research efforts. A special highlight of transnationality and partnership has been the organisation of a European summer school, which saw the exchange of students between the participating regions. The participants developed their own visions of how the future development of mining regions might look like.

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Next to these internal means of knowledge sharing and communication, the project also utilises instruments that engage a broader public. Public symposia, newsletters and publications (press articles, events, handbook) and an online mining database (best practice, cultural potentials) all aim at actors outside the partnership. This also involves knowledge sharing with other projects with a similar focus, even outside the Central European programme space.

Besides these formal project activities, the partnership encourages informal meetings and visits of partners in order to ensure lasting network connections beyond the project run-time.

### **Constraints and challenges of ReSource**

In a project period of about three years' duration and with limited financial resources, the ambitious agenda of ReSource faces certain limitations. The time factor in particular limits the initiatives set by regional and academic partners, which often would require long term attention and management (e.g. internet knowledge base, pilot actions). In this sense, working out ready-to-use solutions and providing sustainable regional development at one stroke is a difficult objective to be realised. ReSource is more a starting point for initiating a consciousness about existing potentials and future options in mining regions. In the end it depends on every single project partner, regions as well as academic institutions, to make use of project results and continue the initiated cooperation proactively. In this sense the "unofficial" main task of the project is to establish a self organising network for the mutual exchange of knowledge and experience.

Bringing together regions from five different countries presents all project-actors with a big challenge. On the one hand, each participating region faces a different development level regarding the end of mining as well as the surrounding framework conditions (financial support, legal situation, political awareness etc.). Additionally, there is also the fact that despite

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broad similarities each region has specific problems (e. g. environmental damages, peripheral location, regional specifics) to solve. On that account the transferability of results is somewhat problematic. On the other hand, regional actors have to overcome regional pride and mental reservations to make use of other s experiences. It could be observed that before discussing the real problems, regional actors tend to present their home region from rather a positive angle.

Regarding the academic work, the biggest challenge is to get close to the regional partners. As described above, the academic partners depend strongly on the information and experience of the regional partners and vice versa. It is up to the scientific working group to establish an atmosphere of mutual trust. Speaking the same “language” as well as making regional partners understand what academics are good for in the project are therefore the most important social tasks. Additionally, some regions have already established a deep organisational network and knowledge-base, so that further outside interference by researchers is as seen as unnecessary or even unwanted. This is connected with another academic challenge, which concerns insight into the regional network of actors and power relationships. As in all project regions where mining is still running or recently ceased, a typically tight and exclusive organisational structure has remained. This makes it very difficult for an external observer to investigate the interplay of actors.

## Conclusions

The revitalisation of former or declining mining regions can be seen as an attempt to turn a fish soup into an aquarium. Besides the above described disadvantageous physiognomic situation after the end of mining, the first challenge for such regions is to overcome old paradigms and the concomitant paralysis of their society. The role of research within ReSource is therefore clearly defined as a supporting partner in a learning process to find



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innovative ways to establish a basis for future development by using the legacy of mining. But utilisation of the “old” post-mining potentials in order to find new perspectives is not a contradiction: instead of abandoning thousands of years mining tradition and history as well as the infrastructure behind without a trace, post-mining regions and their scientific partners are supposed to find a different and innovative viewing angle regarding mining heritage. And this is somewhat difficult: tight and traditional networks of actors, narrow foci, outmigration of especially the younger population, an overall inaccessibility for external or new actors, plus several additional factors hamper the necessary paradigm shift. In regard to this, the ReSource project tightly knits together practice (regions) and science (academic partners) to provide independent external perception to overcome a narrow inner perception. Academic partners have to meet this challenge by giving continuous evaluation and assessment, theoretical support, experience from similar previous and ongoing projects, benchmarks with other regions, and lastly by common learning activities and events.

Mining tradition and knowledge dies with the last active miner. To make use of this specific source of experience and knowledge mining regions need to make a purposeful restructuring based on the determining heritage within one generation after the end of mining. Otherwise both material and non-material potentials are lost forever.

### **Key Success Innovation**

In its outline ReSource is the first project with a systematic and comprehensive investigation into the utilisation of post-mining potentials in the Central Europe programme space. One of the major innovations of the projects lies in the combination of post-mining regions in different stages of their development. It involves regions from different stages of structural change, i.e. still active or just recently closed mining, as well as regions in the

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stage of “phasing out”. This applied “generation principle”, where recently closed or still active mining regions exchange their knowledge and experiences regarding the sustainable utilisation of post-mining potentials, allows unique learning effects between partners to arise. To further foster mutual benefits for partners with the same interests and problems, thematic working groups have been established during the course of the project. They enhance thematic discussion on special development interests (i.e. biomass or touristic routes) and bind involved partners closer together by encouraging mutual exchange of experiences on a practical and output-orientated basis.

Another innovative aspect of the project is the close interconnection of science and practical development. It creates a valuable opportunity to “professionalise” transnational knowledge transfer by academics and their outputs. The involvement of scientists also provides the regions with an external view on their problems and in this way supports and enhances their search for new development paths connected to mining potentials.

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**C. Gender Mainstreaming in Urban  
and Spatial Planning of Novi Sad**

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**Main features of the project**

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<b>Name of the project</b>	Gender Mainstreaming in Urban and Spatial Planning of Novi Sad
<b>Category</b>	Empowerment
<b>Theme</b>	Sustainable Urbanisation Gender Equality Intersectoral cooperation
<b>Target groups</b>	General public Policy-makers Administrators Researchers
<b>Area of implementation</b>	Novi Sad
<b>Leading organisation(s)</b>	Centre for Regionalism
<b>Author</b>	Maša Mitrović, Bacc.

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**Abstract**

Achieving gender equality is a process that should include all elements of society. The region of Vojvodina is a pioneer in gender strategies adoption in Serbia and its central city, Novi Sad, is preconditioned for application of the concept on the local level. However, a great deal of work still lies ahead. This paper shows the existing potential for implementation of gender mainstreaming in the spatial and urban development of the city. Intersectoral cooperation and a combination of top-down and bottom-up approaches is the recommended methodology that should address the issue. Advancement of capacities, the strong commitment of the local administration, institutions and civil society towards the creation of a just society will enhance democracy and develop a sustainable community for the future.

**Key words:** Gender mainstreaming; spatial and urban planning; empowerment for cooperation;

### Introduction

The European Commission defines gender mainstreaming as the 'integration of the gender perspective into every stage of policy processes – design, implementation, monitoring and evaluation – with a view to promoting equality between women and men. It means assessing how policies impact on the life and position of both women and men – and taking responsibility to re-address them if necessary. This is the way to make gender equality a concrete reality in the lives of women and men creating space for everyone within the organisations as well as in communities - to contribute to the process of articulating a shared vision of sustainable human development and translating it into reality' (European Commission Communication, 1996). Differences between men and women, the realities of their position and achieved equalities are separate for every country. It is one of the factors constituting overall development of society.

Regional development aims to improve the quality of life, but also to raise the competitive capacity of regions. Understanding the different conditions of men and women, concerning employment, mobility, childcare, etc, opens up the possibility for inclusion and for realisation of the full potential of the human factor. It increases chances for success in sustainable regional development. Therefore, for the sustainable development of our society it is necessary to equally include the needs of men and women in spatial planning.

Spatial planning defines the usage of territory by humans, both women and men. Gender mainstreaming provides an assurance that different life situations and needs are taken into account by spatial planning. When the targets of spatial planning take into consideration gender mainstreaming and do not contradict it, spatial development of the region can be said to be based on equality.

At the United Nations Fourth World Conference on Women (Beijing, 1995), the strategy of gender mainstreaming was

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explicitly endorsed by the Platform for Action. The Platform for Action calls for the promotion of the policy of gender mainstreaming, repeatedly stating that ‘governments and other actors should promote an active and visible policy of mainstreaming a gender perspective in all policies and programmes, so that, before decisions are taken, an analysis is made of the effects on women and men, respectively’ (Beijing Declaration on Strategy for Action, 1995).

In the Republic of Serbia, gender equality is guaranteed by the Constitution, the Law on Prohibition of Discrimination and the Law on Gender Equality in the Republic of Serbia. The Resolution on Gender Equality in the Autonomous Province of Vojvodina states that “provincial organs should take actions towards the implementation of gender equality in all strategies, programmes, projects and other implementing activities” (Provincial Secretariat for Labour, Employment and Gender Equality, 2009: 14)

### Regional challenges

Applying a gender point of view in an urban environment means understanding if cities are planned for women and men of every age, income and race. A change towards gender mainstreaming in spatial and urban planning is a visualisation and redefinition of social values that are creating equality for men and women.

The city of Novi Sad does not have any document that specifically defines its commitment to gender based policies, although on the provincial level the creation of gender equal policies is recommended for all institutions under provincial jurisdiction. Recognising differences in needs between men and women is fundamental to mainstreaming and good governance. It is a matter of democracy that all people shall be treated equally: discrimination is not acceptable. With the recognition of differences in needs, administration is becoming more efficient and earning greater acceptance among citizens.

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In the General Plan of the City of Novi Sad to 2021 a demographical gender perspective was not included in the aims and principles. Special groups that the plan refers to are: the elderly, the young, commuters, students, multigenerational families and the disabled. Data given in the document on population, habitation, labour and employment do not take into consideration gender diversification.

Characteristically, one problem for cities in Serbia is illegally built buildings that have inadequate communal services. Some of newly built areas are not provided with adequate public transport, social or child care and educational facilities in their nearby surroundings. In addition to these problems of housing there are buildings with access issues such as: elevators, staircases, entrances, spatial barriers, secondary utility rooms, apartment groundplans and the area around the buildings. Illegal construction is preventing the realisation of planned urban development and impairs the quality of life of the citizens. Another issue of interest from a gender perspective is safety. The planning response to this challenge can be found in the budgeting policy of the city and propositions for issuing construction liaison.

The development of the city economy in the past decade was influenced by the crisis in the nineties. These circumstances brought about restructuring and market adjustment within the economy. A number of large companies changed over to private ownership and subsequently stopped production and went into bankruptcy. The tertiary sector raised its share in the overall economy of the city. However, the development of entrepreneurship could not make up for the loss of big companies in the economic activities of the city. Increases in overall unemployment, unsatisfactory levels of investment and the poor competitiveness of the country's economy are consequences of this process. The usage of space in industry zones has changed. Nowadays it is partially occupied for the purpose of other smaller businesses. According to the 'Study of

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Economic Development' created for the purpose of the general urban plan of the city, the 'economy within the city is developing in the form of medium-sized and small businesses. These are predominantly trading companies, mechanical services and real estate agencies' (Gačević, , Bursać, , 2009: 12). Most of the city's population is employed in manufacturing, trade and construction. In general, there is a lack of data, gender sensitive indicators and analyses of employment of men and women, their positions in companies and the structure of unemployment figures within the age range. Acquiring this data would help in understanding the concentrations of the female and male labour forces within the sectors, their hierarchy roles in the companies and participation in decision making processes.

Novi Sad is the cultural centre of the region. According to the study 'Analyses of Public Services', most cultural institutions are located in the centre of the city, while in other areas, even though they have been planned for construction, cultural institutions are very rare. This situation affects access to city culture and reveals the problem of unequal opportunities for participation in cultural life.

Health care institutional development should follow other institutional transformation and the demographic characteristic of the population. Since the older population is mostly female, in the areas where it is concentrated e.g. the old part of the city and the area next to the river, facilities should be built or reconstructed in accordance with this group's needs. Prioritising gender sensitive facilities such as maternity hospitals, child care hospitals and nursing homes for elderly will introduce a new quality of provided care.

## Objectives

The aim of the project is to create targets of spatial and urban planning that take into consideration gender mainstreaming and do not contradict it. This approach will lead to spatial development of the region based on empowerment for equality.



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Objective 1. To include a gender perspective in spatial and urban planning as an integral part of the planning process on the local level.

Objective 2. To provide a gender analysis of the General and Urban Plans of Novi Sad and studies made for the purpose for developing spatial and urban plans of the city in order to understand the current situation and the potentials for upgrading based on the equality principle.

Objective 3. To strengthen intersectoral cooperation in order to create an overall study as a basis for gender mainstreaming in spatial and urban planning in the city of Novi Sad. Future development will be built on such networks, therefore the project increases the chances for sustainability.

The project aims to improve the quality of life through raising awareness and skills for providing equality, but also to enhance the competitive capacity of the region. The study that will be created will represent the first gender mainstreamed spatial and urban planning documentation in Serbia. It may be used as a basis for future project development and potentially for amending the adopted planning documentation. Acceptance of this concept within the community and the administration who are direct participants in the project paves the way for implementation of future equality projects. In addition to this, providing education, deepening understanding of the concept of equality and practicing cooperation empowers local administration and planning institutions for sustainability.

### **Partners – Networking activities**

Inclusion of gender mainstreaming in spatial and urban planning in the city of Novi Sad in its complexity requires both a top-down and a bottom-up approach. The general form of networking is the creation of cooperation between local government, institutions for planning and the civil sector.

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Institutions and organisations that will be involved in the project are:

1. The Centre for Regionalism is a civil society organisation with experience in regional development in the Balkans. This organisation will coordinate and monitor its implementation of the project. Public relations and informal lobbying of local government will also be the task of the Centre for Regionalism.
2. The local government of the City of Novi Sad.  
The Commission for Gender Equality will recommend and lobby for adoption of the Resolution on Gender Equality in Novi Sad, similar to the one adopted on the provincial level that states commitment to implementation of gender equality principles in all documents that local government or public enterprises are issuing. This will be a non-binding decision but the basis for further developments of the project. Also, the partner will participate in a team that will provide a study of gender mainstreaming in spatial planning in Novi Sad. Finally, it is important to gain support from this partner because of its political and institutional legitimacy for the implementation of results of study in the General Plan and other urban planning documentation.
3. The Urbanism Office is a public enterprise that is in charge of the creation of spatial and urban plans in the City. Their contribution to the project will be participation in a group that will work on the creation of a study providing expertise on spatial and urban planning.
4. The Provincial Secretariat for Labour, Employment and Gender Equality is a regional government partner institution that will provide support in education and training on gender mainstreaming. Also, considering its experience in creating conditions for adoption of the Resolution on Gender Equality in Province of Vojvodina, the Secretariat will have an advisory role in the process of lobbying for local resolution approval.
5. The Cube is a civil society organisation (non-governmental, non-profit) that will be actively engaged in consultations from

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the perspective of the experience of someone who is engaged in direct communication with the community. Furthermore, it will contribute through the facilitation of a process of participation and the raising of local public awareness of the project.

6. The University of Novi Sad, Faculty of Technical Sciences, Department of Architecture and Urbanism will participate in the project as part of the research staff in the study. Students from the department will be engaged as assistants in research and in the creation and administration of the website of the project.

### Structure

#### *Activity 1. Resolution on Gender Equality*

Support from the local administration is necessary in order to achieve political consensus for implementation of the gender concept. Such support is embodied in the form of a resolution that will state the commitment to the gender perspective of the local administration and other public institutions governed by it. With the resolution, the administration will express its will for gender mainstreaming in policies and action plans that are in the jurisdiction of the city's governance.

#### *Activity 2. Learning process*

After adopting the resolution, the Committee for Gender Equality will support and monitor implementation of the resolution within the administration authority. Alongside this, education for the decision makers, participants of the research group and members of the Committee will be provided. Provincial resources, external trainers and practitioners will be engaged in empowering city administration and project participants, providing the knowledge and skills on gender mainstreaming through training. The Provincial Secretariat for Labour, Employment and Gender Equality is relevant and internationally acknowledged to provide the above mentioned assistance.

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### *Activity 3. Creation of study analyses and recommendations for inclusion of gender mainstreaming in spatial and urban planning in Novi Sad*

Planning in Novi Sad is entrusted to the Urbanism Office. Documents and analysis for planning development are usually made by the university, the Centre for Spatial Information of Vojvodina, the Urbanism Office itself or other relevant institutions. For the pilot project of gender sensitive planning it is important to create a study that will comprehensively explore the topic and make recommendations for amendments to the General Plan in the spheres of: demography, housing, transport, the economy, access to public services, green areas, etc. Also, existing documents such as the General Plan, urban plan and studies that have been relied on in the process of the Plan's creation. Work on this study should engage planning experts, gender mainstreaming practitioners and local government representatives. The researchers' group that works on the study will comprise six experts and four assistants, mostly students of the University of Novi Sad. The main characteristics of the study will be based on gender sensitive indicators, principles of participation and within the framework of the existing legal scope.

### *Activity 4. Communication and participation*

This top down approach will be supported with the bottom-up engagement of civil society organisations that are working on civil rights promotion and achieving gender equality at the local level. Lobbying for the resolution adoption and local educational campaigns are part of their activities within the project. Furthermore, creation of the document will require citizens' engagement as a tool for the research. Finally, results and plans for future spatial development will be communicated with citizens through the website of the project. The interactive website will allow citizens to follow up development of the project, comment and give suggestions for further implementation. Project staff will closely follow the feedback from citizens and communicate it with the coordinator and researchers.

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### *Activity 5. Implementation of the study recommendations*

The project will form a partnership between the administration, public institutions and civil society. Within the implementation process, a monitoring process will be established in order to rethink the gaps between implementation of the project and real challenges in the field. Lessons learned will form the basis for ongoing correction of project activities.

### **Approach / Methodology**

Learning activities

Learning activities will be organised through:

1. Three seminars on gender mainstreaming over a six month period for the local administration and planning institution representatives who will be involved in the project either through research, lobbying or advocacy activities. The participation of 20 persons per seminar is expected. The seminar will be created as a process of non-formal learning and its curriculum will include the additional engagement of participants through individual and group assignments and discussion groups. The main topics of the seminars will be: understanding gender mainstreaming, the purpose and benefits of the process, methods for inclusion of mainstreaming in policies and plans, and the monitoring and evaluation of gender mainstreaming processes. After completion of the education process participants will be able to understand and apply gender mainstreaming in their area of expertise.
2. An open forum on the website for citizens' information and exchange throughout the whole period of implementation of the project. This activity will be an opportunity for active participation in the developing project and research study. Feedback received through the forum will be taken into consideration while implementing the project. Learning within this activity will be practical through information in the

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field. This will help to foster a deeper understanding of the situation and overall insight from the perspective of the local community.

### **How the project functions as a learning network for sustainable development**

The creation of cooperation between local government, the planning institution and the civil sector will contribute to follow-up and to the further development of the project. The Committee for Gender Equality will include implementation of the project on its agenda and will monitor it to see if the resolution is being implemented in the policies and laws adopted by the City Assembly. Empowered with the learning process and bearing in mind any recommendations for future developments from the study, the research team and project will be motivated to continue engagement in projects that will upgrade this process. Lessons learned will form the basis for correction in subsequent projects and the future experience capital of the community.

### **Constraints**

Possible constraints on the project are:

1. Adoption of a Resolution on Gender Equality could be a time consuming process because of slow administration and procedure. Also, obtaining political parties' approval on this matter is unpredictable in the light of the economic crisis. This process could take more than a year.
2. Around 50% of the population in Serbian urban areas currently has an internet connection. Therefore one of the constraints might be that not all citizens will have the opportunity to participate in the web forum. However, this number still provides a representative sample. On the other hand, project outcomes are not dependent on quantity, but on quality of feedback.

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3. The limited availability of gender statistics and gender indicators in Serbia is one of the constraints for research study. The first statistical data that included a division of data between men and women was only created in 2005. Local and provincial offices work with estimations and average data. In 2011, another census will be conducted in Serbia that will provide more specific and accurate data.

**Success factors** (learning activities/outcomes meant to be counted as success)

1. Twenty participants in the programme from local government, public institutions and the civil sector will be educated to implement gender mainstreaming in their work.
2. A group of researchers will develop recommendations for the implementation of a gender perspective in spatial planning.
3. Students of the Faculty of Technical Sciences will receive training and have an opportunity to engage in learning through assisting researchers and developing the website.
4. Local government will adopt a Resolution on Gender Equality that will express its will to implement gender mainstreaming in all laws and policies on the local level.
5. An advocacy campaign will inform citizens and influence their understanding of the gender equality concept and its benefits.
6. Communication among the citizens within the project website will increase participation.

## Conclusions

In order to achieve sustainability requirements the project will provide ecological, economic and social benefits to the community. The gender mainstreaming of spatial and urban development will influence the environment, quality of life and overall societal progress. Gendered understanding of how people see their environment is important in developing policies to combat future ecological challenges.

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Empowering local administration and institutions will lead to the creation of best practices and increase regional competitiveness. This will follow the inclusion of gender equality in policies and upgrade the work of policy makers, so that an equally distributed budget will contribute to the creation of a just system and raise local government accountability. Furthermore, participatory policies will create a sense of good governance and increase trust between the community and the administration. A gendered understanding of spatial planning highlights issues of safety and security, ensuring that the quality of places and spaces reflects everyone's needs. It will create space that is easily accessible and usable for everyone.

Gendered spatial planning will influence how the city expands in the future. The provision of functional services and suitable spatial solutions will motivate citizens to start families within existing city borders. This will prevent the reduction of agricultural land in peripheral areas of the city. Enlargement of green areas and reshaping of existing areas will be another environmental benefit.

Inequality between women and men leads to resource misuse. Disparities between genders have social costs. For society this means a waste of existing human capital. An example of this is the correlation between gender equality in urban development and increased birth rates. Future projects of spatial reconstruction will provide quality infrastructure and possible working places suitable for parents. This will result in a higher female employment rate. Well organised and gender sensitive public services could decrease the costs of parental leave, health and social care. Project-based funding will ease the burden on the local budget, attract alternative funding and donors and create a better image for potential investors. Having skilled practitioners within gender mainstreaming in urban planning will decrease the costs of expert engagement within future projects.



### Case study author

**Maša Mitrović** (Novi Sad, Serbia, 1983) obtained a Bachelor's degree in Media and Management at the Business Academy in Novi Sad. Currently she is doing her Master's studies on Regional Policies and Development at the University of Novi Sad. Mrs. Mitrović has been an activist in several youth and peace civil society organisations in the Balkans since 2003; she is employed as project manager at the Centre for Regionalism. Her personal interests include regional development, gender equality and the European integration of Serbia.

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## **D. Sustainability in Practice**

### **Main Features of The Project**

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<b>Name of the Project</b>	Sustainability in practice
<b>Category</b>	Multi-stakeholder involvement
<b>Theme</b>	Rural development, environment education, project training, sustainability and security
<b>Target Group</b>	School children, university students, rural community, general public, policy-makers, administrators, researchers
<b>Area of Implementation</b>	Rural area in Moravia/Czech Republic Deblín primary school
<b>Leading Organisation(s)</b>	Masaryk University Brno, Deblín primary school
<b>Author</b>	Alois Hynek, Břetislav Svozil, Tomáš Vagai, Jan Trávníček, Jakub Trojan

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### **Abstract**

This educational project describes activities in a study programme undertaken by the Department of Geography, Faculty of Science, Masaryk University, in the Moravian city of Brno. The sustainability teaching/learning was based on the educational taxonomy of Krathwohl (a revision of Bloom's taxonomy) emphasizing such methods as joint deduction, induction and abduction in study groups, and emphasizing fieldwork in the Deblín-town area, near the city of Brno. It was also based on the cooperation of the university, the Deblín primary school and the Deblín town community. The project also involved the municipal authorities of Tišnov, their Department of Environment and the public administration of the Deblín microregion. We have included the main stakeholders/actors for the Millennium Ecosystem Assessment for their important role in cultural landscape ecosystems sustainability. Studying environmental perception and

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participation and the application of GIS technology within the framework of multiple methodology in geographical research based on field surveys provided new knowledge.

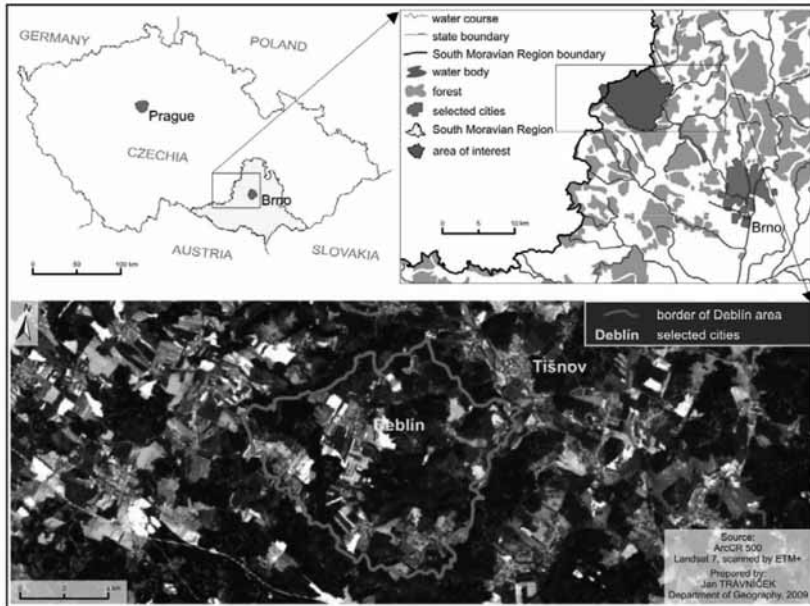
**Key words:** sustainability, educational project, rural, spatiality, community, South Moravia

### Introduction

#### *Regional challenges*

The Deblin area, from a geomorphological point of view, is a faulted dome – an elevation with its base at 240 m above sea level and the summit at 540 m a.s.l. It is comprised of a very wide collection of metamorphic and sedimentary rocks covered with earth/slope sediments and soil cover consisting of cambisols, luvisols, pseudogleys and leptosols. The topoclimate is mildly warm and moist with sunny and shady spots. At the foot of the dome five streams can be seen flowing around it with an average discharge of up to  $8 \text{ m}^3 \cdot \text{s}^{-1}$ . Their autochthonous tributaries from the Deblín dome are strongly influenced by the dissected terrain. The former *Ulmi fraxineta carpini*, *Carpini terceta*, *Fagi querceta + typica* and *Querci fageta* were almost de-reterritorialised into cultural forests, cultivated fields, orchards, meadows and villages/country town settlements. It includes 9 municipalities with 3,156 inhabitants in an area of  $56.8 \text{ km}^2$  as a part of the town region of Tišnov, a marginal suburban town of Brno. Deblin is a sub-regional/local node attracted by Tišnov (population: 8,704 inhabitants) and the city of Brno (population: 404,067 inhabitants). Large-scale agriculture (since the 1950s) and Saxon-type forestry (since the 1750s) strongly influenced rural landscaping, causing biodiversity depletion, a monotonous landscape character, accelerated anthropogenous soil erosion and run-off with impacts on the human environment.

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**Figure 1:** The spatial delimitation of the area. A geometrically transformed picture from a satellite in natural colours (RGB 3 2 1), May 24th 2001

### *Objectives*

- To commemorate the United Nations Decade of Education for Sustainable Development, Chapter 36 of Agenda 21 on education, training and public awareness in the sense of The United Nations Conference on Environment and Development (UNCED), held in Rio de Janeiro in 1992, Johannesburg Plan of Implementation (World Summit on Sustainable Development / Earth Summit 2002)
- To understand the process of how to promote and improve the quality of education, reorient curricula, raise public awareness of the concept of sustainable development in joint primary and tertiary geographical education with respect to Krathwohl's education objectives (2002) and the Millennium Ecosystem Assessment (Alcamo J. et.al., 2003)
- To apply within the project courses Z0131 – Sustainability (taught during the autumn semester) and Z0132 Urban and

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Rural Studies (taught during the spring semester) at the Department of Geography, Faculty of Science, Masaryk University in Brno (Czech Republic), including fieldwork as well, e.g. in the Deblín area where geographical education at the Deblin Primary School is coupled with the aforementioned courses

- To analyze the cultural landscape of the Deblin area, landscape ecosystems and their components, the links between human communities and landscape ecosystems, social learning and the construction of the environment, knowledge-power relations in machinist ecology, and various spatialities – nodal, formal, functional, perceptual/vernacular
- To evaluate the living conditions/livelihood in the Deblin area, human-nature relations, ecosystems services, residents' mobility – commuting to work, social reproduction, local/household economy, and technologies. Using multiple methods in social mapping, mental maps techniques and social action research can provide a different portrayal than common statistical data
- To create an alliance among the indigenous population and university students, empower local communities and foster fellowship in good governance with regional public administrations. Improving educational process by accepting advanced technologies such as GIS (geographical informatics systems), a field survey supported by instruments leading to active reterritorialisation of the landscape that enforces interactive landscape elements within the framework of the resilient landscape ecosystems that provide their services. The debate on the state of the environment is a starting point in searching for sustainable development.

### *Partners-Networking Activities*

As the project is oriented toward activating local/regional stakeholders, we linked up with several partners from the public, private and academic (research) sector. The partnership was established among:

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- Deblín Primary School (project leader, activating the local community through pupils and their parents)
- Masaryk University Brno (Faculty of Science, Institute of Geography) - co-leader
- Ycnega Technologies, Ltd.: a key partner from private sector, helping with technical support for the project, promoting and activating local resources
- Municipal authorities of the town of Tišnov: the Department of Environment is our key partner at the regional governmental level
- Municipal authorities of Deblín: our key partner from the local governmental level
- Technical University of Liberec, Faculty of Education, Department of Geography: another university which participates in research activities; important academic actor
- The Forests of the City of Brno.: strategic partner for sustainable land use planning and management in Deblín area

Partnership means a deeper overview of activities inside the regions. We should notice that these activities were done directly in the Deblín area. These activities are transferable – but with certain awareness of the locality where practiced. If the project is taken as a template without local variables, no successful results are implied. That is also the reason why trainers are not being specifically taught – lived reality with deep theoretical background and experiences suggest effective outputs. Open debates at conferences, seminars, workshops in the Czech Republic and elsewhere paid attention to childrens and their parents' participation as very effective practice in rural community.

### *Structure*

The sequencing of the project is very similar for both primary school pupils and the students of the Department of Geography, Masaryk University. The differences are only in the approach which is taken for the different purposes of the university and

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the primary school; the university strives for sophisticated methodologies and expert opinion, studying a selected area as an object with multiple facets. The primary school mainly participated in the project to raise educational standards through partnership with the university. The common denominator is getting a deep overview of a particular locality in the rural region.

The individual steps are connected and often blended together; further progress is influenced by the results of previous stages:

1. Mental mapping – a unique personal presentation of reality, used on a daily basis for spatial mobility and orientation which is evaluated and continually improved (Lynch 1960); mental maps were completed by guided interviews to enable their interpretation.
2. Definition of the area linked to the results of the mental mapping.
3. Collecting available data and controlled interviews with major actors.
4. Profiling the Deblín region as a place, land and landscape.
5. Making a list of major problems, examples of problems and their brief interpretation via the team's solutions
6. Student and pupil meetings on the Deblín primary school premises and joint field work.
7. Generating outputs and public presentation of the results.
8. Joint excursions and identification of problems suggested by the general public and local or government authorities.
9. Seeking opportunities for financial and organisational backing for further cooperation.

### *Funding*

The project was designed as a low cost and effective way of how to join key stakeholders in the locality. All partners were included without financial support. Pupils worked on the project during their regular lessons, students participated during their



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semester work and research activities were undertaken for the research itself. The Department of Geography, Faculty of Science, Masaryk University, in particular was the initial point of the project focus and the primary school in Deblín kindly supported it.

However, the continuation of the project is dependent on EU support. The authors obtained support for the project oriented toward the innovation of sustainability learning in the local primary school, which has now been implemented. Under the EU Operational Programme Education for Competitiveness activities such as a local geographical textbook (with an atlas) or an open e-learning platform are being developed and other projects (connected to recent research and improving the educational process in learning *about* and *with* sustainability) are under preparation.

### **Approach/methodology**

#### *Learning Activities*

In the educational sphere, the proposed model of project teaching (with a methodological basis and research methods) provides an application basis for verifying and exploiting theoretical knowledge and forming skills; during this process students validate, amend or disprove information gained from the available resources. Another important target is the practical application of sustainability principles and policy to concrete topics chosen according to their particular interest. Each of the topics is dealt with by a team of three or four students. They are encouraged to cooperate with students from other study groups and share the results and know-how. At the same time the students learn how to defend their results at public meetings, in published studies or at scientific conferences. This approach does not need a special teaching model for active trainers – as described above, lived reality combined with experiences and a theoretical toolbox resulted

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in a successful teaching scheme during the project-oriented lessons.

The project is of great benefit to primary school pupils as well. It contributes to developing their key competences; they learn how to obtain and critically evaluate information in the selected area, carry out the field verification, propose solutions, and present and argue for their solutions at public meetings (there was a marked improvement in students' performance of other school subjects and the marks they received). The benefits of the project can be expressed by one pupil's statement: "I understand now what geography is, how I can use the knowledge I have gained at school and understand which skills I still need to develop."

The whole project has been a team effort, including cooperative teachers, students, pupils and their parents with common ideas and practices emphasizing active role of participants. However they have remained individuals, with many different personal attitudes and skills not limiting collaborative efforts.

### Form(s) of learning

- Formal learning (e.g. seminar, lecture in formal education system)
- Non-formal learning (e.g. workshop, course without certification)
- Informal learning (e.g. discussion groups)
- On-line learning (for students from Masaryk university)

### Learning approach(es)

- Collaborative learning
- Practically-oriented learning
- Theoretically-oriented learning
- Intergenerational learning
- Project-oriented learning
- Other:  
Student centre learning

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### Types and number of learning interactions

- inside a research group (every day by internet and every week face to face)
- between a research group and the general public/community (among decision-makers, shareholders, stakeholders, experts inside, experts outside)
- every month on Thursday an open lecture was held for the community, an open workshop for the community twice a year, and an open expedition in the local/regional landscape twice a year as well.

### Innovative aspects of learning activities

Innovative and cooperative working:

- interaction between university courses (Sustainability, Urban and Rural Studies), the primary school, local and regional government, the community and the general public
- pupils from the primary school like having mediators for gaining access to the wider community.

### *Online Learning Activities*

At Masaryk University, Brno, an e-learning platform is used as a part of an internal information system. It includes interactive syllabi with the sharing of study materials, question sets (for testing procedures) and discussion groups. More information can be found online: <http://is.muni.cz/?lang=en;furl=%2Ffel%2F;ag=el;so=nx>. In this platform, fora are used for the sharing of documents, databases of students' work, discussion groups, question sets, interactive syllabi etc.

In the Deblín primary school an open e-learning platform is being prepared as an educational support (see 'Funding' below) and a local Project Website is to be commissioned during winter 2010. This website will display the issues currently being

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resolved within the project. Because of the informal (non-commercial) character of the website no statistics are being collected at this time. This also correlates with the location where website is uploaded – the university servers, which do not offer detailed statistics.

### Research Activities

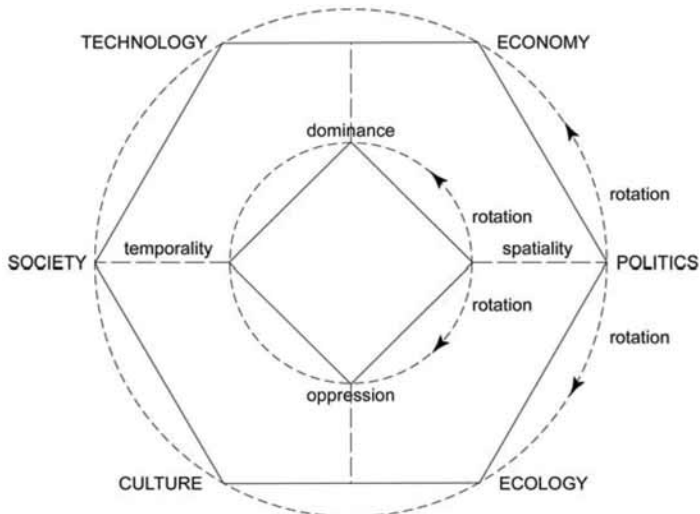
The educational project is focused on studying (researching) the Deblin area and detailed knowledge (cognition) of the local environment. An inside understanding of community problems from local citizens' perspectives was identified as a key approach. Geographical research of the local community, and qualitative field research, which has a strong ethnographic orientation in the sense of "thick description" by Geertz (1993), was applied. Based on participative observation of everyday practices, the concept of deeper data is preferred which portrays the studied reality rather differently than surface data (Cloke et al., 2004).

The methodological basis of the research is the ESPECT/TODS concept (Hynek, Hynek, 2007), which enables a study of the components of social reality both in an integrated way and separately, in terms of spatiality and the emergence of power. ESPECT/TODS include six pillars of environmental sustainability/security: Economy, Society, Politics, Ecology, Culture, and Technology (Figure 3). One can say that the pillars are determinants functioning in the socio-cultural system. Each pillar must be regarded as a product of the other systems' operations. The interaction of factors that develop in the area under research is not well-balanced or neutral. According to M. Foucault, the dominating factors which may cause heterotopia have spatial effects. The essence of heterotopia is represented by the nucleus of the hexagon encompassing the spatio-temporal dimension of superiority and inferiority. The innovation of this model is the usage of Foucault's concept of bio-politics.

The importance of so-called multiple method research (e.g. Tashakkori, Teddlie, 1998, 2003; Fay, 1996), or using both

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qualitative and quantitative techniques and paradigms within one study has been on the increase since 2000 with reference to the above resources cited. In this respect, it is important to mention the inspirational usage of abduction in geographical research. The essence of abduction consists in verification of the induction-deduction relationship through field surveys (Holt-Jensen, 2001). Another concept applied is the Actor-Network Theory (ANT) by Bruno Latour (2005). ANT is included among the post-structuralist approaches that, among other things, initiate new environmental discourses; as such, it has also been increasingly used in human geography (e.g. Crang, Thrift 2000). ANT also deals with the integration of nature and society, their hybridism and separation, live participants, or actors, and inanimate actants (Whatmore, 2002; Murdoch, 2006). Consequently, the research methodology is based not only on cooperation between geographical disciplines but also benefits from interdisciplinary cooperation with other, non-geographical sciences, such as ethnography, anthropology, sociology, philosophy or psychology; it can be carried out as a transdisciplinary science. Other methods and techniques: mental maps, focus group, talks, etc.



**Figure 2:** ESPECT & TODS concept scheme (Hynek, Hynek, 2007)

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### *How the project functions as a learning network for SD*

The idea of networking creates a very important part of sustainable development implementation in at least two senses from the point of view of the project:

- As a heterogeneous assemblage of environmental management practices
- Discourses and knowledge mutually connected among decision-makers, stakeholders, experts, etc. about sustainable development.

Foucault's view on space, the actor-network theory of Latour, Callon and Law concerning scientific knowledge, and a deeper ethnographic study were the trigger for rethinking the role of a university in social life. Connecting a university and primary school is not so common, and involving public administration was the right step to the rural community as a main target group for embedding sustainable development in rural space. J.Murdoch (2006) was very inspirational for the project.

## **Project Discussion**

### *Constraints*

There were administrative constraints in particular from the top management of public institutions. Old school approaches were typical not only in the principality of the Deblín primary school but also in some uninformed, skeptical and critical (with no constructive solutions) entities from the public/society.

### *Success Factors (learning activities/outcomes meant to be counted as success)*

Success factors were integrated into the whole concept, which is based on the shift from a theoretical background (used as a set of tools) into the practice. Success derives from several points:

- Network identification
- Discovering one's own position

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- Maintaining the power to influence network parts (nodes and vertexes)
- Preparing positions for new networking and transformation of networks

*Challenges (sustainability challenge, transferability challenge, other challenges)*

The main challenges are in deepening and expanding the existing concept and the possibility of creating a local action group with broad public participation. Pragmatically understood, the challenge is also in securing additional funds for project development from European public resources.

## Conclusions

### *Results*

Qualitatively oriented cooperation on the Deblín project led to findings and understanding and interpretation of the area from the situated perspective of regional actors. The involvement of the primary school is essential for sustainable development. The primary school is in the position of a gate keeper for understanding the local situated knowledge of Deblín communities in several ways. The first one is represented through the primary school educational/institutional framework that allowed the project team to work with the knowledge base, values and attitudes of the younger generation in the area of interest. The pupils gained an understanding of the principles of sustainability; and they applied the deep knowledge acquired of specific areas during fieldwork in their area. They learned to perceive the process of modifying the landscape and to understand that they are part of the landscape and are responsible for making a positive, negative or neutral impact on their area. They discussed their observations and results with the participating project members, which included an opportunity for providing feedback.

The exchange of views, while respecting the rules of debate, was part of the final public presentation in Deblín where the

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students and pupils shared their results from the project work with the public. This event represented an important part of understanding locally situated knowledge through the position of the primary school in Deblín communities and the school's potential to be a relevant part of those communities. That is the second level of work with knowledge-production processes within this project. Topics which were a part of school work did not remain within the school walls only, but were discussed through the communities. The pupils were important facilitators within those processes.

The pupils showed that with appropriate support they also have the capacity to initiate solutions. The pupils' activities helped to arouse parents' and local residents' interest in their locality, develop their sensitivity to sustainability principles and stimulate their active participation in the project. One can also talk about a third level of support for situated knowledge-production processes thanks to the cooperation between the different participating actors mediated through the primary school. From the perspective position of the primary school as a community centre it was important to use its educational, social and cultural capital. The primary school is, especially in rural areas, the place with the highest concentration of human capital. This way of using a school's potential could help to re/construct the school position within its communities, as well as have positive impacts on local communities.

The project proved to be of fundamental importance for the university students as well. While working with other participants they searched for unsustainable elements in an area unknown to them and proposed solutions based on a common consensus.

This project exceeded the common concept of a two-semester workshop culminating in an examination awarded by credits. Positive feedback (collected at the public presentation and discussion among academic supervisors) confirms the value of the project's approach.



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The students successfully applied their theoretical knowledge while working in cooperative multi-disciplinary teams that dealt with selected issues corresponding to their areas of interest.

The actual application of the results both on the ground and in the academic sphere proved to be an important motivational aspect of the project. Many students continue to work on the project individually in their free time. Establishing further links and cooperation with other subjects at the Geographical Institute would be very helpful for them. Therefore, besides the value of the completed research, the project has an added educational value as well.

The common approach to sustainability aims to involve the people living in this area, who influence it in different ways. The pupils' activities helped to make the inhabitants of the town interested in their environment and develop their understanding and openness.

### *Lessons Learned*

The team of authors was engaged in project training, focused on urban-rural relationships emphasizing sustainability and safety of the area/landscape/region, on a long-term basis. These questions were dealt with in courses at Masaryk university in Brno: Z0131 Sustainability (autumn semester 2008) and 0132 Urban and Rural Studies (spring semester 2009).

Other lessons learned were obtained through non-formal approaches. The team prepared public presentations with lessons where pupils talked about their findings. We also prepared field activities (field mapping of Significant Landscape Components, field excursions, etc.) both for both pupils and students. Multiplication effects from the project continued to other activities and projects – Fair trade afternoons, a Landscape Behind the School project, GIS lectures based on the peer-to-peer approach, public events connected to the results of pupils'

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field work, a project of learning innovation financed by the EU, etc.

### *Impact on Sustainable Development*

**Social Sustainability:** communities are formed by their socially constructed identities, which are principal to an understanding of their practices. Since we are able to understand the practices and processes of a social construction of identities, we will be able to strengthen those leading to the sustainable development of communities connected to their localities.

**Environmental Sustainability:** one of the basic processes connected to a socially constructed identification with a locality is embedding. It is represented by everyday practices connected to places and landscape. Orientations toward the secure and sustainable development of the life of communities in their localities pay attention into well-judged planning and practice in their natural environment.

**Economic Sustainability:** driving forces which is shaping the landscape is economy. This statement demonstrates that the economy is a necessary condition of sustainable development. Communities practicing economic autarky are able to identify, activate and use their endogenous potential with a smart combination and use of global possibilities toward their own sustainable and secure local strategy.

**Cooperation/coordination:** between the aforementioned impacts of the project on the sustainable development of the area there is primarily one which is necessary to ensure the results of the project remain sustainable within the area of interest. After the process of internalisation (within the project) which allows the social, environmental and economic aspects to change the strategies of local communities, those strategies need to be coordinated in a manner that allows them to be institutionalised within the life of local communities. It is not

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only a question of building a functional project network. It is also necessary to coordinate the project in the direction of creating a mechanism which allows the coordination of a project through feedback from the project's results. To attain this goal /support/cooperation is needed not only at the local level, but also at the regional and global level.

Dissemination of the project has several formats. First of all the public presentation of the outputs in Deblín cultural centre with broad public participation, local government included. Secondly the dissemination were written and published in several journals (e.g. Journal of Tourism, Hospitality and Commerce, Envigogika), conferences (IGU Barcelona) and on relevant websites.

Key Success-Innovation
<ul style="list-style-type: none"><li>• Combination of primary and tertiary education within a framework of public participation</li><li>• Identification and mobilisation of key actors and endogenous development potentials of local communities through a local primary school</li><li>• Empowerment of (local/regional?)decision processes influencing local sustainability</li><li>• Implementing participative approaches and glocalisation strategy into ordinary life</li><li>• Implementing modern technologies (like advanced GIS) combined with post-structuralist points of view and methods into locally resided spatiality</li><li>• Practical implementation of LENSUS knowledge triangle of education+research+innovation for regional sustainable development</li><li>• Balancing rural insiders and outsiders in knowledge-power assemblages</li><li>• A critical side-benefit of the project is raising the public awareness of the local population watching the youngsters to pay pragmatic respect to and interest in the local environment.</li></ul>

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## **E. National Persistent Organic Pollutants Centre**

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<b>Main Features of The Project</b>	
Name of the Project	National Persistent Organic Pollutants Centre
Category	Multi-Stakeholder Involvement
Theme	Sound management and interpretation of environmental data
Target Group	State legislation, regional authorities, industry, academia, high school and university students, non-governmental organisations, general public
Area of Implementation	Environmental science, technology, and management, legacy and emerging pollutants and their environmental impacts, monitoring of the quality of the environment, assessment of the human exposure and associated risks, environmental data management, visualisation and interpretation, environmental education, awareness rising of the general public.
Leading Organisation(s)	RECETOX Research centre for toxic compounds in the environment of the Masaryk University, Czech Ministry of Environment

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### **Abstract**

The National Centre for Persistent Organic Pollutants of the Czech Republic is a joint project of the Research Centre for Toxic Compounds in the Environment of Masaryk University in Brno, Czech Republic, and the Czech Ministry of Environment. It was established in 2005 with the goal of creating a scientific base for addressing the environmental problems and fulfilment of responsibilities of the Czech Republic stemming from being a signatory country of international conventions on persistent

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organic pollutants (POPs), especially the Stockholm Convention on POPs. It serves the state legislation, regional authorities, industrial enterprises, academia, as well as the general public. It executes a number of national and international scientific projects and provides environmental education. In 2009, the Centre was endorsed as a Regional Centre of the Stockholm Convention for capacity building and transfer of technology in the region of Central and Eastern Europe. Under the umbrella of the Regional Centre international summer schools, workshops, and training courses are being organised to support the development of regional capacities in environmental management.

**Key words:** environmental pollution; persistent, bioaccumulative, and toxic chemicals; environmental and human risk assessment; environmental data management, environmental education, awareness raising

### Introduction

#### *Regional challenges*

Sustainable development as a key requirement of modern society is unthinkable without proper management of the natural environment. Such management requires sufficient information on the effects of various technologies on the environment, including humans, information on the main factors that influence, threaten and damage the environment, on chemical substances produced or unintentionally generated during anthropological activities, information on the physical and chemical properties of such substances, their fate in the environment, lifetime and potential for long-distance transport, on their accumulation in environmental matrices, food chains and living organisms, on mechanisms of their toxic effects at various levels, on the risks they represent to the environment and humans, and information on the possibilities of reduction of such risks and effective corrective measures. This is even truer in the region of Central and Eastern Europe which has many

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countries with economies in transition and generally lack comprehensive environmental data. The consequence of this situation is the inability of the research sphere to submit rational analyses of problems in frequent conflicts between the supporters of “development” and “protection”. Autonomous research programmes lack a conceptual approach and ties to international activities. Traditional deficiencies include the weak cohesion of fundamental research with the application sphere. The greatest barrier to an effective solution for this situation is the absence of facilities and human resources providing sufficient scientific capacity for multi-disciplinary research on the one hand, and showing the interest and potential to apply the results of the fundamental science in practice on the other.

### *Objectives*

The objective of the project was to build a centre to serve as the regional base for research in the area of environmental chemistry and ecotoxicology, environmental and human risk assessment, the impact of technologies and environmental management for sustainable development. At the same time, the centre should serve as a platform for capacity building and transfer of technology, educational activities and expert consulting. It required an accumulation of necessary material and human resources, a stimulation of cooperation with the application sphere (industrial partners, health organisations, regional authorities and state legislation), a transfer of environmental know-how and technology, as well as an extension of environmental education to the target groups of students, primary and secondary school teachers and the general public as an effective tool in the prevention of environmental damage with all its negative impacts.

### *Partners-Networking Activities*

Due to the significant diversity of the centre’s activities, the partners of the centre include research institutes and healthcare



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facilities, industrial enterprises and private companies, state administration, regional authorities, and international organisations, including the UN. Its most important partners are the Czech Ministry of Environment on the national level, and the Secretariat of the Stockholm Convention on POPs on the international level (UN). However, the centre also cooperates with regional authorities in all 14 regions of the Czech Republic and with local companies. Wide scientific international cooperation has been established in recent years.

### *Structure*

The structure is based on the Research Centre for Toxic Compounds in the Environment (RECETOX) which is a research and educational facility attached to the Faculty of Science, Masaryk University in Brno. RECETOX was established in 1996 with the support of the European project PHARE and currently has several divisions oriented towards research and education in the field of chemistry and the ecotoxicology of POPs, the National POPs Centre and the Regional Centre of the Stockholm Convention for capacity building and transfer of technology in the region of Central and Eastern Europe.

The National and Regional Centres (the subject of the case study) serve as interfaces effectively linking available capacities to the needs of the application sphere on the national and regional levels. The National Centre was established in 2005 as a joint project of Masaryk University and the Ministry of Environment with the goal of creating a multidisciplinary National Centre of Expertise in the area of toxic chemicals that are the subject of various international conventions, to which the Czech Republic is a signatory country. The major responsibilities of the National POPs Centre are to provide up-to-date information on the levels and environmental fate of hazardous compounds, to summarise their toxicological properties and associated risks, and to develop new techniques for their environmental management.

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In 2008, the RECETOX centre was nominated by the Czech government to serve also as a Regional Centre of the Stockholm Convention for capacity building and transfer of technology in the region of Central and Eastern Europe. RECETOX thus became a part of a network of eight regional centres around the globe supporting the successful implementation of the Stockholm Convention, as well as other synergic conventions (i.e. Basel and Rotterdam). The Centre aims to develop a network of cooperating institutes capable of successfully addressing complex environmental issues and problems within Central and Eastern Europe. It provides an active link between Western and Eastern Europe by using existing contacts and cooperation with several top world institutes.

### *Funding*

The research activities of the RECETOX Centre have been supported by numerous national grants from the Ministry of Education and other ministries, and from the National Science Foundation. European research grants have formed an important funding support (2 projects within EU FP5, one FP6, and four FP7) with a total budget of almost 40 million CZK (more than 1 million CZK per researcher). RECETOX was also successful in obtaining support from EU Structural Funds. From the “Research and Development for Innovation” operational programme the Centre is supported by a total budget of more than 500 million CZK, and a new facility for the Centre is being built. New educational activities are funded via the “Education for Competitiveness” operational programme.

RECETOX has also been actively involved in the area of applied research addressing practical environmental issues. It has a long-term cooperative relationship with industry (chemical and petrochemical industry, municipal, hospital and dangerous waste incinerators, waste water treatment plants, remediation companies) focused on the assessment of the environmental and human health impact of their technologies, and health

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institutions (institutes of public health, hospitals). Last but not least, it cooperates with public authorities at national and regional levels, and international bodies (the secretariats of the international conventions on chemical pollution).

### **Approach/methodology**

#### *Learning Activities*

RECETOX currently guarantees BSc., MSc. and Ph.D. levels of education in three study programmes: Environmental Chemistry, Ecotoxicology, and Mathematical Biology. There are some 30 MSc. and 40 Ph.D. students working at the Centre. RECETOX actively develops new lectures and practical courses within university curricula. Over the following three years, new educational activities will be supported from the EU's "Education for Competitiveness" operational programme. That includes development of several courses taught in English.

The National Centre supports cooperation in education with partners from the application sphere. They participate in teaching, supervising and reviewing master and Ph.D. theses, and organising excursions and mobility programmes.

Students of secondary schools and universities are coming to the Centre on days when it is open to the public, e.g. the annual Day of Science, and for other events. University students also have an opportunity to work on their student research projects for one or two semesters; the gifted students may even extend their stays. The Centre participates in the lifelong education of primary and secondary school teachers, as well as the general public, as awareness raising is an effective tool in the prevention of environmental damage with all its negative impacts.

The Regional Centre supports capacity building and the transfer of know-how and technologies in the CEE region by organising conferences, workshops and training courses. The most

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important capacity building activity of the Regional Centre is the International Summer School of Environmental Chemistry and Ecotoxicology, organised annually since 2005. Fifty international students from not only the Centre's regional sphere of operations, but also from the whole world receive theoretical knowledge as well as practical training in the field of environmental science. The summer school has been supported as an official training activity for the Global Monitoring Plan by the Secretariat of the Stockholm Convention and the Czech Ministry of Environment.

### *Online Learning Activities*

All BSc., MSc. and Ph.D. courses are available on-line on the RECETOX web sites. E-learning activities will be further developed over the next three years under the RECETOX Education project of the EU's "Education for Competitiveness" operational programme starting in January, 2011. The project is focused on the development of new classes and practical courses in the latest areas of Green Chemistry, LifeCycle Assessment and Sustainable Development, as well as upgrading current courses through the application of e-learning elements.

### *Research Activities*

Understanding the relationship between chemicals in the environment, their effects on living organisms, and consequent impacts on ecosystems, including climate change, is a major research objective of RECETOX. Besides the environmental sciences, RECETOX research activities have extended to interdisciplinary fields such as geochemistry, geology, geography, meteorology, and climatology. Thanks to the activities of the National and Regional Centres, this research potential can be further exploited in the area of application and innovation. Collaborative and contracted research projects initiated by the public authorities supported implementation of the international conventions, helped to develop the national

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positions in international negotiations, evaluate the effectiveness of current measures and policies, and develop new approaches.

### *How the project functions as a learning network for SD*

The scientific networks of RECETOX are focused on the integration and support of outstanding research institutes from the new EU member countries, which established RECETOX as an “EU DG Centre of Excellence for Environmental Chemistry and Ecotoxicology”. These networks are being used for both scientific and educational purposes. With many of these partners, Masaryk University has signed the SOCRATES ERASMUS contracts supporting the international mobility of students and teachers, and RECETOX sends several students to partner universities every year as well as receiving both students and staff from these universities.

RECETOX is also involved in the activities of Masaryk University focused on the enhancement of university education in natural sciences, and on work with talented university students. The facilities as well as human resources of the Centre are offered to the students interested in working in the Centre on their student research projects. “From roots to tops” is an excursion and intensive e-learning course for primary school students, “Chemical compounds in the environment – help or threat?” is a one-year long university e-learning course, and “Understanding the environmental consequences and changing behaviour” is a one-week course for 60 selected talented university students.

Activities targeted toward the general public include “Days for the Earth” series (How to live in harmony with the natural environment), “Open Door” activities presenting research and education on the new Masaryk University campus, a “Science Festival” advertising environmental education, and a “Night of Science” explaining the Centre’s research projects.

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The National Centre extends this cooperation further in the field of education toward partners from the application sphere. These partners participate in teaching, supervising and reviewing Master and Ph.D. theses, and organising excursions and mobility programmes. Networking will be enhanced in the next three years under the EU's "Education for Competitiveness" operational programme. The main focus of this project is to broaden the educational focus of RECETOX, and to include such topics as Green Chemistry, Life Cycle Assessment or Sustainable Development in the main university curricula while at the same time involving long-term partners from the practical application field (industry, public health, regional and state authorities) in the learning networks. The learning network builds on the history of the long-term research cooperation among all partners and benefits greatly from on-going communication among them.

The Regional Centre supports capacity building and transfer of know-how and technologies in the region by organising conferences, workshops and training courses. The most important capacity building activity of the Regional Centre is the International Summer School of Environmental Chemistry and Ecotoxicology, organised annually since 2005. Over the last few years, RECETOX has developed a network of cooperating regional and sub-regional centres around the world, as well as a network of institutions in the region of Central and Eastern Europe that can benefit from its educational activities.

### **Project discussion**

#### *Constraints*

All Centre activities are supported and appreciated by the project partners, by students as well as the general public at the national level. On the regional level, it takes longer to find partners willing to be not only a subject of a Centre initiative and its help, but also an active player.

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### *Success Factors*

A major factor securing the long-term success of the National and Regional Centres is the fact that they are integrated into the structure of the Research Centre for Toxic Compounds in the RECETOX environment and use its research capacity (material and human resources), latest technologies, experience from the field of application and innovation, inter-sectoral mobility, international networks, and experience with the mobilisation of resources for strengthening the links between fundamental science and the practical application sphere, including industry, government, state and regional authorities, public health, educational institutions, non-governmental organisations and the general public. The unique outcomes from the variety of national and international projects as well as from contracted research enhance the attractiveness of the National and Regional Centres as partners in the educational as well as research networks. Close link to stakeholders such as UN institutions or the Czech government and ministries, and positive experience from long-term cooperation increase the potential for mobilisation of financial resources.

RECETOX centres have proved their potential when successfully executing a number of capacity building projects in the last five years.

### *Challenges*

A major challenge for the development of efficient scientific and educational networks involving academia, industry, public authorities, non-governmental institutions as well as general public is the sustainability of financial resources. This cannot be solved by providing short-term financial support but by strengthening the capacity of the individual players to secure the necessary resources in the long run. Thus, the training activities, especially in developing countries, should cover that field in addition to the professional and educational training.

### Conclusions

#### *Results*

One of the most important successes of the National Centre was the development of the nationwide MONET monitoring network of air quality based on passive samplers and established in close cooperation with partners from both industry and governmental institutions.

Within a few years, the network supported by the Regional Centre expanded throughout the whole of Central and Eastern Europe and became an outstanding example of technology and know-how transfer within the region. Currently, the network of passive sampling has become an official world-wide monitoring tool, and RECETOX is the strategic partner for other regions as well (Africa, Asia, Pacific and Western Europe). The original Czech network still serves as the only and highly successful model for building similar programmes in other countries and regions.

The unique feature of this network is that it serves not only the scientific but also educational and capacity building purposes. Participating partners are involved in the international summer schools and workshops focused on the transfer of technology and know-how cooperating in the preparation and execution of the capacity building projects of GEF, NATO, and others.

#### *Lessons Learned*

Building new environmental facilities is only one step towards better management of the environment. Securing long-term development of infrastructure and human resources, however, is equally important. To ensure continuous development of human resources means establishing close cooperation with



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universities and enhancing environmental education at various levels, including the on-going improvement of their own education curricula. Awareness raising among the general public cannot be underestimated. In the case of the National and Regional Centres, the combination of research and education, science and application, national and international activities seems to be working very well and will be maintained.

### *Impact on Sustainable Development*

The National POPs Centre of the Czech Republic and the Regional Centre for Capacity Building and Transfer of Technology in the region of Central and Eastern Europe were established with the goal of developing new approaches to the management and interpretation of environmental data in order to make it available to the experts as well as to the public. The general availability and proper management of data from the environmental quality monitoring programmes as well as the scientific projects is, however, only a first step towards the better understanding of processes affecting the environment and human health.

Key success-innovation
Building and strengthening the environmental capacities not only in the Central and Eastern Europe but worldwide by organising an annual international summer school of environmental chemistry and ecotoxicology, capacity building workshops and conferences.

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## **F. Towards Science and Research**

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### **Main Features of The Project**

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Name of the Project	Towards Science and Research
Category	E-Learning
Theme	Science and research for high schools
Target Group	High school students
Area of Implementation	Environmental Education
Leading Organisation(s)	Sdružení TEREZA
Author	Josef Brůna, Bára Semeráková

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### **Abstract**

This new project builds on a tradition of successful projects by the TEREZA Association for primary and secondary schools, especially The GLOBE Programme. Its main objective is to enhance the scientific literacy of secondary school students in order to support their further investigation and understanding of environmental issues and science in general. Project tools range from classroom and outdoor learning activities, student research projects, e-learning, online publishing tools to workshops, and excursions to research labs, as well as a final students' conference. It is based on close cooperation between the coordinating NGO, universities and secondary school teachers and students.

The result of this project is a compact set of materials and online activities which can help to spread inquiry based science education to high schools. They can be used out of the box, or they can help teachers to prepare their own research and help them solve questions students are interested in, or even some regional environmental problems.

**Key words:** research skills, scientific literacy, inquiry based education, database, games, soil, carbon cycle, science, environment.

### Introduction

This new project builds on a tradition of successful projects by the TEREZA Association for primary and secondary schools.

Its main objectives are to enhance scientific work in secondary schools, to promote interest in science and to contribute to the cultivation of a scientific way of thinking. It also aims at increasing the attractiveness of science careers for the younger generation, especially taking into account that there is a rapid decline of students in these fields in Europe (OECD, 2006). This topic is based on the educational area of Humans and Nature, and Environmental Education in the new Czech curriculum for high schools (Výzkumný ústav pedagogický v Praze, 2007).

It is also based on our experience with methodological materials and activities for primary schools and an increasing demand for such materials from secondary school teachers, as well as experiences from older students that have participated in our long term programmes.

### *Regional challenges*

Inquiry-based science education is a brand new topic in the Czech curriculum and there is very limited experience in learning through scientific skills (due to the fact that a knowledge-oriented science education still prevails in many schools). We therefore faced several difficulties when trying to implement our methods, as originally planned, on a broad scale. However, with the aid of teachers from pilot schools we came to understand the limits of training the research skills process in classrooms. The project team's next step was to prepare tailored packages of learning activities that could easily be implemented at a minimum cost and with no special equipment at any school. Placing emphasis on offering incentives to the most active and experienced teachers, we offered additional options for further

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increasing scientific literacy through long-term student projects and investigations, e.g. The GLOBE Programme. Another challenge was to establish a connection between high schools and universities, especially taking into account that such cooperation is rare mainly due to the absence of a communication platform.

### *Objectives*

The main objective of the project is to enhance the scientific literacy of secondary school students in order to support their further investigation and understanding of environmental issues and science in general. The project focuses on the development of scientific research skills, such as hypothesis formulating, planning and carrying out experiments, analysing data, interpreting results, drawing and presenting conclusions. The overall goal of the project activities is to strengthen cooperation among students, teachers and researchers.

### *Partners-Networking Activities*

The project is based on our long-term cooperation with a team of scientists from the Department of Experimental Plant Biology, Faculty of Science, Charles University, led by Prof. Jana Albrechtová, and a newly established cooperation agreement with the Department of Soil Science and Soil Protection, Faculty of Agrobiolgy, Food and Natural Resources of the Czech University of Life Sciences, led by Prof. Luboš Borůvka.

The experiments and the materials were created in close cooperation with four high schools and were tested on eight high schools with approximately 1,000 students. Technical background on e-learning activities was developed by the Centre for Modern Education (CZ), whereas their content was created by the same team of authors as the rest of the project activities.

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### *Structure*

The project encompasses four main activities:

- Developing, testing and implementing methodical materials for teachers and workbooks for students.
- Developing, testing and implementing e-learning lectures, an online publishing system comprising a database and a browser game.
- A number of workshops and consultations addressed to teachers and excursions to the universities and research labs addressed to students.
- A final students' scientific conference.
- The project is divided into three phases - preparation, testing and dissemination. We have now entered the third phase, in which we are planning to spread the materials to 80 high schools in Prague.

### *Funding*

The project is fully funded by the Operational Programme Prague - Adaptability Priority Axis 3: Modernisation of initial training, with the support of the European Social Fund and the City of Prague.

The idea of implementing more inquiry-based science education methods into our materials was prepared long ago, with the vision of intensive cooperation with the universities. There were no suitable grants for a project like this until the end of 2008 when we applied for this grant. The final outlines of the project became clear during the preparation of the proposal, and we have extended our visions in order to meet the criteria and proposed innovative materials and methods, unlike our usual projects.

Future development of the materials will be done as a part of The GLOBE Programme, unless we receive a new grant for it.

### Approach/methodology

#### *Learning Activities*

The main activities of the project are constructed on methods of inquiry-based science education and hands-on learning through experience. Project tools range from classroom and outdoor learning activities, a student research project, e-learning, online publishing tool to workshops, and excursions to research sites and a final student conference. Both researchers and teachers work together on the development of learning activities and their testing in classroom.

#### *Online Learning Activities*

We provide three different online learning activities to complement other project materials: e-learning lectures, an online publishing system with a database, and a browser game.

#### *E-learning lectures*

First are flash based e-learning slides with interactive tasks. Two animated characters (scientists) guide students through all three topics of the project - scientific work, soil science and the carbon cycle in three corresponding sections. They either provide additional information to the school lessons, or they can serve as a main source of information whenever teachers do not lecture. The whole activity is fully voiced and can also be used on interactive whiteboards.

Sections are divided into lessons where each lesson has 5-9 slides and focus on important aspects of the topic. Each slide starts with a dialogue between two scientists, namely Mojmir (a plant physiologist and expert in the carbon cycle) and Lumir (a soil scientist). They discuss a particular problem in each lesson and introduce the interactive task that tests whether students have understood the topic through their dialogue. After its

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completion, students get direct feedback from the scientists. The version of feedback commentary is adapted to the student's performance during the task. Student's achievements and position in the course are individual and stored under their login, which allows for a flexible work pace according to their choice.

Each dialogue can be repeated or paused, which can help students to concentrate and understand more difficult information. This function is also highly useful when displaying the slides on interactive whiteboards, where the teacher can easily pause and add a comment or link the topic to real experiments. The whole course is available both online and offline, in the form of a CD that requires no installation.

The first section is about the scientific process and focuses on the general nature of scientific work. It teaches students how to find relevant literature, formulate their hypothesis, select the applicable methods, and plan their research, as well as to analyse data, discuss results and present or publish them. This helps students learn how to conduct their real experiments and research in school. The use of e-learning methods allows for a convenient presentation and use of electronic information sources such as library databases and teaches how to use them. The entire section is based on examples from real research into North Bohemian coal mine dumps, where soil scientists meet carbon cycle ones.

The second section is about the carbon cycle in which Lumír excels. It is entirely devoted to the global carbon cycle with the main sources and links, photosynthesis as the most important part of the cycle and the journey of carbon atoms from the atmosphere to biomass, including the food chain. Emphasis is also given to CO<sub>2</sub> emissions from land use changes. The final lesson deals with the issue of the increasing amount of CO<sub>2</sub> in the atmosphere in relation to the greenhouse effect and climate change.



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The last section focuses on soil science, the importance of soil as a vital source and its context. Lumír the scientist presents basic facts about soil science, which are often absent from most school textbooks nowadays. Additionally, he provides more but he also adds more information about real threats to soil and its relationship to the environment.



**Example of an e-learning slide about soils with our guiding scientists Mojmir and Lumir**

He explains the variety of soil types, their history and environmental conditions needed for their establishment. Consequently he discusses the vulnerability of land and current threats such as erosion, acidification, salinisation, the occupation of fertile soil and contamination. At the end, Lumír and Mojmir alert us that the way we treat soil will be paid back

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to us in the quality of production and the environment on which we are dependent.

### *Online publishing system with a database*

The second tool is an online content management system and a database called DATEL. It serves as a collaboration platform for groups of students working on a report (like a scientific article) about their school research. It focuses on teaching how to work with literature and electronic information sources and helps students to understand the principles and importance of citations. It also gives them the opportunity to share the knowledge they have gathered during their research with other students from different schools and learn how real scientific publication works today. The report is reviewed by their teacher or some scientist or graduate university student who is willing to undertake the reviewer role. There is no method to control plagiarism, which should be explained by the teacher. We support students with easy citation methods and rules for working with information sources.

In similar projects, the most commonly used tool is a wiki environment (Zahradník & Pachmanová, 2009), but this does not allow for collaboration in real time, and so we have designed a new system which allows it in collaboration with experts from CFME. Students can follow the writing of other members of the team in real-time, almost like on Google Docs. The only limitation is that only one student can be editing at once. They may also return to previously saved versions of the text. Each report must have the standard structure of a scientific paper, i. e. starting with an introduction and known facts about the topic, followed by methods and hypothesis, results and their discussion and a summary. Students can also upload images, graphs and their datasets into the body of a report or as attachments. The other part of the system serves as a database of published results, where the users can find related articles and easily cite them in their work.

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DATEL also serves as a platform for sharing inspiration and discussion among participating teachers. They can easily find variants of the experiments and their results, as well as new experiments and research. Articles from this system will be used for the Proceedings of the Student Conference which was held in November 2010, allowing students from eight testing schools to try out another part of the scientific work - presentation of results in a professional environment at a university.

### *Browser game*

The last online activity is a browser simulation game. Its purpose is motivational as well as educational as it shows the long term and regional scaled consequences of various environment-related decisions. Players have to decide between 2 - 4 solutions to a number of problems, based on their knowledge, insight and some given parameters. The aim is to show the impact of small decisions in actions connected with soil, land use and the carbon cycle on a regional scale. In the carbon cycle, emphasis is given



**Browser game about a sustainable village**

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to the release and sinks of CO<sub>2</sub> with land use changes. Some tasks are connected to the experiments, so that they can use their results in a “real situation”. One of the proposed approaches to the game is the involvement of a group of students who get different roles (the mayor, businessman, farmer, unemployed, etc. and with this, a local decision-making process will be simulated in the classroom and the result is then entered in the game.

### *Research Activities*

Our methodological materials for teachers and workbooks for students serve as a basis for hands on experiments and research. Schools can easily pick one of our prepared experiments with full methodological support, or they can follow the guidelines and prepare their own research. Each experiment is designed to be easily conducted in any school even without laboratory equipment. We also provide additional tasks to those with better equipment.

The first part is focused on scientific skills - working with scientific text, finding relevant literature, understanding graphs, documentation of methods and collection of data, as well as their basic analysis and presentation of results.

For the topic of the carbon cycle we have experiments on carbon storage in the biomass of different plants and others on release of carbon from different soils. For the latter, students use milk bottles that serve as perfect sealed environments.

For the topic of soil science, we have an indoor experiment with flower pots, where students grow seeds of barley under different conditions - concentration of toxic substances, salinisation etc. The second experiment is a soil science field survey, where students try to find differences in soil profiles between two types of land use, in various slopes or geological

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### **Easy experiment to demonstrate different amounts of carbon in soils using milk bottles.**

conditions. More importantly we can also supply schools with professional equipment in order to facilitate their experiments.

#### *How the project functions as a learning network for SD*

The overall goal of the project activities is to strengthen cooperation among the students, teachers and scientists. During the project we focused not only on students, but also on their teachers. We have organised workshops with scientists to encourage them to try inquiry based methods in their lectures, to use experiments that do not have simple results. We encourage them to ask questions for which they do not have the answers, a method that can stimulate curiosity and motivation. Even scientists do not know all the answers. They exchanged valuable experiences with their colleagues and found solutions to some difficulties with experiments. It also allowed us to get detailed feedback about the use of our pilot version of materials, thus helping us to improve them substantially.

Reports from students' experiments and an online teachers' forum for the exchange of experiences with different activities are available to all students and teachers.

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All students from the eight pilot schools had the opportunity to visit university scientists and see their work and consult about their experimental results.

The conviction is that hands-on experiments and inquiry based learning activities motivate young people, challenge their minds and make them ask better questions and stimulate their desire for answers and knowledge in general. This can help them to understand science, its beauty and role in society. Some of them may even find their way into science and maybe they will help other young students find their way into science.

### **Project discussion**

#### *Constraints*

One of the constraints of the project is the limited time that can be dedicated to such activities in schools. Sometimes these activities have to be conducted in free time with student groups, since the lectures of biology and chemistry are limited. We see a great opportunity in the gradual change towards school education plans, including specialised lectures on science or the environment, which can be found at some schools and which allow for better incorporation of such activities in the curriculum.

Another constraint lies in the limited number of topics that are currently offered, because we have focused on proper development of the materials, rather than their number. Thanks to this experience, we will be able to deliver more topics in the future. Until then, other topics can be studied in the “GLOBE Programme” which will gradually use more inquiry based methods in other fields of research such as meteorology, hydrology or vegetation science.

Another constraint that occurred during the implementation of the project is a lack of communication between high schools and

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universities. It is rare and is mostly based on individual contacts and relationships between people. Universities are not searching for cooperation with high schools, or vice versa. Since most of the high schools do not have a specific field of study, their graduates can choose between various universities and there is no special link between them. We are glad that we could help teachers from pilot and testing schools establish contacts and discuss the work of their students and make excursions to the labs and greenhouses, and maybe we have convinced some of the students to study some scientific topic. We will continue with the cooperation after the end of the project because we consider it beneficial for all participants.

### *Success Factors*

The main success factor of this project was the equality of all participants, especially during the initial phase, which helped to prepare a clear vision and overcome some initial difficulties that could have had a huge impact on the results (time constraints, etc). The inclusion of high school teachers in the project team helped us solve problems we had not foreseen.

During the project, we shared responsibility for the preparation of the deliverables between the experts and coordinated the work using workshops, meetings and e-mail. During the development of the online activities, we had meetings almost every week to test and prepare new lectures. The preparation of research experiments was done in turns. The experiments were proposed by us and the universities, tested on high schools and universities, and the students' and experts' feedback was collected and incorporated in another version through to the final one.

The open communication during workshops was beneficial for revealing additional feedback and sharing ideas and new methods.

*Challenges* The dissemination of the project results is a great challenge for us. For the future, we will focus on integration of the materials of The GLOBE Programme, which will help us to

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disseminate it to many schools in the Czech Republic. Equally challenging is possible collaboration with other universities to help high schools find science partners in their region.

Another challenge is to simplify the materials for use in primary schools and disseminate these materials and methods among primary school teachers. It would be helpful to establish cooperation with colleges of education (pedagogical universities) to address young teachers directly during their studies.

Materials and methods can be easily transferred to other countries by simple translation and adaptation to local curriculum.

## Conclusions

### *Results*

We have succeeded in creating a functional network between our project partners which will help us to improve our materials and incorporate up-to-date scientific results. We also expect that the established contacts of high school teachers and scientists can aid them to improve their lectures and methods.

The result of this project is a compact set of materials and online activities which can help to spread inquiry-based science education to high schools. They can be used out of the box, or they can help teachers to prepare their own research and help them solve questions students are interested in, or even some regional environmental problems.

Soil science and the carbon cycle were not very popular topics, and although they are important they were not taught at many schools. With our simple activities, they can find their way into biology or chemistry classes.

An established network of high school teachers and scientists can be also counted as a result of this project.



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We greatly value one particular achievement of the project, which is to explain to teachers that scientific skills are not only one of many formulations in the new curriculum, but a vital part of all science subjects.

### *Lessons Learned*

For the TEREZA Association, e-learning was a new learning tool and we have gained a lot of experience during its development.

We also have the opportunity to work very closely with universities and get background information about their own students and what kind of students they would like to see coming from high schools. Some of the activities were beneficial for them as well because they do not offer a special course on scientific literacy and could potentially use some of the activities for first year students.

We have verified that inquiry-based science education is highly motivational for high school students and increases their interest in environmental topics and science in general. It also makes them cooperate in groups and present their common work.

The method of the work in close cooperation with high school teachers and students allowed us to get direct feedback for the materials and methods and we have gained valuable knowledge for future materials.

### *Impact on Sustainable Development*

Sustainable cooperation between researchers and teachers is beneficial for both sides. Teachers get access to up-to-date scientific information and research methods, while researchers can influence the potential students of their universities and familiarise them with scientific methods and careers.

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Students gain knowledge about soil and the carbon cycle through various experiments in school or outdoors. Long term hands-on activities provide experience and knowledge, as well as motivate young people in regard to environmental responsibility (Kenney et al., 2003).

The development of low cost hands-on learning activities for science education with use of online tools also provided community-based sharing of information gained during experiments.

Key success-innovation
<ul style="list-style-type: none"><li>• The most innovative is the interconnectedness of online tools with paper materials and field and laboratory experiments.</li><li>• We have created materials appropriate for high school education, which might draw students' attention towards science and research, and if not, they will at least improve their research skills and literacy.</li><li>• The database and online collaboration tool DATEL for students' science reports is also quite unique for high schools in the Czech Republic.</li></ul>

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### *About the Organisation:*

**The TEREZA Association** is a nongovernmental non-profit organisation fostering environmental education at schools in the Czech Republic. We deliver our programmes to over 67,000 children participants a year.

More information can be found on our website: <http://www.terezanet.cz/>

List of links of projects online activities and websites

- <http://www.projekt3v.cz/>
- <http://elearning.projekt3v.cz/>
- <http://datel.projekt3v.cz/>

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**G. The SUN project: exchange,  
learning, virtual learning?**

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**Abstract**

The SUN (Sustainable Urban Neighbourhoods) project aims to stimulate the sustainable development of seven neighbourhoods clustered in the Euroregion Meuse-Rhine. In this context, various learning processes occur among academics, experts, practitioners, local stakeholders, Euroregional professionals and other interested parties. This paper reflects on the extent to which the SUN project has provided an effective learning experience so far. To this end, we zoom in on the case of the SUN energy action in a neighbourhood of Genk Noord-West in Flanders, Belgium. Some success factors and bottlenecks are identified, in particular in relation to the Euroregional character of the project. Further, we discuss how web 2.0 technologies might enhance learning in a regional sustainable development project like SUN.

**Keywords:** sustainable development, regional development, urban development, learning

**Introduction**

Over a few years, the concept of a ‘sustainable neighbourhood’ or ‘eco-district’ has become increasingly fashionable. Many new districts are being planned, and their buildings are increasingly designed in a ‘sustainable’ way. They are, for example, provided with efficient insulation, grey water circuits, green roofs and solar panels. Somewhat futuristic still, such newly built ‘EcoHoods’ appeal to our imagination. At the same time, however, they pose a new challenge to existing urban neighbourhoods: how can we prevent them from becoming

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unattractive and inhospitable zones compared to the newly designed 'sustainable' districts surrounding them?

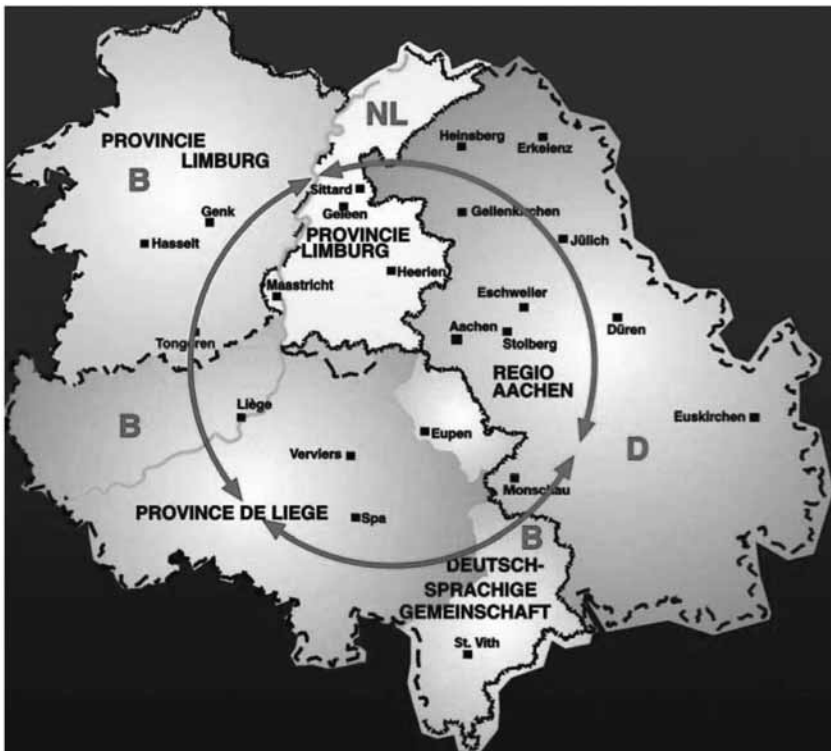
The SUN project (Sustainable Urban Neighbourhoods) aims to address that challenge. Its main objective is to stimulate the sustainable development of seven neighbourhoods clustered in the European cross-border region (Euroregion) Meuse-Rhine (EMR), covering parts of Belgium, Germany and The Netherlands, see Figure 1. The neighbourhoods share a similar history of a flourishing industrial past and more recently a closure of many of the old industries that shaped and constituted their characters. The closing of the industries and many related economic activities during the second part of 20<sup>th</sup> century led to social problems and economic hardship in these urban areas. Associated with these problems was a decline in the quality of the physical environment, especially through the dereliction of industrial sites and declining housing quality (Baeten et al. 1998; Dewulf 2003; Fraser and Marechal 2003; Pasmans and Voorburg 2005; Heerlen 2008). Yet, the neighbourhoods equally include many assets related to cultural heritage or social capital. The project motto 'Enhance your neighbourhood!' reflects that negative trends are to be reversed, and positive trends are to be stimulated.

The SUN project is constructed as a transdisciplinary action research project, engaging academics, practitioners, experts, Euroregional professionals and local stakeholders. In doing so, it puts an emphasis on coordination of public and private action to effectively contribute to neighbourhood sustainable development, on community engagement in the sustainable development process, as well as on building learning networks likely to support collective innovation. Also, it aims to address important research questions. Examples are: how to measure and compare sustainable development across heterogeneous neighbourhoods? And: how to support the exchange of information between heterogeneous groups?

The project started January 2009 and runs till December 2011. It is funded by the European Commission's Interreg IVA Euroregion

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Meuse-Rhine programme. Match funding is provided by the Walloon Region of Belgium, Province of Belgian Limburg, Province of Dutch Limburg, and Regio Aachen. The project is coordinated by the Local Environment Management & Analysis group (LEMA) of the University of Liège. Project partners include various *academic institutes* (LEMA-ULg, Maastricht University-ICIS, Hasselt University, Fachhochschule Aachen, Volkshochschule Aachen), seven participating *cities* (Heerlen, Liège, Verviers, Eupen, Genk, Aachen and Eschweiler), and *expert organisations* (COS-Limburg, DuBoLimburg, Eco'Hom and associated partners Cluster Eco-construction, Smart and SPI+).



**Figure 1:** Overview of the SUN Project area. The seven SUN case study neighbourhoods are located in Heerlen (MSP), Liège (St. Leonard), Verviers (Hodimont), Eupen (Unterstadt), Genk (Noord-west), Aachen (Aachen-Ost) and Eschweiler (Eschweiler-Ost).

### Project structure

The structure of the SUN project is presented in Figure 2. The core of the project consists of four interrelated actions which include coordinated investments necessary to allow a learning process from the local to the Euroregional level. The specific aims of these actions are:

- Action 3 – Economy: to facilitate the reintegration of compatible economic activities within the neighbourhoods, contributing to a dynamic and healthy ‘economic life’;
- Action 4 – Greenery: to develop a neighbourhood’s green spaces, thereby improving environmental quality, strengthening social cohesion, and improving the neighbourhood’s image;
- Action 5 – Energy: to improve the energy performance of neighbourhood buildings, stimulate energy innovation, and create awareness about energy use;
- Action 6 - Community: to facilitate new social connections within and between neighbourhoods and to create a sense of social cohesion amongst the community members.

These aims are reflected in specific development targets, such as improving the energy performance of at least 200 private properties (Energy Action) and creating at least 10 new companies in each neighbourhood (Economy Action). To achieve these targets, the SUN project relies upon the active engagement of local stakeholders. Activities are proposed to them through which they learn about various sustainability themes (reduction of energy consumption, urban greening, etc). Also, they learn to develop, implement and follow-up concrete projects that effectively contribute to improve the liveability of their neighbourhood.

Actions 1, 2, 7 and 8 are aimed at coordinating the whole project and ensuring Euroregional added value: they provide the link between all the other actions, organise the Euroregional exchanges, and ensure the effectiveness of the implemented



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actions (evaluation of the effects in the different neighbourhoods). Action 2, notably, will set up a long-term Euroregional SUN platform, which will keep disseminating relevant information, key contacts and news related to the regeneration of urban neighbourhoods. Actions 7 and 8 will complete the SUN project by further disseminating its results, advertising the participating neighbourhoods and the implemented actions, impacting again on the image and attractiveness of the neighbourhoods and the EMR.

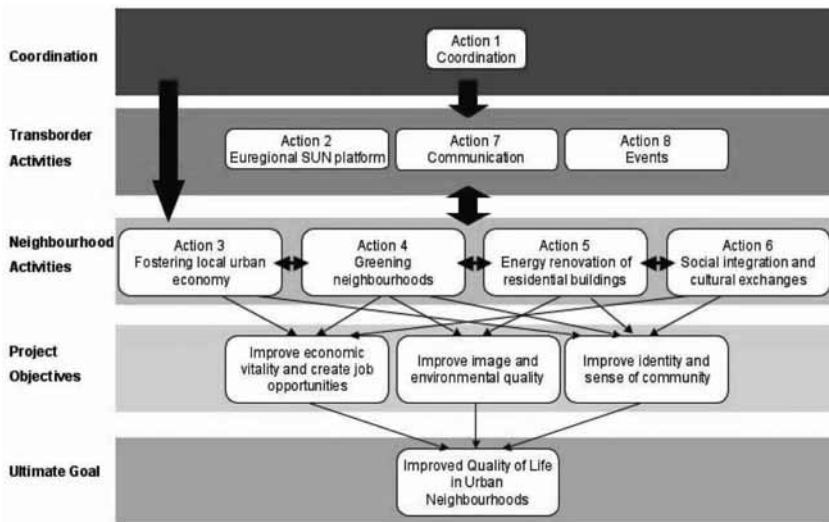


Figure 2: The SUN project structure

### This paper

In this paper we assess to what extent the SUN project provides an effective learning experience so far, which success factors and bottlenecks can be distinguished, and how Web 2.0 technologies might enhance learning in a regional sustainable development project like SUN. In Section 2, the general learning approach of the SUN project is presented. In Section 3 we describe some actual learning experiences over the past year, zooming in on the Energy action in the neighbourhood Genk Noord-West. In Sections 4 and 5 we discuss our main finding and extract the major lessons learned.

### The SUN project as a learning network

The SUN project is a good example of a learning network, as described in the literature on sustainable regional development (e.g. Manring and Moore 2006; Von Malmberg 2007). The project constitutes a network (alliance, partnership) of actors aiming at innovation, amongst others through knowledge sharing or collaborative knowledge development. In terms of participants, this network is rather heterogeneous with representatives from municipalities, consultancies, academics, and individual citizens and entrepreneurs, from different Euroregional nationalities. The elements of the network are people, usually representing organisations, and physical meetings are important in establishing the connections in the network. In addition, ICT support is provided to facilitate interactive learning amongst project partners, and also to reach the wider SUN audience (i.e., the 'direct and indirect beneficiaries' see Figure 3).

The SUN learning network is coordinated through the so-called 'Euroregional SUN platform'. This platform involves all project partners, with the five academic partners as core participants. First and foremost, the platform is devoted to 'building bridges' between academics, experts, and practitioners.<sup>2</sup> It aims to ensure the sharing of relevant information and Euroregional cooperation between all SUN partners. Second, the platform involves the development of a Euroregional common monitoring framework, allowing for an 'on-the-ground', comparative assessment of sustainable development in the different neighbourhoods, based on strong community involvement. This will allow raising awareness about sustainable development, learning from implementation of actions 3, 4, 5 and 6, and highlighting the

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<sup>2</sup> For example, it aims to advise and support local practitioners in their actions, but also to inform and organise exchanges about case studies, best practice, public-private partnerships, and sustainable approaches in order to stimulate creativity and innovation among practitioners.

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critical success factors and bottlenecks for the sustainable development of urban neighbourhoods. Third, the SUN platform aims to set up a long-term Euroregional observation and exchange platform, to be maintained and updated after the project's lifetime. On this ICT supported platform, stakeholders of urban regeneration will be able to find, for example, relevant information on sustainable urban development within EMR, lists of relevant persons and experts, news on related events (inside and outside the Euroregion), updated news on the SUN neighbourhoods, news on other Euroregional urban development projects, and more.

### Who learns?

The SUN project constitutes a complex network of directly and indirectly involved actors, engaged in exchange and learning in various ways. The main learning groups and their relations are displayed in Figure 3 that visualises the learning network as three concentric circles.

- The inner-circle - the 'learning core' - is formed by the SUN project partners, engaged in the Euroregional SUN platform. These include 'Academics' (i.e. the universities), 'Experts' (public/private agencies holding various expertise), and 'Practitioners' (city workers, managing and/or carrying out projects on the neighbourhood level). These partners communicate regularly, for example through project meetings, email exchanges, and exchanges on the SUN website forum.
- The second circle - the 'direct beneficiaries' of the project - closely surrounds this core. First, it includes the various 'Local stakeholders': individual residents, local entrepreneurs, local associations and other stakeholders within the SUN neighbourhoods. Their stake in the project concerns the implementation of the various core actions of SUN in which they are directly involved, and from which they may directly benefit. Second, it includes the 'Euroregional professionals':

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various professionals from cities, provinces, NGOs and businesses in the Euroregion working on specific sustainability themes. These are involved for example through Euroregional professional workshops on specific sustainability themes. Their stake concerns primarily knowledge development, and the development of their professional networks.

- The third and final circle of actors is referred to as ‘indirect beneficiaries’. These actors, labelled the ‘outside world’, include various interested parties (academics, practitioners, experts, citizens, policy-makers) in other regions, cities, and neighbourhoods. They might benefit from knowledge development in the SUN project, e.g. by attending the bi-annual SUN events, visiting the SUN website, and reading SUN publications.



**Figure 3:** The SUN learning network can be visualised as three concentric circles constituting of 1) the SUN partners (‘learning core’), 2) local stakeholders and Euroregional professionals (‘direct beneficiaries’) and 3) other interested parties (‘indirect beneficiaries’ or ‘outside world’)

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### Learning processes and tools

The knowledge exchange between groups - represented by the arrows in Figure 3 – is generally two-way. These exchanges materialise in some main learning processes and tools:

#### *General communication and dissemination*

This includes regular project meetings and email exchanges devoted to project coordination and collaborative work, contributing to exchange mostly amongst project partners. Literature reviews on the one hand, and disseminating SUN publications on the other, is one way in which the two way exchange amongst the project and outside world takes place. The project aims to identify interesting examples of best practices or policies elsewhere and introduce them to the partners. This happens by inviting speakers, setting up field visits to related projects (Green Roofs in the Netherlands, Le Chenelet in France) or share web-based information about them (greenery or passive housing project in Brussels).

#### *Neighbourhood activities*

The implementation of the SUN actions in the neighbourhood involves close collaboration, notably between practitioners (usually from different municipal departments), the academics and experts involved in the SUN project, and local stakeholders. Mutual learning occurs among all these parties through planning, managing and evaluating very concrete activities (for instance, micro-greening projects). Neighbourhood activities may also include awareness raising activities, trainings, and information campaigns related to specific SUN actions.

#### *Euroregional professional exchanges*

Representatives of SUN partner organisations who are involved in a specific SUN action (Economy, Greenery, Energy or Community) meet on a regular basis to coordinate and evaluate the

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implementation of their action in the various neighbourhoods. In addition, informal stakeholder meetings are organised in which Euroregional professionals discuss new ideas and working methods, for example in the field of social and youth work. These exchanges support cross-border knowledge and experience transfers.

### *Bi-annual SUN events*

Five events are planned for the project's duration, four being dedicated to one of the project's specific working themes (Economy, Greenery, Energy, Community) and the project closing event. The four specific events are intended for both communicating on the project and learning from external experts or participants. During the last event the SUN partners will communicate the main lessons learned from the large-scale 'SUN experiment' to a broad public.

### *Evaluation and monitoring framework*

During the second part of the project, an evaluation of the SUN actions will take place in the participating neighbourhoods. This exercise is conducted by the academic partners, but will involve experts, practitioners and local stakeholders as well. To initiate this process, a first attempt was made to develop a shared vision of what a Sustainable Urban Neighbourhood means amongst the various project partners (Beumer et al. 2010). This vision will further evolve throughout the course of the project. Overall, the development and application of the framework aims to result in a better understanding of actions and factors contributing to sustainable development at neighbourhood level.

### *SUN website (member and public area)*

The public area of the SUN website ([www.sun-euregio.eu](http://www.sun-euregio.eu)) is intended to keep the broad public informed about what is going on in the SUN project. It includes a description of the SUN project, the various actions and participating neighbourhoods. Also, it includes news items and an agenda to keep visitors up-to-date on ongoing

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SUN activities. The public area is maintained in four different languages French, German, Dutch and English. The member area of the website is a place where project partners can find and exchange documents (archive function), discuss specific topics (forum function) and plan or announce an event (agenda function).



Figure 4: Homepage of the SUN project website (public area)

### What is learned, and how?

The processes and tools described above facilitate different types of knowledge exchange and development. We distinguish three types:

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- Practical knowledge: e.g. How to insulate your house? or, How to start up a business? Learning practical knowledge is referred to as ‘single loop’ (SL) learning (Van de Kerkhof and Wieczorek 2005).
- Learning regarding attitudes, norms, values and beliefs: e.g. awareness raising about energy use, or developing a shared interpretation of a sustainable urban neighbourhood. This type of learning is referred to as ‘double loop’ (DL) learning (Van de Kerkhof and Wieczorek 2005).
- Learning (collective) skills: e.g. How to manage a neighbourhood in a sustainable way? How to plan and conduct a collaborative project?<sup>3</sup> This type of learning is referred to a ‘capacity building’ (CB).

As a common learning interest, developing a shared interpretation of what constitutes a sustainable urban neighbourhood stands out. Sustainable development is considered the outcome of a process of dialogue (Robinson 2004), rather than an objectively defined notion. Developing a shared interpretation of what a sustainable neighbourhood is, and why and how to create it, is thus probably at the core of the learning experience of a project like SUN. In Table 1, specific learning goals of the various learning groups are further specified and related to the learning processes and tools.

### **Experiencing learning: a case study**

Having described the general learning approach in SUN, we now further analyse how actual learning has taken place during the first two years of the project. To this end, we will zoom in on one particular case: the Energy action in the neighbourhood of ‘Boxbergheide’ in Genk Noord-West.

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<sup>3</sup> This may equally concern a collaborative research action among various SUN partners, or a specific neighbourhood activity requiring cooperation between local citizens, associations, and entrepreneurs.



**Table 1:** an overview of learning goals for the various learning groups, and (a selection of) the processes through which these goals may be achieved.

Who?	What?	How?
<b>Academics</b>	<ul style="list-style-type: none"> <li>• Which actions and factors contribute to sustainable development at the neighbourhood level? (DL)</li> <li>• How to measure and compare sustainable development across neighbourhoods? (DL)</li> <li>• How to support the exchange of information between heterogeneous groups? (SL)</li> <li>• Obtain specific advice on the various sustainability themes (SL)</li> <li>• Improved skills to manage neighbourhoods in an integrated and sustainable way (CB)</li> <li>• Insight in the effectiveness of methods for sustainable neighbourhood development (SL)</li> <li>• Improved methods for sustainable neighbourhood development (CB)</li> </ul>	<ul style="list-style-type: none"> <li>• Development and application of an <i>evaluation and monitoring framework</i></li> <li>• Participation in and monitoring of <i>neighbourhood activities</i></li> </ul>
<b>Practitioners</b>		<ul style="list-style-type: none"> <li>• Testing new practices in <i>neighbourhood activities</i></li> <li>• <i>Euroregional professional exchanges</i></li> </ul>
<b>Experts</b>		<ul style="list-style-type: none"> <li>• Testing new practices in <i>neighbourhood activities</i></li> <li>• Organising and participating in <i>Euroregional professional exchanges</i></li> <li>• Application of the <i>evaluation and monitoring framework</i></li> </ul>

(Continued)

**Table 1:** an overview of learning goals for the various learning groups, and (a selection of) the processes through which these goals may be achieved. *(Continued)*

Who?	What?	How?
<b>Local Stakeholders</b>	<ul style="list-style-type: none"> <li>• Practical knowledge and skills (e.g. how to insulate my home?) <b>(SL / CB)</b></li> <li>• Awareness of sustainability issues <b>(DL)</b></li> </ul>	<ul style="list-style-type: none"> <li>• Participation in <i>neighbourhood activities</i>; awareness raising, training, information campaigns, and participatory planning</li> </ul>
<b>Euroregional professionals</b>	<ul style="list-style-type: none"> <li>• Methods and approaches regarding the various sustainability themes <b>(SL)</b></li> <li>• Practical information on working for private end-consumers in other regions (legislation, tax- and VAT-situation, regional demands) <b>(SL/CB)</b></li> <li>• Extending their professional networks; finding new markets for their business <b>(CB)</b></li> </ul>	<ul style="list-style-type: none"> <li>• Participation in <i>Euroregional professional exchanges</i></li> <li>• Participation in <i>SUN events</i></li> <li>• Participation in SUN activities (call for tenders, call for projects, meetings, training sessions, etc)</li> </ul>
<b>Outside world</b>	<ul style="list-style-type: none"> <li>• What can be learned from the SUN-project in terms of new skills, methods, concepts and approaches to sustainable urban neighbourhood development? <b>(CB)</b></li> </ul>	<ul style="list-style-type: none"> <li>• Exchanging with SUN-partners during the project</li> <li>• Participating in SUN events</li> <li>• Reading/hearing about SUN: website, articles, external conferences</li> </ul>

### The Energy action in Genk Noord-West

The Energy action is one of the four 'core actions' of SUN, directed towards implementing sustainability on the neighbourhood level. Its specific aims are to:

- improve the energy performances of at least 200 dwellings distributed over the participating neighbourhoods,
- set up an operational Euroregional pool of energy contractors,
- raise awareness of global warming and energy consumption of residential buildings in the entire Euroregion, and
- inspire other Euroregional initiatives for renovating houses in existing neighbourhoods.

The Energy action deploys activities in all SUN neighbourhoods. Here, we zoom in on its implementation in Genk Noord-West, in particular in the neighbourhood of 'Boxbergheide'. Boxbergheide is a relatively well-kept neighbourhood with detached and semi-detached houses on large plots that were built in the 1950s and 1960s. The first inhabitants are now retired. Some of them leave the neighbourhood for a smaller dwelling closer to the city or for a retirement home. Young families move into the attractive, though by now outdated, houses<sup>4</sup>. In Genk Noord-West, the SUN Energy action has been integrated into the ongoing projects 'Limburg isoleert' - a 2-year insulation campaign by the Belgian province of Limburg ([www.limburgisoleert.be](http://www.limburgisoleert.be)) - and 'Limcoop' - an existing purchasing group programme by the Christian Workers Movement ([www.limcoop.be](http://www.limcoop.be)).

To accomplish its task, the Energy action set up a strategy based on two main actions: an *energy challenge* and the setup of

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<sup>4</sup> As opposed to the other case study neighbourhoods in SUN, especially the old city-centre neighbourhoods in Liège and Verviers, most inhabitants here are home owners and have been living in the country for many years. Therefore, in a second stage, we are now looking into other neighbourhoods in Genk with a more comparable situation vis-à-vis the general context of SUN.

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*purchase groups*. As a complementary service, a *Euroregional pool of energy professionals* that are offering their services to people planning an energy renovation is being set up.

### *Energy challenge*

The energy challenge is based on the existing Climate Neighbourhoods ('Klimaatwijken') /Energy Neighbourhoods campaign, discussed later in this paper. The general idea is to set up a contest between the city and groups of neighbourhood inhabitants to reduce their energy consumption. The set up of the challenge offers the opportunity to:

- Inform people about their actual energy consumption.
- Provide a medium of exchange within and amongst neighbourhoods.
- Provide a way to evaluate the results of modifications in dwellings or in behaviour and therefore a way to communicate the results and stimulate others to join.

The following activities were undertaken:

- The energy challenge was presented to the inhabitants of Boxbergheide in an information session about purchasing of insulation materials.
- In a second session, the inhabitants were offered the chance to monitor their energy consumption through the energy challenge website ([energie.sun-euregio.eu](http://energie.sun-euregio.eu)), and were offered help with filling out subsidy application forms.
- Finally, some inhabitants were visited to give them advice on their individual options to improve the energy performance of their household.

The cornerstone of the energy challenge is an internet-based computer programme where the so-called 'energy masters' or the participants themselves enter the energy meter readings,

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taken preferably every week at the same time.<sup>5</sup> When the meter readings are entered, the programme immediately compares the latest meter reading with the results in a reference period. The programme also immediately compares the energy consumption with the consumption of comparable families and houses. For many families this is an important time of truth and insight. The fact that it is not the individual families, but the groups that are being challenged, stimulates the families to exchange experiences and to share tips and tricks. Also, the meter readings give the energy masters and the back-up professionals the opportunity to help people reduce their energy consumption and trace technical or behavioural problems.

### *Purchase groups*

Setting up purchase groups, furthermore, aims both to offer inhabitants an attractive deal, and to stimulate them to communicate and work together. An invitation for group purchase information sessions was distributed in every mailbox in the neighbourhood. Local commerce was asked to put posters announcing the sessions in their shop windows. While distributing them we explained the SUN-project and the Energy action offer. Some 100 inhabitants attended the information sessions. At the first session, both the 'Limburg isoleert' and SUN projects were presented as an introduction to the practical part of the evening. This part explained the why and how-to of roof insulation and presented the purchase group approach. After this session, people expressed their interest in the participation in the purchase group. At a second session people came back with the dimensions of the roof or the attic-floor

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<sup>5</sup> The energy masters are members of the groups volunteering to help their fellow participants with tips and tricks to reduce their energy consumption. Before the start of the challenge the energy masters get training and some materials like energy meters to check the consumption of appliances.

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to place the order. They were also informed about the practicalities of the delivery of the materials. Eventually, some 40 inhabitants of the neighbourhood bought roof insulating materials for their houses through this first purchase group. When the materials were delivered, another session was organised where people were assisted with the application for subsidies. For the second year the proposal was extended to the purchase of cavity wall insulation and condensing boilers.

### *Euroregional pool for energy professionals*

The Euroregional pool of energy professionals, finally, aims to offer lists of relevant advisors, contractors and suppliers to people who became interested to renovate their house through the Energy action activities. The energy professionals are asked to engage themselves to stimulate people to insulate their homes correctly, to work according to good practice and manufacturers indications, and to stay informed by attending information sessions. At first we started to list professionals locally to extend afterwards to cross-border activities. The call for participation in the pool was presented to groups of contractors at the annual construction trade fair in Hasselt. Recently we developed a commitment pledge that we presented for the first time to contractors from both Wallonia and Flanders attending a meeting concerning the purchase groups in Liège. While preparing the public tender we personally contacted contractors in both regions asking for their interest.

### **Who learned what and how?**

These activities engaged various learning groups in the exchange of knowledge:

- *Local stakeholders* – notably individual residents - gain practical knowledge (e.g. about how to insulate their houses), and become aware of their energy use. The energy challenge helps people to learn from their own experiences and those from other people in their group, in their neighbourhood, in

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other SUN-neighbourhoods and in the Euroregion. These learning experiences were facilitated by the mix of information sessions, individual advice, and the web supported energy monitoring system.

- *Practitioners* learn about the different approaches for neighbourhood energy consumption reduction amongst the partner cities and amongst other cities. They attended local preparatory meetings with SUN-energy experts to discuss various approaches, allowing them to decide on their own approach. They were also involved in the preparation and implementation of the actual actions undertaken. SUN also trained a number of practitioners as 'energy masters' to instruct people how they could reduce their energy consumption and their climate footprint.
- *Euroregional professionals* learn from the SUN project in various ways. For many of them, the purchase groups and working in other regions are new experiences. The SUN-projects also translates the concept of sustainable development into something tangible. The SUN energy experts confront them with 1) a preference for the use for ecological materials for insulation, 2) working in cramped old city neighbourhoods for clients who are in many cases less well off and less motivated, and 3) with the challenge of putting (local) unemployed people to work. They learn also about the regional differences in social legislation, tax- and VAT practices and energy performance regulations.
- *Experts* engaged in SUN have different backgrounds. So the contacts introduced them to other fields. To do so, they had to adapt their 'professional' language. Also, partner organisations adopt ideas from other cities for their own work.
- *Academics* have learned notably how sustainable development is perceived among project partners, the role of energy efficiency in various monitoring frameworks for sustainable neighbourhood development, and first insights in factors which support and hamper the exchange of information between the various actors involved in SUN.

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The learning processes thus entailed a mix of sharing information often through internet, informal conversations, dedicated meetings, websites, web forum, and email. The dual track Energy action has been a red ribbon through all meetings we had, but there has also been quite some informal and somewhat ad hoc exchange. Whenever relevant information is found that might be interesting to others, this information is sent on by email. In preparation of the actions, SUN partners were present at local markets and neighbourhood festivities talking to residents and explaining about the project. Contacts were made with representatives of local organisations, and information sessions were set up. The hope is that partners and external contacts pick up these ideas, modify them to suit their situation, and exchange again.

## Discussion

### Success factors and bottlenecks

In terms of facilitating information exchange and learning, the main challenge of the SUN project originates from the complexity of the project. In short, the project aims to facilitate *trans-border* exchange between representatives from different regions (Flanders, Wallonia, Netherlands, Germany), *interdisciplinary* exchange between different sustainability themes (energy, greenery, community, economy), and *trans-disciplinary* exchange between academics, professionals, and local stakeholders. Note that with four core actions being undertaken in seven different neighbourhoods, potentially 28 sub-projects should be taken into account. This implies specific challenges in terms of facilitating exchange among stakeholders of diverse backgrounds, and managing extensive information flows. In this section we discuss some of the success factors and bottlenecks that have emerged so far, in relation to the learning processes listed in Table 1.

A major success factor is the diversity among the partners, which relates to the Euroregional character of the project. All partners bring in their own experiences, circumstances, and framework in which to work. Just comparing the different situations already



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opens people's minds. Successful examples of Euroregional learning include the shared understanding of a sustainable urban neighbourhood developed by the academic partners, and the exchange on local legislation, support mechanisms, and approaches with respect to energy saving among and between the practitioners and experts.

A second success factor is connecting learning with concrete action. The SUN actions bring various groups together in neighbourhood activities to translate the concept of sustainable development into something tangible. Learning about sustainable development then becomes concrete, fun, and in one's own interest. Examples are the neighbourhood gardens project in Heerlen and the energy challenge in Genk.

A third success factor is the involvement of role models. Thus, energy challenge group members get tips and tricks to save energy from voluntary "energy masters" who have been trained by experts and from fellow group members who were already very energy efficient.

A fourth success factor is the provision and exchange of relevant 'new' data that generate new insights and awareness. An excellent example is the collection, sharing and comparing of data on energy consumption of households in the Energy action.

At the same time, there are bottlenecks associated with these success factors. A first – rather practical - bottleneck is the language barrier: the Euroregional character brings along language barriers which hamper communication and learning. This concerns not only exchanges between neighbourhoods. Also within neighbourhoods, having inhabitants from various cultural backgrounds (also from outside Europe), communication can be a challenge.

A second group bottleneck factors related to the relationship between project partners on the one hand, and neighbourhood

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inhabitants on the other. The development of mutual relationships around common interests requires trust building, which, especially with inhabitants, is a long-term process that does not match well with the short time frame of a project. Also, the main common interest of the SUN project – working towards sustainable neighbourhood development – can be considered abstract. Moreover, the project is of an experimental, learning-by-doing nature, which conflicts with expectations of direct benefits and fully functional offers among stakeholders.

Some additional bottlenecks are listed below:

- The present SUN website appears to have a relatively high threshold for uploading information by the various project partners. As a result, the website remains a rather static description of the project's starting points, rather than a dynamic overview of the many activities that are taking place. Also, it fails to support communication in between face-to-face meetings and events, which might be a benefit of a web based communication platform.
- For the academics engaged in the SUN platform it is hard to engage in or even to keep track of neighbourhood activities. The sheer extent of the activities taking place forms the main culprit here, probably in combination with the lack of an adequate and continuously updated overview of the activities taking place.
- The experts and practitioners, finally, are sometimes faced with very practical bottlenecks, such as finding sponsors and money for investments. Stakeholder participation is often limited ('high potential' participants are absent), as is the involvement of other city services and neighbourhood partners. Also, balancing city and project interest can be a challenge for city representatives.

### **How can web 2.0 technologies help?**

Web 2.0 services have the potential to foster creativity and collaboration, enhance interactivity and sharing, and stimulate

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participation and networking far better than the more traditional knowledge exchange platforms (see also Chapter 6 by De Kraker et al.). Here, we reflect on how web 2.0 technologies may help to overcome the barriers in the learning processes mentioned in the previous section, and may thus enhance the effectiveness of learning in the SUN project.

- Language barriers: Multi-lingual technical support is a standard feature in web 2.0 software. There are also automatic content translation tools such as Google Translate, which do not work perfectly, but usually suffice 'to get the message across'.
- Short time frame of the project: Intensive social interactions mediated by web 2.0 social software in addition to the current face-to-face meetings could (partially) compensate for the short duration of the project.
- Experimental nature of the project: Web 2.0 facilitates active contribution of ideas, data, opinions et cetera of each participant. Using this to involve inhabitants in the project's learning-by-doing, may even lead to an appreciation of the nature of the project.
- Limited communication in between face-to-face meetings: Web 2.0 based platforms put the user in control and are highly accessible. The facilities for networking and collaboration in dedicated communities could help to keep communication alive and productive between meetings.
- Keeping track and monitoring of neighbourhood activities is hard: Following such activities could be made easier when they would make use of web 2.0 tools, e.g., through dedicated communities or websites that include news, (micro)blogs, photos, data collections and forums on particular neighbourhood activities such as the energy challenge.
- Limited participation in the various SUN activities: The barriers to participation could be reduced by allowing more opportunities for virtual exchange activities on a web 2.0 based platform. In particular exchange of practical knowledge can be mediated very effectively and efficiently with web-

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based forums. An inspiring example is the Ecobuilders User Forum ([www.ecobouwers.be](http://www.ecobouwers.be)) from the 'Bond Beter Leefmilieu' (Federation for a Better Environment) in Flanders. This forum is running nearly by itself and yet offers an incredible amount of information at an understandable level on a very broad range of living and construction related issues. Recently a construction Wiki was created based on the exchanges on the forum and a blog section was added where builders show the progress in their construction activities.

## Conclusions

The SUN project aims to stimulate the sustainable development of seven neighbourhoods clustered in the Euroregion Meuse-Rhine. The project is a good example of a learning network. It includes various learning groups such as academics, experts, practitioners, local stakeholders, and Euroregional professionals – each with their specific role, expertise, and learning goals. The project involves various learning processes and tools, including neighbourhood activities, Euroregional professional exchanges, bi-annual SUN events, the development and application of an evaluation and monitoring framework, and the SUN website. Through these processes and tools, different types of knowledge may be exchanged and skills developed. This includes the exchange of practical knowledge, learning regarding attitudes, norms, values and beliefs, and capacity building.

The case study in Genk illustrates that learning indeed covers these different types of learning. Practical knowledge is exchanged (e.g. on how to insulate houses), awareness is raised (e.g., about energy use), and capacities are built (e.g. concerning group purchasing). A main success factor relates to the Euroregional setting of the SUN project: exchanging cross-border experiences may lead to successful transfer of practices to a different context. The same setting creates, however, a bottleneck as language barriers exist between inhabitants and between people directly involved in the project hamper communication. Web-based learning may

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stimulate the learning experience as is illustrated by experiences from two other projects. Web 2.0 technologies may help to overcome, at least partially, various bottlenecks in the learning processes of the SUN project. As such, virtual, web-based learning could be an important contributing factor in achieving the project's learning goals.

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**H. Development of common environmental training activities between Greece and the Former Yugoslav Republic of Macedonia (FYROM)**

Eftichios S. Sartzetakis, Benjamin Karatzoglou, Thomai Filippeli

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**Main Features of The Project**

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Name of the Project	Development of common environmental training activities between Greece and FYROM
Category	Multi-oriented learning approaches (learning processes addressing people from a range of backgrounds ,e.g. intergenerational, intercultural or intersectoral learning)
Theme	Environment, Education for Sustainable Development, Awareness raising
Target Groups	Pre-school children, school children, children and teenagers, (non - school activities) University students, general public, business
Area of Implementation	Thessaloniki Greece Prilep, FYROM
Leading Organization(s)	University of Macedonia St. Kliment Ohridski University at Bitola
Authors	Ass. Prof. Dr. Eftichios S. Sartzetakis Dr. Benjamin Karatzoglou Thomai Filippeli

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**Abstract**

The project entitled “Environmental Education and Development of Educational Material in All Stages of Education” was a three-year programme that started on January 2006 and completed on November 2008. It was funded by INTERREG IIIA/ Cross-Border Programme between Greece and the Former Yugoslav Republic of



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Macedonia. It aimed at promoting cooperation between Greece and FYROM on issues related to environmental education. The main deliverables of the project were: (a) at the primary education level, the development of a best practice data base in the field of environmental education for young pupils, the production of bilingual educational materials and the creation of an internet site on which to upload the material produced and serve as a communication platform; (b) at the university level the development of a complete set of education material to support two courses on environmental economics and management; (c) at the business level, the design and implementation of a thirty-six hour seminar on environmental economics and management delivered by ten leading scholars to selective group of business executives, and the development of the supporting educational material.

**Key words:** development of education material for ESD, environmental economics and management

### Introduction

#### *Regional challenges*

The main objective of the funding organisation is to promote European partnerships at the regional level with the intention of transferring knowledge, experience and best practices and furthermore developing common strategies and actions for the region's development. Greece and FYROM apart from sharing common borders, they have developed, over the last decade, strong economic and business ties – a great number of Greek enterprises have branches in FYROM – and more recently there is considerable cooperation at the educational level. However, there is little effort in developing common strategies to address environmental issues, despite the fact that the two countries share common problems as well as natural resources.

Given this situation and the fact that both partner institutions, University of Macedonia and St. Kliment Ohridski University, have

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considerable expertise in economics and business, we chose to cooperate on economic and environmental issues at all levels of education. We identified the need for the establishment of a common set of principles, terminology, and tools which would help the learning subjects (pupils, students, young professionals) understand the continuity and complementarities that characterise learning for sustainable development.

Finally, the need to introduce the EU's existing legislation, regulations, trends, and aspirations on environmental issues, modified and appropriately adjusted to the perceptions, priorities and needs of a non-EU country benefited both the producer and the recipient of the information and educational material, in the sense of juxtaposing the past with the future, the motivations with the limitations.

### *Objectives*

There were three individual sets of objectives:

1. Cooperation between the two leading institutions (University of Macedonia and St. Kliment Ohridski University) on environmental education issues concerning primary, secondary and higher education. More specifically, for higher education the main objective was the development of integrated, scientifically sound training material for the introduction of two new undergraduate environmental courses (environmental economics and environmental management).
2. Environmental awareness raising of low- and mid-level corporate executives / organisation decision makers.
3. Construction of a (bilingual) site comprising supportive formal and informal training material (games, videos) for elementary school children and high school students.

### *Partners-Networking Activities*

This project was oriented towards the cooperation of institutions at all levels of education. More specifically the partners of the project are:

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1. University of Macedonia (university, the leader of the project)
2. St. Kliment Ohridski University at Bitola (university, Core Partner from FYROM)
3. Union of Greek elementary school teachers, department of Central Macedonia (public sector, partner, participation in development of educational material for environmental issues)
4. Union of Elementary school teachers, Macedonia (public sector, partner)
5. Fivestar S.A. (private sector, portal development and e-learning materials manufacturer. This partner developed the internet site of the project and uploaded the educational material.)
6. Regional Authority of Central Macedonia (Local/Regional Government, the partner that supervised the project financially)
7. University Research Institute (partner, research centre that was in charge of the project's administration)

### *Structure*

The project was a collaborative effort between the Universities of Macedonia and University of "St. Kliment Ohridski" at Bitola, Faculty of Economics at Prilep on issues related to environmental education and developed along the following two lines. The first one aimed at educating and raising awareness about environmental issues, university students and business professionals / executives. At the University level, the project focused on creating educational and training programmes in the field of environmental economics and environmental management. At the business professionals' level the project focused on integrating environmental issues into the management practices. The second line of the project, aimed at developing environmental education material for younger pupils that combined education with entertainment (edutainment). These materials included a data base containing best practices in environmental education, the production of bilingual educational material and a collection of electronic games with environmental themes.

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The project also included the organisation of workshops and short training sessions for primary and secondary education teachers. These seminars were designed to inform teachers on topics and teaching techniques, including the creation of databases and educational material. The outcomes of all the project's actions are presented in a specially designed website which serves also as the main platform for communication among the participating groups and individuals.

### *Funding*

The project was carried out as a part of the Programme of Community Initiative INTERREG IIIA/PHARE CARDS 2000 – 2006 Greece – FYROM, Measure 2.3 “CO-OPERATION OF EDUCATIONAL AND RESEARCH INSTITUTES” – Category of Actions “Development of Common Educational Activities” and it was financed jointly by national resources and European Regional Development Funds. The total amount of funding was 240,000 Euros.

## **Approach/methodology**

### *Learning Activities*

#### Forms of Learning:

For the purposes of the project the partners decided to provide both forms of learning

- (i) Formal learning e.g. seminars and lectures in the formal education system
- (ii) Non formal learning e.g. workshop, course without certification

#### Learning Approaches:

The learning approaches that were followed during the implementation of the project were

- (a) Online learning
- (b) Collaborative learning

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- (c) Theory-oriented learning
- (d) Intercultural learning
- (e) Project-oriented learning
- (f) Edutainment (education through entertainment)

### Types and number of learning interactions:

More specifically, the formal learning interactions include two courses of twelve lectures each, per semester, for undergraduate students. The modules taught are environmental economics and environmental management and the educational material developed for the aforementioned courses was translated from Greek to English. These two courses were integrated into the curriculum at the University of Macedonia, while there were presentations to students at St. Kliment Ohridski University in order to increase their interest and create the conditions for integrating these courses into the local formal curriculum in the future.

Moreover, a thirty-six hour seminar entitled “Environment – Economy – Firms: New Approaches on Environmental Management” took place at the University of Macedonia for professionals and executives. The participants had the opportunity to attend lectures from distinguished academic scholars in the field of environmental economics and management, leading practitioners in the field of Environmental Management Systems as well as the Director of Greenpeace Hellas. They also exchanged ideas about corporate activities and their relation to the environmental awareness and made their own suggestions for future seminars. We received more than 80 applications, a number beyond our expectations and could accept only 36. The participation was very active and the evaluation of the speakers and educational material reflected the success of this event.

Apart from the above actions, two conferences took place in Thessaloniki – the first in the middle of the project and the

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second at the end – where the partners from the two countries, Greece and FYROM, had the opportunity to exchange ideas and best practices concerning environmental education in all stages of education. During these conferences, the participants from both countries had the opportunity to get informed about the structure of the educational system of the other country with an emphasis in environmental education. There were also some academic activities such as presentations of PhD students from both universities concerning environment and sustainable development issues and short lectures from invited professors in the field of environmental economics from abroad. At the end of each session of the conferences there were short discussions between the members of the two partners and exchange of ideas for further cooperation between the two academic institutions.

Apart from these two conferences, several meetings between the leaders of the project took place in order to achieve the best cooperation and synchronisation of the activities that were essential for the successful implementation of the project. One of these meetings took place in Chalkidiki, as an education excursion, where the partners had the opportunity to meet in a different environment and combine the activities required for the project with entertainment and further teambuilding.

The last meeting of the partners took place in FYROM at the “St. Kliment University Ohridski” at Prilep. The partners from Greece visited Prilep and among other activities they presented two 2-hour lectures introducing to undergraduate and postgraduate students the area of environmental economics and management.

### Innovative Aspects of Learning Activity:

- In all learning activities of the project, apart from the two university courses for the content of which particular constraints exist, we used interdisciplinary teaching approaches. For example, the seminar for business executives was designed so

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that environmental issues were approached from the engineering, economic, management, accounting and ethical point of view. To achieve this, leading academics and professionals were invited to give lectures on the topic of their expertise.

- Equally important was the fact that the project promoted cooperation among educators from Greece and FYROM on environmental issues. This is especially important given the tension that exists between the two countries in the last few years. These tensions at the international affairs level prohibited cooperation at the educational and environmental level. Thus, the project contributed to building bridges, exchanging ideas and developing common approaches to some important issues.
- Also the intergenerational aspect of the project led to interesting and important results as it was the first time that all levels of education were included in a research programme with aligned aims and scopes.
- The mixing of the academically approached normative knowledge with the practical perception of active business executives enriched knowledge and understanding on managing sustainable development issues.
- Further added value was achieved by the exchange of training and environmental management experiences between trainers and authorities from two different, yet neighbouring countries.
- Edutainment – Development of games addressed to children with the participation and the guidance of experienced teachers was a side-benefit of the project.
- A common intercultural glossary and set of principles in training participants for sustainable development issues was developed by the partners.

### *Online Learning Activities*

The aim of the online activities varied among the different parts of the project. The educational materials that were produced for

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the two academic courses and the seminar for business executives were posted on the internet. The purpose was to make them available to a wider audience in order to disseminate knowledge and information. For the elementary and high school students activities and games were collected, categorised and presented on a website. New activities/games can be added to the existing list by interested actors after contacting the project administrator. The internet address of the project's website is [www.go-green.gr](http://www.go-green.gr).

The internet site was developed by a company from the private sector, which had the responsibility of the technological aspects. The deliverables of the project were uploaded by the project's members. This site is mainly addressed to teachers of the primary and the secondary education and to children aged from five years to fifteen years old. Teachers can participate actively via the forum of this site and children can find some very interesting games concerning environmental issues. The site is offered in two languages, FYROM and Greek.

Also, one of the deliverables of the project was the creation of two original multimedia learning materials and more specifically the creation of two interactive online game platforms promoting environmentally sound social behaviour. Unfortunately, due to bureaucratic barriers this part of the project was not implemented.

### *Research Activities*

The research conducted within the project aimed at creating the data base for best practices explained above, assessing the current status of environmental teaching and research activities at the two universities and the current status of environmental management at the corporate level in the two countries and evaluating the results of certain actions of the project. The research fields the project covered included Education, Social Sciences, Business and Law. The research methods followed



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were the interview method and the use of metadata from corporate sites. Also, we used questionnaires for the students that participated in the two new courses, in order to estimate their satisfaction from the lectures and the educational material used. We also prepared an elaborate overview for the two participating universities and estimated their potential for research in environmental issues.

These research activities were aimed at evaluating the current status concerning the understanding of the notions of environmental economics and management, so as to customise the training programmes to the actual needs of students and corporate executives. Further, the extent of penetration of environmental training courses and awareness in the educational sector was analysed and several suggestions and tools aiming at improving the current situation developed.

### *How the project functions as a learning network for SD*

The project intended to enhance cooperation and create research and education networks between the scientific and educational communities of Greece and FYROM on sustainable development issues. The cooperation in innovative aspects of teaching and research in the fields of environmental economics and environmental management is very important for the advancement of sustainable practices at the corporate level. The cooperation in environmental education at the primary and secondary education is critical for the promotion of sound environmental behaviour. The cooperation at this level was particularly beneficial for both sides, since both capitalized on the exchange of examples and good practices. Furthermore, relationships developed during this project have created the basis for continued cooperation. For example the two partner universities are exploring the possibility of cooperating in estimating climate change impacts and developing common adaptation strategies with particular emphasis on the region's tourism sector.

### Project discussion

#### *Constraints*

The main constraint was the fact that although the funding was satisfactory for the purposes of this project, there were several problems due to bureaucracy, such as long delays of payments and very complicated procedures for getting the funding. These bureaucratic difficulties prevented the materialisation of the multimedia learning material, which was an important part of the project.

#### *Success Factors (learning activities/outcomes meant to be counted as success)*

The training programme for professionals / executives met the aforementioned needs of the labour market by providing the necessary, comprehensive and complete training to the participants. The penetration of many European and Greek companies in FYROM and the convergence of the economy of the latter with the European – and hence with the Greek – economic reality, makes the need for an early cooperation and exchange of experience and resources between the two countries imperative. We expect that further benefits will arise from future cooperation and exchange of views between business executives and organisations from both countries, as well as from the greater and deeper knowledge on policies and practices of the European Union in environmental management.

The development of teaching material, including best practices, for primary and secondary education in the form of databases and the creation of a website to provide wide access met the needs of environmental education for children at school age. It gave also the opportunity for cooperation and coordination of actions between teachers of elementary and secondary education in both countries, opening up the road for further collaboration.

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The development of the website resulted in wide accessibility to the educational material and more generally the promotion and the dissemination of the project's results. The most important result though is the establishment of a communication channel – through the website's forum - between individuals and organisations in both countries who are interested in issues of environmental education with an emphasis in socio-economic sciences. The number of visitors of the site is really high, and the extended use of its forum not only from school-aged children but also from teachers are signals that this communication channel is an effective way to diffuse the results and the knowledge acquired during these two years that the programme lasted.

*Challenges (sustainability challenge, transferability challenge, other challenges)*

One of the challenges faced in this project was that the partners tried to develop a horizontal effective cooperation between peers from the two participating countries at an era of hostility. Yet, Greek and FYROM elementary teachers, high school and University academic staff cooperated efficiently to the benefit of the regional environment.

## Conclusions

### *Results*

The primary target of the project, which was achieved very effectively, was to establish the collaboration and the coordination of research and teaching activities in the fields of environmental economics and management among faculty members at the partner universities. Equally important goal was to raise environmental awareness of students at the two universities, through their engagement with the fields of environmental economics and management. This goal was also achieved judging from the answers the students gave in an

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evaluation questionnaire prepared for the purposes of the programme. The results of this questionnaire are really encouraging regarding the intention of the students to attend similar courses in the future. An additional indicator of the success of the programme is the fact that students at the University of Macedonia have formed an environmental group, the activities of which continuously increase both in numbers and quality.

We expect similar benefits to arise in the St. Kliment University when these courses will be included into the curriculum. The University's management team has committed to introduce these courses as soon as possible. Further long run effects have to do with covering the needs of the labour market that requires professionals with a basic education in economics and administrative sciences and a specialisation in environmental issues. The environmental awareness and ultimately the specialisation of students of both universities are expected to have significant multiplying effects and future managers of public and private companies will have not only the necessary scientific training and relevance but also the sensitivity and knowledge to promote environmentally friendly practices in their future careers as professionals.

The critical pending issues of environmental concern which may impact the natural environment as well as the effectiveness and efficiency of active entities (business and organisations) were identified and special training material was produced by field experts who delivered a 36-hour seminar in the premises of the University of Macedonia.

Special supportive edutainment material was created to train elementary and high school students on sustainability topics. The development of the material was cooperative and dynamic in the sense that active members from both countries took part in the initial conception, examined the appropriateness and the effectiveness of the manufactured activities and suggested

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corrective action. The outcome of the effort is freely accessible on the [www.go-green.gr](http://www.go-green.gr) site to promote and disseminate information between potentially interested parties and facilitate communication for further relevant initiatives.

### *Lessons Learned*

Within the project, the partners succeeded in creating education and entertainment material for almost all ages – from children that attend elementary school to graduates students and teachers – and combine their knowledge on environmental education in order to create a database with a great amount – not only in quantity but also in quality – of courses, lectures, sources, games etc. This was the first attempt in Greece and FYROM of creating such a useful set of materials for so many people of different age and cultural background.

### *Impact on Sustainable Development*

The main goal of the project was first to introduce the notion of sustainable development and then broaden the understanding of its content, to young people at all stages of education and also in their early professional career. We believe that through the actions of the project we made a significant contribution towards changing consumption and production habits and patterns in the two countries. Consumption patterns are built from a young age, so our focus on the primary and secondary education could be really effective. The seminar for business executives provided concrete strategies for implementing environmental management practices and also specific examples and best practices that could contribute towards changing production patterns. Sustainable development, climate change, energy efficiency, sustainable tourism, solid waste and water resources management were among the topics discussed at the seminar. Business executives were trained in the standardisation of performance measurement and presentation of the environmental impact of corporate activities.

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Furthermore, we believe that the establishment of relationships and common interests between actors of neighbouring countries via workshops, conferences and lectures will help to combat common sustainability problems. Ethics, creativity, and coping with changes were also part of the corporate agenda.

### Case study authors

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# Chapter Nine

## Summary, Reflections and Meditations

Jon Dron, Zinaida Fadeeva (3-LENSUS external evaluators)

### Introduction

The 3-LENSUS project, some results of which have been presented in this book has, in keeping with the principles it has discussed and uncovered, taken a multifaceted and many-dimensional perspective on learning for sustainable development. Reading through the chapters of this book it is possible to perceive a build-up of networked layers through which those facets are projected. The resulting composite structure is not a perfectly cohesive edifice in which a single view or understanding prevails. Rather, it reveals complexities, nuances and, occasionally, contradictions that combine and intertwine to create a rich examination of the subject area from multiple perspectives. Having said that, certain themes are pervasive, most obviously that learning is a profoundly social phenomenon, networked at many levels. This theme informs both the subject-matter and process of the project. A great strength of networked learning is that it both emphasizes and valorises diversity of views. In this respect, the project has, self referentially, been a rich learning network, woven in ways that have sometimes led to collective outcomes, sometimes to individual insights.

There are many products of this projects that are worthy of note, including:

- The theoretical frameworks (reflected in Chapters 2-7)
- The literature review (related to the overall focus of the project – Chapter 2, and to the individual topics – Chapters 3-7)
- The database (Chapters 5 and 7)

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- The development of indicators (Chapter 3)
- Events, summer schools, workshops (Chapter 5)
- Analysis of some existing learning processes/courses (Chapters 3 and 8)
- Platforms for learning and knowledge exchange and building (Chapter 6)
- Case presentations of the multi-actor regional learning processes for sustainability (Chapter 8)

Each of the components stands alone yet each joins with the rest at various points of contact or overlap, building through loose connections into a distinct web of knowledge. In this chapter we shall attempt to trace some patterns in that web, to critically examine how it hangs together and what, overall, can be discerned about the learning that has occurred in the course of this project.



**A brief overview of the chapters  
and some of the key findings**

## Chapter 1

This chapter frames the issues of sustainability in a context of the knowledge triangle of education, research and innovation and the roles of universities in enabling learning for sustainability. It provides an important reference point for the rest of the book by framing a number of the most important questions and issues. Of particular salience are the relationships between knowledge production, application and communication. Another important issue raised is that of the need for diversity of knowledge, recognizing that it is not one thing for every need, but a set of interlocking, overlapping and sometimes conflicting ways of seeing the world.

By highlighting the role of HEI as a central partner engaged in all aspects of the knowledge triangle as well as responsibility for further sustainability agenda, the article points at the need for HEI to incorporate a range of principles – collaborative activities, attention to equity, democratic research (or formation of research agenda) into research, education and innovation. By doing so, it clarifies the focus of the project, choice of the project partners and project activities (development of the RCEs, focus of the ESD cases) as well as justifies some of the recommendations seconded by other chapters.

## Chapter 2

This chapter provides a critical review of research in the ways that universities can and do contribute to regional sustainable development and to ESD. A notable conclusion is that the type of SD and ESD research undertaken on the role of HEI in regional sustainable development are not providing enough analysis and

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do not generate a sufficient degree of abstraction to derive lessons useful for other HEIs and regions. In particular, the article posits that typical case study methodology used for such research makes comparison and measurement difficult. While we would argue that such methodologies tend to be appropriate for the subject area because the meanings in each case are closely associated with context, so a reductive approach would be counter-productive in discovering the value of most interventions, which does raise some interesting questions as to how such measurements and comparisons might be achieved. To some extent, the development of indicators described in chapter 4 shows one way this might be achieved in the focus area of 3LENSUS project: the indicators do not allow for experimental comparisons but do place different projects on a more even footing, allowing one to distinguish key differences between them.

In the context of the Project, the article, similarly with Chapter 1, justifies the role of the HEIs in the regions as well as shows challenges of collective ESD actions, identifies the need for the cases that not only are more reflective but also focus, simultaneously, on the ESD/SD project planning, the implementation process and results, and relates these results to the broader regional context.

## Chapter 3

This chapter discusses the development and form of the indicators that reflect learning processes in networks for sustainability. As such, there are some large overlaps between this chapter and the one discussing database (Chapter 3), which also had to make such distinctions in order to structure the database in the first place. The two processes took place fairly independently for much of the time although regular meetings and communication meant that they were not at complete odds with one another. None-the-less, it is interesting that there are indicators which were not implemented in the database and

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information collected in the database that was not reflected in the indicators: the two co-evolved and, like many co-evolved systems, never entirely reached a point of mutual stasis. We do not see this as a flaw for, though it might have made things easier if both were applying the same structures at the start and end, the dialogue that arose and the need for interpretation that was implicit in those differences made for a richer perspective that pushed each forwards in a dance of co-evolution. This is especially useful because of how the development of the indicators drew heavily from other parts of the project, notably in its application of the Graz model, thereby helping to bind together the work of different teams with different perspectives.

Interestingly, the article tells a story of intra-project learning and development where the ultimate “meeting point” between the Database and the project indicators happened at the end of the project where indicators served to identify the most interesting and informative case stories uploaded into the Database, the cases presented in Chapter 8.

The chapter also shares some useful insights of the partners critically discussing ESD indicators developed by reputable international processes, i.e. UNECE.

## Chapter 4

This chapter presents a discussion of the kinds of learning that are significant in education for sustainable development. By bringing together social learning and e-learning it shows the potential of e-learning for strengthening the development of the ESD systems.

The case study presented by the article shows an interesting approach within a formal course-oriented setting. By positioning its discussion, among other reference points, in relation to the Delores Framework (UNESCO, 1996), it paves the way for the future discussions and development of the topic beyond boundaries of the project.

## Chapter 5

This chapter presents application of the methodology developed for assessment of the multi-stakeholder regional initiatives to three sub-projects – , the Database on Learning for Sustainable Development, the Project Seminar Series and the Copernicus Alliance (the European Network on Higher Education for Sustainable Development). This methodology – the Graz Model for Integrative Development Processes - most notably has helped to analyse the processes behind the cases. Five categories of assessment - Leadership & Vision, Social Networking, Participation, Education & Learning and Research Integration – present an important set of characteristics for regarding regional collaborative initiatives for sustainability.

## Chapter 6

According to the authors, Web 2.0 tools promise important support to the four principles of effective learning networks: diversity, autonomy, interactivity and openness. Complementing Chapter 5 that demonstrated an opportunity to enhance social learning with Web 2.0 technologies and e-learning strategies within individual courses, Chapter 7 highlights such potential for the learning processes at the regional level. Both chapters bring theory of learning for SD together with concrete applications of ICT.

In this chapter the theoretical underpinnings and development of two social learning environments to support sustainable development – the SUN project and the RCE networks – are described. Following presentation of a selection process of the web-based networking platform, the article describes prototype designs of web-based platforms for both networks.

The authors also demonstrated one of the instances where thinking of the 3-LENSUS partners went beyond the life span of the Project. By offering theoretical insights and strategic design of the web-platforms to the RCE and SUN communities, the

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Project promised a strong virtual component to learning networks facilitated by the projects.

### Chapter 7

The third chapter of the book describes the content of the online database on learning for sustainability, offering a broad overview of the kinds of project that were documented. We were interested to see this because one of the interesting challenges faced by the project throughout related to how this database was developed and populated, and how it related to the development of the indicators discussed in Chapter 4. While technical issues dogged the system (which is not an unusual phenomenon for newly developing products), the results have been useful and revealing. The chapter presents these results with little commentary or discussion but they give a broad overview of attempts that are being made in this area and, because of how the database is structured, provide a means for comparison that somewhat addresses concerns raised in the literature review of Chapter 2. (Interpretation of the meaning of fields was needed and, because of the diversity of organisations that added to the database, not all revealed easily comparable information).

### Chapter 8

Six case examples, selected from the database using indicators of “best practices” and supplemented by two further regional case studies, provide interesting insights into regional ESD practices.

#### **Lessons learned**

##### Kinds of learning

Beyond the notion of networks and sustainability, a central binding theme in this project is learning, both for and about

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sustainability. It is important to distinguish these two meanings because, although there is overlap, the processes and methods used are distinctive depending on whether sustainability is the object of study or the goal of learning. In the latter case, learning is part of the means by which sustainable development arises while, in the former, it is the content to be addressed. There is a constant tension throughout this book that is well explored in several chapters about what kinds of learning are of interest for sustainable development, where the learning comes from, who is doing it, how it is communicated, and who owns it. The knowledge triangle of education, research and innovation can be seen appearing at multiple scales and with multiple overlapping foci, including:

- Learning *by* individuals
- Learning *within* groups
- Learning *within* networks
- Learning *by* networks (collectives)
- Learning *between* networked groups (knowledge transfer)
- Top down education
- Bottom up learning networks

Learning processes presented by different articles have shown many distinctive characteristics of ESD – systems thinking, future orientation, transdisciplinarity, transformative potential and ability to “shift perspectives” between space, time, generations and cultures. They also presented potential for defining personal and collective values.

Apart from generic perspectives and levels of learning, the tensions have emerged in the Project process itself. Among the many discussions relating to which case studies should be included was one that explored whether the 3-LENSUS network itself could be seen as a valid object of study. Certainly, in many ways, its processes and outcomes were closely related to its objects of study: it was entirely about learning, research and innovation for learning towards sustainability. However, in

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another sense this perspective is like a snake eating its own tail: to put knowledge to use means to go beyond the separate space in which it is discussed and to apply it in a manner that improves sustainability.

### **The role of the university**

Universities must have, as a core goal (perhaps the only one from which others are derived) to increase the knowledge in the world. In accordance with Humboldtian principles, this may be through learning, through research and innovation or through providing services to the society, and all of the processes, frameworks, models, and methods that are used to support, enable and facilitate them. Bearing this in mind, a recurring motif throughout the chapters is to examine how formal learning institutes and universities can contribute most effectively to increasing knowledge in ways that lead to or from sustainable development. Chapter 6 presents a particularly interesting discussion of ways that universities can contribute to regional development and the theme is also well explored in the literature review of Chapter 2, but the central theme binds all of the chapters in one way or another.

### **Formal learning in informal ways: bringing HEI closer to the society**

One obvious way that universities can contribute back to the community is to leverage the traditional skills and practices of the institutions to provide courses for students and professional communities. As might be expected from a consortium that is largely composed of academics in formal institutions, formal education has indeed figured largely, with much talk of students and courses in several chapters, with a focus on education about sustainable development rather than for it (although the two are linked – learning about sustainable development is a vital step towards embedding learning in the process). In this regard, some innovative methods and processes have been used to help

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students to understand issues in sustainable development, including powerful ways of utilising wikis and vibrant workshops and summer schools.

Chapter 5 presents an interesting transitional approach, making use of a framework based on communities of practice and extensive use of wikis to support that process. The interventions were clearly successful, with a particular focus on the application of the communities of practice model in this case, given that it describes and prescribes an approach suited to non formal practices (Lave & Wenger, 1991; Wenger, 1998). The course described here is, however, much in the traditional formal mould, in which distinct, task-focused, deliberately closed and hierarchical groups are intentionally formed and legitimate peripheral participation is frowned upon, at least when grading students. While the strict applicability of a communities-of-practice model may therefore be questioned, the fact that a model that comes from work with communities and organizations comes to be used here highlights one of the key strengths of the project, in which diverse ideas and practices have been allowed to bleed through into other facets of organizational behaviour. This may be seen as a step toward a richer model of institutional learning that blends social learning within a traditionally rigid learning context.

What the wiki-based methods and communities-of-practice ethos actually seem to have allowed was a greater level of ownership and participation on the part of the students, carefully and effectively nurtured through the interventions of a skilled and dedicated teacher, whose presence was made visible and tangible through the use of wikis in the process. Indeed, rather than a community of practice, this was a model of excellence in the community of inquiry model (Garrison & Anderson, 2003), with very strong teacher, social and cognitive presence throughout. This model might have strong applicability within a less formal context, bleeding backwards into enabling more effective learning in an informal or less formal context. Indeed, it illustrates well how the Graz model (chapter 6) might



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apply in such a setting for it was the leadership and vision, combined with a social network, participation, research integration and learning and education that, holistically, led to the successful outcomes observed. Had any of those elements been missing, it may not have been such a success.

### **Informal learning in formal ways: embedding learning in organisations**

Formal education can play an important role in enabling individuals to deepen their knowledge of sustainable development, but it is often only a part of the story because it carries with it the grave risk of an ivory tower mentality that separates learning from the place where it is applied. While the interventions described in this book have involved some effective approaches to reducing that divide, bringing the community directly into the formal learning process, part of the role of the HEI is to provide a safe place in which to learn which invariably implies some filtering and protection from the raw flow of community lives. This is an effective and valuable method to impart knowledge that can be valuable in building for sustainability and that separation can itself assist in taking a broader perspective than might be possible within the context in which it is applied, but such separation means that it does not deal directly with the spread of knowledge at the grass roots. Reflecting both sides of this divide, this project has gone far further, in seeking to embed learning in the organizations that form its subject and object of study.

This project has spent considerable resources in investigating, discussing and implementing means to enable learning of HEI within and between regional partners, including RCEs. Networks have been uncovered and nurtured and RCEs have been involved in the project in many ways, including contributions to the database, participation in workshops and contributions of case studies, leading to rich learning within and between organizations that has fed back into the formal setting as well as for the participants themselves.

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In this regard, the development of the sites to support SUNs and RCEs is a particularly interesting case. The choice of a networked platform which is inherently networked, lacking hierarchies of control found in spaces such as the Moodle site that underpinned the project process, is an interesting one, because it departs radically from the model of “traditional” formal learning and courses that carry with them an innate “we know best” assumption, seeing learning as a thoroughly networked phenomenon. The tools that have been created using the Elgg platform do not themselves embody knowledge but act as conduits through which knowledge can flow. This raises a set of challenges relating to engaging communities and enabling ownership as, without a content- or formal process-oriented focus, the platform is nothing without the people who use it. It remains to be seen whether these challenges can be overcome but the outlook is positive.

### **Thinking beyond the Project life**

The team have wisely avoided assuming that simply building a tool will lead to effective use and have concentrated on creating a participative process of community involvement supported by a well-considered framework. One of the keys to success will be to nurture those who feel a sense of ownership and have a passion to share and collaborate, as such well connected and active nodes are often what bind such bottom-up networks together (Siemens, 2005). It is hoped that the network of individuals and RCEs that has developed throughout this project may be the seeds from which such activities will grow. Linking the project to the RCE community and COPERNICUS Alliance might not only secure development and use of the products (Database, Indicators, Platforms) build up by the Project but might facilitate a growing of the Alliance and RCE movement themselves.

### **Final remarks and suggestions for future steps**

The project presents an interesting and ambitious example of action research where the work of researchers and practitioners

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lead to an integration of several perspectives informing regional ESD learning and to the development of several products (Database, indicators, web-based platforms) that opened a space for the emergence of new ESD activities. To summarize some of the points mentioned in the chapter, let us highlight the notable achievements of the Project team:

- Theorising e-learning possibilities in relation to the HEI.
- Testing learning theories and practices at the level of the region and individual courses.
- Building an element of upscaling reached through interlinking with several movements and processes, e.g. RCEs and Copernicus Alliance, relating it to several bodies of knowledge and learning practices, e.g. face-to-face and web-assisted learning.
- Facilitating interesting learning dynamics within the project where initial assumptions were tested and eventually adjusted to the realities of the project and the world beyond.

If the results of the project are to be taken beyond the Project boundaries and the time frame, it will be interesting to see whether any of the other outputs of the project will have any influence on how this develops further. The chapter already discusses the thorny issue of identifying the right mix of top-down and bottom-up processes. Should, as is likely, there prove to be a need for some top-down structure, It would perhaps be useful to apply the Graz model in this case, which would open up opportunities for approaches like that discussed in Chapter 5, in which champions with a passionate interest might facilitate intentional learning activities. Furthermore,

- the case study materials could be developed into the learning case studies for building the capacities of others to engage in a) regional learning activities, b) assessment processes of developing such activities;
- there might be an interest in realising the potential for capitalizing on the opportunities offered by ICT in the regional learning processes;

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- there could be further attempts to link the Project products for the use of other initiatives such as the Mediterranean network for ESD, various networks of innovation, etc.

By exploring an opportunity to assist the collaboration and learning of regional partners towards a further sustainable development agenda, the 3LENSUS project assists one of the critical challenges of the UN Decade of Education for Sustainable Development – strengthening ESD to national and regional levels.

### **Concluding reflections of the external evaluators**

It is pleasing to see how what sometimes seemed to be incohesive parts have come together as the project nears its close. As it progressed, as outsiders, we were sometimes confused about how one part fed into the next. For example, how was it possible to design a database to collect examples of good practice when the indicators for such practices had not yet been developed? Why were different learning environments created for different purposes when the processes they employed were so closely linked and in need of integration? However, in keeping with the networked nature of the teams that made up this project, it is now possible to see how the iterative and loosely connected processes gave a richness that a more focused methodology would have missed. The fact that indicators and database were developed in a loosely connected way but in tandem meant that each could feed from the other's independent insights and, although this led to discontinuities and missed opportunities (not all indicators were captured in the database, for instance) the process enabled richer opportunities for innovation. The iterative steps towards integration of the various online components, still non-integrated, were reflective opportunities to explore the solution space. Because networks are loose and diverse, the parts are better able to explore the adjacent possible than more cohesive groups. Thus, although it may be harder and less efficient for a network to aim for a goal,

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it traverses a broader and more creative space along the way. The result is what Maik Adomssent describes in Chapter 1 as ‘Usherian’ innovation – a series of small steps towards a richer understanding of the field.

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## Annex One

### The 3-LENSUS project team members

#### **Czech Republic**

##### **Ing. Jiří Dlouhý**

Jiří Dlouhý graduated with a Diploma in Control Systems from the Faculty of Electrical Engineering, Czech Technical University, in 1982. After graduation, he worked for 10 years at the Institute of Physics of the Czech Academy of Sciences in the Material Research Department. After 1991, he worked in the Information Department of the Federal Ministry of Environment. He was one of the main organisers of the first conference of environmental ministers “Environment for Europe” in Dobříš, 1992. After the split of Czechoslovakia he entered the Charles University Environment Center, where he heads the Department of Environmental Education and is also responsible for IT. He is also active in the non-governmental sector, being a founding member of the Society for Sustainable Living and since 2007 chairman of this Society. For the period 2002–2006 he represented Czech NGOs on the Board of the European Environmental Bureau.

##### **Dr. Jana Dlouhá**

Jana Dlouhá graduated from the Charles University Environment Department of the Science Faculty, with a doctoral degree in natural sciences. At present, she is completing postgraduate studies in the Charles University “Philosophy of Education” programme. She has worked at the Central Geological Institute (research institution) and the Federal Ministry of Environment. Currently she is working at The Charles University Environment Center as a researcher and project manager. Her field of activity comprises the development of educational tools (textbooks and e-learning materials) – she created the national environmental Wikipedia used for educational purposes

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(EnviWiki - <http://www.czp.cuni.cz/enviwiki/>) and holds the position of Editor-in-chief of the Charles University peer reviewed e-journal for philosophy and environmental education *Envigogika* (<http://envigogika.cuni.cz>).

### **Laura Henderson B.A.**

Laura Henderson graduated from the School of Oriental and African Studies, University of London, in 2001, with a Diploma in Chinese and a BA in the History of Art and Archaeology of Asia and Africa. After graduation, she worked in London in the field of asylum and refugee issues, focusing on women and mental health disorders. Between 2004 and 2007 she worked as EU projects manager at the Institute of Sociology, Academy of Sciences, Czech Republic. She joined the Charles University Environment Center in May 2007 to contribute her experience in project management and communication to the Center's international activities concerning the development of e-learning courses on sustainable development. Laura managed the 3-LENSUS project until she went on maternity leave in August 2009.

### **Andrew Barton M.Int.St.**

Andrew Barton holds a Master's degree in International Studies from the University of Otago, and a Post-Graduate Diploma in Development Studies from Massey University, both located in New Zealand. He has been a senior policy advisor at New Zealand's Tertiary Education Commission where he advised on funding policies for post-compulsory education and where he was responsible for establishing the first cooperation programme in higher education between New Zealand and the European Union. He has also worked as a senior policy and planning advisor at New Zealand's Career Services – a government-funded stand-alone agency dedicated to providing information to people from all walks of life and of all ages about lifelong learning opportunities. Andrew has been resident in the Czech Republic since 2008 and has worked at the Charles

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University Environment Center since 2009 where he is an e-learning tutor, researcher, and coordinator of various projects. He took over management of the 3-LENSUS project when Laura Henderson left on maternity leave.

### **Greece**

#### **Assoc. Prof. Dr. Eftichios S. Sartzetakis**

Eftichios S. Sartzetakis (1962, GR) is an Associate Professor of Environmental Economics at the Department of Economics, University of Macedonia (UOM), Thessaloniki, Greece, acting director of the University's Research Institute and UOM's Eco-Management and Audit (EMAS) Project Manager. His research interests include issues of environmental policy design and the structure of international environmental agreements. He is a member of a number of research teams dealing with environmental economics issues. He is currently an advisor to the Minister of Environment, Greece, and serves in a number of committees, including as President of the inter-ministerial Committee for Green Public Procurement, a member of the Greek National Workgroup investigating the impact and adoption strategies for climate change and a member of the board of the National Centre for the Environment and Sustainable Development. He taught at the University of British Columbia, Laval University and Thompson Rivers University in Canada before returning to Thessaloniki. In the past Prof. Sartzetakis participated in a number of projects and committees including the Millennium Ecosystem Assessment as a leading author and as a member of the Greek delegation for the negotiations leading to the World Summit for Sustainable Development, Johannesburg, August 2002.

#### **Dr. Benjamin Karatzoglou**

Benjamin Karatzoglou (1960, GR) holds a BSc in Petroleum Chemical Engineering, a BA in Business Administration, an MBA from the University of Macedonia and a PhD from the University



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of Aegean, Greece. Dr. Karatzoglou has been an Instructor on Financial Accounting Issues and on Applications of Accounting Packages at the University of Macedonia for the last 18 years. He is the head of the Environmental Education Programme of the UOM (EMAS certified) and has worked as a Lecturer on Financial and Managerial Accounting, Financial Statement Analysis, and Corporate Social Responsibility Issues at CITY Liberal Studies (International department of the University of Sheffield, UK), the American College of Thessaloniki, and the European University, Athens. Dr. Karatzoglou is a State Accredited Investment Analyst and an IRQA certified environmental auditor. He has had over 10 years of experience in various accounting positions at the National Bank of Greece. His work has been published in national and international peer-reviewed books and articles and presented at 20 international conferences

### **Dr. Anastasia Litina**

Anastasia Litina holds a BSc degree in Economics, a MSc degree in Economic Theory and a PhD degree in Macroeconomics with specialisation in economic growth from University of Macedonia. She is currently a lecturer on Macroeconomics and Economic Growth at the Economics Department of the University of Ioannina. In her current research she is working on environmental economics with a focus on creating and suggesting effective policies for minimisation of environmental damage without damaging growth. Additionally she is working on corruption issues and aims at examining whether political corruption can hinder environmental protection. During the last four years she is participating in projects related to sustainable development (VCSE, LENSUS) with a focus on e-learning.

### **The Netherlands**

#### **Assoc. Prof. Dr. Ron Cörvers**

Ron Cörvers (1964, NL) holds an MSc degree in Environmental Geography from Radboud University Nijmegen (1990) and a PhD

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degree in Environmental Policy and Public Administration from Utrecht University (2001). He is an associate professor at the School of Science of the Open Universiteit Nederland. He has developed a wide range of courses in the field of environmental policy and sustainable development, and is always looking for innovative (e)learning opportunities. Since 2001, he is the central coordinator of the European Virtual Seminar on Sustainable Development (EVS). In April 2007 he joined the International Centre for Integrated Assessment and Sustainable Development (ICIS) at Maastricht University as a senior researcher for two days a week. His teaching and research interests are: environmental policy, governance for sustainable development, interactive and participatory approaches, and virtual seminars and e-learning communities. He has written several publications on these topics.

### **Dr. Joop de Kraker**

Joop de Kraker (1965, NL) holds an MSc in Applied Ecology (1989) and a PhD in Agricultural and Environmental Sciences (1996) from Wageningen University. He has worked on a range of educational and research projects in sustainable agriculture in Africa, Asia and Europe. Since 2001, he has been at the School of Science, Open University of the Netherlands, currently as Research Coordinator and Associate Professor in Environmental Sciences. His research interests focus on the interface between science, policy and society in sustainability issues, particularly the role of learning and potential of ICT to support collective learning processes and competence development.

### **Jos Rikers**

Jos Rikers (1956, NL) holds an MSc in Geography, Utrecht University, 1984, and specialised in regional geography, spatial planning and research methodology in the social sciences. In 1990, he started work at the Open University of the Netherlands as an assessment specialist in charge of the development of the

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centralised computer based assessment system of the university. Later his tasks were extended to the Quality Assurance of the assessment process for the university as a whole. In 1996 he moved to the Research & Development department to continue his research and development work on computer based assessment. He was one of the initial leaders of the project leading to the Educational Modelling Language, parts of which are now included in IMS/Learning design, the internet standard for modelling learning processes on line. Since 2001, he has been a senior policy advisor to the University's Executive Board on both sustainable development and international relations. In 2004, he helped found the RCE Rhine-Meuse, a regional centre of expertise on learning for sustainable development, and became one of the first co-ordinators. From 2007-2010 he was the project director at the RCE Rhine-Meuse.

He has been a member of the city of Kerkrade's Climate Advisory Council since 2009.

The Open University of the Netherlands holds two UNESCO Chairs. One Chair on Knowledge Transfer for Sustainable Development Supported by ICTs, and one Chair on Open Educational Resources at the Open University of the Netherlands. Since 2009 Jos has been coordinating both the UNESCO Chair programmes.

## Germany

### Dr. Maik Adomssent

Maik Adomssent (1962, DE) is Senior Lecturer and Senior Research Fellow at the Institute for Environmental and Sustainability Communication/Faculty of Sustainability Sciences at the Leuphana University of Lüneburg, Germany. He is a carpenter by training and holds a degree in applied cultural sciences. In 2000, he obtained a certificate in Online Education and Training from the University of London. In his PhD thesis he dealt with sustainability communication of farmers, while in his professorial dissertation, he analysed knowledge against the

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backdrop of the sustainability paradigm with particular emphasis on communication and production of knowledge. He is a member of the Round Table for the implementation of the UN Decade of Education for Sustainable Development in Germany. His activities in teaching and research are centred on (higher) education for sustainable development, biodiversity and nature conservation, and sustainability communication.

### **Austria**

#### **Prof. Dr. Friedrich M. Zimmermann**

Friedrich M. Zimmermann is Chair of the Department of Geography and Regional Science, and former Vice Rector for Research and Knowledge Transfer at the University of Graz. He is President of COPERNICUS Alliance, the European Network on Higher Education for Sustainable Development, and Vice President of the Austrian-Canadian Liaison Group. His research experience focuses on regional development and regional studies, with special emphasis on peripheral areas, using sustainable approaches to study the effects of regional policies in Europe in rural as well as urban areas. He additionally focuses on tourism planning and prognosis and is a consultant for private and public institutions. He has published widely in international journals and works with several international and interdisciplinary research teams. He was visiting professor in Munich, Germany, and in Philadelphia, PA and Portland, OR, and was awarded Fulbright fellowships to the US twice. Currently he is visiting professor at Novi Sad, Serbia.

#### **Dr. Clemens Mader**

Dr. Clemens Mader is director at RCE Graz-Styria, University of Graz, Austria. His research and lectures focus on sustainability transition processes as well as theories and practice of ESD. In the course of his PhD he developed the Graz Model for Integrative Development which is a main assessment model for

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sustainability processes applicable in inter-cultural and interdisciplinary contexts. Dr. Mader is also a member of the management board of the COPERNICUS Alliance and the European Network on Higher Education for Sustainable Development. He is assistant professor at the University of Graz, lecturing at the University of Novi Sad (Serbia) and was a visiting lecturer at Hiroshima University (Japan).

### **Marlene Trummler MSc**

Marlene Trummler studied Environmental System Sciences at the University of Graz, Austria, and Gothenburg, Sweden, and graduated in June 2009. Ms. Trummler has worked as a research associate at the Department of Geography and Regional Sciences at the University of Graz since March 2009. Beside her cooperation in 3-LENSUS she is involved in two projects where European master study programmes are being developed and implemented – on Regional Policies and Development and on Education for Sustainable Development. Furthermore Ms. Trummler contributes to an EU-Tempus project, where Centres of Excellence are being established at Egyptian universities to promote Education for Sustainable Development through teacher training programmes. Ms. Trummler lectures at the University of Graz as well as being involved in international e-learning courses. Her professional interests contain lifelong learning and education for sustainable development as well as urban development.

### **Elisabeth Görsdorf M.A.**

Elisabeth Görsdorf is a graduate in English and French with secondary teacher accreditation, and currently doing a PhD in Educational Sciences, focussing on further education and innovative forms of learning and teaching. Since 2006, she works for the Academy for New Media and Knowledge Transfer at the University of Graz, where she is responsible for developing the use of educational technology and methodology.

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### **Mario Diethart, MSc**

Mario Diethart graduated in Environmental System Sciences with focus on geography at the University of Graz. Since 2009 he has been working at the Regional Centre of Expertise Graz-Styria being involved in different projects such as the COPERNICUS Alliance and other initiatives in the field of Education for Sustainable Development.

## Annex Two

### The 3-LENSUS partners

#### **The University of Macedonia (UOM)<sup>1</sup>**

The University of Macedonia, Economic and Social Sciences, is one of the newest higher education institutions in Greece. It was founded in 1957 as the Graduate Industrial School of Thessaloniki with only two departments: the Department of Economics and the Department of Business Administration. Today, the University of Macedonia offers courses on economics, business administration, economic and social sciences, European studies and diplomacy, accounting and finance, applied informatics, educational and social policy, Balkan, Slavic and Oriental studies, music science and art, marketing and operations management and technology management to more than 13,000 graduate and post-graduate students in ten fields of undergraduate studies and seven fields of inter-departmental programmes of post-graduate studies. Its main headquarters are located in Thessaloniki, while two new departments have been created since 2004 in the cities of Edessa and Naoussa.

Such an expansion has helped promote the university's reputation as a high quality academic institution. The University of Macedonia aims at constant development in all its fields and the dawn of the third millennium has found it to be an equal partner among Greek and international universities and an active agent of knowledge. It keeps abreast of international trends, promoting research and evolving its main goal, to create the next generation of scientists, researchers, businessmen, and business executives who will participate equally, dynamically and effectively in the new challenges of an international and increasingly globalised market.

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<sup>1</sup> <http://www.uom.gr/> and <http://www.greenuniversity.gr/>

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The University of Macedonia is the first university, and as a matter of fact the first public authority in Greece, to have successfully implemented an Eco-Management and Audit Scheme according to the EMAS Regulation, since 2005. It is worth mentioning that it was awarded the “European EMAS Award for Greece, 2006” for its successful campaign in promoting EMAS. The University of Macedonia acts as a focal point for the dissemination of best practices and lessons learned regarding the implementation of environmental management systems in the service sector. The main goal is to widely disseminate the practice of sustainable management in the private and public sector in Greece.

### **Sustainable development know-how:**

- EMAS-EDIN/LIFE02: Development and Implementation of Eco-Management and Audit Scheme (EMAS) in an Educational Institution (EMAS – EDIN) - LIFE 02 – Environment
- VCC-Virtual Copernicus Campus - eLearning 2004
- Interreg III/PHARE CARDS Greece-F.Y.R.O.M. Environmental education and development of educational material in all levels of national education.
- Member of the Virtual Campus for a Sustainable Europe

### **Main contribution to 3-LENSUS:**

- Literature review of existing practice in L4SD
- Organisation and hosting of final conference and workshop

**Open University of the Netherlands,  
School of Science (OUNL)<sup>2</sup>**

The Open Universiteit Nederland welcomed its first students in 1984. It is an independent government-funded institute for distance learning at university level. The OUNL offers people who never had the opportunity to attend higher education a second chance. The university’s aim is to make higher education accessible

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<sup>2</sup> <http://www.ou.nl>



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to anyone with the necessary aptitude and interest, regardless of formal qualifications. Many take advantage of this opportunity. Furthermore, studying at the OUNL allows professionals to sharpen their skills. In fact, many of its students already have degrees and take one or more courses to acquire additional know-how or to retrain for a different occupation. Approximately 21,000 students are currently enrolled at OUNL, following one of the university's courses or fully accredited Bachelor or Master degree programmes. About 70% of these students remain in paid employment throughout their studies, and more than 50% have enrolled because it leaves them free to choose their own time and place of study and lets them progress at their own pace.

The School of Science at the Open Universiteit Nederland offers a Bachelor of Science programme in Environmental Sciences, with the opportunity for students to major in Natural Sciences of the Environment, Environmental Policy, or Environmental Health Sciences. After the Bachelor programme students can enter the Master of Science programme in Environmental Sciences. In both the Bachelor and Master programme, students not only learn *about* sustainable development, but are also enabled to learn *for* sustainable development through courses in which relevant core competencies are developed. Examples are the *European Virtual Seminar on Sustainable Development*, promoting an international dialogue between students with different cultural and disciplinary backgrounds, and the *Virtual Environmental Consultancy*, in which students work in different roles in a virtual company dealing with real life environmental problems for external clients. The academic staff of the School of Science participate in a wide range of national and international projects and programmes on sustainable development.

The School of Sciences of the Open Universiteit Nederland is the project coordinator of the European Virtual Seminar on Sustainable Development<sup>3</sup>.

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<sup>3</sup> <http://www.ou.nl/evs>

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### Sustainable development know-how:

- European Virtual Seminar on Sustainable Development (EVS)
- Virtual Copernicus Campus (VCC) - eLearning 2004
- Alfa-project “International Master “Sustainable Development and Management” of the network ELaN (European-Latin American Network for Sustainable Development)
- Virtual Campus for a Sustainable Europe (VCSE) - eLearning 2006
- Lived Experience of Climate Change – e-modules development and pilot (LECH-e) project for a joint international Master-track – Lifelong Learning 2009
- Regional Centre of Expertise (RCE) on Education for Sustainable Development Rhine-Meuse was founded in August 2005 by OUNL and Zuyd University

UNESCO Chair “Knowledge Transfer for Sustainable Development Supported by ICT”

### Main contribution to 3-LENSUS:

- Development and testing of the virtual learning space

**University of Graz, Department of Geography  
and Regional Science & RCE Graz-Styria<sup>4</sup>**

The University of Graz is one of the largest institutions of higher education in Austria. With approximately 27,000 students and 3,500 employees, it makes an essential contribution to the vibrant life of the Styrian capital. So far six Nobel Prize winners have taught and researched at this second oldest university of Austria, which was founded in 1585.

Diversity and a wide scope characterise the education programmes at the six faculties. Students can choose from more than 100 bachelor, master, diploma and doctoral programmes.

<sup>4</sup> <http://www.uni-graz.at/>

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The curricula prepare students not only for 'classic' careers but also allow innovative combinations with future potential. The youngest faculty, the Faculty of Environmental Sciences, Regional Sciences and Education, which started in 2007, focuses on a strong cooperation with the region with respect to environmental issues, sustainable development and educational matters. The other faculties comprise Social and Economic Sciences, Law, Humanities, Catholic Theology as well as Natural Sciences. The university also encourages interdisciplinary studies, such as Gender Studies, Life Sciences and Cultural Sciences.

The University of Graz acts as a pioneer in numerous regional and international co-operations and it supports young graduates in their academic career. One of the most important research and teaching projects concentrates on South-Eastern Europe, an area of rapidly growing cultural and economic importance. Moreover, the Alma Mater of Graz is engaged in numerous international networks. A total of 18 university partnerships corroborate the importance of worldwide integration of research and teaching. The University of Graz is the only Austrian university to be included in the Utrecht Network and the Coimbra Group.

The Department of Geography and Regional Science is located at the Faculty of Environmental Sciences, Regional Sciences and Education. As a prerequisite for sustainable development research, teaching and lifelong learning are based on the core values of a sound environment, a humane society as well as a socially compatible economy. The research focuses on sustainable urban and regional science, climate and mountain research, geographical technologies as well as education for sustainable development.

The Regional Centre of Expertise on Education for Sustainable Development (RCE) Graz- Styria was established at the University of Graz in 2009 in the context of the UN-Decade 'Education for Sustainable Development' 2005-2014. The RCE

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Graz-Styria strengthens and fosters regional, national and global co-operations and empowers strategies to implement research and education for sustainable development into the region of Graz-Styria and abroad.

### Sustainable development know-how:

- VCC-Virtual Copernicus Campus - eLearning 2004
- Academy for New Media and Knowledge Transfer<sup>5</sup>: Since 2006, this service-oriented institution at the University of Graz aims at connecting research, teaching, entrepreneurs and the public by developing communication and networking models based on educational technology.
- Since 2007, the University of Graz has initiated the setting up of the Regional Centre of Expertise (RCE) on Education for Sustainable Development Graz-Styria<sup>6</sup>. The RCE Graz-Styria strengthens and fosters regional, national and global co-operations and empowers strategies to implement research and education for sustainable development in the region of Graz-Styria and abroad.
- Member of the Virtual Campus for a Sustainable Europe

### Main contribution to 3-LENSUS:

- Reanimation of the COPERNICUS Alliance
- Design and organisation of the 3-LENSUS seminar programme
- Creation of the open database on L4SD projects
- European Network on Higher Education for Sustainable Development

**Leuphana University of Lüneburg, Institute for  
Environmental and Sustainability Communication<sup>7</sup>**

Leuphana University of Lüneburg is perceived as a model for the university of the future. This development has become possible

<sup>5</sup> <http://akademie.uni-graz.at>

<sup>6</sup> [www.rce-graz.at](http://www.rce-graz.at)

<sup>7</sup> [www.uni-lueneburg.de/infu/](http://www.uni-lueneburg.de/infu/)

## Multi-Actor Learning

because the University and the Polytechnic University in Lüneburg have bundled their strengths since 2005, combining their successful traditions in a new common endeavour. The traditional division between university and polytechnic has been largely overcome in Lüneburg. Since 2003, the University of Lüneburg has been one of the first five state universities to become a so-called foundation university, an organisational form that allows the greatest possible degree of autonomy from the state while still being an organisation under public law.

The Institute for Environmental and Sustainability Communication (INFU) is one of several institutes of the Faculty of Environmental Sciences which was established in 1996 at the University of Lüneburg. INFU combines the three working areas of Environmental and Sustainability Communication, Environmental Informatics and Participation & Sustainable Development. Environmental and Sustainability Communication deals with environmental and sustainability aspects, aiming to foster individual and institutional competencies to shape our future. The focus of research and education is the overall concept of Sustainability. The staff members of the Institute study the various effects of specific communication strategies aiming at a popularisation of this concept. They develop new practical approaches and contribute to a scientific theory-development in the field of environmental and sustainability communication. Here, questions are taken up relating to individuals as well as institutions.

The Institute for Environmental and Sustainability Communication at the University of Lüneburg was also awarded the UNESCO Chair in “Higher Education for Sustainable Development” in 2004.

### **Sustainable development know-how:**

- VCC-Virtual Copernicus Campus - eLearning 2004
- Alfa – Project “Programa de Maestría Internacional en Desarrollo y Gestión Sustentable” (International Master “Sustainable Development and Management”) of the network

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ELaN (European-Latin-American Network for Sustainable Development)

- Development of a Virtual e-learning Space for an interdisciplinary study programme “Sustainable Development”
- Participation in the European Virtual Seminar (EVS) on Sustainable Development as Tutor and Expert
- Development and Implementation of an international e-Seminar “Syndromes of Global Change
- Member of the Virtual Campus for a Sustainable Europe

### **Main contribution to 3-LENSUS:**

- Creation of 3-LENSUS information and communication portal

<p style="text-align: center;"><b>Charles University in Prague, Charles University Environment Center<sup>8</sup></b></p>
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The oldest university in Central Europe, Charles University was founded on 7 April 1348 by Charles IV, Holy Roman Emperor and King of Bohemia. The Charles University Environment Center, CUEC was founded in 1992 as part of Charles University. The activities of the Center include conducting environmental research; providing environmental expertise and information for students, the staff of the University and for the general public. CUEC collaborates with parliamentary bodies, state administration, non-governmental organisations and many academic and research institutions in the country and abroad. The Center closely follows the work of international bodies, particularly the OECD and EEA.

CUEC has worked on many projects funded by ministries as well as international organisations, and has experience in international research project coordination (e.g. UNDP funded project ‘Towards Sustainable Development of the Czech Republic: Building National Capacities’ 1998-2001). CUEC has participated in several projects funded by the European Commission’s Fifth and

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<sup>8</sup> <http://cozp.cuni.cz/>

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Sixth Framework Programmes (e.g. INFOSDEV). In the field of education, the Center cooperates closely with the Faculty of Humanities, and the Department of Social and Cultural Ecology. The Center is also involved in EU educational projects funded by the European Social Fund and Leonardo Da Vinci grant schemes.

CUEC consists of the three units: sustainable development indicators, environmental economics, and education and information for sustainable development. CUEC also has an information and resource centre providing computer lab, library, and study rooms. The Center has twenty staff members.

### **Sustainable development know-how:**

- VCC-Virtual Copernicus Campus - eLearning 2004
- CUEC can provide academic expertise in the field of environmental education – through the national “Forum of University Teachers”, Working Group for the National SD Strategy for Education and international UNECE Expert Group on Indicators.
- CUEC has particular expertise in environmental and sustainable development indicators. It collaborates with the “global indicators community” (UNC sustainable development, UNEP, OECD, European Environment Agency, EUROSTAT) academic institutions and international programmes (SCOPE, JRC, WRI, Wuppertal Institute, IFF University of Klagenfurt). The Sustainable Development Indicators of the SCOPE (Scientific Committee on Problems of the Environment) project was coordinated by CUEC.
- Member of the Virtual Campus for a Sustainable Europe

### **Main contribution to 3-LENSUS:**

- Publication of Best Practice Handbook
- Research into best practices in e-learning methodology
- Development of transferable indicators
- Project management

### RCE Rhine-Meuse

RCE Rhine-Meuse is a Regional Centre of Expertise on Education for Sustainable development (EfSD). RCEs are an initiative of United Nations University within the UN Decade Education for Sustainable Development (DESD). RCEs are the DESD instrument to connect local activities with the global goals of the Decade. Each RCE is active in a home region where on the regional level educational institutions, science, the business sector and authorities (local and regional) collaborate to initiate learning processes that contribute to a more sustainable future. RCE Rhine-Meuse operates according to the OPEDUCA concept, which is a vision of learning and education including practical instruments to realise future oriented learning. Within its region RCE Rhine-Meuse is supporting the development of several OPEDUCA sub-regions, where local stakeholders collaborate. Local knowledge and local opportunities to connect theory and practice are included in the learning experience developed. This learning experience is no longer restricted to a certain school level (it will extend from primary education to higher education) and it will overcome the boundaries between formal, non-formal and informal learning. The RCE Rhine-Meuse is the network connecting the OPEDUCA sub regions with each other and with the global network of RCEs.

RCE Rhine-Meuse was founded by the Dutch Open University, Zuyd University of Applied Science and KidsLive Foundation in 2004 as the first RCE in Europe.

For more information about RCE Rhine-Meuse, phone 0031-45-4009795, email Mr. Jos Eussen (Director), [jos.eussen\(at\)rcerm.eu](mailto:jos.eussen(at)rcerm.eu), or Mr. Jos Rikers, [jos.rikers\(at\)rcerm.eu](mailto:jos.rikers(at)rcerm.eu).

#### **Main contribution to 3-LENSUS:**

- RCE advice on overall project, particularly in development of virtual learning space



## Annex Three

### Glossary

**The glossary**<sup>9</sup> is largely based on the Addendum to the document of the UNECE CEP/AC.13/2004/8/Add.2, 19 May 2004 with minor corrections and amendments and includes also terms of the Glossary of the Global Monitoring and Evaluation of DESD Implementation of UNESCO, 2008.

**Education** is derived from the Latin *educare*, meaning to rear or foster and from *educere*, which means to draw out or develop. While this developmental and transformative meaning retains currency, it has largely been overshadowed by transmissive ideas relating to instruction and teaching. Education (as a verb) is commonly used to describe a process and also (as a noun) shorthand for the ‘education system’, which involves policies, institutions, curricula, actors, etc.

**Learning** is the process through which knowledge, values and skills are developed. The processing of information results in a relatively stable change in the behaviour of an individual or organisation. Learning is absorbing information and integrating the information and considerations in such a way that this leads to different choices, different behaviour. Information (consisting of data, basic information) is connected with our knowledge, our experience, our norms and values and the way we lead our lives (giving meaning to life).

**Education for Sustainable Development** is still developing as a broad and comprehensive concept, encompassing interrelated environmental, economic and social issues. It broadens the concept of environmental education (EE), which has increasingly

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<sup>9</sup> Document prepared by the UN ECE Indicator Expert Group in September 2008.

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addressed a wide range of development subjects. ESD reflects the parent term “sustainable development”, and also encompasses various elements of development and other targeted forms of education. (for more information please see the Chapter III. of the UNECE Strategy for ESD, CEP/AC.13/2005/3/Rev.1).

**Learning processes** are often described at an individual level although it can be acquired at three levels: (a) As a learning person: individual skills, self-development, the individual position in society, having ability to contribute sustainable society; (b) Within the learning organisation: the organisation tries to improve the quality of its own structure and performances. The qualification “learning organisation” applies only if there are sufficient numbers of individuals who adopt a behavioural change leading to changes in the structure and performances; (c) Within the learning society: an addition of learning processes of different organisations and individuals with their own perspectives, but with a cumulative effect.

**Social learning** The development of knowledge and understanding has both personal and shared elements. The term social learning often refers to an understanding emphasizing that learning is always a social process, because it always takes place in a social setting or context. And the practices that learners take part in, the means and technology that they learn to use, the skills or insights that they develop have a social context. Furthermore, cooperation or being part of a certain division of labour is often the situation for learners. Social interaction allows learners to relate or mirror their ideas, insights, experiences and feelings to those of others. In this process of “relating to” or “mirroring” these personal ideas, insights, experiences and feelings are likely to change as a result. This mirroring may lead learners to rethink their ideas in the light of alternative, possibly contesting, viewpoints or ways of thinking and feeling. At the same time (learning) experiences which are shared with others are likely to gain importance. However, the term “social learning” is sometimes also used to

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characterise certain educational settings or processes whereby a group, organisation or whole society is collectively engaged in competence development. In this sense, social learning is used to broaden the meaning of learning in relation to its normally very individualistic meaning. It includes learning by individuals, but recognises that groups as a whole can learn. Arguably, progress towards sustainability is dependent on such learning. The thought behind social learning is that people do not learn alone, or not as usefully as possible, by means of individual routes, but that they also learn, and often better, by relating their personal experiences to the experiences of others. It is assumed that other people play an important role in the recognition, formulation and generalisation of individual experiences. In social learning four elements ('axes') that provide the basis for learning processes can be distinguished: (a) *Action*: people have to be able and prepared to consider themselves to be people who can actively take their own situation in hand (motivation). The organisers of the learning process are therefore required to approach the participants as competent actors and to review what they can do *themselves*; (b) *Cooperation*: people have to be able and prepared to collaborate with others. This presents an area of tension of consensus and dissensus in a group; (c) *Reflection*: people have to be able (to learn) to reflect on what they have done; look back, evaluate, draw conclusions and translate into changed behaviour; (d) *Communication*: it is conditional for social learning that people can communicate about it, explain and demonstrate it to others – transfer of experience.

***Dynamic qualities*** in the learning process mean an emphasis on qualities in educational activities that engage learners in active and participative positions and assign teacher and learner more reciprocal roles that respect the existing knowledge and ability of the learner. Dynamic qualities can be seen as opposed to *static qualities*, which are more mechanical and see teaching and learning as little more than a transfer of information and the learner as a passive recipient.









