

# Virtual Campus Development oon the Bais of Subsidiarity: The EVS Approach

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## Chapter XII

# Virtual Campus Development on the Basis of Subsidiarity: The EVS Approach

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### ABSTRACT

*The main objective of this chapter is to highlight the importance of subsidiarity in the development of a virtual campus. Subsidiarity is the principle that matters ought to be handled by the lowest competent authority. In our view, subsidiarity is crucial to sustainable approaches in virtual mobility. We support this view by two case descriptions: the development and implementation of a very successful virtual course - European Virtual Seminar on Sustainable Development (EVS) and the project to expand from this single course to a virtual campus - Virtual Campus for a Sustainable Europe (VCSE). We conclude that the factors determining the viability and uptake of international online learning initiatives, such as virtual campuses, are a bottom-up approach enabled by the availability of inexpensive ICT, an educationally driven need for virtual mobility, and interdependence within the international partnership.*

### INTRODUCTION

Physical mobility of students and teachers, who may spend a period of time abroad to study or teach at another university, has become a familiar phenomenon in many European countries over the past decades. For over 20 years, the European Commission has been stimulating

physical mobility in its member states through the Erasmus programme. The objectives of this international exchange programme range from promoting a sense of European citizenship and the competence to cope with cultural diversity, to improving access to high quality education throughout Europe and improving the quality of higher education through international collabora-

tion and competition. The Erasmus programme can be considered a success, given that more than 1.5 million students have participated since 1987 (European Commission, 2006a). In fact, however, in each academic year, less than 1% of the total European student population take courses at a university in another member state (Bijnens et al., 2006). The European Commission is currently aiming for a major increase in student mobility by 2012 (European Commission, 2008), but it appears that these targets will not be achieved by physical mobility alone. Even if the campaign is successful, the large majority of students will not be internationally mobile, due to a variety of social, organisational, administrative, financial and physical barriers. It is for these students that an alternative has been suggested in the form of virtual mobility, i.e., ‘using information and communication technologies (ICT) to obtain the same benefits as one would have with physical mobility, but without the need to travel.’ (eLearningEuropa.info, cited in: Bijnens et al., 2006). A recent best practice manual and review of European virtual mobility projects distinguishes four main types of virtual student mobility: virtual courses, virtual study programmes, virtual student placements and virtual support activities to physical mobility (Bijnens et al., 2006). A virtual campus, the topic of this chapter, is a web-based platform to deliver either a collection of virtual (e-learning) courses or an entire virtual study programme. In addition to teaching and learning functions, a virtual campus usually includes administrative support services, such as web-based enrolment, and sometimes also social functions, such as a web-based ‘cafeteria’ (chat rooms). In the context of virtual mobility in the European Union, a virtual campus is based on international cooperation between higher education institutions, involving formal or informal agreements on quality assurance, entrance requirements, transfer of credits etc. (cf. European Commission, 2007).

The main objective of this chapter is to highlight the importance of subsidiarity in the

development of a virtual campus. Subsidiarity is the principle that matters ought to be handled by the lowest competent authority (Wikipedia). This concept is a fundamental principle of European Union law. The basic idea of subsidiarity is that a central authority should have a subsidiary function, performing only those tasks that cannot be performed effectively at a more immediate or local level. The principle is applicable in fields of government and business management, but also in education. In our view, subsidiarity is crucial in sustainable (i.e., viable) approaches to virtual mobility. This view is supported in this chapter by two cases, the development and implementation of a very successful virtual course and the project to expand from this single course to a virtual campus. Before discussing these two cases, we first briefly explain the motivation at our institution to integrate virtual mobility elements into the curriculum. The chapter concludes with our view on the factors determining the viability and uptake of international online learning initiatives, such as virtual campuses.

## **VIRTUAL MOBILITY AND LEARNING FOR SUSTAINABLE DEVELOPMENT**

Recent reviews of virtual mobility initiatives list many actual or potential advantages and benefits at student and teacher as well as institutional level (Bijnens et al., 2006; Brey, 2007). These range from better Europe-wide access to courses for students, to an enriched, internationalised work environment for teachers, and a cost-effective expansion of the number of courses being offered for universities. In our context, which is that of the Bachelors and Masters Degree programme in Environmental Sciences at the Open University of the Netherlands (OUNL), educational objectives set by the teaching staff were of prime importance in the decision to integrate international virtual courses into the curriculum. One of the

major objectives of these Bachelors and Masters programmes in Environmental Sciences is the development of competencies that enable the graduates to contribute significantly to sustainable development (so-called 'learning for sustainable development', UNESCO, 1997). A prominent feature of the concept of sustainable development is the many different ways in which it is interpreted. This diversity of perspectives seems inevitable, given the global scale and complexity of sustainability problems and the many uncertainties that surround them. In an increasingly globalised, open and pluralistic society, a key competence for scientists supporting sustainable development processes is therefore the ability to think, communicate and work across the boundaries that divide the various perspectives (De Kraker & Cörvers, 2006). Major examples of boundaries to be crossed in this respect are those between disciplines, ideologies and nations or cultures. We refer to the ability to cross such boundaries as 'transboundary competence' (De Kraker et al., 2007a).

To determine how transboundary competence can best be developed in the context of higher education, we applied the insights of competence-based learning experts into the elements that constitute powerful learning environments. Powerful competence-based learning environments are those that combine actual practice ('learning by doing'), and explicit reflection on what and how to learn from this practice ('learning by reflection') (Könings et al., 2005). Based on these principles, the ideal learning environment for sustainable development, fostering transboundary competencies, would provide students with actual experience in interdisciplinary, international or intercultural project work in teams (De Kraker et al., 2007a). In a traditional university setting, such a learning environment with cross-boundary contexts and group work as major ingredients is difficult to achieve. It would require a high level of international student mobility to bring students from different disciplinary, national and cultural

backgrounds frequently together at the same time and in the same place. Virtual mobility, using computer-supported collaborative learning (CSCL) environments, provides an innovative and almost ideal solution to this problem, as these learning environments allow communication and collaboration, independent of time and place, between internationally dispersed student teams at low cost (Cörvers et al., 2007, De Kraker et al., 2007b, Ivens et al., 2007). An added advantage of virtual learning environments is that they provide better opportunities for structured group discussions as well as reflection processes, both individually and collectively (Barth, 2007).

Thus, although it might seem somewhat counter-intuitive, virtual learning environments appear to be well-suited to develop the transboundary competence required to effectively contribute to sustainable development. In addition to 'learning for sustainable development', international virtual learning environments are also major instruments in preparing students for the rapidly internationalising labour market and for new ways of working, such as Internet-based collaboration in geographically dispersed teams. These educational considerations were the major reasons to develop the European Virtual Seminar on Sustainable Development (EVS), which is discussed in the next section. In turn, the success of the EVS course and the ambition to expand the number and diversity of similar courses in the curriculum formed the basis of our institution's support for the subsequent development of the Virtual Campus for a Sustainable Europe (VCSE).

## **THE EUROPEAN VIRTUAL SEMINAR ON SUSTAINABLE DEVELOPMENT (EVS)**

The idea for a European Virtual Seminar on Sustainable Development (EVS) originated in 2000 at the Open University of the Netherlands (OUNL). At that time, the OUNL was a partner

in a worldwide alliance of universities offering the Global Seminar on Environment and Sustainable Systems (see Global Seminar website). In the Global Seminar, students from different parts of the world engage in ‘live’ discussions about sustainable development issues during frequent video conferences (Cörvers et al., 2007). The encouraging experiences gained during the Global Seminar were used to develop a European version, but it was decided to use computer conferencing rather than video conferencing – a much cheaper approach – to be able to operate without substantial external funding. Enthusiastic teaching staff at several institutions of higher education in different European countries joined the initiative, and as early as 2001, an EVS pilot seminar was offered to students from the participating institutions. Since then, the EVS has been organised each year and the partnership has gradually expanded, especially in its early years (see Table 1).

At present (2008), the EVS network consists of 10 universities in 8 European countries. It is expected, however, that the network will expand again in the near future because of the integration of EVS into the Virtual Campus for a Sustainable Europe (VCSE), which is discussed in the next section. The present section focuses on the educational format underlying the EVS (computer-supported collaborative learning in geographically dispersed student teams) and its organisational model (a bottom-up network approach with distributed responsibilities, operating

without external funding). Whereas these basic features have remained unchanged, EVS is not a static design but rather a dynamic process of recurrent cycles of evaluation and improvement, driven by the users (staff and students) as well as educational researchers. Since the 2001 pilot seminar, the EVS has been widely acknowledged at institutional (OUNL, 2003), national (Cörvers, 2003; Jager, 2005; Schoonenboom et al., 2004; Werkgroep SALDO, 2004) and international level (Bijnens et al., 2006; Brey, 2007; Brouwer et al., 2006) as a successful model and ‘best practice’ in inter-institutional e-learning. Recent external quality assessments of educational programmes in environmental sciences in the Netherlands and Belgium explicitly commended the EVS as an excellent example of internationalisation (QANU, 2007; VLIR, 2007). A detailed description and discussion of the EVS can be found in Cörvers et al., (2007; EVS website: <http://www.ou.nl/evs>). A summary of its educational<sup>1</sup> and organisational aspects is presented in the sections below.

### **Educational Format**

The term ‘seminar’ traditionally refers to a study group working under the guidance of a teacher. An advantage of a ‘virtual’ seminar, using modern ICT and the Internet, is that it enables communication, independent of time and place, between the students and their teacher, and – even more importantly – between the students themselves.

*Table 1. Institutions and students participating in EVS*

Year	No. of institutions	No. of countries	No. of student groups	No. of case studies	No. of students enrolled	No. of students passing
2001	9	4	6	3	59	43
2002	11	5	6	4	45	30
2003	15	9	11	5	61	37
2004	18	11	13	5	78	41
2005	12	9	10	5	68	41
2006	9	8	8	6	36	20

In the EVS, students with different national and disciplinary backgrounds work together on case studies in sustainable development. The heterogeneous student groups in EVS represent an excellent learning environment to develop the transboundary abilities discussed above, as the students experience differences of perspective in a very direct way, and have to develop a joint solution to the problem presented in the case study. The ultimate goal of the EVS is to create a dialogue – in which students question each other to understand the ideas underlying their statements – between a learning community of geographically dispersed students. The educational format for EVS should therefore support collaborative learning, which is an educational approach in which students work in small groups to achieve a common goal. This is a new type of learning practice for most students and teachers, however, and differs considerably from face-to-face meetings, where all participants are present in the same place at the same time (Kreijns, 2004).

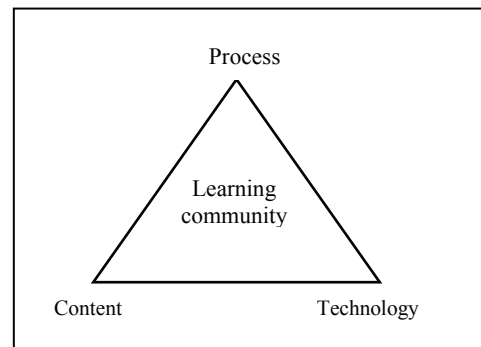
The educational format for EVS consists of the following components (Figure 1):

- A *learning community* of geographically dispersed student teams, their tutors and subject matter experts;
- *Learning content* that consists of topical scientific or societal problems triggering collaboration between students;
- A *learning process* that supports collaboration between students of different nationalities and from different cultural and disciplinary backgrounds;
- *Learning technology*, based on modern ICT and the Internet, facilitating collaboration, communication and interaction between students.

### **Learning Community**

The target group of EVS is broadly defined, consisting of students from different nationalities

*Figure 1. Key components of a virtual seminar*



and disciplines who are interested in sustainable development, willing to perform group work, able to read and write in English, able to spend the required amount of time on the seminar, having access to a computer with an Internet connection, and having some prior experience with e-learning. The student groups are responsible for their own learning process in EVS. They are responsible for keeping the process going and delivering high-quality products by the deadlines set. Our experience is, however, that the student groups also need coaching from a tutor, as well as in-depth knowledge input from an expert, which is what they normally receive from their teachers. For this reason, staff play a vital role in EVS. Each student group is coached and monitored by a tutor, whose task it is to solve any problems in the student group as quickly as possible, and to find the right balance between managing a group and allowing the group to manage itself (under the tutor's guidance). Yet, tutoring in EVS can be difficult, because not all students might have experience of working in an electronic learning environment, nor may they be familiar with self-guided group work (i.e., doing group research). To support the tutors, a set of guidelines was developed, as well as a strategy for collective action in the event of problems in a group (e.g., caused by intercultural friction or free riders). In addition to the tutor, each student group has access to an expert, i.e., the author of the case study on which the group is working. Compared with the

tutor, the expert plays an essentially passive role. Although the students are free to contact him or her for information or advice about the case study, they are also encouraged to find external experts or stakeholders who are relevant to the case. A student group in EVS consists of 4-6 students from different institutions, who are in the late stages of a Bachelors programme or the early stages of a Masters programme at their home university. Experiments with relatively large groups (10 students or more) were unsuccessful due to the presence of free riders, coaching and monitoring difficulties, delays in communication, etc. Small, heterogeneous groups were found to work very well for collaborative learning.

## **Learning Content**

The EVS is open to all disciplines contributing to the process of societal change towards a more sustainable Europe (e.g., economics, natural sciences, agronomy and technology).

A typical characteristic of sustainability problems is that they are 'wicked' (i.e., complex and difficult) rather than 'tame'. This type of problem requires the selection and assimilation of information from a multitude of sources, domains, discussions and argumentations, thus maximising the potential benefit of collaboration. The students are challenged to address these wicked problems by using all the expertise and perspectives available among their group members. The assumption is that a student group can perform an in-depth analysis of the problem, and come up with a refined problem definition, as well as a proposal for solving the problem. This is why the student groups in EVS are highly heterogeneous, in terms of nationality, discipline, institution and gender. The basic idea is that each group member cooperates with the others and contributes to the group activities from the perspective of his or her own cultural and disciplinary background. In EVS, sustainability problems are presented to the students in the form of case studies. When

registering for EVS, students are asked to state their case study preferences, and these preferences are taken into account when the student groups are formed. An EVS case study is an open problem description that consists of background information, a general assignment, sources and web links. The case studies are supplied by experts from the participating institutions. A set of writing guidelines has been developed to make sure that the case studies are well-written and more or less similar in format. Topics of case studies in 2007 were Decoupling Environmental Pressure from Quality of Life, Implementation of the European Water Framework Directive in the Danube basin, and Strategies for Communicating the Concept of Sustainable Development.

## **Learning Process**

The learning process in EVS differs greatly from that in traditional education. There are no lectures, students have to work in international, multidisciplinary groups, the group members cannot organise face-to-face meetings, and all collaboration, interaction and social processes depend on the use of modern ICT and the Internet. Furthermore, the learning process is spread over a relatively long period (i.e., 14 weeks) so as to create the best possible conditions for virtual collaborative learning and to allow the students to participate in the EVS alongside their regular study programmes. The study load of EVS is 120 hours (5 ECTS - European Credit Transfer System), and students are required to spend 8-10 hours a week on the seminar. To support such an 'exceptional' learning process, the EVS is divided into four stages.

The first stage consists of several individual activities that help students acquire basic skills in working in the electronic learning environment of EVS. To facilitate collaboration in the next stage, they have to fill in a template, called pEXPi (personal expertise information), with information about themselves (see Box 1). Students who

successfully complete the individual activities in the first stage are allowed to enter the next stage, whereas students who do not are excluded from further participation. This procedure for separating active from inactive students is quite effective in reducing the dropout rate in the following, ‘collaborative’ stages of EVS. Whereas we originally thought that ‘dropout’ was mainly due to the complexity of EVS, involving international, multidisciplinary, virtual, collaborative learning, we found out later that the majority of dropouts never really started at all. The main reasons for this are probably that they underestimate the intensity of EVS (they quickly discover that it involves much more than sending a message to fellow group members once a week) and that some partner institutions fail to use a strict intake procedure and check if their students meet the requirements.

In the second stage of EVS, the student groups are composed by the central EVS coordinator, and

the process of group formation and community building begins. The students start working on group activities that require communication and interaction between the group members. Each group has to define sustainable development, specifically from a European perspective, and make sure that the definition applies to the topic of their case study. The students formulate a definition on which all or – if this is not possible – most group members agree, using the group discussion board. This allows them to comment on the views of other group members and formulate an ‘enriched’ definition of sustainable development. Furthermore, the group has to discuss the objectives of the case study they will be working on during the EVS run, as well as their knowledge of the subject (see Box 2). In addition to the asynchronous communication via the discussion board, the tutor – and in next stages also the students – initiates ‘live’ chat sessions to discuss the case study, planning and task division, and to socialise.

### *Box 1. Fostering trust*

A problem in newly-formed student groups is that students do not know what expertise and input to expect from their group members. To overcome this problem, one of the first activities for students in EVS is to fill in a profile with static and/or dynamic information about themselves (pEXPi). The aim of this activity is to foster trust in situations where students do not know each other and do not have a chance to meet, but need to collaborate. Educational research has found that, according to both students and tutors, a pEXPi does indeed contribute to the emergence of a sense of community in the start-up phase of the group work (Werkgroep SALDO, 2004). It proved that the pEXPi profiles especially contribute to building a mental picture of one’s peers and lowers the threshold to contacting each other. Rusman et al., (in press) showed that the implementation of the pEXPi initially helps students to form an impression of each other, and that after this initial period, students base their impression on factors like the quality of work-related contributions, behaviour during collaboration (e.g., responsiveness) and communication style. Brouns et al., (2007) concluded on the basis of these two studies that the use of pEXPi helps to kick-start the learning interaction and collaboration in the EVS. They therefore proposed to use pEXPi – combined with portfolio information – as an incentive mechanism to enhance participation and contribution in communities, building on the notion that trust is a result of relationships between people and can only arise when people get to know each other. Together with other incentives and policies for online communities, this should enhance sociability in a ‘learning network’ and thereby have a beneficial effect on learning (Brouns et al., 2007).

### *Box 2. Grounding*

One of the problems that students face in collaborative work is ‘grounding’, a term referring to the interactive process by which students establish common ground, i.e., mutual knowledge, understanding and assumptions. Grounding in international student groups can be supported by using collaboration scripts, which is a set of rules for structuring dialogues. Schoonenboom (2008) studied the effect of a collaboration script on grounding in EVS student groups, i.e., on establishing common goals and acquiring an understanding of each other’s knowledge, skills and motivation. The script divided grounding discussions into three phases, the input phase, the discussion phase and the consensus phase, and was implemented in two ways: as a textual instruction (in a Word document) or as a pre-structured discussion board (in Blackboard). The study showed that the script led to more orderly discussions and more and longer contributions. In the groups that worked with the pre-structured discussion board, the effect of the script was even larger than in the groups using the textual instruction. This greater focus on grounding discussions resulted in the script having an impact on the awareness among group members of each other’s knowledge and of differences in expertise between members (Schoonenboom, 2008).



The third stage of EVS involves writing a group research proposal for the case study. The basic input for the proposal derives from the previous stage. In this stage, however, the groups have to translate their tentative research plans and learning objectives into a coherent group research proposal. An outline research proposal is provided to give all student groups a clear picture of what is expected at the end of this stage. The first draft of the group research proposal will be commented upon by the expert (i.e., the author of the case study), who usually asks the students to redraft the proposal accordingly. After publishing the approved research proposal, the group enters the fourth stage.

In the fourth and final stage of EVS, the student groups research their case study, and publish their results in the form of a group report and policy summary. The research builds on the group research proposal produced in the previous stage. In order to implement the research project, the students divide tasks and often roles between group members (e.g., project leader, English language editor, etc.). The students are required to make full use of the members' different cultural and disciplinary backgrounds in analysing the problem presented by the case study and finding a sustainable solution. Experience with the EVS shows that some groups produce comprehensive high-quality reports based on detailed discussions and contributions reviewed by all group members, while other groups deliver reports consisting of no more than a series of individual contributions.

The latter groups appear to practice cooperative learning rather than 'true' collaborative learning, with an emphasis on efficient allocation of tasks within the group rather than shared knowledge construction (see Roschelle & Teasley, 1995). The assessment procedure in EVS is relatively intensive (see Box 3), as it involves two staff members (tutor and expert) and takes individual contributions, group processes and group products into account. A student's final mark is a combination of the mark for the group products (which is allocated by the expert and determines 50% of the final mark), the mark for the group process (which is allocated by the tutor and determines 25%) and the mark for the individual contribution (which is allocated by the tutor and determines 25%).

## **Learning Technology**

The backbone of EVS is the use of modern ICT and the Internet. The electronic learning system used is Blackboard. When EVS was launched in 2001, no in-depth analysis was performed of the best systems or tools available to support virtual collaborative learning. Blackboard was selected on account of its user-friendliness and the experiences gained with the system by a number of partner institutions. All EVS course materials (case studies, individual and group activities, assessment criteria, timetable, guidelines for students and staff, etc.) are accessible via Blackboard. More important, however, are the tools for communication and interaction, such as discussion

### *Box 3 Peer assessment*

A problem associated with performance assessment in competence-based learning is that it can be quite time-consuming for teaching staff. In a research set-up, peer assessment was integrated in the EVS assessment procedure by letting students assess the quality of the first draft of the report of a fellow group (Prins et al., 2005). The students were prepared for this task by means of an online mini-course in assessment and were provided with assessment tools (feedback rules, scoring forms, examples). To the students, the advantage of participating in peer assessment is the opportunity to develop their peer review and feedback skills, which are important skills for academic professionals. The peer assessment trial in EVS was successful in the sense that it led to better final drafts of the group reports and, thus, to a decrease in teacher workload (Sluijsmans et al., 2006). However, the quality of most peer assessment reports was relatively poor. Observations of the student groups revealed that the students were very much focused on content and that they regarded the peer assessment tasks as an additional effort. Options to motivate the students to put more effort into peer assessment include making the acquisition of peer review and feedback skills an explicit learning objective, making it part of the marking and/or integrating the peer assessment tasks even further with the content-related tasks (Prins et al., 2005).

boards, email and chat facilities, and a tool for file exchange between group members. The emphasis in EVS is on asynchronous communication, using pre-structured group discussion boards. An advantage of discussion boards is that it gives students time to think about the meaning of a message or to reflect on the collaborative process (Barth, 2007; Schoonenboom, 2008). The risk of long delays in communication between students has been minimised by adopting a clear set of rules of conduct for students (check the group discussion board at least twice a week, reply as soon as possible to questions or messages from your group members, inform your tutor immediately if any problems arise within the group, etc.). In addition to the discussion board, there are real-time chat sessions between group members and their tutor (using Blackboard or Skype).

### **Reflection and Evaluation**

A characteristic of EVS is that students reflect on their learning process, both individually and as a group, at various points during the course of the seminar. The individual and group reflection reports are rich sources of information that can be used to improve the educational format. This data is supplemented by formal evaluations using end-of-course questionnaires and educational research. Finally, an annual staff meeting is organised after each EVS run. This meeting provides an opportunity to evaluate the seminar, and gives the tutors and experts an opportunity to share experiences, discuss group products and award formal marks to student groups, discuss potential improvements to the EVS, and, last but not least, to socialise. One of the great advantages of EVS is definitely that staff members also learn from each other about tutoring in an electronic learning environment, writing a case study, new ICT options, etc.

### **Organisational Model**

The organisational model for EVS is a bottom-up network approach with distributed responsibilities, operating without formal, top-down institutional arrangements or external funding. The institutions participating in EVS share their expertise and invest staff time and other resources, such as server space to host the electronic learning environment. The distribution of tasks and responsibilities over the partners is differentiated, as institutions can become partners in an EVS run at three different levels: (1) providing students and an institutional coordinator; (2) providing one or more tutors in addition to (1); and (3) supplying a case study and providing an expert in addition to (2). The idea is that a new EVS partner starts at the first level before – hopefully after positive experiences – moving on to level two, and finally, to level three. It is up to each institution to decide at which level it wishes to start, and when it wants to switch to a different level of participation, becoming either more or less involved in the EVS. However, a core of active and experienced partner institutions is needed to sustain the EVS. The central EVS coordinator (OUNL) is responsible for the overall management and control of the development of EVS, as well as for maintaining the electronic learning environment. The other partners tutor and assess the student groups, develop case studies, implement EVS at their institutions (as a compulsory or optional course, or as part of an existing course), and recruit and select students. Each participating university appoints an institutional coordinator who is responsible for the management and administration issues for his/her EVS students (intake procedure, student details, credit points etc.). At three points during the seminar (i.e., at the start, halfway through and at the end), the institutional coordinator organises a face-to-face meeting with the students from his

or her institution to discuss the educational format and learning process, and to give the students (who are members of different student groups) an opportunity to share ideas and experiences. Since students participating in EVS continue to be regular students of their home universities, no formal enrolment at a foreign university is necessary. Neither do they have to pay any extra fees for participating in EVS. The collaboration between the partner institutions can be described as a joint process of ongoing development of the EVS in educational and organisational respects.

### **Lessons Learned**

Our evaluations show that the large majority of students who complete EVS are enthusiastic about their experience of international and multidisciplinary learning, and appreciate its value in learning for sustainable development. Another strength of EVS for competence-based learning is the authenticity and openness of the learning environment. The students deal with open, real-life case studies, and in their research of the problem, they interact with the ‘real world outside’ (external sources, experts, stakeholders, etc.). A good example is the case study on the Hateg County Dinosaurs Geopark in Romania, where students have to come up with creative ideas about sustainable development of the geopark, and for which they have to contact specialists involved in geopark management (in Romania and at European level), as well as local authorities and stakeholders in the vicinity of the geopark. Such a realistic learning environment is generally acknowledged as a major requirement for effective competence development. These two features of EVS – international, multidisciplinary student groups working in a realistic learning environment – can only be realised through intensive interuniversity collaboration in development and implementation. Thus, the organisational model of EVS, which makes this type of cooperation possible, is almost by definition a strength. The

bottom-up approach based on network principles guarantees flexibility, and makes it easy for new partners to join. Distributed responsibility and the absence of reliance on external funding have been critical factors in sustaining the EVS since its start back in 2001. In the opinion of the staff, the innovative learning experience that the students can be offered by sharing expertise, staff time and resources definitely outweighs the relatively large time investment this cooperation requires due to differences in educational paradigm, institutional policies, etc.

Obviously, the EVS requires specific skills from the educational staff involved, such as teaching in an intercultural context, dealing with other educational paradigms, using modern ICT, communicating without face-to-face meetings, etc. The role of the tutor in particular is difficult yet crucial under these conditions. Most staff are not trained to operate in such an electronic learning environment. In the EVS, this problem is dealt with by approaching the repeated implementation of EVS as a joint learning process. The annual staff meetings after each EVS run in particular are a major mechanism to exchange experiences and initiate improvements. The EVS is a new learning method not only for the staff, but maybe even more so for the students. The heterogeneity of the student groups is a strength from an educational perspective, but also creates difficulties in communication (as regards the English language and cultural differences). As effective communication between students is crucial in collaborative learning, this is a major issue for further improvement (Barth, 2006). The fact that communication and collaboration in EVS takes place via the Internet makes it even more complicated than in face-to-face meetings, because facial expressions, body language and social awareness are missing, and all social processes depend on computer technology. In the current format of EVS, the ‘personal expertise pages’ (pEXPi, Box 1) are an important tool to facilitate socialisation. Yet, the lack of live dialogues and visual communication is a major

drawback of computer conferencing. Therefore, we hope that in the not-too-distant future the use of webcams and other 'social software' tools can be integrated as a standard option in EVS.

## **SCALING-UP: FROM A VIRTUAL SEMINAR TO A VIRTUAL CAMPUS**

Inspired by the success of the European Virtual Seminar on Sustainable Development (EVS), a consortium mainly consisting of EVS partners has devised a project to expand from a single joint course to a joint virtual campus on Sustainable Development. The first phase involved the design of the virtual campus and the development of e-learning courses as its building blocks. This phase, which ran from 2005 to 2006, was funded as the 'Virtual Copernicus Campus' project<sup>2</sup> by the European Commission's eLearning programme (European Commission, 2004). The next phase, funded by the same programme as the 'Virtual Campus for a Sustainable Europe (VCSE)' project (2007-2009), involves the implementation of the virtual campus website, running the e-learning courses, and active expansion of the VCSE and dissemination of its virtual campus model to other interdisciplinary fields of study (see VCSE website: <http://www.vcse.eu>).

The design philosophy of the VCSE is based on the features that made the EVS so successful, in the sense that it has been running uninterruptedly since 2001, almost without external funding. Just like the EVS, the VCSE is organised as an open and flexible network with distributed responsibilities, offering high-quality e-learning opportunities on interdisciplinary topics which are ideally taught and learned in an international educational setting. This point, the relationship between the field of study (sustainable development) and the educational format, has already been elaborated earlier. This section focuses on the educational, organisational and technological aspects of the implementation of the virtual

campus, and in particular on the distribution of responsibilities between the individual partners and the partnership (or consortium).

A major decision taken by the consortium at the start of the virtual campus development was to drop the original ambition of creating a joint European Masters Degree programme in Sustainable Development. First of all, this removed the necessity of creating a coherent and comprehensive set of courses. More importantly, this made it possible to organise the virtual campus in a much more decentralised and informal way. The perceived advantages motivating this decision are the following:

1. The effort spent on bureaucratic arrangements, problems of institutionalisation, official agreements and formalities can be minimised. This greatly enhances the motivation and commitment of the educational staff involved, whose primary interest is in content and e-learning aspects of the virtual campus.
2. It was expected that a joint Masters programme would not attract large numbers of new students, and that it might even directly compete with Masters programmes offered by the individual partners. The option of taking just a single course in the virtual campus, however, greatly expands the target population of students and, at the same time, makes the Masters programmes of the individual partners more attractive.
3. The operational costs of running the virtual campus can be kept low, which reduces the financial risks considerably and enhances its sustainability after the lifetime of the (externally funded) project.
4. The virtual campus partnership is more accessible to new members and the selection of courses offered can more easily be expanded when they are not tied to a joint, accredited Masters programme.

In organising the virtual campus as a flexible network, subsidiarity has been the leading principle, as indicated in the introduction to this chapter. Following this principle, as many as possible of the tasks involved in operating the virtual campus are the responsibility of the individual partners. Only those issues for which a joint approach is

considered essential are handled at the level of the partnership. Table 2 presents an overview of the various educational and organisational aspects of the virtual campus, and the level at which these are handled.

## Educational Issues

*Table 2. Handling level of educational and organisational issues in the Virtual Campus for a Sustainable Europe (VCSE)*

Type of issue	Handled by individual partner	Handled by Virtual Campus partnership
Educational		
- language of instruction		x
- academic level		x
- size of courses		x
- entrance requirements		x
- course evaluation		x
- general course topic	X	x
- specific contents	X	
- learning objectives	X	
- didactic model	X	
- protocols & guidelines	X	
Organisational		
- student registration	x ('host')	
- assignment of grades	x ('host')	
- certificate of completion	x ('host')	
- pre-registration selection (enrolment)	x ('home')	
- post-registration selection (exclusion)	x ('host')	
- attracting students	x ('home')	
- fees	x ('home')	
- local recognition of credits	x ('home')	
- integration in study programme	x ('home')	
- distribution of responsibilities and tasks within partnership		x
- promotional activities		x
- selection of new partners		x
- scheduling of courses		x
- evaluation of virtual campus		x

Educational issues handled jointly by the partners include the choice of the language in which the courses are offered (English as a common language), the academic level of the courses (late Bachelors or early Masters level), the approximate size of the course (in European Credit points), the entrance requirements for the students (basic skills in English and ICT, access to computers with Internet connection, basic understanding of sustainable development), and course evaluation (comparable pre- and post-course questionnaires). 'Intra-course' aspects, such as the specific contents and learning objectives, the didactic model and protocols or guidelines for students and teachers, are discussed by the partnership but are the responsibility of the partner offering the course. The didactic model includes not only the sequence of learning activities, but also the learning approach (e.g., self-study or collaborative work), the learning technology employed (type of e-learning platform, learning materials and communication tools) and type of assessment (e.g., emphasis on process or product, knowledge or skills). The general topic of the course is an aspect that involves both levels of decision-making: an individual partner proposes one or more topics and the partnership accepts or chooses to ensure complementarity both within the selection of courses offered by the virtual campus and with the curricula of the individual partners.

This distribution of responsibilities results in a rich diversity of topics and approaches at course level (see Table 3), which has advantages for both the students and the teaching staff. The students are provided with a wide choice of courses which are clearly distinct in terms of content and com-

petence objectives. This allows them to choose a course with a clear added value as compared to the courses offered by their home universities. For the teaching staff, this diversity creates the opportunity to learn from each other. This mutual learning process is promoted by giving all teachers access to all courses offered by the virtual campus and presenting and discussing course evaluations at the level of the partnerships. In time, this might well result in convergence regarding certain aspects, such as the e-learning platform and ICT tools used and the assessment protocols.

### Organisational Issues

The responsibilities for organisational issues are distributed in a similar way as those for the educational issues (Table 2). The individual partners can adopt different roles in this respect. Following the terminology of the Erasmus programme, they can be ‘host universities’, offering a course, or ‘home universities’ for their own students who take courses from another university. As host universities, the individual partners handle administrative

issues that directly concern the course(s) they are offering, such as student registration, assignment of grades and issuing certificates of completion. Exclusion of inactive students, which is necessary in collaborative learning-based courses such as the EVS, is also the responsibility of the host university (after consulting the students’ home university). As home universities, the individual partners are responsible for attracting students to the virtual campus, enrolment in the sense that they must decide which students (or groups of students) are allowed to choose which courses, course fees, local recognition of credits awarded by a host university, and integration of international courses into the study programmes, either as compulsory or optional courses.

A number of organisational issues must be handled at the level of the partnership, for reasons of effectiveness and efficiency. These concern the distribution of responsibilities and tasks within the partnership, e.g., maintaining the technical facilities of the virtual campus, managing the content of the website, hosting meetings etc. Other issues requiring a collective approach are promotional

*Table 3. Core partners and courses offered in the Virtual Campus for a Sustainable Europe (as of March 2008)*

Partner	Course title	Course topic	Didactic model
Open University of the Netherlands (NETHERLANDS) School of Science	European Virtual Seminar on Sustainable Development	Case studies on sustainability issues in Europe	Collaborative, computer-supported project work in international, multidisciplinary student teams
Leuphana University Lüneburg (GERMANY) Institute for Environmental & Sustainability Communication	Syndromes of Global Change	Systems approach to complex global change issues	Collaborative, computer-supported team work, combined with self study of source texts on theory and methodology
Charles University, Prague (CZECH REPUBLIC) Environment Center	Critical Approaches to Globalisation	Multidisciplinary lecture series on globalisation	Self study of lecture texts and exercises for critical thinking and writing skills, combined with student peer review
University of Macedonia, Thessaloniki (GREECE) Social and Economic Sciences	Corporate Sustainability and Natural Resources	Lecture series on environmental management in the context of sustainable development	Self study of lecture notes and presentations, group discussions, individual and group case studies
Karl Franzens University, Graz (AUSTRIA) Institute of Geography and Regional Science	Sustainable Spatial & Regional Development	Lecture series on spatial and regional planning in Europe in the context of sustainable development (concepts and cases)	Self study of lecture materials (PPT, videos, podcasts), individual exercises, group discussions in chat

activities for the expansion of the partnership, selection of new partners, formal agreements, scheduling of the courses in the academic year and regular evaluation of the virtual campus.

## **Virtual Campus Technology**

The technological aspects of the VCSE have not been discussed thus far, but merit some explicit attention. Important features of the VCSE virtual campus web are attention to the social dimension of a campus, the facilitation of collaboration between the educational staff of the partner institutions and the use of open-source software (see VCSE website: <http://www.vcse.eu>). The social dimension is addressed, for instance, by providing space for informal communication ('cafeteria'), by displaying portraits of discussion forum participants and by including a personal information page for each teacher or student. Collaboration between educational staff is facilitated through an intranet, with extensive communication, collaboration and database options. The use of open-source software (Moodle, TYPO3), not only allows each partner to contribute to the continuous improvement of the virtual campus web, but also enables the dissemination of the VCSE's virtual campus web solutions to other fields of study. A fully equipped e-learning platform in Moodle is available and is used for VCSE courses. However, partners may prefer to offer their courses on the e-learning platform used by their university. In that case, the virtual campus web functions as a portal to these other learning platforms. For instance, EVS makes use of Blackboard.

## **Sustainability of the VCSE Virtual Campus Model**

We expect that the distribution of responsibilities following the principle of subsidiarity as outlined above will result in a sustainable virtual campus model. The success of the EVS, which was organised on similar principles, may serve as some

kind of proof here. The pillars of durable success will not be the top-down obligations arising from formal high-level agreements, but bottom-up assurance of educational quality, financial viability and accessibility to teachers and students.

Educational quality is assured through various mechanisms. The core group of five VCSE partners selects and invites promising potential new partners to central demonstration workshops, and, based on an evaluation of their presentations and course offerings, invites them to join the VCSE. It is the responsibility of the teaching staff at the home university to decide which VCSE courses they offer to their students. They can base their decision on their personal evaluation of all VCSE courses offered, as they have full access to these courses. For each VCSE course, the participating students fill in evaluation questionnaires, and the outcome is discussed by the partnership and used for course improvement.

The VCSE organisational model minimises out-of-pocket costs by following a 'quid pro quo' approach, based on an exchange of courses, students and know-how on e-learning. External subsidies are only needed to get the virtual campus started, that is, to develop the concept, to form a core group of partners, to develop the virtual campus web and to attract new partners. In principle, the partners are expected to strike a certain balance between incoming and outgoing students and to prevent an excessive teaching or tutoring load, e.g., by setting a maximum to the number of foreign students per course. However, this balance will probably not be maintained very strictly, as in many of the courses offered, foreign students are not seen as a burden, but as a necessity to create internationally mixed student teams.

The original VCSE core group of five partners actively pursues expansion with new partners to broaden the choice of courses offered and allow courses to run with a sufficient number and international mix of students. To this end, the VCSE organises demonstration workshops and has prepared a wide range of information

resources (see VCSE website: <http://www.vcse.eu>). Joining the VCSE is facilitated by allowing new partners different levels of participation (observer, partly active member, full member), which may change in time. For instance, a new partner may start as an ‘observer’ (with staff access to current courses), become a full member the next year (offering a course, bringing in students), and – due for instance to a temporary shortage of available staff time – participate as a partly active member a year later (only bringing in students). By handling course and student-related matters as much as possible at the local level of the host and home universities, respectively, formalities at the level of the virtual campus partnership can be kept to a minimum, which enhances the accessibility to new university partners as well as to students.

An accessible virtual campus, offering high quality courses without the need for external funding, has a good chance of being sustainable. It will only be so, however, if it fulfils a need among students and teaching staff that cannot be better fulfilled by other means. In this respect, too, the VCSE has a strong point with its focus on sustainable development, an interdisciplinary field of study requiring an international and intercultural approach in teaching and learning.

## **FUTURE TRENDS**

Education is on the move, worldwide. New technologies will offer us new opportunities for e-learning and virtual mobility that we cannot even imagine at present. However, innovations in educational models and technologies are initiated by committed teachers and active students, and do not originate in board rooms. It is especially in the field of e-learning that developments are fast and diverse (emergence of social software, Web 2.0 technology). These cannot be handled in a top-down manner, but require the flexibility and responsiveness of a bottom-up approach. Such an approach to virtual mobility is made

possible by the current widespread availability of inexpensive ICT tools. In EVS, experiments with new ICT tools are often initiated by the students. For instance, it was they who introduced the use of Skype telephone conferencing software, and switched to communication through MSN when the Blackboard server had temporarily broken down.

Thus, developing new, useful and significant educational, technological and organisational models requires ‘experimental gardens’ allowing for a bottom-up approach, as in EVS and VCSE. Mainstreaming of the new models is expected to occur when in due time these bottom-up initiatives connect with top-down efforts aiming at institutionalisation.

## **CONCLUSION**

The two cases described in this chapter both underline the importance of subsidiarity in the development of virtual mobility activities. In practice, this means a bottom-up approach, in which many educational and organisational issues are handled by the individual partners, and partnerships are organised as open, flexible networks. As indicated in the above description of EVS and VCSE, the advantages of such a bottom-up approach are manifold. In summary:

- Access to virtual mobility activities for students and for new partners can be maximised, without being dependent upon high-level formal agreements that may take many years to materialise;
- The educational staff will be more motivated to learn the new skills and invest the extra effort required for international e-learning activities, as they will have ownership, where top-down imposition could easily result in unmotivated staff or even passive resistance;



- Quality assurance can be left in the hands of ‘peers’ (educational professionals), instead of bureaucrats with unwieldy quality control systems;
- Perhaps most importantly, innovations in educational models and technologies stem from committed teachers and active students. It is especially in the field of e-learning that developments are fast and diverse and cannot be handled in a top-down manner, but require the flexibility and responsiveness of a bottom-up approach.

In addition to the importance of a bottom-up approach, two more important principles emerge from the virtual mobility cases we have described. The first is ‘educational necessity’. Formal, high-level policies and agreements or technological opportunities alone will not be sufficient to drive the development of joint international courses or virtual campuses. Students and teachers are much more likely to become supportive when high priority is placed on educational objectives that can best be achieved in international e-learning environments. This is true, for example, if the aim is to ‘learn for sustainable development’, to acquire intercultural skills or to gain experience with working in geographically dispersed teams. Of course, to be effective, these learning environments should be based on appropriate learning theories and didactic models, which differ considerably from those underlying traditional lecture hall teaching (Bélisle, 2008). Only when virtual courses make optimal educational use of their specific features, can virtual student mobility outgrow the stigma of being just a watered-down version of physical mobility.

The second principle is ‘interdependency’, and is directly tied to the principle of educational necessity. Universities simply depend on partner institutions in other countries (and vice versa) to create the international e-learning environments needed to achieve major educational objectives. Furthermore, if no or limited external funds are

available, the partners strongly depend upon each other’s contributions in terms of learning resources and staff time. Yet another aspect in which there is interdependency is the diversity of approaches in e-learning often found in a partnership. This diversity creates welcome opportunities for the exchange of experience and expertise in the rapidly developing field of e-learning.

To conclude, it is our view that virtual campus initiatives are only viable and will only be adopted at a larger scale when the distribution of responsibilities is based on subsidiarity, when there is a clear educational necessity to create international e-learning environments and when there is interdependency between the participants. We expect significant transformation of higher education institutions (‘mainstreaming’ of virtual mobility) to occur when, in due time, these bottom-up initiatives come to connect with top-down efforts at the level of policy makers aiming at institutionalisation of international virtual student mobility through high-level, formal agreements. This could, for instance, take the form of a comprehensive ‘Virtual Erasmus Programme’ legal framework (Bijnens et al., 2006; REVE, 2006). However, the actual need for formal agreements will have to emerge from concrete experiences gained in projects like the European Virtual Seminar and the Virtual Campus for Sustainable Europe.

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## **REFERENCES**

Barth, M. (2006). Lernen mit Neuen Medien - ein Weg für die Bildung für eine nachhaltige Entwicklung? In W. Rieß & H. Apel (Eds.), *Bildung für eine nachhaltige Entwicklung: Aktuelle*

*Forschungsfelder und -ansätze* (pp. 69-80). Wiesbaden: VS Verlag für Sozialwissenschaften.

Barth, M. (2007). *Gestaltungskompetenz durch Neue Medien? Die Rolle des Lernens mit Neuen Medien in der Bildung für eine nachhaltige Entwicklung*. Berlin: BWV Berliner Wissenschafts-Verlag.

Bélisle, C. (2008). eLearning and intercultural dimensions of learning theories and teaching models. *eLearning Papers 7* (February 2008). Retrieved April 7, 2008 from, <http://www.elearningeuropa.info/files/media/media14903.pdf>

Bijmens, H., Boussemaere, M., Rajagopal, K., Op de Beeck, I., & Van Petegem, W. (2006). *European cooperation in education through Virtual Mobility - a best-practice manual*. Heverlee: EUROPACE izvw. Retrieved April 7, 2008, from <http://www.europace.org/articles%20and%20reports/Being%20Mobile%20Manual%20-%20Internet%20version.pdf>

Brey, C. (Ed.). (2007). *Guide to virtual mobility*. Report e-move project, European Association of Distance Teaching Universities (EADTU). Retrieved April 7, 2008, from [http://145.20.178.4/Portals/0/documents/The\\_Guide\\_to\\_Virtual\\_Mobility.pdf](http://145.20.178.4/Portals/0/documents/The_Guide_to_Virtual_Mobility.pdf)

Brouns, F., Bitter-Rijpkema, M. E., Sloep, P. B., Kester, L., Van Rosmalen, P., Berlanga, A., & Koper, R. (2007). Personal profiling to stimulate participation in learning networks. *Proceedings of the ePortfolio 2007 Conference*. October, 18-20, 2007, Maastricht, The Netherlands. Retrieved April 7, 2008, from <http://dspace.ou.nl/bitstream/1820/1012/6/profiling-ln-final.pdf>

Brouwer, N., Byers, B., & McDonnell, C. (2006). *Developing independent learners in chemistry*. Report from ECTN working group, ECTN Association. Retrieved April 7, 2008 from <http://www.wcsi.unian.it/educa/inglese/devindle.html>

Cörvers, R. (2003). *European virtual seminar*. Utrecht: Stichting Digitale Universiteit. Retrieved April 7, 2008, from <http://www.surffoundation.nl/documents/Evaluatiestudie-EVS.pdf>

Cörvers, R., Leinders, J., & van Dam-Mieras, R. (2007). Virtual seminars – or how to foster an international, multidisciplinary dialogue on sustainable development. In J. de Kraker, A. Lansu & R. van Dam-Mieras (Eds.), *Crossing boundaries – Innovative learning for sustainable development in higher education* (pp. 142-187). Frankfurt am Main: VAS Verlag für Akademische Schriften.

De Kraker, J., & Cörvers, R. J. M. (2006). The role of values in sustainability evaluation – insights from three Dutch approaches. In E. Carrera, J. J. de Felipe, B. Sureda & N. Tollin (Eds.). *Proceedings of the I International Conference on Sustainability Measurement and Modelling*. Barcelona: CIMNE.

De Kraker, J., Lansu, A., & van Dam-Mieras, R. (2007a). Competences and competence-based learning for sustainable development. In J. de Kraker, A. Lansu & R. van Dam-Mieras (Eds.), *Crossing boundaries – Innovative learning for sustainable development in higher education* (pp. 103-114). Frankfurt am Main: VAS Verlag für Akademische Schriften.

De Kraker, J., Cörvers, R., Ivens, W., Lansu, A., & van Dam-Mieras, R. (2007b). *Crossing boundaries – competence-based learning for sustainable development in a virtual mobility setting*. Paper presented at the 4th World Environmental Education Congress, Durban (South Africa). Retrieved April 7, 2008, from [http://www.weec2007.com/papers/files/2007-08-05\\_25/98\\_deKraker\\_et\\_al.doc](http://www.weec2007.com/papers/files/2007-08-05_25/98_deKraker_et_al.doc)

European Commission (2004). *Proposed project summary Virtual COPERNICUS-CAMPUS*.

Retrieved April 7, 2008, from [http://ec.europa.eu/education/archive/elearning/projects\\_2004/virtual\\_copernicus.pdf](http://ec.europa.eu/education/archive/elearning/projects_2004/virtual_copernicus.pdf)

European Commission (2006). *Erasmus: Success stories - Europe creates opportunities*. Luxembourg: Office for Official Publications of the European Communities. Retrieved April 7, 2008 from, [http://ec.europa.eu/dgs/education\\_culture/publ/pdf/erasmus/success-stories\\_en.pdf](http://ec.europa.eu/dgs/education_culture/publ/pdf/erasmus/success-stories_en.pdf)

European Commission (2007). *The lifelong learning programme 2007-2013 - Glossary*. (Last update: 31-10-2007). Retrieved April 7, 2008 from, [http://ec.europa.eu/education/programmes/llp/guide/glossary\\_en.html](http://ec.europa.eu/education/programmes/llp/guide/glossary_en.html).

European Commission (2008). *Lifelong learning programme (LLP)*. (Last update 29-1-2008). Retrieved April 7, 2008 from, [http://ec.europa.eu/education/programmes/llp/index\\_en.html](http://ec.europa.eu/education/programmes/llp/index_en.html)

EVS - European Virtual Seminar on Sustainable Development. Retrieved April 7, 2008 from, <http://www.ou.nl/evs>

Global Seminar on Environment and Sustainable Systems. Retrieved April 7, 2008 from, <http://www.globalseminar.org>

Ivens, W., De Kraker, J., Bitter-Rijkema, M., & Lansu, A. (2007). Collaborative learning in an authentic context: a virtual consultancy. In J. de Kraker, A. Lansu & R. van Dam-Mieras (Eds.), *Crossing boundaries – Innovative learning for sustainable development in higher education* (pp. 188-210). Frankfurt am Main: VAS Verlag für Akademische Schriften.

Jager, K. (2005). Samenwerken aan duurzaamheid: het European Virtual Seminar on Sustainable Development. In K. Jager, R. Jacobi, H. Frencken & B. Cordewener (Eds.), *Internationalisering: Cases en Trends*. Utrecht: Stichting SURF. Retrieved April 7, 2008 from, <http://e-learning.surf.nl/e-learning/artikelen/2817>

Könings, K. D., Brand-Gruwel, S., & van Merriënboer, J. J. G. (2005). Towards more powerful learning environments through combining the perspectives of designers, teachers and students. *British Journal of Educational Psychology*, 75, 645-660.

Kreijns, C. J. (2004). *Sociable CSCL environments, social affordances, sociability and social presence*, Unpublished doctoral dissertation, Open Universiteit Nederland, Heerlen.

OUNL – Open Universiteit Nederland (2003). *Lang Leve Leren! Schets van de Open Universiteit Nederland in 2004*. Heerlen: Open Universiteit Nederland. Retrieved April 7, 2008 from, [http://d-hrl-srv-1.ouh.nl/info-alg-organisatie/algemeen/Jaarbeeld2003\\_DEF.PDF](http://d-hrl-srv-1.ouh.nl/info-alg-organisatie/algemeen/Jaarbeeld2003_DEF.PDF)

Prins, F. J., Sluijsmans, D. M. A., Kirschner, P. A., & Strijbos, J.W. (2005). Formative peer assessment in a CSCL environment: A case study. *Assessment and Evaluation in Higher Education*, 30, 417–444.

QANU – Quality assurance Netherlands Universities (2007). *Onderwijsvisitatie Milieuwetenschappen*. Utrecht: QANU. Retrieved April 7, 2008 from, <http://www.qanu.nl/comasy/uploadedfiles/Milieuwetenschappen2007def.pdf>

REVE - Real Virtual Erasmus (2006). *Virtual mobility manual - How to teach internationally from your own desk?* Online publication, REVE project. Retrieved April 7, 2008 from, <http://reve.europace.org/drupal/>

Roschelle, J., & Teasley, S. (1995). The construction of shared knowledge in collaborative problem solving. In C. E. O'Malley (Ed.), *Computer supported collaborative learning* (pp. 69–97). New York: Springer-Verlag.

Rusman, E., van Bruggen, J., Cörvers, R., Koper, R., & Sloep, P. (in press). From pattern to practice: evaluation of a design pattern fostering trust in virtual teams. *Computers in Human Behavior*.

Schoonenboom, J. (2008). The effect of a script and a structured interface in grounding discussions. *International Journal of Computer Supported Collaborative Learning*. [Available online]

Schoonenboom, J., Roozen, F., & Sligte, H. (2004). *Strategische keuzen bij ICT-innovatie van het hoger onderwijs: enige handreikingen vanuit internationale praktijkvoorbeelden*. Den Haag: Ministerie van Onderwijs, Cultuur en Wetenschap. Retrieved April 7, 2008 from, <http://www.rvbh.nl/ict/downloads/Internationalisatie.pdf>

Sluijsmans, D. M. A., Prins, F. J., & Martens, R. L. (2006). The design of competency-based performance assessment in e-learning. *Learning Environments Research*, 9(1), 45-66.

UNESCO - United Nations Educational, Scientific and Cultural Organisation (1997). *Educating for a Sustainable Future: a transdisciplinary vision for concerted action*. Paris: UNESCO. Retrieved April 7, 2008 from, <http://unesdoc.unesco.org/images/0011/001106/110686eo.pdf>

VCSE - Virtual Campus for a Sustainable Europe. Retrieved April 7, 2008 from, <http://www.vcse.eu>

VLIR – Vlaamse Interuniversitaire Raad (2007). *De onderwijsvisiteer Milieuwetenschappen. Een evaluatie van de kwaliteit van de masteroplei-*

*dingen Milieuwetenschappen aan de Vlaamse universiteiten*. Brussel: VLIR. Retrieved April 7, 2008 from, <http://www.vlir.be/02thema/03kz/03tweederonde/download/kv06z2.pdf>

Werkgroep SALDO (2004). *Samenwerkend leren digitaal ondersteund. Handboek*. Utrecht: Stichting Digitale Universiteit. Retrieved April 7, 2008 from, <https://www.surfgroepen.nl/sites/saldo-ho/Bestanden/Handboek-SALDO.pdf>

Wikipedia (2008) *Subsidiarity*. (Last modified on 23 March 2008). Retrieved April 7, 2008 from, <http://en.wikipedia.org/wiki/Subsidiarity>

## ENDNOTES

- <sup>1</sup> The term educational as used in this chapter refers to the ‘primary process’ of teaching and learning. In the literature on virtual mobility, the term ‘pedagogical’ is often used with the same meaning.
- <sup>2</sup> The name ‘Copernicus’ refers to the Copernicus University Charter for Sustainable Development (Geneva, 1994), signed by over 300 European universities, see: <http://www.iisd.org/educate/declarat/coper.htm>