MYNETWORKS – A COLLABORATIVE WEB ENVIRONMENT FOR SUSTAINABLE ENVIRONMENTAL TECHNOLOGY

Urs Karl Egger¹, Andreas Schönborn² and Marcia Pereira³

ABSTRACT: myNetWorks is a collaborative web-based learning environment, where users can access and exchange basic principles, course materials and approaches to problem solving in the areas of sustainable environmental technology. The goal of myNetWorks is to facilitate exchange, to nurture and to sustain a community of practitioners and academics, without following a one-sided technological viewpoint. Social and economic aspects play an important role alongside the technical and ecological aspects as well. An important issue is to promote collaboration and exchange between developing and developed countries. On myNetWorks also courses are offered, which have a practical approach and make large use of real case studies. In these courses, learners are encouraged to use their own experiences to reflect upon the learning material presented. The results of their learning experiences and interactions become later part of the resource pool, which can be accessed by the whole community.

The target groups of myNetWorks are engineers, technical experts, teaching staff and students at educational institutions (universities and colleges); project staff and partner organisations of Swiss Agency for Development and Cooperation (SDC) and its coordination offices; consultants working on behalf of SDC and of other development organisations; non-governmental organisations in developing and developed countries.

myNetWorks offers five main spaces for information and communication: an entrance space giving an overview and general information; a personal space, a strictly private space where

¹ Managing Director, Skat Foundation, Vadianstrasse 42, CH-000 St. Gallen, Switzerland. Tel: +(41-71) 228-5454; Fax: +(41-71) 228-5455; E-mail: urs.egger@skat.ch Web site: http://www.mynetworks.org
² Armadillo Media gmbh, Bruchstrasse 69, CH-6003 Luzern, Switzerland. E-mail: schoenborn@armadillonetz.ch
³ eKnowledge in Engineering Group, Centre of Product Design, Swiss Federal Institute of Technology, CLA E26, Tannenstrasse 3, CH-8092 Zürich Switzerland. E-mail: marcia.pereira@imes.mavt.ethz.ch
users can access their own profile and collect their own information; a resources space with a common collection of articles, photos, case studies, chat records, reports, links, downloadable software, among others; an exchange space that gives access to discussion forums and chat rooms; among other communication functionalities; and a courses space where all the course related activities and information are accessed.

myNetWorks is being created in collaboration between the Swiss Agency for Development and Cooperation (SDC) and the International Ecological Engineering Society (IEES). A prototype of "myNetWorks" was tested with a first 2-week workshop on "Guidelines for effective ecologically engineered wastewater solutions" taking place on February 10 to 21, 2003. The test workshop used a web environment based on software provided by "The Network University" (TNU). During the implementation phase from now until 2005 further courses and workshops are planned. It is foreseen to fully open myNetWorks for course activities in 2005.

INTRODUCTION

The Challenge

There is still a huge knowledge gap between North and South and within the South. In many developing countries basic knowledge to overcome the often-difficult situations is missing. But also many development organisations and institutions, experts, consultants and coaches located worldwide need updated and adapted information and knowledge to tackle the prevailing problems. Often it is not so easy for them to get information and knowledge as they are spread all over the world and attending a course somewhere is time consuming and costly.
The Internet has somewhat facilitated the access to information and knowledge. But often it is not easy to find the right information and one does not know whether one can trust this source. Trust and a sense of community, however, is the basic precondition for knowledge sharing.
Existing face-to-face courses and online courses still focus on the one-way transfer from the teacher to the student. Normally, after the training the course folder is placed somewhere in the bookshelf. If learners get some new insights, it is often difficult or impossible to apply them into their specific context. In addition, the knowledge transfer in the classical courses style has difficulties to deal with cultural limitations especially with the cultural gap between the Western world and the South and Eastern Asian tradition.

The Idea – A Collaborative Web Environment

The community of active professionals in ecological engineering (EE) is presently struggling with the above-mentioned problems. EE is a rather young discipline in the field of Engineering Sciences, yet at the same time it is an old field that builds on hundreds of years of experience in South and East Asia. EE can be defined as the "design of sustainable systems consistent with ecological principles that integrates human society with its natural environment for the benefit of both" (Bergen 1997). EE gathers a variety of different technologies and applications under its roof, e.g. wastewater treatment, avoidance and minimization technologies, nutrient recycling (such as wastewater fed aquacultures), ecological building practices, landscape and river restoration and many more.
For this reason the International Ecological Engineering Society (IEES) has started to develop the collaborative web environment “myNetWorks” in collaboration with the Swiss Agency for Development and Cooperation (SDC). The goal of this new web environment is to generate an online learning community able to exchange basic principles, course materials and approaches to problem solving in the areas of sustainable environmental technology, via common activities and courses. myNetWorks aims to nurture and sustain an online community of practitioners and academics, without following a one-sided technological viewpoint. Social and economic aspects play an important role alongside the technical and ecological aspects. Last but not least the promotion of collaboration and exchange between developing and developed countries shall be facilitated.

Schedule and Project Management

The development of the web environment “myNetWorks” is divided into three phases. The initiation phase was started in May 2002 and ended after the test workshop in February 2003. During the implementation phase (June 2003 until December 2005) it is planned to run 3 or 4 courses and workshops per year, which still have a pilot character, with continuous and user-driven networking activities going on all the time. It is planned to fully open myNetWorks for course activities in 2005.

A project team is developing MyNetWorks: the consulting firm seecon gmbh, The Network University Amsterdam and armadillo media gmbh, a supplier of services and consultancy in e-learning. They provide the personnel capacity as well as the technical know-how for the operation and further development of myNetWorks.

NEEDS ASSESSMENT

During the development of myNetWorks a needs assessment was carried out to identify users’ needs. The assessment was made in two ways: short workshops with three focus groups and an electronic survey in the EE community. The results of the assessments are:

- The main target users of the environment were identified as practitioners, NGOs, university members, and decision makers
- Actions that these target users would perform within the environment were identified and used in a process of activities analysis, generating a range of desired resources and functionalities
- The highest interest was on a working environment for networking and exchange. The high rating of the options "accessing case studies" and "finding solutions for specific problems" indicated a need for practical, concrete information
- The interest for online courses or even accredited online courses was rather biased. Senior professionals showed little interest in online courses, whereas others - probably younger people - showed high interest in them
• The highest rated option in the electronic survey was "quickly accessing other people's experiences in dealing with similar problems". The respondents were also interested in quickly finding information that could help them to develop their projects.

• "Time to access the web environment" was the most important restriction among the respondents. Again, some people rated this restriction as "very important" - presumably senior professionals - whereas others did not.

• "Restricted access to the internet" was not a great problem among our respondents, but low bandwidth was, especially in developing countries.

• Some of our respondents said they do not always have access to computers. Thus, asynchronous ways of communicating have to play a role in our concept.

The initial needs assessment generated important input and was determinant in the development of myNetWorks according to the users’ needs.

THE WEB ENVIRONMENT “myNetWorks”

Theoretical Background

The theoretical background for the design and development of myNetWorks and the adopted course model are given by the reflective socio-constructivist approach (Pereira, 2001) and the concept of reflective practice as developed by Schön (1997). These concepts and the team’s professional experience (Schönborn et al., 2002) shaped the web environment “myNetWorks”.

Objectives

The vision of myNetWorks is to provide a web environment where interested participants can get and share knowledge on sustainable environmental technology and build up a learning community. The specific objectives of myNetWorks are as follows:

• Generate a web environment for online courses in a workshop style

• Enable communication for dissemination and sharing of knowledge

• Creation of a learning community where participants support each other

• Provision of quick access to information, expertise and experiences

• Generation of access to tangible solutions, technologies available and experiences

• Establishment of a continuous dialogue and exchange between North and South

• Build-up of a resource pool for continuous education.
The objective of myNetWorks is therefore not only to provide tools for capturing and locating, transferring and sharing of knowledge but also for enabling knowledge (re-)creation (see von Krogh, Ichijo, Nonaka, 2000).

**Target Group**

According to the needs assessment the target groups of myNetWorks were defined as follows:

- Engineers, technical experts in developing countries
- Administration, government departments in developing countries
- Teaching staff and students at educational institutions (including colleges)
- SDC coordination offices, project staff and partner organisations
- Consultants working on behalf of the SDC and of other development organisations
- Non-governmental organizations in developing countries and developed countries

**Structure of the web environment**

![Figure 1: Structure of the “myNetWorks” web environment](image)

*Fig. 1: Structure of the “myNetWorks” web environment*
The basic metaphor to structure the information on myNetWorks are “spaces” – an analogy to real spaces. Five main spaces are distinguished (see Fig. 1):

**Entrance space**: Provides an overview over the concept and content of myNetWorks and information on how to use it. Users can log in or register as new members here.

**Personal Space**: In this strictly private space, the users collect and organize their own resources, links and contacts, edit their profile, and reflect on their learning process.

**Resources Space**: A collection of articles, photos, case studies, chat records, reports, links, downloadable software and more is accessible from here. Members of myNetWorks can upload new resources and rate all others (open access concept). Thus, users will contribute to the generation and construction of knowledge.

**Exchange Space**: Allows access to discussion forums and chat rooms. Members can create new discussion groups or reserve a chat room and invite people of his or her choice (open access concept). The member’s profiles are available from here, with an indication of who is online at a given time and an instant messaging facility.

**Courses Space**: Courses and workshops are located here and make use of tools and facilities provided in the other spaces, e.g. course related chat rooms, discussion groups and resources. Members can run courses by themselves after a short evaluation procedure (open access concept).

The use of labels helps to classify resources and functionalities. Documents are labelled as "reviewed" (by the editors) or "not reviewed". Chat or discussion groups have "free access" or "restricted access", they may be "moderated" or "not moderated". This allows a quick visualization of the state or quality of a resource or function.

**Course Concept**

The concept for the structure of the courses provided on myNetWorks is based on "reflective practice" theories and on the socio-constructivistic approach. A major difference to other e-learning platforms is that the courses on myNetWorks are held in a workshop-style. They make largely use of real case studies and impart therefore practical, applicable knowledge. Participants are encouraged to compare case studies with their own experiences, share them with others and to reflect upon the presented learning material. In this way a learning process can be established where knowledge is not only transferred one-way from a trainer to a student but is recreated by participants according to their experiences.

Learning and knowledge sharing on myNetWorks takes place in different ways:

- Individual reading and study of articles, documents, case studies
• Collaborative learning by interactive debates in chat rooms (synchronous) and discussion forum (asynchronous)

• Assignments that have to be done individually or in groups

• Development of common tools like FAQs or guidelines

In addition, conference calls can complement the dialogues on myNetWorks.

**Technical Concept**

myNetWorks was developed on the basis of the web environment provided by the "The Network University" (TNU). The specific platform for myNetWorks was programmed with PHP and mySQL. To use myNetWorks users need Windows 95 or Mac OS9 (or newer), the Internet Explorer 5 or Netscape 4.76 (or newer) and the Acrobat Reader 5. The URL of “myNetWorks” is: [http://www.mynetworks.org](http://www.mynetworks.org).

**TEST WORKSHOP**

To check the developed prototype of myNetWorks a 2-week test workshop on "Guidelines for effective ecologically engineered wastewater solutions" was carried out from February 10 to 21, 2003. It was based on four real-world case studies of ecologically engineered solutions for a

*Fig. 2: Plan for week 1 of the test workshop on myNetWorks, Feb 10-21, 2003*
wastewater situation. Information about these case studies was provided as downloadable PDFs. In week 2, the four case studies were evaluated and compared with respect to "design and planning", "maintenance and economics" and "messy problems and how to avoid them". Week 2 was structured similar to week 1 and made use of downloads, discussion groups and "classroom talks". The test workshop ended with two feedback groups and with filling out an evaluation form.

Results of the Test Workshop

Characterization of Participants: 24 active participants attended the test workshop: 16 users took part as students, 4 as experts and 4 as coaches. 18 participants have filled out an evaluation form. The geographical distribution of the respondents shows that all continents and time zones are covered: New Zealand (1), India (3), Nigeria (1), European countries (8), USA and Canada (4) and Costa Rica (1). There were 6 women and 12 men. Most of the respondents were engineers, researchers or lecturers/professors. 7 of the 18 named wastewater treatment as their area of work.

Most of the users had good or even very good experience in using the Internet in general in a passive way (browsing, reading, downloading). The senior experts had rather little experience. Hardly any participant had used communication tools over the web before. About 80% had never attended an online course or conference. A good induction course therefore seems to be an important point, particularly for the senior experts.

Rating of myNetWorks Spaces and Functionalities: Concerning the quality of the online spaces and the interactions, the great majority of the responses were very positive. Respondents thought that myNetWorks can generate an online community well (ca. 44%) or very well (50%). Even though a prototype level of the platform was used, most of the participants classified the interface design, forms of navigation and some other usability factors as reasonably, well, or very well contemplated. The "chat records" and the "course schedule" were said to be among the most useful functionalities, together with the "list of documents". "Student’s assignments", "discussion groups" and "members list", were also classified in a high position. Just a bit below came the "library", the "list of experts" and the "chats". The "calendar" and a "time zone converter" were not considered of high relevance by the majority. "FAQ", and "help" function seem to have been less used and considered less useful functionalities. The efficiency of data transfer proved to be quite good, allowing even participants with “slow” Internet connections (in particular in developing countries) to take part in the workshop without difficulties.

Chats and Discussion Groups: Half of the respondents took part in less than 50% of the chats. It seems that the amount of time dedication the chats demanded (2 hours per day) was a lot, considering that most of them were working during the two weeks of the workshop. The most cited reasons for non-active participation in the chats were time and lack of experience. The intense nature of the chat conversation seemed to be inhibitory to those with less experience. During the workshop a reluctant use of the discussion groups (DG) was observed. There seem to be mostly two complementary reasons: lack of time and competition with the chat sessions. The chat sessions were livelier and had a more immediate appeal. Thus, they attracted participants
and the most interesting discussions took place in chats. However, as the chats were time consuming, participants were left with no time to invest in the asynchronous discussions in the DGs. As a result, those who could not participate in the chats due to time difficulties were somehow deprived from the best discussions and probably felt more like having a passive participation, reading posts and the recorded chats. A better balance of both functionalities (chats and DGs) should be sought, as various participants recognize the importance of both. Chat stability, together with PDF visualization and browser compatibility seem to be among the main technical issues to be improved. In general, however, the environment performed remarkably well.

**Positive and Negative Aspects:** The overall feedback on positive aspects is encouraging, as it confirms the usefulness of the approach chosen in the design of the learning environment and of the workshop. The functionalities were praised, as well as the interface design, the community feeling, and the organisation. Time was cited as the reason for most difficulties. To deal with this, the use of chat rooms may be reduced and combined them with the intensified use of asynchronous activities in the discussion groups. This would allow participants who have less flexible working hours to better manage their participation. The fragmentation of the learning environment into different spaces was negative to only one participant, while it was positive to others. The reason for this problem may be the very little experience this respondent had with internet-related technologies.

**Suggestions for Improvement:** The organisation of chats and discussion groups, in a way that they complement each other and alleviate the time-related problems seems to be the most important suggestion, regarding the course organisation. A reorganisation of assignments was also asked for. Other important points were the definition of course results and the need for an introduction course (to allow participants to get used to the environment, tools and resources) and for more preparation material.

**OUTLOOK INTO THE FUTURE**

After the test workshop the implementation phase of myNetWorks has started. Together with partner organisations approximately 12 workshops will be conducted on myNetWorks. In cooperation with various universities and educational institutions a system of credits, which is appropriate to the modular workshop style concept of myNetWorks, is to be developed for selected courses.

An important issue is the design of a sustainable business model. The basic idea of myNetWorks is to be an open platform to as many participants as possible. However, some financial return will be necessary to become financially sustainable.

The return will be generated in different ways:

- Course fees
- Paid services
• Membership fees

• Sponsorship

The course fees will be adjusted according to the financial means of the relevant target group and will be regionally differentiated. All workshop participants receive one year of free access to the myNetWorks community. Interested people who do not wish to participate in a workshop, but nevertheless would like to utilise the other aspects of myNetWorks, can register as user with the payment of an annual fee. It is anticipated that myNetWorks community will grow to at least 2000 members in 3 to 4 years.

CONCLUSIONS

In this paper the design and development of the web environment “myNetWorks” - an online learning community for professionals in the area of sustainable environmental technology - were presented. A first test workshop with worldwide participation generated important hints for future developments.

In general, the feedback from participants in the test workshop was very positive, although there are still some challenges to tackle. In the implementation phase of the web environment these teething troubles will now be solved. Nevertheless, the limits of myNetWorks should not be neglected. This web environment will and can never replace face-to-face courses, trainings and workshops.

But overall the conclusion can be drawn that myNetWorks has the potential to become a powerful tool for knowledge sharing on sustainable environmental technologies.

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