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Forum on Global Responsibility in Research and Education – Practices in Partnerships and Daily Activities
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– Practices in Partnerships and Daily Activities

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In spring 2007 the Ministry of Education announced the project Education for Global Responsibility. The aim of this project was to open the eyes and minds of academics and citizens to the necessity of education for global understanding, respect and responsibility.

Our two Eastern Finland Higher Education Institutions have had a long and successful cooperation in many fields. Through this ‘Global Responsibility in Research and Education’ forum we wanted to respond to the request of the Ministry and wished to promote discussion and collaboration between academics and students of different disciplines having interest in sustainable future, global education and research themes.

We gratefully acknowledge the financial support of the Ministry of Education, which made this Forum possible.

November 15, 2010

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Part I: Plenary Keynotes
The political relationship between Europe and Africa is evolving; the historic first Africa-EU Summit in Cairo in 2000 was followed in 2007 by the Joint Africa-Europe Strategy, taking the Africa-EU relationship to a new, strategic level with a strengthened political partnership and enhanced cooperation at all level. Science and technology cooperation has become a cornerstone of the EU-Africa relationship and the nature of that cooperation is based on ever better mutual understanding of priorities and needs. Africa has very clearly articulated continental, regional and national development and capacity building priorities in many domains, endorsed at the highest levels, for which science and technology can offer solutions. Africa’s indigenous capacity for R&D in science, technology and innovation places limitations on the scale and scope for "home-grown" solutions to all the priorities, and this in turn can lead to dependence on external assistance. International partnerships between higher education institutes, public and private research centres offer one route for supplementing indigenous capacity to address development challenges. Powerful asymmetries can and do exist in partnerships but need not destabilise cooperation if good practice is adopted and partners strive for equitable relationships. The nature of cooperation partnerships is changing, becoming more focussed and aware of the need for standards to build trust, such as joint planning, implementation and ownership, complete transparency and communication, alignment with recognised priority agendas, and an acknowledgment of mutual benefits and interests. Africa’s development priorities and capacity building needs do not always align neatly with the policies and funding instruments of development partners but innovative approaches at the European Commission for example are demonstrating the benefits of mobilising multiple instruments which have traditionally occupied distinct niches.

The EU-Africa S&T cooperation landscape can appear complex, fragmented and constantly changing. Nevertheless, an understanding of that landscape and of the drivers of cooperation provides the essential context and greater assurance that outputs are adapted to meet the needs for which they were intended and that they are delivered to the end users and scientific hierarchy.

Africa and Europe very much want, and need to cooperate, each on their own terms in equitable relationships of mutual respect and benefit; it’s enlightened self-interest to do so.

International cooperation in science and technology between Europe and Africa

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It should be self evident, that ensuring the preconditions for life and human well-being is a key goal in society, in other words societies should strive for sustainable development and global responsibility. WWF works for these goals as our mission is to stop the degradation of the planet’s natural environment and to build a future in which humans live in harmony with nature. We do that by conserving the world’s biological diversity, by ensuring that the use of renewable natural resources is sustainable and by reducing pollution and wasteful consumption.

As we all know, sustainability and global responsibility are not easy goals as they require changes in attitudes, in social values, in politics and in the ways we live, consume and produce our goods and services.

When speaking about sustainability and global responsibility difficulties appear especially in the integration of the environmental, socio-cultural and economical pillars. How to combine e.g. human needs and nature’s capacity, the needs of the poor and the rich (problem of intra-generational equity) and the needs of the present and those of the future generations (problem of inter-generational equity).

In my presentation I will first argue that human well-being and the well-being of ecosystems are not necessarily contradictory – understanding this could enhance societies to strive for a change.

After that I will raise up the importance of changing the way of life and thinking in western societies. I will concretize the urgent need for this change with the concepts of ecological footprint and Living planet index, both of which identify some central threats in ecosystem services caused by human activities.

Then, I will argue that less can make us also happier and increase our well being – which at the same time could turn the world towards a more sustainable and fair pathway.

At the end I will highlight critical elements for learning for sustainable development and the importance of education for sustainable development and global responsibility, and the key role which institutions of higher education play in this process.
Part II:
Global responsibility in research

Oral presentations
The study aims to survey the conceptions of teacher educators of health education in teacher education and in schools from the perspective of sustainable development. A further aim was to explore their ideas for developing curriculum of health education in teacher education. The theoretical framework of the study is based on human ecology which emphasizes holistic health in relation to the environment. The study is a qualitative case study. A total of seven teacher educators in the University of Oulu participated in the research. The data were collected by questionnaires in spring 2010. It was analysed by the inductive content analysis method.

Based on the conceptions of the teacher educators, environmental factors have an important role in health issues. The curriculum of health education should be developed in accordance with the factors and challenges of society.

**INTRODUCTION**

Some Finnish studies of students’, teachers’ and teacher educators’ conceptions on health and health education (HE) (e.g. Jeronen et al., 2008a), and of sustainable development (SD) (11th Annual international sustainable..., 2005) have been published. Instead, it has not been studied how SD is included in HE in teacher education and in schools.

HE and education for sustainable development (EfSD) have become essential at all educational levels. Innovative, inquiring teacher education has a significant role in educating people for a sustainable future (Rajakorpi & Salmio, 2001, 7; Guidelines and recommendations...., 2005). Teacher educators and teachers have vital tasks and challenges in promoting sustainable development and health (Jeronen et al., 2008a).

The definition of health emphasizes the health triangle which includes the physical, mental and social aspects of health (WHO, 1997, 24; Downie et al., 2000). Connection between health and environment is remarkable because health is influenced by many environmental factors (Kroll-Smith et al., 2000).

Based on the estimation of World Health Organization (WHO, 2010), nearly every fourth case of illness in the world is caused by the environment. In Finland, health problems are caused e.g. by air and water pollution, smoking, and environmental factors connected to mental health (Kannas et al., 2010, 199). The question of whether and to what degree chemicals and other poisonous substances present in air, drinking water, food, consumer prod-
ucts, and work places is obviously socially and medically important (Eyles, 2000).

On the other hand, natural environments have potential emotional benefits. Nature tends to make most people feel good. Furthermore, many other environmental, social, and economic factors in society have health effects. (Pretty et al., 2005) In addition, many researchers have discovered the relationship between health promotion and health-related consumer culture (Bunton & Burrows, 1996, 206). Therefore, it’s important to consider health, HE and SD in relation to each other.

**BACKGROUND**

The study is based on human ecology which emphasizes a holistic and positive approach of health in relation to the physical, social, and cultural micro and macro environment. Health is regarded as the status of being: how we feel inside ourselves, and how we are seen from the outside. It is connected with wellness, happiness, and satisfaction with life. It is a degree of physical, emotional, intellectual, social, moral and spiritual wholeness, which characterises the individual. (Honari, 1999) The holistic view of health is described also in previous studies (Jeronen et al., 2008a). In this study, health is understood as a state of well-being within sustainable environments. The meaning of physical, mental, and social resources, positive life attitude, and personal feeling of life control are emphasized (Honari, 1999).

Human welfare in healthy nature is seen as an ultimate aim. Some researchers argue that life quality of people depends greatly on the health and that better environmental quality achieved through SD has positive impacts on the society when improving the health of people (Kozlowski & Hill, 1999, 114). A healthy environment is one in which people have access to safe food and water, adequate sanitation, and are protected from risks associated with chemical pollution, environmental degradation, and disasters (WHO, 2010). It is evident that the current use of natural resources, consumption, production, and operating habits are a threat to the world’s natural balance. There are also other hazards to human well-being, health, and security caused by changes in societies and environments (Strategy for education..., 2006, 8–9). Many people are worried about different social, mental, and environmental issues, such as dangerous environments, insecurity, violence, poverty, climate change, pollution, and the decrease of biodiversity (Jeronen et al., 2008a; 2010).

EfSD demands a new vision for HE that helps people to understand better the world in which they live, and to meet the future with hope and confidence, knowing that they can influence complex and difficult problems in future. EfSD is one of UNESCO’s responses to the challenges. (UNESCO, 2010)

HE is included in the curriculum of teacher education in the University of Oulu. The most important content is: definitions of essential concepts, ways of life, challenges for mental development, and structure and function of the body (Opinto-opas, 2008–2011).

**RESEARCH AIMS AND QUESTIONS**

The study has two aims. First, it aims to describe and interpret teacher educators’ conceptions of health and HE from the perspective of SD in the University of Oulu. Secondly, the study is focused on the development of curricula. Our purpose is to utilize the findings of this study in the theoretical and practical development of HE, both in teacher education and at school later on.

1. The research questions concern following teacher educators’ conceptions:
2. What different factors do teacher educators appreciate in their own health?
3. What are the objectives and the contents of HE that should be included in teacher education?
4. What are the possibilities in promoting pupils’ welfare and health in schools?
5. What kind of challenges, threats and risks do we have in society from the viewpoint of health and healthy life?

**MATERIAL AND METHODS**

The study is qualitative and belongs to the school of didactical case studies. The research data were collected by open-ended questionnaires in spring 2010. Altogether seven teacher educators participated in the study. Respondents of the study were selected through discretionary sampling. Especially teacher educators who teach HE in science but also in other subjects participated in the study. All respondents were experienced teacher educators from the Faculty of Education of the University of Oulu.

The data was analysed by the inductive content analysis method. All responses were at first read through carefully, and after that they were coded. Coding categories were derived from the text data. This kind of method is suitable for examining conceptions, views, attitudes, meanings, and experiences of participants (Berg, 1988; Elo & Kyngäs, 2007). Although preliminary research questions were posed beforehand, the research was held open for new insights arising from the empirical world. The data was allowed to ‘speak for itself’, trying not to impose a priori theoretical concepts and compel the facts to fit into categories set beforehand (Eisenhart & Howe, 1992).

**FINDINGS**

The findings are described below in the order of the research questions. The interpretation is focused on the most typical and the most exceptional conceptions of the respondents.

**Matters relating to health**

All teacher educators participating in this study emphasized the balance between physical, mental, and social aspects of health. One respondent also mentioned spiritual welfare. Physical fitness was considered crucial in the construction of mental and social welfare. Nutrition, sleep, rest, exercise, and safe living were regarded as significant factors. From the perspective of mental condition, one respondent reported life harmony, balanced emotions, positive life attitude, self-control, self-esteem, self-fulfilment, adaptability, and respect and acceptance by others. The meaning of healthy lifestyles was emphasized. The holistic meaning of welfare was discussed, e.g.:

“The state of physical welfare has a key role in constructing welfare. When the body is healthy, you endure mental stresses better...
All components of welfare meet each other in the social interaction.” (R2)

Many respondents appreciated their own social and professional competence and activity. Human relations, family life, work atmosphere and working conditions were found essential to mental and social welfare. The meaning of cultural, leisure and recreational activities were stressed. Some respondents underlined such aspects as a permanent job, meaningful and interesting tasks, and possibilities to realize themselves, to participate, to influence and to have her/his voice heard.

“Working and acting in a sufficiently challenging environment is very rewarding and empowering. This has a direct connection to mental health and well-being.” (R4)

Several respondents told that environmental factors are essential for human health. Both the beneficial and injurious effects of the environment were described. For example the importance of healthy and clean nature was mentioned. A safe physical environment was thought to be important. In addition, an encouraging, supportive, and loving environ-
ment was seen necessary for successful individual growth. One respondent mentioned the importance of ergonomic circumstances at work, the other paid attention to eliminating hazards of environmental damages (pollution, environmental toxins, climate change, poor food, and unsafe neighbourhoods).

**Objectives and contents of HE in teacher education**

Many teacher educators mentioned matters that help student teachers to develop their subject knowledge in health and environmental themes. The responses are categorized in Table 1 according to three basic elements of SD: ecological, economic and socio-cultural sustainability. First the responses were classified trying to find objectives and after that the contents were classified in the direction of the objectives. Many content areas mentioned by teacher educators overlap each other. Respondents proposed e.g. different physical, mental and social elements concerning human development. Some of the presented contents are wide and they should be considered in the individual’s, community’s, society’s and the whole world’s perspective. Especially, knowledge, skills and values necessary in teacher’s work in challenging present and future societies were emphasized.

**Table 1. Objectives and contents of HE recommended by teacher educators**

<table>
<thead>
<tr>
<th>Objectives</th>
<th>Physical health</th>
<th>Mental health</th>
<th>Social and cultural health</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge: Essential knowledge</td>
<td>– Environmental and ecological factors</td>
<td>– Environmental and ecological factors</td>
<td>– Environmental and ecological factors</td>
</tr>
<tr>
<td></td>
<td>– Human development</td>
<td>– Mental health and presuppositions of mental welfare</td>
<td>– Health care services</td>
</tr>
<tr>
<td></td>
<td>– Ways of life: nutrition, physical exercises, rest, sleep, cleanliness, and hygiene</td>
<td>– Mental development of children</td>
<td>– Cooperation, support, and safety networks</td>
</tr>
<tr>
<td></td>
<td>– Drug, alcohol, tobacco education, sex education</td>
<td>– Unpleasant and sorrowful experiences, accidents, and death</td>
<td>– Ethnicity, culture, and health habits</td>
</tr>
<tr>
<td></td>
<td>– Developmental disorders of children</td>
<td>– Significance of healthy, empowering working community</td>
<td>– Socioeconomic status and health</td>
</tr>
<tr>
<td></td>
<td>– Chronic and national diseases in Finland, prevention and treatment</td>
<td>– Identifying and preventing work exhaustion, fatigue, and stress</td>
<td>– Regular lifestyles</td>
</tr>
<tr>
<td></td>
<td>– Pandemic, prevention and treatment</td>
<td>– Healthy self-concept and self-esteem</td>
<td>– Respecting, supporting and helping other people</td>
</tr>
<tr>
<td></td>
<td>– Health risk assessments</td>
<td>– Responsibility for own health and being as a good example</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>– First aid and preventing accidents</td>
<td>– Identifying and controlling emotions</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td></td>
<td>– Issues of identity</td>
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</tr>
</tbody>
</table>
Promotion of pupils’ health in schools

According to teacher educators, schools have an important role in creating and maintaining physical, mental, and social health. For this purpose, teacher educators and teachers should develop an open, supportive, and good atmosphere. Pupils’ well-being and healthy growth can be supported in different ways. Most of the respondents stated that in Finland, the national curriculum with exact objectives, contents, and assessment criteria offer excellent possibilities for teachers to plan and teach health education. Teachers have the right to plan local and school curricula in accordance with pupils’ needs and local possibilities. One respondent proposed improving the status of cross-curricular themes and HE in the curriculum. Especially, the successful realization of cross-cultural theme “Responsibility for the environment, welfare and sustainable future” is essential. The danger is that these topics are studied too generally and too cursorily during lessons.

Some respondents emphasized close cooperation with school health care, public health care, and school refectory. The school can also support pupils’ physical and cultural hobbies together with other institutions and organizations. One respondent stressed the importance of spiritual education and cooperation with the church. All respondents emphasized the importance of co-operation with homes. Lifestyle-related habits in nutrition, hygiene and physical activity as well as social skills are an essential part of HE, especially at home. In addition, peer groups have a considerable role.

One respondent believed that teachers of physical education have an enormous responsibility in promoting children’s physical well-being and in achieving positive attitudes. In this respect, all pupils should have pleasant experiences during the school day. Some respondents noted that the whole school staff should underline the importance of life skills and the responsibility of one’s own life. Pupils should be conscious of the meaning of their health behaviour and the environment, because healthful conditions affect favourably their growth and ability to learn and act. School staff can give pupils a useful example for instance by favouring healthy living habits and environmentally friendly products.

“Teachers’ own example in the observance of good lifestyles is extremely important. Teachers have to interfere in pupils’ behaviour if they have bad life habits. Also consumer habits have influence.” (R3)

According to one respondent it’s important that pupils get skills to participate in the everyday life of the school and have experiences in communal activities. Contextual participation and experiences are important presuppositions for happy life.

One respondent discussed the present resource problem and its consequences in the educational institutions. First, staff resources such as number of teachers, school health personnel and other staff in relation to the tasks cause limitations. Increasing class sizes, heterogeneous pupil groups and reducing staff have led to the situation, where the possibilities of individual education and guidance are worse than earlier. This weakens possibilities to support the pupils’ well-being and healthy growth. Secondly, economic resources of schools have diminished. The bad economic situation is reflected in the growing class sizes and the decrease in staff. It has a bad impact on the acquisition of equipment and materials as well as on the selection of learning environments. The lack of money has a negative influence on book acquisitions, excursions, camp schools, equipment, and application ac-
quisitions in information and communication technology. Thirdly, rising class sizes and the heterogeneity of pupil groups have brought problems in the classrooms, and this endangers the guidance of individual learning and even learning in groups.

Challenges, threats and risks in society
When discussing challenges, threats and risks to health in society the teacher educators found some hidden factors, some visible, sensible or concrete factors, some manipulative factors, and some personal factors which overlap each other. All respondents saw possible serious dangers in media culture and in its domination.

“Consumption ideal marketing by media arouses anxiety, feelings of shame and dissatisfaction with the self and one’s own life.” (R1)

The possibilities and risks of the Internet as an important environment were discussed. One respondent mentioned Internet addiction, another discovered possible problems in privacy questions and in the quality of information. Dangers of the virtual world and excessive communication in social media can lead to dependence where virtual communication substitutes physical presence. As extreme phenomena Internet bullying and personal abuse were mentioned. To prevent further problems, media education in schools should focus on developing students’ media literacy and critical thinking skills.

All respondents thought that difficulties and conflicts in the environment are reflected in children’s health. Unstable psychosocial environments may influence health negatively. Depression and other mental illnesses may cause more and more difficulties in the future. Feelings and experiences of loneliness, powerlessness, and alienation may increase. Also the superficiality of social relations can become problematic. Teachers should identify characteristics of these phenomena and be capable of acting meaningfully in difficult situations. One respondent was worried about the increasing amount of neglected children.

“Social deprivation, exposure, and exclusion have serious impacts on individual’s health and behaviour which can be a very problematic dilemma in future society. These kinds of matters have an extensive influence on the development of the world and teachers should recognize them.” (R5)

Teacher educators discussed also the meaning of other changes in postmodern society. One stated that increasing work requirements and the continual assessment and control of work results have caused unhealthy competition in the workplaces and created uncertainty about job security. In addition, the constant urgency causes stress to the employees.

One respondent considered that too “easy living” and laziness have serious consequences on people’s health. Lack of physical activity, over hygiene, and excessive security can be hazardous to the normal human development. The other stated that current eating habits may cause health problems. Highly processed food products, unhealthy “junk” food, and sweets may cause restlessness and obesity. Additives can be harmful especially to the children.

The injurious effects of pollution, environmental toxins, and climate change were considered. One respondent regarded these singularly dangerous because they can multiply in the food chains and accumulate insidiously over time and gradually ruin the environment: air, water, soil, plants, animals, and people.

“We don’t know what pollution and envi-
ronmental toxins cause in the future. The developmental disorders and sick-ness of people, animals and nature may increase.” (R5)

Also dangers of equipment and machines were mentioned. One respondent supposed that cell phone and computer radiation can threaten children’s health in the course of time.

The global aspect of the social risks was also recognized. Prejudices, intolerance, poverty, injustice, and discrimination threaten extensively the realization of social sustainability in the world. These are hazardous to mental health as well. One respondent believed that the gap between poor and rich people may cause societal and even world-wide uncertainty and insecurity.

SUMMARY OF THE RESULTS
Health in this study has been seen as a sustainable state of total well-being in sustainable ecosystems and in safe environments (Figure 1). The creation and maintenance of healthy homes, schools, and communities within a healthy world is the basis of all. The health of human beings, families, communities and populations is ultimately dependent on the health of the whole world. The health is maintained through delicate balance between the needs of people and the satisfaction of the needs, by the appropriate utilisation of resources, both environmental and human (Honari, 1999, 21). Education has a primary function in developing people’s behaviour and habits in a more responsible and sustainable direction. Emotional, identity, and lifestyle education give support to holistic welfare of people.

CONCLUSIONS
Based on the conceptions of the teacher educators environmental factors have an important role in health issues. The curriculum of HE in teacher education and in schools should be developed in accordance with the requirements of the changing world. Teachers ought to be continually aware of current threats to human health and environment and the connections

Figure 1. Environment, holistic welfare and health education between them.

Contents of the curriculum should deal with health knowledge, skills and values which are useful in the challenges of present and future school. HE from the perspective of SD in teacher and school education is extremely important because children are particularly vulnerable to many environmental risks and threats, including unsafe and unfavourable physical, mental, social and cultural environment.

HE is also of great personal importance to student teachers and teachers. Teacher’s ability to deal with life problems and coping at work is crucial for successful education. People should understand the world-wide effects of environmental phenomena. At a global level, health and sustainability may mean equity and understanding between people and
cultures as well as peaceful, unprejudiced co-existence so that social and cultural justice is taken seriously. A new national core curriculum for basic education is under consideration in Finland. Also curriculum of teacher education will be renewed periodically. Findings of the study can be benefitted in planning the curricula of HE in schools and in faculties of education. However, conclusions based on the findings are directional and transferable mainly in Finnish settings. To increase the trustworthiness of the study two researchers have reviewed, analyzed and interpreted the data. In the problematic cases for agreement there was dialogue among three co-researchers. Some research findings get support from previous studies (Jeronen et al. 2008a; 2008b; 2010). In addition, similarities were found in the responses of teacher educators working in different fields and subjects.

REFERENCES


Sustainability has become one of the key concepts in a range of fields where social or environmental deteriorating has been implicated, and it is necessary that the principles of sustainability will be applied to health care as well. One means to support the principles of sustainability in health care is to focus on health prevention and patient education; it is important to apply approaches that encourage preventative and lifestyle approaches supporting people’s self-management. To address and assist health care professionals in developing their skills in client-centred patient education, a two year multilateral project was initiated in 2008. The project’s (DIPRA) main product will be an on-line study module on patient education for health care professionals. The project aims to raise awareness about the importance of effective patient education. The initial results of piloting the module are very promising related to professionals’ improved patient education skills, and consequently, creating sustainability through effective patient education and people’s self-management.

INTRODUCTION
Sustainability has become one of the key concepts in a range of fields where social or environmental deteriorating has been implicated, and it is necessary that the principles of sustainability will be applied to health care as well. One means to support the principles of sustainability in health care is to focus on health prevention and patient education; it is important to apply approaches that encourage preventative and lifestyle approaches supporting people’s self-management. To address and assist health care professionals in developing their skills in client-centred patient education, a two year multilateral project was initiated in 2008. The project’s (DIPRA) main product will be an on-line study module on patient education for health care professionals. The project aims to raise awareness about the importance of effective patient education. The initial results of piloting the module are very promising related to professionals’ improved patient education skills, and consequently, creating sustainability through effective patient education and people’s self-management.
have a lifelong dependency on medicaments and health care services, and must adapt their behavior to their illness. (Spreeuwenberg et al. 2010.) Consequently, the emphasis should be placed on health prevention and patient education to ensure that patients are able to make good lifestyle choices in their self-management (Melchior et al. 2010).

However, the health care system is dominated by hospitals and their orientation towards acute care. The care is fragmented within and between health care sectors and lacks continuity and understanding of the various needs of different chronic patients. Health care professionals are familiar with traditional medical treatments but have no knowledge of approaches and interventions to inform patients and to support them to change their behavior. (Spreeuwenberg et al. 2010.) Consequently, it is important that health care professionals will develop their patient education and counseling skills. In addition, it is important that health care professionals are able to support their patients’ self-care and self-management.

HEALTH CARE PROFESSIONALS’ COMPETENCE IN PATIENT EDUCATION
Quite often it is assumed that patient education delivered by health care professionals is patient-centred, however, there are several studies that this is not the case.

Funnell and Anderson (2004) state that traditionally patient education was based on the authority responsibility and patient education was prescriptive and goals where set by health care professionals. However, it was considered that this kind of traditional education did not correspond to the needs of patients with chronic illnesses such as diabetes. In order to manage a chronic disease successfully, the patient has to be one who sets goals and make decisions in his or her daily life. Consequently, patient education interventions should enable the patient to make decisions about self-care behaviours and to assume the responsibility for daily care. (Funnell & Anderson 2004.) The patient-centeredness and patient empowerment offer opportunities for patient to increase their autonomy and involvement in their care and treatment (Holmström & Röing 2010).

There has been and is a shift towards more patient-centred approach focusing on self-management education and emphasising teaching problem-solving skills (Bodenheimer et al. 2002). Health care professionals face, however, challenges in making the shift from the traditional education model to the empowerment model of education and counselling (Funnell & Anderson 2004). The shift presumes education of health care professionals, because the concepts of patient-centeredness and patient empowerment appear to be understood in different ways by professional groups involved in health care and research (Holmström & Röing 2010).

According to Anderson & Funnell (2010), misunderstandings about and challenges on patient empowerment are due to health care professionals’ education and socialisation. They state that embracing empowerment means making a paradigm shift that is often difficult because the traditional approach to care is embedded in the training and socialisation of most health care professionals. In most countries health care professionals are trained and socialized in approach to care based on treatment acute diseases (Anderson & Funnell 2010) and health care professionals have a long tradition of making decisions for the patient.

Patient-centeredness and patient empowerment in patient education and care presume versatile skills: the success of patient-centeredness and patient empowerment appears to
depend on how well the professional and the patient communicate with each other. Good communication skills and an ability to be sensitive to the needs of each individual patient place great demands on health care professionals. It requires that health care professionals will develop their educational skills, learn self-management education and teaching of problem-solving skills to patients as a complement to traditional patient education, in order to increase patients’ understanding of their situation, and consequently, enhance lasting change in the patients’ lives. (Holmström & Röing 2010.)

According to research (Holmström & Röing 2010, Anderson & Funnell 2010, Adolfsson et al. 2004, see also Kääriäinen 2007) it is a challenge for health care professionals to adopt an education model where the patient’s needs and empowerment are the focus of education. Conducting patient-centered education presumes that health care professionals possess, in addition to positive attitude, understanding of their own role as an educator as well as motivation to practice patient education.

Consequently, in order to develop health care professionals’ education and support them to develop their patient education skills, it is important to study what are professionals’ views about patient education and counselling in relation to patient-centeredness, empowerment and self-management; what issues they perceive as important in patient education and counselling.

TOWARDS EXPERTISE IN PATIENT EDUCATION AND COUNSELLING BY ONLINE EDUCATION; THE STUDY

To address and assist health care professionals in developing their skills in client-centred patient education, a two year multilateral project was initiated in 2008. The project’s (DIPRA) main product will be an on-line study module on patient education for health care professionals. The project aims to raise awareness about the importance of effective patient education and to improve counselling skills of professionals.

DATA, METHODOLOGY AND AIM OF THE STUDY

The on-line study module (15 ECTS) includes five different courses (3 ECTS each) related to patient education and counselling. The module was piloted during the academic year 2009-2010. The second of the five courses included a written assignment where the students (14 registered nurses, most of them having a long work experience) assessed their patient education skills and designed a development plan in order to develop their competence in patient education. These assignments (14) formed a data for this study where the aim was to describe health care professionals’ views about the need to develop their patient education skills; what are the most important skills to be developed.

DATA ANALYSIS

The data from the assignments were analysed using qualitative content analysis. First, the assignments were read through. The analysis included five stages. Stage 1: the analysis started by identifying the statements describing the students’ views about how to develop their patient education and what skills they need to develop. These statements consisted of either phrases or sentences. Stage 2: The statements were condensed to make the text shorter without losing the idea. Stage 3: The condensed text was labelled with a code describing its content. Stage 4: The codes were then reviewed in order to find similarities and differences to identify sub-categories represented in the data. Stage 5: The sub-categories were combined to form main categories which
represent the students view about the need of the development of their patient education skills. The purpose was to find out if they acknowledge the need to develop their patient education towards patient-centeredness.

RESULTS

Three main categories emerged to describe students’ views about how to develop their patient education: Patient-centred counselling; Supporting self-management; Continuous development.

Patient-centred counselling in students’ experiences about the need to develop their patient education and counselling skills include patient-centred counselling style, planning and evaluating education and counselling together with the patient, the patient’s goals, the needs and life situation of the patient as a starting point of the education, taking into account the patient’s ability to learn, and individuality in patient education.

The students described that their goal is to develop their patient education to be patient-centred, including an equal relationship. According to their assignments, they found it important to change the way of their patient education style towards more patient-centeredness; they found it important to include the patient in planning and evaluating the education as well as setting the goals together with the patient. They would like to take into account the patient’s needs as well as the life situation; the students described this from versatile perspectives including managing every day chores, self-care after the discharge from hospital, knowledge about the patient’s resources, the patient’s lifestyle, the patient’s environment, the patient’s values and beliefs. They emphasised the need to develop their education to be individualised instead of mechanical and formal education that they think that it often is. It is also important to take into account the patient’s ability to learn. The students discovered that the counselling relationship between the professional and the patient should be equal; both are experts in the situation and share their expertise.

“Weakness in my patient education is that I do not necessarily assess the patient’s knowledge about the issue of education; my patient education is somewhat mechanistic and formal when educating a certain patient group. I also have to develop my abilities to plan the education together with the patient; it is important to assess patient’s knowledge and understanding by using open and clarifying questions as well as asking evaluation about my counselling and patient’s understanding.”

“I am aware that sometimes I talk too much and it is a weakness that hinders emerging of an equal relationship.”

Supporting self-management includes supporting self-care and self-management, encouraging the family to participate, using written material to support education, and patient-centered documentation. Supporting self-care and self-managements include motivating the patient for self-management as well as evaluation. The students noticed that it is important to offer alternatives to the patient instead of providing direct instructions. They emphasized that it is important to support the patient in changes as well as to support him or her to take responsibility in self-care. It is important to give supportive feedback to the patient. Moreover, the students found it important to have feedback from the patient. Taking into account the patient’s right of self-determination is necessary as well as supporting the patient to commit in self-care. They found it important to be able to support the patient’s
self-confidence. In addition, the students emphasized the importance of supporting the family members to participate in education and counseling. They found it important to use written materials to support oral education. In addition, the documentation of the education and counseling is necessary to assure continuation and quality of the individual education and counseling, and consequently self-management.

“I think that I should learn to support more the patient’s self-management. This kind of education supports patient to manage her or his every day life.”

“I will motivate the patient to take responsibility in making choices and changes in health behavior; my responsibility is to support him or her.”

“Patient education is based on equality and shared expertise.”

Continuous development includes the need to continuously reflect and develop one's own abilities on patient education and counseling, actively seeking for feedback and evaluation from the patient

“Good, patient-centered education and counseling presumes reflection; the professional has to critically assess her own values, attitudes, and beliefs. It is also necessary that she acknowledges and understands their meaning in patient education.”

CONCLUSIONS
In this study the health care professionals experienced that they should develop their patient education towards patient-centeredness. This result is supported by the previous study of Kääriäinen (2007) where she concluded that patient education should be more focused on the patient’s individual needs and the patient’s life-situation should be taken into account.

In this study, the nurses noticed that it would be important to make a shift from professional-led education and counseling towards the education relationship where the professional and the patient are equals and represent different kind of expertise. Similarly, Van Dam et al. (2003) in their literature review concluded that interventions which are directly focused on enhancing the patient’s participation seem to be the most powerful ones. Moreover, Kääriäinen (2007) states that the quality patient education is manifested in encountering the patient: is the patient faced as an active and responsible expert of her or his life situation and are the patient’s values and beliefs respected.

The participants in this study experienced that it is necessary for them as patient educators to acknowledge their own abilities, beliefs and values in order to be able to develop their patient education skills. This is noteworthy because appreciating and acknowledging the importance of reflection is one prerequisite for the paradigm shift from the traditional patient education model towards the patient-centered education (e.g. Funnell & Andersson 2004).

DISCUSSION
According to the results of this study, it seems that the paradigm shift from the traditional professional-led care and patient education towards patient-centeredness is a challenge, as Anderson and Funnell (2010) suggest. However, the nurses of this study acknowledge the need for change and development towards patient-centeredness in care and patient education. It seems that assessing and reflecting one’s own communication and patient education skills is the most important factor in initiating the development towards
patient-centeredness. Consequently, it is important to organise large scale education for health care professionals to support this development.

Society in general is developing more and more toward equality, participation and citizen rights (e.g. Adolfsson et al. 2008).

Consequently, it is important to take this development into account in health care and patient education as well, because long-term success and sustainability will be achieved only by empowering the patient as a consequence of the cooperation, support and facilitation of health care professionals (see also Trento et al. 2008).

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**REFERENCES**


ABSTRACT
In learning sciences, environmental education has been modelled in many ways. In most of the models, environmental education has generally been seen to include four dimensions: sensitivity, knowledge, action, and participation. When education begins, sensitivity should be aroused, with the aim of attaining skills to participate in society as a globally responsible citizen. Thus with young children, sensitivity is more prominent, whereas with older students, action and participation are more emphasized. This study focuses on how the four dimensions of environmental education appear in the university students’ life and more specifically, how these dimensions link. University students (N=219) answered a questionnaire concerning the four dimensions of environmental education. Most of the students possessed both knowledge and sensitivity towards the environment, but only one third of the students aimed at continuous sustainable behaviour and participation.

INTRODUCTION
Environmental education consists of three or four dimensions. Palmer (1998) highlights education about, in and for the environment. In models based on ideas of Hungerford and Volk (1990), environmental education most often consists of four dimensions: sensitivity, knowledge, action, and participation (Jeronen, Jeronen & Raustia 2009; Käpylä 1995). The final phase of environmental education is towards participation in society and in its broadest sense, participation at the global level, which then relates to global responsibility. We are interested in how the dimensions of environmental education relate to each other, and we also try to recognize some signals concerning students’ global responsibility.

According to Reid and Petocz (2006), many university teachers in varying disciplines show awareness of sustainability playing some role in their teaching, but some of them view it in rather limiting ways. Their qualitative research study focused on the variation of ways university lecturers experience or understand sustainability and indicated that while limiting conceptions of teaching are related to limiting approaches to sustainability, expansive or holistic conceptions lead to a broader approach to sustainability. For the majority of the teachers, sustainability and teaching were separate entities; also the language associated with sustainability, for example EE, SD, ESD, was not a part of most academics’ vocabulary (Reid & Petocz 2006).

Each discipline can however provide knowledge, skills, perspectives and values which, when used leveraged with the strengths of other disciplines, can convey...
the knowledge, issues, skills, perceptions and values associated with searching for and progressing towards sustainability (McKeown & Hopkins 2003). Environmental education discourse generates not only cognitive meanings about a specific subject area, but also companion meaning. Science or environmental education is not solely concerned with the teaching of a certain subject matter, specific values and representations of the world always accompany the learning of factual content. When the teaching of natural phenomena is in question, these companion meanings include views of science, nature and human relationships. (Michail, Stamou and Stamou 2007.)

The role of these different dimensions of environmental education may vary. Elshof (2005) studied teachers of technology and found that sustainability issues which related to social justice and equity, were considered to be less important. On the personal level, teachers considered population growth, human rights, international trade and pollution to be the most significant components of sustainable development, while biodiversity, international trade, perverse economic subsidies and global warming were the least important. According to Elshof (2005) this is not surprising, given that these issues may be perceived as being more abstract and distant from commonly held notions of sustainable behaviour.

Several studies have been conducted on teachers’ or students’ ideas about environmental issues (see e.g. Michail, Stamou & Stamou 2007; Summers, Kruger & Childs 2000; Shepardson 2005). Michail et al (2007) conclude that the research has revealed a general failure on the part of teachers, to distinguish between the causes and consequences of different environmental issues, and even between the environmental issues themselves. The influence of environmental education on teachers’ and students’ attitudes or values has also been studied by, among others, McMillan, Wright & Beazley (2004), Herremans and Reid (2002) as well as Smith-Sebasto and Cavern (2006). The influence of education is apparent in different ways, depending on the goals and cases in question, but discussion about environmental attitudes and values has been seen to be important. Finally, only through genuine participation can students develop dynamic qualities which span from sensitivity to action and conservation (Toili 2007).

Finnish students’ attitudes, activity levels, and knowledge concerning the environment, have been studied by Tikka, Kuitunen and Tynys (2000). Finnish students were studied in a variety of educational establishments, and major variations among students were found to be according to their gender and educational backgrounds. Attitudes, the quantity of nature-related activities and knowledge about the environment or nature-related issues, correlated with one another. Although educational background seemed to affect attitudes, activity level and knowledge, there are without a doubt, a number of other underlying factors. (Tikka et al 2000.) Students have already adopted certain attitudes and behaviour at home and while attending comprehensive schools. As a rule, the people who come from the most densely crowded region, seem to be most worried about the state of the environment, whereas students who grew up on farms spend the greatest proportion of their time on nature-related activities. Childhood experiences and milieu, undoubtedly affect the subsequent choice of education. Tikka et al (2000) believe that the role of educational field is significant. Developing suitable environmental education in different fields represents a great challenge. Only after understanding the relationships between the attitudes that people have towards the environment and the factors that influence these attitudes, is it possible to improve the public’s attitudes towards nature. Attitudes find their expression in action and in
interaction among people. (Tikka et al. 2000.)

In this study we explore university students’ ideas and behaviour concerning the environment and focus on the following research questions:

1. How sensitive are students towards the environment?
2. How do students act on behalf of the environment?
3. How do students participate in society for the benefit of the environment?
4. How sensitivity, knowledge, action and participation relate to each other?
5. What kind of global responsibility do students possess?

METHODOLOGY

This study is a quantitative case study. The participants in the study comprised two hundred and nineteen (n=219) university students from different disciplines. The data has been collected in connection with three different courses: case 1, primary school teacher students; case 2, environmental education course students; and case 3, environmental sciences students. The students were from different faculties and majored in different subjects.

The data was collected through a questionnaire which consisted of five parts and included a total of 73 questions. In the beginning of the questionnaire we asked for demographic information, namely: gender, age, how many years of studies, the major and minor subjects, and where the participants came from.

Part A constituted of questions about sensitivity towards both the physical and societal environment. Part B of the questionnaire included questions about the view of natural processes and values and part C concerned knowledge about the environment. All three parts included the Likert scale from 1 = strongly agree, 5 = strongly disagree and 3 = unsure. Some of the statements in part B and C were adopted from the modified NEP/DSP Environmental Attitudes Scale (Trobe and Avott 2000). Part D included activities in the place of residence in everyday life with a three step scale on the frequency with which the university students act or participate in environment e.g. how to make personal sacrifices in favour of the environment and wildlife (Likert scale: 1 = always, 2 = sometimes and 3 = never). Part E of the questionnaire also included closed-form questions which had alternative, yes or no, as well as open ended questions e.g. definitions of the term ‘environmental education’.

Data collection took place in September and December of 2009. It took 30 minutes for students to fill in the questionnaire and they worked independently. The SPSS program was used for analysis. In order to compress the data, principal component analysis was used to find out scales, which were used for descriptive statistics and for further analysis. The reliability of these scales was evaluated with Cronbach alpha. For the action part D K-means cluster analysis was used in order to find out different activity type groups.

RESULTS

Here we report some preliminary results from the statistical analysis. In part A, the principal component analysis was carried out with Quatrimax rotation, and the three main components’ solution fitted in data explaining 41% of the variation. The three principal components were entitled: Forest, Place of Domicile and Place of Study (Table 1).
Table 1. Principal Components in part A, sensitivity.

<table>
<thead>
<tr>
<th>Component 1: Forest</th>
<th>Component 2: Place of Domicile</th>
<th>Component 3: Place of Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cronbach’s Alpha = 0.865</td>
<td>Cronbach’s Alpha = 0.731</td>
<td>Cronbach’s Alpha = 0.773</td>
</tr>
<tr>
<td>Mean = 1.7 (Sd=0.55)</td>
<td>Mean 1.7 (Sd=0.6)</td>
<td>Mean 3.9</td>
</tr>
<tr>
<td>I am frequently in natural areas.</td>
<td>I remember the houses at home.</td>
<td>I am happy in my place of residence. (Reversed scale)</td>
</tr>
<tr>
<td>In like to be in forests.</td>
<td>I can describe the most famous buildings in my home area.</td>
<td>I am satisfied with my studying environment. (Reversed scale)</td>
</tr>
<tr>
<td>I seldom visit natural forests. (Reversed scale)</td>
<td>I remember the journey to school.</td>
<td>I would like to change my place of residence.</td>
</tr>
<tr>
<td>It is relaxing to be in a forest.</td>
<td>I do not know the most significant buildings at home. (Reversed scale)</td>
<td>I am not happy with my studying environment.</td>
</tr>
<tr>
<td>I think a forest is boring. (Reversed scale)</td>
<td>I can’t describe the houses at home. (Reversed scale)</td>
<td></td>
</tr>
<tr>
<td>I like to look at landscapes.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Forests do not belong to my favorite landscapes. (Reversed scale)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The forest is one of my favorite landscapes.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I follow the events in nature.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Events in nature are all the same to me. (Reversed scale)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The mean value in components 1 and 2 was 1.7 (agree), and 50% of the respondents fell between 1 and 2. Thus, for half of the students the forest was a relaxing landscape and they had positive attitudes towards it. Their place of domicile was set deeply in the students’ minds which was positively significant and the town in which they studied was also experienced in a positive way.

In analysis of the part B values, and C knowledge, principal component analysis was carried out with Quatrimax rotation, and four main components’ solution fitted in data explaining 40.2% of the variation. The four components were entitled the Earth globally, personal action, energy and matter cycles, the greenhouse effect (Table 2).

In part D concerning the everyday actions of students, the K-mean cluster analysis was used in order to find out different activity type groups of respondents. In the K-mean cluster analysis participants fell into three groups: Ecological, if it causes no trouble, Ecological within reasonable limits, and Ecological even if he/she gets into difficulties (Table 3).
Table 2. Principal components in parts B and C.

<table>
<thead>
<tr>
<th>Component 1: The Earth globally</th>
<th>Component 2: Personal action</th>
<th>Component 3: Energy and matter cycles</th>
<th>Component 4: The greenhouse effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cronbach’s Alpha 0.733</td>
<td>Cronbach’s Alpha 0.706</td>
<td>Cronbach’s Alpha 0.635</td>
<td>Cronbach’s Alpha 0.669</td>
</tr>
<tr>
<td>Mean 1.8 (Sd 0.5)</td>
<td>Mean 2.5 (Sd 0.7)</td>
<td>Mean 1.6 (Sd 0.6)</td>
<td>Mean 2.3 (Sd 0.9)</td>
</tr>
</tbody>
</table>

- We are approaching the limit of the number of people the Earth can support.
- I don’t think I’d join a group or club concerned solely with environmental issues. (Reversed scale)
- There are limits to growth beyond which our industrialized society cannot expand.
- I would donate some of my money to improve the environment.
- Humans are severely abusing the environment.
- I’d be prepared to go from house to house to distribute literature on the environment.
- Nature can stand the influences of human action. (Reversed scale)
- Plants and animals exist primarily to be used by humans. (Reversed scale)
- Biodiversity is a prerequisite for the continuity of life.
- Even if it is inconvenient, I’d be willing to ride a bicycle or use public transport in order to reduce air pollution.
- To maintain a healthy economy, continuous industrial growth is highly desirable. (Reversed scale)
- I would not go out of my way to do anything about ecology because it is the government’s job. (Reversed scale)
- The balance of nature is very delicate and easily upset.
- The Earth is like a spaceship with limited room and resources.
- Humans must live in harmony with nature in order to survive.

Energy flows through the ecosystem.
Decomposers are a part of the ecosystem.
The release of green house gases causes the thinning of our ozone layer.
The cycle of matter in the ecosystem makes life possible.
The greenhouse effect is bad for our environment.
Life is dependent of the sun’s energy.

The thinning of the ozone layer has the same effect as global warming has on our environment.
### Table 3. Student groups according to their actions on behalf of the environment

<table>
<thead>
<tr>
<th>Student group</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Ecological, if it causes no trouble</td>
<td>86</td>
<td>39.3</td>
</tr>
<tr>
<td>2. Ecological within reasonable limits</td>
<td>84</td>
<td>38.4</td>
</tr>
<tr>
<td>3. Ecological even if he/she gets into difficulties</td>
<td>49</td>
<td>22.4</td>
</tr>
<tr>
<td>Total</td>
<td>219</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Students in group 1 were only seldom or never acting on behalf of the environment. They did not save water, recycle or use public transport. Students in group 3 were almost always doing these things. Of all the respondents 22.4% belong to the most environmentally friendly students.

In correlation analysis, it was found some minor but statistically significant correlations. The Forest component related to the Earth globally component (Pearson Correlation 0.241), to Personal action Component (0.228) as well as to the Energy and matter cycles component (0.251). The Forest component revealed sensitivity towards nature and particularly positive feelings regarding forests. Thus the positive experiences and feelings in the forest relate to actions on behalf of environment. The Place of domicile and Place of study components, did not correlate with the global and cycle understanding or actions. There was also correlation between the Earth globally and Personal action (0.325) and Energy and matter cycles (0.337). Those students who understand global issues also understand cycles and are environmentally active in everyday life. There were also minor differences in the student groups. One quarter of the students was without exceptions socially, environmentally active in everyday life, and also fell global responsibility.

In the final part, it was found that university students most often consulted lectures, newspapers and school for their environmental information. In contrast, magazines and television were reported to be much less used as sources of environmental information. (see also Michail, Stamou & Stamou 2007). Most of the university students thought that the two concepts, environmental education and education for sustainable development, mean the same thing. They also said that they want to use environmental education in the future in school or work.

### CONCLUSIONS

In the preliminary results we have found that university students had positive experiences when being in a forest or spending time in natural surroundings. These experiences are related to personal activities on behalf of the environment, thus demonstrating that the sensitivity level in environmental education relates to the level of activities. Knowledge and actions also relate to each other agreeing the results of Tikka et al (2000). About one quarter of the students almost always behaved ecologically. Contrary to Tikka et al (2000) we did not find differences in students’ attitudes, actions or knowledge in relation to their major subject, attitudes and actions are very individual features, neither can we conclude differences in the dimensions of the sustainability (see Elshof 2005).

In conclusion, it is important in environmental education to sensitize individuals to nature; forest is particularly important from the viewpoint of activities on behalf of the environment. We used in the questionnaire statements concerning being in nature and forest, but not in fields or lakes. Thus nature has been seen as a limited area in our study. We will modify in the future the statements to include also other natural environments.
Knowledge about the environment is also important. The university students were aware of global issues and a minor part of them also felt global responsibility.

In order to develop positive environmental values in society as a whole, universities should encourage all students to enroll in environmental studies and administrations must continue to provide resources for environmental programs (McMillan, Wright and Beazley 2004). Nursey-Bray (2009) highlights that a critical pedagogical approach helps not only to enliven the notion of sustainability but also encourages a process of learning for, rather than about, sustainability. We point out that all dimensions of environmental education should be considered and emphasize that nature experiences for young children should particularly be supported.

REFERENCES


Domestic wastewater is often used for fertigation (simultaneous irrigation and fertilization). Since wastewater might also contain enteric microorganisms it is essential to study the fate of these microorganisms. In the present work we have shown that artificial wastewater used in poor sand allowed a good growth of sugar cane, but not that of okra, tomato, and cucumber. The enteric microorganisms spiked did not survive in root area of sugar cane. Thus there would be no specific risk of contaminating groundwater. The sand towers used could be used in tropical home plots and utilizing the nutrients of wastewater as fertilizers and by reducing the small wet ponds close to homes – so that mosquitoes would have less sites to breed.

**INTRODUCTION**

Wastewater is the flow of used water from a community and the characteristics of the discharges will vary from location to location depending upon the population sector served. Physically, wastewater is usually characterized by a grey color, musty odor, solid content of about 1-0.1 % and 99-99.9 % water content. The solids can be suspended (about 30 %) as well as dissolved (about 70 %) of which the dissolved solids can be precipitated by chemical and biological processes. Chemically, wastewater is composed of organic and inorganic compounds as well of as various gases. The organic components may consist of carbohydrates, proteins, fats, and grease, surfactants, oils, pesticides, phenols etc. Inorganic compound may consist of heavy metals, nitrogen, phosphorus, pH, sulphur, chlorides, alkalinity, toxic compounds etc. Biologically, wastewater contains various microorganism but those of concern are the protista which includes bacteria, fungi, protozoa and algae, and viruses (http://www.ikisan.com/links/ap_sugarcane-Nutrient%20Management.shtml).

Sugarcane is a very demanding crop as a cane yield of 100 ton ha$^{-1}$ would need about 205 kg N, 55 kg P$_2$O$_5$, 275 kg K$_2$O and a large amount of micronutrients (Yaduvanshi and Yadav, 1990). However, the efficiency of sugarcane to utilize N ranges between 16 % and 45 % as large quantities of applied N leach down through the soil layers due to irrigation (Yadav and Prasad, 1992).

Sugarcane root systems are commonly depicted as comprising highly branched superf-
cial roots, downward-oriented buttress roots and deeply penetrating agglomerations of vertical roots known as rope roots (Smith et al., 2005). Root distributions for sugarcane show the expected exponential decline with depth, with maximum values for root length density as high as 5 cm cm\(^{-3}\) (Smith et al., 2005). Recent \(^{15}\)N dilution/N balance study confirmed that certain sugar cane varieties are capable of obtaining large contributions of biological associative nitrogen fixation, (Boddey et al., 1991). They also estimated that up to 60 to 80 % of plant N could be derived from this source, and under good conditions of water and mineral nutrient supply, it may be possible to dispense with N fertilization of these varieties altogether. Also similar experiments carried out by Lima et al., (1987), in a \(^{15}\)N-aided N balance experiment performed in pots containing 64 kg of soil showed that the sugarcane variety CB 47-89 was able to obtain a large contribution of biologically fixed nitrogen, which they estimated to be in excess of 60 % of the total N incorporated.

*Gluconacetobacter diazotrophicus* (earlier known as *Acetobacter diazotrophicus*) is a nitrogen fixing bacterium, associated with sugarcane existing in high numbers (as high as \(10^6\) counts g\(^{-1}\) plant tissue) in root, shoots and leaves (Cavalante and Döbereiner, 1988).

It is primarily responsible for biological N fixation and seems to contribute substantially to nitrogen nutrition of the plant (James et al., 1994; Döbereiner et al., 1995).

*G. diazotrophicus* inoculation experiments involving micro-propagated plants suggest the positive colonization and its contribution to plant growth and development in terms of improved plant height, nitrogenase activity, leaf nitrogen, biomass and yield (James et al., 1994; Sevilla et al., 2001; Oliveira et al., 2002; Muthukumarasamy et al., 2002).

However, high N fertilization causes a negative effect on the population of such endophytic diazotrophic bacteria in sugar cane (Suman et al., 2008).

**MATERIALS AND METHODS**

In the set up, the four empty towers were placed on a carriage in a greenhouse with illumination which had a light intensity of 400 watts (illumination supplied by a yellow light lamp). The height of the lamp to the surface of the soil was measured to be 150 cm with an illumination intensity of 114 W/m\(^2\) in tower 1, 117 W/m\(^2\) in tower 2, 117 W/m\(^2\) in tower 3, 100 W/m\(^2\) in tower 4 and 119 W/m\(^2\) at the center of the towers, (illumination measured by Gossen Mavolux digital). The average temperature in the Greenhouse throughout the experimental period was 19.7 °C.

The towers were then later filled with sand approximately 45 kg of sand per tower. The artificial solution of wastewater with measured pH was then poured to the tower beds of sand at recurrent intervals until there was excess water leaching out through the perforated delivery tubes at the bottom of the tower. In the first day of irrigation before the seedlings were planted, this was observed after the addition of 7.5 litres. Irrigation was done a week before the seedlings were planted to enrich the sand soil and the total volume of irrigated wastewater supplied to each tower was recorded.

The one week grown seedlings were planted on the 15\(^{th}\) September 2009 to each tower such that there were four seedlings to each parallel tower (N=4). A measured quantity of artificial wastewater was added 5 to 6 days a week depending on the level of water in each tower and the rate of growth of the plants. The wastewater was added to the tower such that the water holding capacity was exceed-
ed by the time the water start to flow through the delivery tube at the bottom of the tower. After 14 days and 18 days of plants growth, 55 ml urea solution (of concentration 8.17 gN/l) was added these days to each tower to supplement the nitrogen content of the soil. A total of 110 ml urea was supplied to each tower. The addition of urine was in consideration of the factor of 50 KgN/ha of 8.17 gN/l.

In the process, the measured volume in a pipette was added by inserting the pipette to the soil about 2 cm deeper into the soil in order to avoid the smell of ammonia and the lost of urea by evaporation. This was later followed by the addition of wastewater to aid in the even distribution of the urea throughout the soil (Fig 1). The wastewater was collected daily, the pH measured and analyzed for the determination of any microbial growth in the tower.

In order to determine the total nutrients supplied to each tower, the total volume of wastewater supplied was first calculated after which the nutrients in the given volume of wastewater was calculated. Also, since nitrogen was supplemented by the addition of urine, these were added to the total amount of nitrogen by the expression:

Since 1 litre of wastewater contained 36 mg N, the total N was determined by multiplication with the total volume of wastewater (L),

Total N from wastewater = 36 mg × total volume (L)

Total N from urine = 0.45 g × 2 = 0.9 g = 900 mg, this value was added to that from wastewater to get the total mass of N supplied to each tower.

Total N = 36 mg × total volume of wastewater (L) + 900 mg

The total P was also calculated by, 0.29 mg × total volume of wastewater (L).

The result of total nutrients supplied calculated from the total volume of wastewater and urine supplied was highest in Tower 3, followed by Towers 4 and 2, and least in tower 1 as seen in Table 1.
Table 1: Amount of Total nutrients supplied to each tower

<table>
<thead>
<tr>
<th>Tower</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total volume of Waste water (l)</td>
<td>38.11</td>
<td>46.565</td>
<td>50.01</td>
<td>47.56</td>
</tr>
<tr>
<td>P from Wastewater (mg)</td>
<td>11.05</td>
<td>13.5</td>
<td>14.5</td>
<td>13.79</td>
</tr>
<tr>
<td>N from wastewater (mg)</td>
<td>1371.96</td>
<td>1676.34</td>
<td>1800.36</td>
<td>1712.16</td>
</tr>
<tr>
<td>N from Urea (mg)</td>
<td>900</td>
<td>900</td>
<td>900</td>
<td>900</td>
</tr>
<tr>
<td>Total N (mg)</td>
<td>2271.96</td>
<td>2576.34</td>
<td>2700.36</td>
<td>2612.16</td>
</tr>
</tbody>
</table>

RESULTS

After three weeks of plants growth, all okra plants, cucumbers and three tomatoes had died off except the tomato in tower 3 which was replaced after two weeks of growth but also it died. On the contrary the sugar canes were growing well although the sugar cane plant in the tower 4 was clearly smaller than the other also there was water leakage in tower 4.

No MS2 was observed in any other plates except in tower 1, in concentrations of 9 pfu/ml with a few plaques. The soils in sand tower showed no occurrence of any E. coli in plate after 24 hours incubation but only the presence of background flora which are milky white, disc shaped, medium sized and unevenly distributed. Even after further incubation at 44.5 °C to isolate background colonies, there was no significant difference. The soils had no occurrence of any Enterococcus faecalis in the plate after 48 hours incubation but still the presence of background flora which were characterized by tiny-medium size, milky white colored and sparsely, unevenly distributed.

Table 2: Result of Bacillus number after 24 hours incubation as CFU/ml

<table>
<thead>
<tr>
<th>Soil tower</th>
<th>Number of Bacillus CFU/ml in leaching water</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>240</td>
</tr>
<tr>
<td>2</td>
<td>50</td>
</tr>
<tr>
<td>3</td>
<td>60</td>
</tr>
<tr>
<td>4</td>
<td>2050</td>
</tr>
<tr>
<td>Geometric mean</td>
<td>350 (200 from towers 1-3 only)</td>
</tr>
</tbody>
</table>

Table 3: Result of Pseudomonas (Agar F) after 24 hours incubation as CFU/ml.

<table>
<thead>
<tr>
<th>Soil tower</th>
<th>Number of pseudomonads CFU/ml in leaching water</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2688</td>
</tr>
<tr>
<td>2</td>
<td>3936</td>
</tr>
<tr>
<td>3</td>
<td>2376</td>
</tr>
<tr>
<td>4</td>
<td>4080</td>
</tr>
<tr>
<td>Geometric mean</td>
<td>3200</td>
</tr>
</tbody>
</table>
Table 4: Result of Pseudomonas (Agar P) after 24 hours incubation as CFU/ml.

<table>
<thead>
<tr>
<th>Soil tower</th>
<th>Number of pseudomonas CFU/ml in leaching</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>800</td>
</tr>
<tr>
<td>2</td>
<td>4560</td>
</tr>
<tr>
<td>3</td>
<td>2144</td>
</tr>
<tr>
<td>4</td>
<td>3608</td>
</tr>
<tr>
<td>Geometric mean</td>
<td>2300</td>
</tr>
</tbody>
</table>

Table 5: Result of Water Holding Capacity and Organic matter content before and after cultivation (N=4).

<table>
<thead>
<tr>
<th>Soil tower</th>
<th>WHC before cultivation</th>
<th>WHC after cultivation ±0.03</th>
<th>OM before cultivation</th>
<th>OM after cultivation ±0.06</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.29</td>
<td>0.34</td>
<td>0.5</td>
<td>0.59</td>
</tr>
<tr>
<td>2</td>
<td>0.29</td>
<td>0.28</td>
<td>0.5</td>
<td>0.58</td>
</tr>
<tr>
<td>3</td>
<td>0.29</td>
<td>0.32</td>
<td>0.5</td>
<td>0.45</td>
</tr>
<tr>
<td>4</td>
<td>0.29</td>
<td>0.32</td>
<td>0.5</td>
<td>0.53</td>
</tr>
<tr>
<td>Geometric mean</td>
<td>0.29</td>
<td>0.31</td>
<td>0.5</td>
<td>0.53</td>
</tr>
</tbody>
</table>

Fig 2: Comparative cumulative growth rate of sugarcane in all soil towers.
DISCUSSIONS

The high concentration of root bacteria typically inhibits the growth of pathogenic microbes. According to Siasou et al. (2009), certain rhizosphere fluorescent pseudomonas strain are potential biocontrol agents producing antibiotics, such as 2,4-diacyethylphloroglucinol (DAPG). DAPG is a broad-range antibiotic with antibacterial, antifungal, antihelminthic, and phytotoxic properties (Thomas and Weller, 1996). Also the aerobic spore forming *Bacillus thuriengiesis* has parasporal crystals consisting predominantly of protoxin molecules known as δ-endotoxins, Cry toxins or Cry proteins. The increase in growth rate (height) as well increases the number of root bacteria and these root bacteria could probably reduce the enteric bacteria which were no more found in soil water, and account for the occurrence of the trace MS2 viruses in Tower 1. However, virus transport and fate in soil is predominantly a function of advection, inactivation, sorption and desorption (Schijven and Hassanidazeh, 2000). Inactivation can be the result of biological factors including predation, competition and production of inhibitory substances by soil microorganisms (Gerba, 1986). Also, Nicholson et al. (2005) observed that, the survival of microorganisms is lower in summer and in sandy soils. Thus the temperature condition of the soil type has also been a key factor making it difficult for the pathogen to survive. Therefore if the experiment had been done in hot African climate, the survival of added bacteria and viruses would probable been similar or shorter as in this experiment.

The increase in plant yield is as a result of the nutrient uptake in the wastewater by the plant and aided by the occurrence of associated nitrogen fixing bacteria in the soil. The highest growth rate in tower 1 than in tower 3 is due to excess nutrient supplied in Tower 3. According to Suman et al. (2008), high nitrogen fertilization cause a negative effect on the population of endophytic diazotrophic bacteria in sugarcane, which contribute to plant growth and development interms of improved plant height, nitrogenase activity, leaf nitrogen, biomass and yield (James et al., 1994; Sevilla et al., 2001; Oliveira et al., 2002; Muthukumarasamy et al., 2002). This could probably account for the higher growth of the sugarcane in Tower 1 which had less supply of nitrogen relative to the sugarcane in Tower 3 which had higher supply of nitrogen.

The survival of only the sugarcane can be attributed to it ability of *Acetobacter diazotrophicus* to fix nitrogen from associated plants. According to Boddey et al. (1991), sugarcane varieties are capable of obtaining large contribution of nitrogen from plant-associated N2 fixation. That up to 60 to 80 % of plant N could be derived from this source, and under good conditions of water and mineral nutrient supply, it may be possible to dispense with N fertilization of these varieties altogether (Boddey et al., 1991). Though the experimental process did not favour the growth of the other plants (tomato, cucumber and okra), but the replacement of the tomato plant in tower 3 showed some significant growth which means that the cultivation of other plants in same plot as well needed time for stabilization. The high rate of water requirement of sugarcane and the dense root network made it difficult for the other plants to initial gain their growth ability. Thus if the system would operate for a longer time, it will give the possibility of the other plants to regain growth adaptations.
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Multifaceted cooperation between Russia and Finland

Relevance: There is a continuing need for increased Finnish-Russian cooperation between neighbouring areas to enable sustainable development. The cooperative process supports the implementation of social and health care programs in the St. Petersburg and Primorsk districts and in Vyborg.

Purpose: To develop outpatient care by using family-centred and multiprofessional approaches, and developing those methods for caregivers through education and workplace guidance.

Participants: Social and health care students and teachers from the Saimaa University of Applied Sciences, the employees of health care and social work departments and rehabilitation centres from the Primorsk District, teachers and students from the Midwifery College of St. Petersburg, and the City of Vyborg’s staff from social care and education.

Results: Exchanges of the social and health care experts on both sides of the border, continuing education for teachers and employees in Russia and Finland, common projects, student and teacher exchanges.

Conclusions: By training both teachers and working employees, the final benefits are felt by the clients, patients and their families. Knowledge of other cultures helps us to understand and respond to the actions of others.

SAIMAA UNIVERSITY OF APPLIED SCIENCES

The Saimaa University of Applied Sciences (Saimaa U.A.S.) is located in Finland and has campuses in the cities of Lappeenranta and Imatra. The university is comprised of 5 faculties, and the faculty of health care and social services is the largest of these with the highest number of graduates. There are 6 programmes in the school of health care and social services: paramedic nursing, physiotherapy, nursing, social services, and occupational therapy, as well as the master’s degree programme in health promotion. There are approximately 700 students and a teaching staff about 40. In accordance with the action plan of the Saimaa U.A.S., the purpose of this institution is to provide education and competent employees, above all, to meet the needs of this region. Additionally, an increase in cooperation between the institutes of higher learning in this region and the Northwest re-

In this presentation, we will tell you about our faculty’s cooperation with St. Petersburg and Vyborg. Our experiences have shown us, and we hope to show you, how from the smallest stream, a great river may grow. This kind of development requires from all participants, active, committed, and motivated work in order to successfully cooperate across borders. The final product of this cooperation is seen in the client families, who benefit from empowerment and increased possibilities for equality in care. The story began in 1997, with our cooperative work with the St. Petersburg Midwifery College.

THE COOPERATION WITH ST. PETERSBURG’S MIDWIFERY COLLEGE
The Midwifery College is one of the oldest nursing schools in Russia, and celebrated its 210 year anniversary in 2007. It has very good reputation in Russia and abroad. It coordinates the activities of all other nursing colleges and schools engaged in training midwives or nurses. It accomplishes the postgraduate training of hospital nurses and midwives, teachers from similar medical schools, coming from various regions of Russia. The college is staffed with highly-qualified teacher-doctors, teacher-nurses having a large experience of practical work in clinics and hospitals. There are about 400 students in the college who receive the specialty either of a nurse or a midwife.

Our cooperation started in 1997. The form of our cooperation has become stable. In a thirteen-year time period we have had twelve seminars: Ten of them in St. Petersburg and two in Lappeenranta. The subjects of the seminars have been decided cooperatively. The template has been the need to develop teaching; its content, methods, and evaluation. We have had such subjects as Ergonomics in Nursing, Foot Care, Nurse Education in Finland, Nursing Care Plans, the Nursing Process and Nursing Care Documentation, Elderly Care and Geriatric Nursing, the Situation of Venereal Diseases in St. Petersburg, and the Care and Rehabilitation of Postoperative Hip Replacement (prosthesis) Patients. The lecturers in these seminars have been experts in their own professions from the Saimaa U.A.S and from the Midwifery College. They have planned the seminars so that the viewpoint of the themes is multiprofessional (e.g. nursing and physiotherapy teachers working together).

In this case presentation, the main subject is Ergonomics in Nursing. The seminars for this subject (6 days altogether) included teaching and mentoring on the part of the Finnish teachers for their Russian colleagues from both the College and the hospitals regarding ergonomic patient transfer techniques, assisting with transfers, and positioning skills.

As the seminars were open to working life partners (e.g. the personnel from training hospitals, clinics and units), the information was common and they were able to share and adapt it to their own practice. Two teachers from the Midwifery College came to Lappeenranta to observe teaching practices in action, and began teaching these skills to their students. In 2001, one of these teachers transferred from the College to become the Director of the Primorsk Rehabilitation Centre. As director, she has been able to maintain the contacts between the College and the Centre, and has continued to participate in the joint seminars.

COOPERATION WITH THE PRIMORSK DISTRICT
Cooperation with the Primorsk Social and Health Care Department began in the spring of 2003. The Primorsk District of the city of St. Petersburg has approximately 500 thousand residents. The area does not have its own hospital, and for this reason has developed
a strong outpatient health care system. The Primorsk District has developed day wards that work in conjunction with the outpatient clinics in medical-surgical care, outpatient surgery services, a geriatric centre, a stroke centre, a dental care centre, and a hospice care home. The Primorsk District is financially independent, and this has enabled purposeful and systematic development of services. This part of the city has stayed ahead of its time when compared to other parts of St. Petersburg, and indeed other parts of Russia. The Primorsk District has developed special programmes, among which the stroke rehabilitation Centres are the first of their kind in all of Russia. The first Centre was established in 2000, and the Primorsk District now has 4 such centres for rehabilitation.

The Primorsk Rehabilitation Centres provide medical-social rehabilitation through multiprofessional cooperation. The rehabilitation team includes the coordinating doctor, a neurology nurse, physiotherapist, occupational therapist, speech therapist, social worker, and psychologist. There are 14 such teams, and they do the initial rehabilitation in the patient’s home and continue it in the rehabilitation centre when the patient is able. In the centre, they also arrange courses for patients and their families about preventing or adjusting to stroke. There is also a department for assistive devices in the centre.

The cooperative work with the Primorsk stroke rehabilitation team has occurred through joint seminars, workshops, and exchange of experts in the field. Themes for seminars have included prevention of stroke, client pathways in Finland, where to start with rehabilitation for stroke patients, and multifaceted health promotion. During the workshops, Russian experts have given guidance to patients both in their homes and at the rehabilitation centre as well as discussing cooperatively various methods of helping clients.

During exchange visits, experts from Russia have become familiar with Finland’s stroke practices and rehabilitative or assistive devices. The Finnish experts have become familiar with the multiprofessional home rehabilitation programme model in St. Petersburg.

During the spring of 2009, together with Primorsk Centres and funded by the European Union (EU), second cycle degree students in the field of health care and social services from Finland became familiar with the multiprofessional teamwork model for home rehabilitation in Primorsk. They visited in the homes of patients along with the experts from the Primorsk Centres, and participated in workshop learning. The students then reflected together all the things they had seen and experienced, and how the home rehabilitation model might be utilised in the Finnish health care system. The students also arranged a seminar in Lappeenranta for experts in the field to discuss the multiprofessional home rehabilitation model. Invitations for the seminar were sent to those working in rehabilitation with settings with the elderly. During the course of the whole project, students produced various types of educational materials for review of the teacher mentors. From this was also developed a model for project guidance and learning which has been helpful in implementing similar projects.

**COOPERATION WITH VYBOR**

The number of foreigners in South Karelia has increased since the 90’s, and is the third largest foreigner group in Finland. Due to the close proximity to the Russian border, the majority of these foreigners are Russian. Officials on both sides of the border working with children, youth and families require common knowledge about prevention of problems, and the goals are mutual even taking into consideration differences in environments and legislation between the countries.
Partners in the current project are experts working with families in the Vyborg area. A project focusing on multi-professional work development has been implemented in South Karelia that combines the concepts of work guidance counseling and education. The goal is to share information between different operating environments. Since 2006 a project called “Promoting the Wellbeing of Youth in Vyborg” has fostered co-operation with different subgroups in Vyborg.

The goal of the current project is to support the well-being of families on both sides of the National border. For several years, partners have participated regularly in events both in Finland and Russia. There have been visits to different communities including social and family work and student counseling by experts from both sides of the border. The main functions of the project have been to develop work counseling groups, held in Vyborg, which helped us to share information on different cultures and working methods. Working within these groups is based on sharing information and experiences. Groups have produced new work methods, for example, a model for early intervention, a parenting role map, and “Audit” test. Also training on children and family legislation as well as services and working methods in anti-drug operations has been held on the both sides of the border. Consultant support in children protection has also been developed.

It takes time to understand the cultural differences between Russia and Finland. This is why long-term and constant cooperation is needed. This project has developed opportunities for experts to network with colleagues, has increased knowledge about Finnish and Russian culture and ways of supporting families, and increased understanding and developed new concrete tools for working with children, youth and families. Good partnership development as well as learning and working together have also been very significant.

**CONCLUSIONS**

In the social and health care fields, Finland’s border areas are striving for sustainable development of cooperative work. Continuous development is attainable through participation, prevention, and action, and the Saimaa University of Applied Sciences bases organization and planning on these goals. According to the Finnish Foreign Ministry (2009), cooperative work with border areas includes networking across borders leading to continuous development on both sides, and must be done in a systematic manner to support this development in health and social care. Joint work with both the Primorsk District and Vyborg has been built around the developmental plans of these areas.

The cooperative work planned between Russian and Finnish border areas for 2009-2011 emphasizes improving the wellbeing of children and young people. Special emphasis is given to the support of families in danger of alienation as well as to the prevention of substance abuse. Cooperation between the Saimaa University of Applied Sciences and the Vyborg Social, Health, and Educational personnel will centre on the development of different approaches and methods for supporting families in various life situations such as during periods of exhaustion, insecurity, and illness, and relationship difficulties. Family centred solutions using multiprofessional education and guidance will be sought in the rehabilitation centres and family health centres.

Through this joint work with our colleagues in Northwest Russia, the faculty and students of our university’s health care and social services have increased their competencies for understanding a different culture and learned about new models for social and health care rehabilitation.
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Good morning –project 2005-2007 (EU neighborhood program –funding)
Increasing wellbeing of Youth in Vyborg project 2006-2007 (EU Neighborhood program funding)
Good youth, increasing wellbeing of children and families in Vyborg 2008 – (Foreign ministry funding)
Sustainability management as factor of success in daily business of crafts sector

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Keywords: Crafts, business, SME, sustainability

Kuopio Academy of Design (Savonia) is in the project EuroCrafts21 (Developing competencies for sustainable management in European handicraft ) with European countries developing and testing international method to evaluate, develop, and consult the concept of sustainable thinking of crafts companies. The target group consists of instructors and teachers in the vocational training, entrepreneurs and executives of the handicraft sector, multipliers such as consultants and chambers. The “Self-Check Crafts – self evaluation of sustainable management in crafts business” is an instrument, which helps crafts enterprises to discover how sustainable they manage their business. The aim of the approach is to show crafts businesses concrete needs for actions, information and trainings on the basis of their self-identified problems and experiences. The project produces also CD-rom from the tested material.

SUSTAINABILITY MANAGEMENT AS FACTOR OF SUCCESS IN DAILY BUSINESS OF CRAFTS SECTOR

The project Euro Crafts 21 is carried out under the administration of plenum - society for holistic sustainable development and the Factor 10 Institute Austria. Euro Crafts 21 project got the financing in 2008 from the Life Long/Leonardo da Vinci programme. The project come to the end in December 2010.

The objective of the project is to establish a significant added value in the vocational education in Austria and the participating partner countries. The partnership consists of nine partners in six European countries, which cover the necessary know-how and competencies in the areas of innovation transfer, handicraft, education and sustainability management for the project implementation. The participants are from six different countries: Austria, Germany, Hungary, Spain, Slovak Republic and Finland.

From Finland in the project are the Kuopio Academy of Design from Savonia University of Applied Sciences and with Academy the crafts and design associations of North-Savo and Kuopio.

Contractor: Plenum – society for holistic sustainable development (Austria), www.plenum.at
Coordinator: Factor 10 Institute (Austria), www.faktor10.at
Participants:
• Meisterstrasse Austria, www.meisterstrasse.at
• Wuppertal Institute für Climate, Environment and Energy (Germany), www.wupperinst.org
• Trifolium – Beratungsgesellschaft mbH (Germany), www.trifolium.org
• Kuopio Academy of Design, Savonia University of Applied Sciences (Finland), www.designkuopio.fi
• Chamber of Commerce and Industry Csongrád County (Hungary), www.csm-kik.hu
• Trencin Regional Chamber of Slovak Chamber of Commerce and Industry (Slovakia), www.scci.sk
• GesMA Moreno A. – Environmental Management and Sustainability (Spain), www.gesma.es

The expertise areas are connected to the sustainable development of research and innovation activity, environment know-how, the education of crafts and design field, to consultation activities and supporting the business of companies. Altogether more than 50 trainers and crafts companies are involved to this project thinking to extend the sustainable development in the own operation.

OBJECTIVES OF THE PROJECT
The sustainable development is both a megatrend and a challenge. The companies and the different organisations build more and more of their management strategies from the viewpoints of the sustainable development. The main topic of the project EuroCrafts21 is to integrate aspects of sustainability management into the range of qualification and consulting concepts in the European craft sector.

• Establishing a significant added value in the vocational education in the participating partner countries through the innovation transfer
• Sensitising the target group to sustainability management and aspects
• Developing and empowering competencies of the target groups
• Adaptation und further development of existing qualification and consulting concepts for sustainable management to the specific needs of the targets groups
• Adaptation of existing and development of new qualification modules realising pilot projects with the target groups
• Dissemination and valorisation of project results and experiences in the partner countries and Europe

This will be achieved through the innovation transfer of an already completed pilot project – aiming at the development and testing of an overall qualification and consulting concept for sustainability management in the craft sector. Therefore the sensitisation and development of competencies of the target groups concerning sustainability management is one of the main objectives. The target group consists of instructors and teachers in the vocational and professional training, entrepreneurs and executives of the craft sector, multipliers such as consultants and chambers. They can get tools which they can use in own teaching and in business services.

CRAFTS ( AND DESIGN ) IN FINLAND
In Finland we use the term crafts and design describing the branch which is: glass, metal, stone and ceramic field, cabinet-making, textile, fashion textiles, knitting and leather fields, fur productions, Lappish
handcrafts, gold and silver smith, bookbinding, metal building, gunsmith, instrument building, boat-building, renovation, and conservation. In Finland the new technology belongs to today’s crafts and keeps them as objective development and innovation.

The crafts enterprises have been grouped differently. In Finnish government declaration of design policy (Design 2005) the craft companies have been distributed as follows:

- entrepreneurs working alone
- entrepreneurs who have networked and have arranged the sales and marketing together
- the producer concepts in which the producer collects the experts together, design with them the products and take care of marketing and distribution
- as subcontractors of a bigger manufacturer or design office

Characteristic of the crafts sector is aesthetically high level environment and product world based on the design of high quality. This creates a strong identity to Finland as leading country of design and of high-quality crafts. It is also as basis for the citizens’ welfare and being creative and satisfied.

The Ministry of Trade and Industry’s sectoral report on craft enterprises (Craft Entrepreneurship in Finland in the 21st Century) gives an overall picture of the forms, corporate structure and trends of craft entrepreneurship. In Finland the number, personnel and turnover of craft enterprises have been on a slow increase since the mid-1990s. It is only seldom that craft enterprises drift to the growth track, but they remain small firms that operate under a registered firm name and provide employment only to the entrepreneur him- or herself. On the other hand, large companies, too, may carry out activities similar to crafts, which raises the industry’s employment effects in national economy. Development of craft entrepreneurship would be an important challenge for Finland.

However, there are big differences between the craft industries. There are Finnish craft industries that have managed to increase their net sales and personnel and in which price is not a decisive competition factor, but high expertise, top quality and uniqueness. Among these are industries producing boats, sports equipment, design products or musical instruments.

BACKROUND OF THE PROJECT: CRAFTS - CHALLENGES AND OPPORTUNITIES

The entire economy finds itself in an increasingly rapid change, which affects the crafts sector a great deal. Technical and social developments, globalisation and changes in demand are increasingly shaping the economic environment of the crafts. Craftsmen, who want to be successful in the market, must orient their thinking and action on these developments. Craftsmen also have to actively approach customers and develop new markets. Success and economic survival can be assured through the discovery and use of niches, innovative ideas and business concepts. The overall concept of “Sustainability” can play an important role in this context since no other economic sector incarnates the principle of sustainability as much as the craft sector.

Crafts enterprises need successful future strategies. These strategies must be adapted to future challenges to ensure economic competitiveness and secure jobs. It should optimize the work by considering in a holistic way all economic, social and environmental aspects. The orientation on the principles of “Sustainable Development” can be the basis of such a strategy.
ACTIVITIES IN THE PROJECT

1 The Manual
To allow craftsmen a real change in their entrepreneurial behaviour towards a sustainable way of doing business, it is helpful to raise the awareness among the employees for the benefits and opportunities of sustainable development and to apply it at concrete experiences and problems in their direct field of activity. The vocational and professional training in the crafts sector is an important driver for development and implementation of new approaches and awareness-raising.

Therefore the Bundesinstitut für Berufsbildung (BIBB) has instructed together with the Wuppertal Institute for Climate, Environment and Energy (2007) as experts of sustainable development to conduct an economic pilot project as an extracurricular vocational training.

The essential goal of the project »Vocational Training for a Sustainable Business in the Crafts Sector“ (”Berufsbildung für Nachhaltiges Wirtschaften im Handwerk“) is the development and testing of a modular qualification and consulting concept for sustainability management applicable across all sectors of crafts with additional continuous education modules in Germany.

Based on this manual in the project EuroCrafts21 was aim to test the material in six countries and find some improvement to the manual. This process was possible by training the trainers for companies need. Same time was created the basic material for the CD-rom from this sustainability material.

CONTAIN THE MANUAL
The qualification and consulting concept has a modular structure and consists of two basic modules and eight specialisation modules.

The basic modules contain the core aspects necessary for the qualification and consulting on sustainable management in the crafts sector and consist of an introduction to the topic of Sustainable Development and of module “self check-crafts”- self-assessment of sustainable management in craft businesses.

The specialisation modules serve to address the identified qualification needs and can be selected as needed by the various businesses.

References to further literature, useful media and links are given. Each module includes a number of materials from which a selection can be taken. The working material contains working sheets, tasks and notes as well as tips for the trainers how to conduct the sessions and what is the necessary time-frame for the implementation of the relevant material.

2 Train-the-Trainer (TtT) workshops
As EuroCrafts 21 is funded as a innovation transfer project, the Train-the-Trainer workshops (in the following: TtT workshops) are an instrument for innovation transfer. Transfer object is a German qualification and consulting concept for sustainable management in the craft sector. In every participating countries were arranged the training seminars and workshops for the trainers and teachers. The training sessions were pilot-testing the material of the manual for the crafts companies. The organisation of the TtT workshops in each country were organized by the local partners in close co-operation with the trainers from Germany.

The identification of the qualification needs was realised among others on the basis of a self-assessment tool named “Self-Check Crafts“ for SMEs of all sectors. Furthermore the training seminars were also place to develop specialisation modules on the basis of the country-specific needs of SMEs in the
European partner countries of EuroCrafts 21.

For example in Kuopio Academy of Design was created a new modul: »Product Cycle and Usability«

3 »Self-Check Crafts« - sustainability self assessment for crafts enterprises

In the TiT workshops were teached to use the Self-Check Crafts assessment with the crafts companies. The »Self-Check Crafts – sustainability self assessment in crafts enterprises« is an instrument for trade and handicraft companies to find out how future-compliant they operate. With the help of this self-check instrument, craftsmen review their business’ current situation and determine its available strengths and potentials.

The aim of this approach for enterprises is carrying out the self-appraisal to identify solid needs for action, information and training, based on thus self-revealed difficulties and experiences (or: strengths and potential) made. Compared to many other stock-taking tools and/or company assessments, the instrument of self-assessment has the advantage of involving employees, of increasing participants’ self-appraisal skills and of contributing to increased motivation by enabling target-oriented discussions. Sustainability management is to be conveyed to craft enterprises precisely and in step with actual practice by these means.

In this EuroCrafts21 project the trainers trained in the workshops to test this checklist in few craft companies in every participating countries.

The »Self-Check Crafts« is subdivided into ten business subject areas. Each of the ten topics comprises five to seven statements that are oriented to characterise a future-compliant form of management. The result of the self-assessment shows how much progress the crafts business has made towards a future-compliant management. The self-assessment for businesses of the crafts sector and the corresponding evaluation forms are based mainly on the EFQM Excellence Model’s RADAR Logic (or RADAR Cycle).

Example of analysis by “radar chart” (»Self-Check Crafts« sustainability self assessment in crafts enterprises)
FEEDBACK AND CONCLUSIONS
The prior knowledge of the participants was characterized by a wide range concerning the knowledge about trainings in general and about sustainability/sustainable management in particular. This aspect is clearly shown in the results of the written evaluation, too.

The participants gave a good feedback on the didactic approach of the TtT workshops. The mixture of informative parts and active work was rated as comfortable. Especially creative and reflexive methods were rated as useful. The language competence of the participants varied a lot. That made communication and explanations difficult from time to time. After the first workshop in Finland, they were asked to translate the self-assessment sheets (questionnaire self-check) in Finnish to provide a better learning process concerning that important aspect.

In the overall project context, the TtT workshops are the initial starting point of the innovation transfer, and will be followed from pilot-testings in the partner countries.

Results of the project (Products)
• **CD-ROM and booklet** (adapted qualification and consulting modules in six European languages)
• **Train the trainer concept** for consultants and instructors in the craft branch
• **Pilot testing** with trainers and enterprises of the craft sector
• **Information brochure** about sustainable handicraft Project flyer, Newsletter, Internet platform (project website), Evaluation report (external evaluation), Final publication

CD-rom is designed in Kuopio Academy of Design. The task is to develop the electronic material useful for the teachers, trainers and for self studying of craft entrepreneurs.

The didactical methods of the modules are distinct, and based on complementary educational-methodological approaches. Competence and knowledge acquisition through direct reference to the individual scope of action from the participants is supported through the different modules of the qualification and consulting concept. This should facilitate the transfer of know-how directly into the professional practice.

• During the testing the material of the manual, the participants prepared more specialisation modules:
  • Mission and Vision Statement / Strategy
  • Consumer Needs
  • Innovative and Sustainable Business Segments
  • Marketing Concept
  • Process Management
  • [Internal] Communication
  • Key figures for Corporate Management
  • Continuous Improvement Process
  • Sustainability Communication and Reporting
  • Product Cycle and Usability
  • Project Management
  • Innovation

The modules in CD-rom create more understanding of the theme „Sustainable Development“ in crafts, they provides the skills to carry out the “self check-crafts”, an instrument for self-assessment of sustainable practices within a specific business. Target groups of the CD-rom are, besides teachers and trainers, also consultants of the craft businesses as well as executives of the crafts sector, who decided to implement qualification and consulting on sustainable management in their organisations. The CD-rom is flexible to use, so that the modules as well as the components and materials are independently usable.
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Project Flyer EC21

The report of the proceedings of the project EuroCrafts21

Website of the project: www.eurocrafts21.eu
Part III:
Global responsibility in research

Poster presentations
This paper evaluates cultivation process of tobacco (*Nicotina tabacum* L) and its needs for water and energy consumption. Tobacco is usually cultivated in relative warm climate in fertile fields. To guarantee high leaf yield with high nicotine content the tobacco has to be fertilized. If the cultivation time is hot and dry, irrigation is necessary.

After harvesting tobacco yield is dried in warm and often smoky barns. This drying process still consumes extra energy and in some areas it is difficult to get this fire wood. Furthermore, tobacco is sensitive against ozone and other air pollutants and there are risks of phytopathogens so that farmers can lose the yield. This results in a large-scale use of pesticides.

As a conclusion cultivation of tobacco often competes with edible plants for field, water and fertilizers – often in areas where the Millennium Development Goals have not yet achieved and therefore its cultivation is against sustainable development.

**TOBACCO DEMANDS A LOT OF NATURAL RESOURCES**

Tobacco (*Nicotiana tabacum* L.) is cultivated mainly in warm climates. The top producer countries of tobacco are China, USA, India, Brazil and Turkey (FAO 2003). In Europe tobacco is grown mainly in Greece and Italy, where EU supports its cultivation.

There are several environmental problems in cultivation of tobacco.

Problem 1 is water. Tobacco is grown for 3-4 seasons, and then it needs huge amounts of water. Even temporal suffering from water will deteriorate tobacco’s quality. Tobacco is also sensitive to chloride in water. There is deficiency of fresh water in almost every tobacco cultivation area, and in warm climates all other cultivation plants demand fresh water, too.

Problem 2 is fertilizing. Tobacco cultivation needs 200-300 kg nitrogen/ha so that the leaf yields of tobacco and the nicotine content of leaves would be high enough. The production of nitrogen fertilizer consumes more than 300 litres of crude oil/ha, and thus nitrogen fertilizer is expensive for farmers. Almost in all developing countries the crops of poor farmers are suffering from too low fertilizing.

Problem 3 is energy need. Drying of tobacco in smoke consumes wood, and in same areas there is in general the shortage of fuel wood needed for cooking or boiling drinking water and sometimes for heating houses. Wood burning increases also the emissions of greenhouse gases.
ENVIRONMENTAL AND HEALTH IMPACTS OF TOBACCO CULTIVATION

The cultivation of tobacco requires noticeably higher amounts of pesticides per yield than other cultivated plants. Irresponsible pesticides usage can ruin the soil and contaminate the groundwater causing harm to environment and risk to human health. Furthermore, the farmers are usually unaware of pesticide health effects and they do not use proper safety protocols when working with pesticides. The residual pesticides may inhibit the growth of the next crops.

Also the overuse of fertilizers, especially nitrogen, can acidify the soil and spoil the groundwater.

TOBACCO IS RISKY PLANT TO CULTIVATE

Choosing the tobacco as cultivated plant is a high risk for poor farmers, since the cultivation of tobacco is expensive due to extensive nitrogen demand but the quality and quantity of crop is unsure. Tobacco is sensitive to air pollutants, like ozone, which impair its quality. Tobacco is also susceptible to plant diseases, e.g. tobacco mosaic virus, which can infect other cultivated plants like tomato, paprika and aubergine, too.

Thus, the cultivation of tobacco will increase also the risk to fail to grow the edible plants in the same area causing hungeriness to local people.

CONCLUSIONS

Cultivation of tobacco often competes with edible plants for field, water and fertilizers, and moreover often in areas where the Millennium Development Goals have not yet achieved and people are still suffering from lack of food and fresh water. Uncontrolled pesticide and fertilizer usage causes also health effects to local farmers. Therefore cultivation of tobacco is against sustainable development.

REFERENCE

It is very important to hygienize and recycles the possible waste materials to clean the environment with minimal energy consumptions by using different technique and this paper focussed on eco-sanitation especially eco-toilet, and use of urine fertilizer and its multiple benefits. The annual volume of urine of one person is some 500 L and some 50 kg feces. Use of urine fertilizer increase the food products and also reduce the environmental pollution by reducing energy consumption which might needed to manufacture the fertilizer. Urine is hygienically trustful and rich with nitrogen and can be used as such as fertilizers for edible or non-edible plants preferring early growth phases of growth period. Feces must be sanitized by composting or other treatments and after that it can be used as soil improving matter.

**ECO-SANITATION: A MILLENNIUM DEVELOPMENT GOALS WITH A SUSTAINABLE WAY**

Almost half of the people in developing countries (Jenkins and Curtis 2005) and 33.4 million rural people in the poorest parts of Europe lives without safe sanitation services (Aertgeerts 2008). Therefore sanitation must be done with the methods which can be affordable according to the economic situation of the local people or local government. Best sanitation can be made by decentralized eco-sanitation at least in rural areas and in peri-urban areas.

**INCREASE FOOD PRODUCTION FOR INCREASING POPULATION**

The demand of food and fodder is increasing since human population is increasing. On the other hand, agricultural production is decreasing due to the decreasing of soil fertility and use of agricultural land for bio-fuel production. However, agricultural productivity has been increased in industrial countries with a consequence of many improvements including better fertilization practice and use of hybrid seeds and other technology. In fact, the agricultural productivity is still very low in many developing countries and this productivity should be increased at least as much as possible with local resources.

**URINE AS A FERTILIZER**

Human urine contain high amount of plant nutrients NPK. Pure urine when urinated is microbiologically quite safe and it contains only very few enteric micro-organisms (Heinonen-Tanski et al. 2007). Pure human
urine has been studied as a fertilizer in different crops (Pradhan et al. 2007, Heinonen-Tanski et al. 2007) and they produced as good as or higher yields than those treated with mineral fertilizer. The taste, chemical content and microbial quality of the urine fertilized vegetables are very similar compared to those treated with mineral fertilizer. Not only edible plants but also non-edible plants can be cultivated using human urine as fertilizer.

On the other hand, human feces contain less plant nutrients and its volume is only approximately one tenth of that of urine. Feces is very rich in enteric micro-organisms, especially the pathogens therefore human feces must always be sanitized before use in agriculture and a good composting is one of the best ways to do this.

URINE FERTILIZER TO REDUCE POVERTY
Sustainable sanitation would be a convenient way to obtain at least some fertilizers for use in rural areas where many people are so poor that their daily income is less than 2 $ (UN 2009). Annually the urine of one person can contain some 3–4 kg of N. On the other hand people are suffering from lack of food. If urine were valued as a useful fertilizer, then many rural and peri-urban families could be persuaded to build a simple toilet where plain urine could be collected and use as fertilizer in any season.

CONCLUSIONS
1. Agricultural and health organizations should encourage people to use human urine as a fertilizer especially: (a) if people are practicing agriculture without using fertilizer, (b) if there is no wastewater treatment plants and sewage systems.
2. More scientific research work should be done to study cultivation in the tropics using urine continuously to grow three or four crops annually in the same soil plots.
3. Although urine fertilized products had similar microbial and chemical quality compared to mineral fertilized products but still there has risen questions about the possible risk of pharmaceutical residues and hormones in human urine and this issue should be studied in detail. However, there are no literatures shown specific risks caused by pharmaceutical residues or hormones (Winker 2009).

Table 1. Yield achieved from different fertilizer treatments. (NG = not given)

<table>
<thead>
<tr>
<th>Yields</th>
<th>Fertilizers</th>
<th>References</th>
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<tbody>
<tr>
<td></td>
<td>None</td>
<td>mineral</td>
</tr>
<tr>
<td>Maize (t/h)</td>
<td>1.50</td>
<td>2.70</td>
</tr>
<tr>
<td>Cucumber (t/h)</td>
<td>NG</td>
<td>25</td>
</tr>
<tr>
<td>Cabbage (t/h)</td>
<td>55.11</td>
<td>76.45</td>
</tr>
<tr>
<td>Wheat (t/h)</td>
<td>NG</td>
<td>6.01</td>
</tr>
</tbody>
</table>
| Tomato fruit (g/6 kg soil) | 74.5  | 180.7   | 216.4  | NG    | Mnkeni et al. 2008
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Improving the sustainability of water wells hand pumps

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Key words: hand pump, borehole, developing countries, sustainability, maintenance, rural water supply.

Globally, safe drinking water is limited in supply. The situation is more alarming in developing countries where diseases and death cases associated with the consumption of polluted water are very rampant. According to the WHO, diarrhea contributes to the death of 1.5 million children less than five years annually due to consumption of unsafe water and lack of basic sanitation. Many local communities rely solely on water wells for their domestic water needs, when they are fortunate to have one. However, often due to lack of maintenance and neglect, water well pumps stop functioning in a few years after they have been commissioned resulting in a colossal waste of resources. This paper researches into the possible ways to maintain hand pumps and ensure its sustainable use. This paper is also aimed at evolving an efficient small-scale safe water management plan that revolves round the concerned communities as the major stakeholders.

INTRODUCTION
Poor access to safe water remains a major threat to human health in developing countries (WHO, 2004). High incidence of water pollution has rendered natural surface water bodies unsafe for domestic consumption yet the demand for portable water has been on a steady increase. The use of boreholes fitted with hand pumps has been the major source of domestic water supply to rural communities (Olatunji, 2003). Studies indicate that owing to poor management, 90% of hand pumps break down within 3 years of installation and need repair and spare parts (van Beers, 2000).

PROBLEMS FACING HAND PUMP SUSTAINABILITY
According to UNICEF (1999), the majority of failures in rural water supply projects, over the long term, are attributable to problems with maintenance. Several researchers have identified inadequate or non-existent maintenance as the major factor militating against the sustainability of hand pumps (Elson et al., 2000 and Olatunji, 2003). Secondly, the non availability of local technical expertise for repairs has plagued the sustainability of community water hand pumps. Most communities can not afford the cost of maintaining a readily available technical expertise that needs to be sufficiently motivated in order to guarantee their services and continued availability.

Another factor that has also undermined water pump sustainability is the absence of a sustainable functioning spare part supply for hand pump. Even when technical expertise is locally available, difficulty in procur-
ing spares could mean longer down time for a malfunctioning water pump. Furthermore, lack of funding or insufficient funding hinders community effort at maintenance. Many communities find it very difficult to establish financially self-sustaining maintenance systems; therefore, external financial support is needed for the purchase, maintenance and replacement of pumps.

**STEPS TO HAND PUMP SUSTAINABILITY**

**Strong maintenance culture:** Developing and imbibing a strong maintenance culture is a valuable asset in hand pump driven rural water projects. Through a strict hand pumps maintenance programme, frequent water supply interruptions and unnecessary repairs can be avoided thus ensuring longer useful life for the system. Unfortunately, viable village level maintenance arrangement is lacking in many villages that are privileged to have hand pump driven water wells.

**Training and Re-Training:** Good maintenance of the water pumps requires some technical expertise. The sustainability of a hand pump is highly dependent on the availability of skilled personnel, which are often locally not available. Training and re-training in basic maintenance and repairs need to be implemented in order to build the capacity of community level maintenance personnel (Olatunji, 2008). *Adequate motivation is also necessary* in order to make the pump caretakers totally committed and effective. Communities and donors should remember that also women should be trained for the maintenance work of pumps.

**Routine monitoring:** Experience has shown that communities forget about maintenance issues until when the pump completely stops working. According to Elson et al. (2000) “maintenance is not carrying out repairs when a pump finally breaks down but it is periodically inspecting an installation and replacing parts that are worn or show other signs of deterioration.” A routine monitoring programme should be carried out by the water pump attendant to identify potential threats to water pump operation. Such planned and scheduled checking is a preventive maintenance approach aimed at enhancing the sustainability of the pump.

**Capacity building:** Proper human resources development through adequate capacity building is capable of eliminating about 90% if not all the problems and constraints associated with traditional maintenance approach (Bamgboye, 2006). According to Arlosoroff (1987) an active village level participation is crucial to the working and sustainability of a rural water supply project. The communities should be responsible for the management of the systems and they have to take into consideration costs for operation, maintenance and major repairs as well as the reliability. Involvement of the communities could also help to protect water pump from vandalization. Considering the key role of women as water providers at the household level, their involvement in the management team is vital for the sustainability of rural water project.

**Educating local population:** No doubt, education programs can create an appreciation of the health benefits of hand pumps, serve as a preventive maintenance and lessen the likelihood of the pump being abused. Sometimes, inappropriate use or abuse of the hand pumps could lead to dysfunction of the pump. Such enlightenment programme can also incorporate aspect of good sanitation practice at the well and around the vicinity of the well site to prevent pollution of drawn water and the water source.
Subsidized user charges: The importance of profit generating activities to support the water supply should not be underestimated. Unfortunately, this issue has been neglected in many rural water schemes. Since the hand pumps are installed for the benefit of the community, it is reasonable to expect some contribution from the community to ensure its continued use. Van Beers (2001) proposed that even in low income areas, users can pay for water a small amount per day, per month, or a lump sum after the harvest season. If properly managed, revenue generated through this charges could be useful in meeting some minor and urgent financial demands for maintenance of the project.

Investing in simple and reliable technology: There is a high need for a reliable and simple hand pump that is not dependent on spare parts. Although there are still no evidence about this, the new Afripump has been reported to deliver high reliability with an almost maintenance-free system compared to other hand pumps that requires supply of essential spare parts to ensure their longevity.

CONCLUSION
With few years to the Millennium Development Goal’s 2015 deadline of reducing by 50% the proportion of people that have no access to safe drinking water and sanitation, many rural communities (especially in sub Saharan Africa) are still facing acute water crisis. Communities’ dependence on boreholes for their domestic water need is threatened by frequent hand pump break down. Therefore, the sustainability of hand pumps is vital to rural water supply and adequate maintenance of the pumps is required to ensure long-term availability of water. User involvement and collective responsibilities is imperative for the sustainability of the hand pump.
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Integrating sustainable development (SD) into nursing curriculum – best practices?

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Keywords: best practices, development process, health resources, learning by doing, nursing curriculum

SD is an important competence of professionals now and in the future. Novia University of Applied Sciences has a certified environmental policy. Every student takes a course in SD. Nurses have a central role in promoting health on individual, community and global level. In the nursing curriculum we first integrated SD into learning modules by identifying the learning goals for both theoretical and practical courses. Then, SD was raised to the next level by encouraging the students to explicate their knowledge base in portfolios, project reports and the thesis. Now, the new competence-based curriculum identifies SD as a central competence in nursing education at higher level. SD is implemented throughout the curriculum and explicated in learning by doing projects. As a result of this development process, a renewal of the environmental certificate is anticipated and competence in SD is to be disseminated into nursing organizations in the region.

In Novia University of Applied Sciences (Novia) SD is integrated in all activities and acts for a qualitative education and for regional presence and effectiveness. Ecological, economical, social and cultural aspects of SD make a basis for all the educational activities (Novia vision 2010). Novia has been certified according to the International Environmental Management System (ISO 14001, ISO 9001) since 2006 for the Accredited Unit: Det Norske Veritas Certification OY/AB. The certificate is valid for the following products or service ranges: degree-awarding education, continuing education, and applied research and development. Integrated management system of Quality, Environment and Safety will be certified again in autumn 2010.

All students in Novia take a course in SD (Novia curriculum 2010), after which they are anticipated to know that sustainable development consists of ecological, economic, technological, social and cultural aspects, which all are intertwined; understand that the future possibilities of survival depend on a sustainable use of nature, people and the environment; and be able to observe the ecological, social and cultural aspects of sustainability as well as of accessibility in all activities and advocates sustainability in the work setting.

In the nursing curriculum SD is taken into consideration at all levels of studies (basic studies, professional studies, work place-
ment, and thesis). However, in different courses the four aspects of SD vary in order to build an integrated wholeness. For example, in the former curriculum (Novia curriculum 2006-2009), all four aspects of SD were introduced during basic studies: minimizing the use of energy in everyday life, handling waste, economical aspects of social and health care, interaction and collaboration in social network, a safe and healthy environment, cultural skills. Then, the professional studies deepened the aspects of SD within the health care context by giving the students possibilities and skills to apply SD in all nursing activities (see Annerstedt 2009). For example, choosing material and medication alternatives in patient care, planning development projects in counseling, use of new technological innovations in elderly care, prevention of marginalization, identifying health risks in time, understanding equality in health care and reflecting cultural competence. Also the goals for the work placements and criteria for evaluating practical studies contain SD at the level of best practice as we know it.

In the new, competence-based nursing curriculum (2010-2015) we have taken into consideration Novia’s new environmental policy and discussions with different collaboration and project partners. SD is implemented throughout the curriculum in relation to nursing competencies, such as ethics and professional interaction, clinical competence and health promotion, multi-professional and trans-cultural care, counseling, decision-making and leadership, research and development. By doing this, we aim to nurture our students into global responsibility even above professional obligations. Several courses are to be implemented as learning by doing projects (Virtanen 2006) in which the nursing-specific competencies are combined with SD. For example, cultural sustainability together with health promotions skills and prevention of marginalization of male patients and clients became a development project called Well Man. In turn, the project Take a Chance integrates nurses’ counseling and rehabilitations skills into social sustainability. Furthermore, the project with Elderly People focuses on interaction with the help of technological aids instead of actual visits.

During these projects the students and nursing or health care organizations become familiar with each other, and principles of SD are spread to working praxis in the region. The professional competence in SD can be further deepened in a thesis. For example, the project Green Clinic (2005-2008) in collaboration with the South-Western university hospital aimed to introduce all levels of sustainable development into practical nursing care. First, nursing managers and ward sisters were introduced to the project idea. Two wards were chosen to participate in the project. Then, the development needs were identified to be in relation to the hospital environment and patient rooms, to the information needs of patients, and to job motivation and clinical skills of nurses. Nursing students \(n = 13\) chose these development tasks as a central theme for their thesis. Learning tasks and part-task practises consisted of workshops, study visits, literature and research evidence. The project resulted in seven theses, for example recommendations for colours, scents and sounds to be used in hospital environments for reasons of safety and satisfaction. The project products were presented at the target hospital for all personnel available during one day.

**CONCLUSIONS**

One mission and vision for Novia University of Applied Sciences is to be known as an expert in SD. The certification obtained is taken as a signal of acceptance on national level.
All students participate in a course in SD during their degree-awarding education. Nursing curriculum as such has been revised in collaboration with regional actors in health care, and reflection concerning SD and other competencies goes on. Though there are no published nursing curricula to compare with, we state that our nursing curriculum can be seen as an example of best practice.

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The aims of this systematic review were 1) to evaluate the developed hypothetical model which proposes learning as the mediating link between sustainable development and well-being at work, and 2) to identify the learning characteristics which promote sustainable well-being at work. The review comprised of 16 scientific articles. The data were analysed with inductive content analysis. The hypothetical model proved to be relevant, and learning can be considered the main link between sustainable development and well-being at work. The principal requirements of successful learning processes for promoting sustainable well-being at work were the commitment of managers and workers and their collaboration, competent leadership, and planning and development in collaboration with close stakeholders. External help from researchers and occupational health care also increased the understanding of organizations about sustainable well-being at work. Continuous learning at workplaces to increase professional competence seemed to be essential for promoting sustainable well-being at work.

Since 1992 (Rio Declaration 1992), several factors that promote both sustainable development and well-being at work have been identified, such as a clean work environment (Veleva et al. 2001), the health and safety of workers (WHO 2006), an effective work organization and leadership (Svensson and Wood 2006, Kira 2008), and a participatory learning process (Cruz et al. 2006). Organizations enhance their orientation for sustainable development and improve their environmental and social performance through various learning processes (Molnar and Mulvihill 2003; Cruz et al. 2006). In workplaces, promotion of sustainable development in terms of environmental, economic, and social sustainability is a continuous, time-consuming, and evolutionary process ranging from goal setting to the assessment of performance and output (Veleva et al. 2001). The promotion of well-being at work requires both strengthening a worker’s individual resources, including professional competence, and developing work content and the work environment, including both physical and psycho-social aspects (Ilmarinen 2006).

This study was a systematic review which aims were to evaluate (1) the relevance of the developed hypothetical model where learning
is proposed to be a mediating link between sustainable development and well-being at work, and (2) to identify the learning characteristics which promote sustainable well-being at work. The systematic literature search produced 848 references from six databases. The review comprised 16 scientific articles that were analysed with inductive content analysis.

In the developed hypothetical model, the section of well-being at work is based on the model presented by Ilmarinen (2006). Well-being at work is described as tetrahedral with four dimensions: (1) a worker’s capabilities, (2) professional competence, (3) work and work environment, (4) organization and leadership. In our model, sustainable development is linked to well-being at work through learning. The output variables of the developed hypothetical model are productivity of work and quality of life. The external contexts and networks related to working life affecting and regulating this model are family or immediate society and global society.

The developed hypothetical model was relevant when considering learning as the principal mediating link between sustainable development and well-being at work. The main prerequisites of successful learning processes for promoting sustainable well-being at work were the commitment of all workers and managers, true leadership, and planning and developing in collaboration with close stakeholders and customers. External help and guidance from researchers and occupational health care increased the awareness of organizations about sustainable well-being at work. Workplaces can also promote sustainable well-being at work on their own by investing time and resources in learning processes.

In the developed hypothetical model, the element of well-being at work is strongly based on a multidimensional theory of ergonomics concerning the interaction between work demands and conditions, and the capabilities and the competence of a worker. Ergonomics offers one potential solution for workplaces to promote sustainable well-being at work (e.g., Pitkänen et al. 2008).
REFERENCES
The aim of the paper is to present the ongoing research project “Sustainable Innovative Materials in High Tech Applications” (SUMAC). The main focus of the project is to study and evaluate sustainable and safe products, product chains and life-style in the context of sport and leisure time activities. The research consortium consists of three partners: University of Lapland, Tampere University of Technology and University of Kuopio. The main research areas are design research, material technology and ergonomics. The project is funded by the Academy of Finland in 2007-2010.

University of Lapland focuses on strategic design and environmentally sound brands. The key issue is to explore how the technologically added value of products could facilitate sustainable development and brands in products that support health, wellbeing and adoption of the new skills among end-users. User-centered research, usability and acceptability are the main perspectives of the study. Tampere University of Technology will provide environmental assessment on product life-cycle, review and define indicators for major environmental impacts of materials and product chains during the entire life cycle. The assessments and indicators increase knowledge about innovative and proactive high technology materials on the background of sustainability. University of Kuopio will create strategic and operational concepts and models for promoting sustainable development in the context of ergonomics and wellbeing at work in terms of worker’s capabilities, work and work environment, organization and leadership and professional competence. At the consortium level the goal of the research is to understand how product design, production chains, environment, wellbeing and adoption of new skills are related to each other and how they promote sustainability in sport and leisure time activities.
FOCUS OF THE STUDY
The vision of SUMAC project is implemented through the fundamental question: How to design, produce and market products, which are ecologically, economically and socio-culturally sustainable for the producers and the end-users.

The University of Lapland studies on strategic design and environmentally sound brands and points out the most sustainable way to design personal and social significance into products. According to the user interviews the end-users favour high quality design and brands where environment-friendliness and ethicality are designed in. Moreover the use of sport products is to be easy, flexible and purposeful.

Tampere University Technology concentrate life-cycles of innovative and proactive high technology materials available in sport and leisure time products like clothing and accessories. Indicators for major environmental impacts of products and product chains are defined and reviewed during the whole life cycle, “from cradle to grave”. Such as energy and water consumption, renewable and non-renewable resources, waste (non-hazardous, hazardous), potential for recycling, emissions to water and air and hazardous materials like chemicals are the main indicators under discussion. It’s also needed to take into consideration, how these new technological solutions or new innovative materials really promote well-being and sustainability and avoid increasing environmental hazards or human health risks.

The University of Kuopio aims at creating sustainable and productive work systems and products which have no harmful effects on workers and end-users and to identify features of the work systems and products which promote health, wellbeing, skills and competence of the workers and end-users. The research context of the University of Kuopio lies on ergonomics and wellbeing at work in its four dimensions: worker’s capabilities, work and work environment, organization and leadership and professional competence. Sustainable development could be identified in the studies of occupational wellbeing at the organizational level through the terms of learning and professional competence that increase abilities of the organization to predict and cope challenges associated with continuous changes in the working life. Clearly, sustainable development seemed to be is a global paradigm, which should enhance wellbeing of each working human via the society (laws), organizations (cultural, values, strategies) and other communities and networks.

CONCLUSIONS
There is an increased focus in the global marketplace on wellbeing products, though the sports and leisure industry is still operating on a disposable commodity basis. Nevertheless, there is less researched but growing interest in sustainability and ethical responsibility in production also in the sport and leisure industry. Especially in the case of nanotechnology in sports products the information of the effects for human health and environment is one fundamental question to be solved in the future. From the end-user perspective the safety of the products is also linked with the ways of use and the personal and social significance associated with the high technology brands. The research work of the SUMAC consortium provides an interdisciplinary knowledge and understanding for sustainable products and production.
REFERENCES


The students of Engineering in Environmental Technology worked out tools for the assessment of sustainable development in nine different case subjects in existing urban areas. The chosen subjects were a sporting and outdoor activity area, a touring centre, a sport association, a clothes shop, a museum, a centre for teenagers, a city centre, a residential area and an SME industrial area. The presentation describes these tools as used for different case subjects. The results obtained with these tools are presented, too, as examples of sustainable development assessment in existing urban areas.

It is a great challenge to cover all aspects of sustainable development in different cases in existing urban areas. A lot of resources are also needed to state arguments for the prioritization of different aspects of sustainable development. The arguments for prioritization are needed for developing urban areas but they vary a lot according to the case under study.

The students of Engineering in Environmental Technology worked out tools for the assessment of sustainable development in nine different case subjects in existing urban areas. The students worked in small teams of three or four members. Each team chose their case subject according to their own interests. The chosen subjects were a sporting and outdoor activity area, a touring centre, a sport association, a clothes shop, a museum, a centre for teenagers, a city centre, a residential area and an SME industrial area.

The first step for each team was to become familiar with the team’s own case subject. The background and basic information was gathered from common databases and completed with an excursion and personal contacts. The second step was to assess each aspect of sustainable development in the case subject to state arguments for prioritization. As a result of assessment each case got its own arguments. The ecological aspect was significant and important in all cases; the cultural, economical and social aspects varied according to the cases. The arguments and methodology paths were described as tools which are useful in other subjects of this kind located somewhere else.

The presentation covers nine posters each describing the tool which was used for different case subjects. The results obtained with each tool are presented, too, as examples of sustainable development assessment in exist-
ing urban areas. Material choices and maintenance appeared to be the main areas of future development in the sporting and outdoor activity area. The touring centre seemed to be working well economically and socially, but ecologically there were some problems with waste management. The sport association can have an important role in introducing foreign cultures and in combining people from different social or economical backgrounds. The use of premises and equipment recycling could be more effective. Secondary and remainder products could be exploited better in the clothes shop. The use of organic material could be increased, too. More efficient lighting, a bigger size of guiding signs and some nearby handicap parking places would increase visitors’ equality in the museum. Recycling, more effective use of the premises and cooperation with other groups and institutes were the main areas of future development in the centre for teenagers. Pedestrian streets, more lighting and favouring renovation over constructing new buildings appeared to be the developing ideas in the city centre. All aspects of sustainable development were considered well in the new residential area, but there were no collection points for recycling waste. Improving waste management, for example by common litter boxes, was the main area of future development in the SME industrial area, too. Improving road network, investing in new technologies and securing good water and energy supply were other areas of development in the SME industrial area.

The examples given above show the concrete and realistic results, which was one of the goal set for the assessment tools. During the process the students learnt how to deal with all aspects of sustainable development in different case subjects. Another benefit for the students was the integration of one professional course and one English course in the form of giving oral presentations and drawing up posters in English. In addition, the students compiled the seminar reports in Finnish.
Increasing knowledge, knowhow and support by combining workplace guidance and education

**Relevance:** On the job support through guidance provided by a specialist in the workplace and educational provision are essential for development.

**Purpose:** To develop the knowhow of social welfare and school personnel in Vyborg when interacting with families. To enable exchanges of specialists and knowledge of social welfare legislation on both sides of the border.

**Participants:** The Faculty of Health Care and Social Services at Saimaa University of Applied Sciences, Vyborg city personnel from the social, health and education departments.

**Methods:** A development process was used, which pointed out needs for improvement, set common goals, and designated tools for improvement such as training, support of experts, and meetings. A specialist in workplace guidance was present when new tools were tested.

**Results:** Expertise of participants from Vyborg was strengthened and methods in dealing with families were improved and knowledge about wellbeing of families, services and legislation related to families was increased on both sides of the border.

**Conclusions:** The project increased understanding when meeting Russian customers and partners, as well as developing skills in creating multicultural work communities.

The number of foreigners in South Karelia has increased since the 90’s, and is the third largest foreigner group in Finland. Due to the close proximity to the Russian border, the majority of these foreigners are Russian. Officials on both sides of the border working with children, youth and families require common knowledge about prevention of problems, and the goals are mutual even taking into consideration differences in environments and legislation between the countries.

Partners in the current project are experts working with families in the Vyborg area. A project focusing on multi-professional work development has been implemented in South Karelia that combines the concepts of work guidance counseling and education. The goal is to share information between different op-
erating environments. Since 2006 a project called “Promoting the Wellbeing of Youth in Vyborg” has fostered co-operation with different subgroups in Vyborg.

The goal of the current project is to support the well-being of families on both sides of the National border. For several years, partners have participated regularly in events both in Finland and Russia. There have been visits to different communities including social and family work and student counseling by experts from both sides of the border. The main functions of the project have been to develop work counseling groups, held in Vyborg, which helped us to share information on different cultures and working methods. Working within these groups is based on sharing information and experiences. Groups have produced new work methods, for example, a model for early intervention, a parenting role map, and “Audit” test. Also training on children and family legislation as well as services and working methods into anti-drug operations has been held on the both sides of the border. Consultant support in children protection has also been developed.

CONCLUSIONS

It takes time to understand the cultural differences between Russia and Finland. This is why long-term and constant cooperation is needed. This project has developed opportunities for experts to network with colleagues, has increased knowledge about Finnish and Russian culture and ways of supporting families, and increased understanding and developed new concrete tools for working with children, youth and families. Good partnership development as well as learning and working together has also been very significant.

From using drugs to treatment – project 2002-2005 (EU Interreg funding)
Good morning – project 2005-2007 (EU neighborhood program – funding)
Increasing wellbeing of Youth in Vyborg project 2006-2007 (EU– Neighborhood program funding)
Good youth, increasing wellbeing of children and families in Vyborg 2008 – (Foreign ministry funding)
**Baltic 21 education for SD network of institutes for higher education IHEs**

This project has been financed by the Ministry of Education in Finland during the period 2007-2009.

**PROJECT PARTNERS**
- 2007-2009 Novia University of Applied Sciences (earlier Sydväst University)
  Turku University of Applied Sciences
- Hämeen amk – University of Applied Sciences
- Kymenlaakso amk – University of Applied Sciences
- HAAGA-HELIA - University of Applied Sciences
- Åbo Akademi University – National resource centre for ESD / bup.fi
- 2008 Keke – Foorumi / National etwork for higher education in
  Sustainable Development in Finland
- Baltic University Programme

**PROJECT**

Our aim has been to facilitate cooperation between different higher education networks for sustainable development in the Baltic Sea region.

- 2007 the former Baltic Sea Sustainable Development network was integrated into BUP
- 2007-2009 partner-projects have been realized in Universities of Applied Sciences that are presented in the report
- Keke – Foorumi, National network for Sustainable Development for IHEs, was established 2008
- Students have participated in international SD-conferences arranged by Baltic University Programme and other organizations

New idea: to “stimulate the development of management systems for SD in institutions of higher education.”

- Novia University of Applied Sciences implemented a certified EMS / ISO 14001, as the first IHE in Finland. The gathered experience and knowledge about the implementation can be gained by IHEs. The work within Novia University goes on with implementing an Integrated Management System for Environment, Safety and Quality.
Developing by working together

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Keywords: Multiprofessional home rehabilitation, stroke, multiprofessional project learning model

Relevance: As neighbors, it is necessary to know what principles professionals have in Russia to take care of stroke patients. We also have many patients from Russia, so we are able to pay attention to cultural differences. In the Primorsk district, they have a multiprofessional home care model to rehabilitate stroke patients.

Purpose: To develop multiprofessional practice in stroke patient rehabilitation in Russia and Finland. In the Saimaa University of Applied Sciences, we also developed a multiprofessional project learning model.

Participants: The project population consists of health care and social services professionals in the Primorsk district and master’s degrees students and teachers in Saimaa University of Applied Sciences.

Results: A virtual course in project learning, seminars and workshops in Finland and Russia, student study visits to patients’ homes with professionals, and exchanges of teachers and professionals.

Conclusions: It is important to recognize the importance of families for stroke patients during rehabilitation.

The core competencies in the master’s degree programmes in health care and social services are international competencies, project management and developmental competencies. The experts of health care and social services must understand cultural differences and co-operate with people of different cultures. They must also develop their own professions and lead multiprofessional teams.

In this project we co-operated with health areas in Primorsk District in St Petersburg. The district area is large and new and they have about 500000 inhabitants. They have developed stroke patient care and rehabilitation, which is new in Russia. They have their four outpatient departments and 14 multiprofessional teams taking care of stroke patient’s rehabilitation mostly in the patient’s home.

In this project the students of health care and social services became acquainted with home rehabilitation and the multiprofessional teams. They discussed in workshops with Russian experts and visited also in patients’ homes. They reflected on their own work and discussed the benefits and problems with the home rehabilitation model. The students arranged the seminar where the experts from Russia introduced the home rehabilitation model and their own work to Finnish experts. During the whole project the students reflect-
ed on different learning materials, which were analyzed by the teachers. So we developed a multiprofessional model for project learning. The model is now in use in the Saimaa University of Applied Sciences.

CONCLUSIONS
It takes time to understand the cultural differences between Russia and Finland. However, we are neighbours and we have communications between us more and more. It is also possible to learn from each other and develop our own patients’ nursing and rehabilitation processes. In this project the master’s degree students had the possibility to understand the cultural differences and to cooperate with others. They got experience in multicultural and multiprofessional teamwork and also in leading the teams. The master’s degree students also got new ideas for developing their own professions.

REFERENCES
The project Multiprofessional Project Learning Model, Case: Home Rehabilitation has been supported with European Regional Development Fund
The decade of education for sustainable development calls for an eager, constructive step towards a more literate global population, from all big and small actors. Novia University of Applied Sciences introduced a Bachelor’s programme Integrated Coastal Zone Management in 2008 to link environment, society, SD and education in a single curriculum. The school hopes that a good mix of local and foreign students with a strong sense of individual responsibility will carry the message of sustainability forward. With or without the stipulations of UN laid on the students and us, the educators, how much do we actually understand by the word ‘sustainability’? Our work aims to provide a picture.
Part IV:
Sustainable development forum of Higher Education Institutions

Oral presentations
The university sector in Finland has become reasonably active in evaluating its environmental impacts and especially in elaborating the concept of sustainable development from a university’s point of view. Challenges confronting higher education institutes today are somewhat alike. The existence of a university increasingly depends on internal multidisciplinary collaboration, wide co-operation nationally and internationally, and direct responses to the demands addressed by working life looking for large-scale expertise. Each higher education institute has a role to play in order to promote global responsibility (Strategy for the... 2009, 11). A question yet not entirely confronted is how to shift from the preaching stage to actually practising what is stated in strategies and in theory. In this paper the potentials of a diversified approach to sustainable development is discussed, ‘walk the talk’ actions taken in Oulu University of Applied Sciences exemplified and cross-boundary work in sustainable education called for.

INTRODUCTION
Everyone working in a higher education institute acknowledges the fact that the global issue of sustainable development (hence SD) cannot be ignored any longer, but must be taken into account in all planning and operations. The necessity has been stressed both in national and international forums (e.g. Kaivola & Rohweder 2006). Passivism has been largely justified with the diversity of concepts that prevail in the discussion. How can we put anything into action, if there exists disagreement and dispute over the theoretical grounds? What is the main concept chosen to be operationalised and used before any action plan is decided upon and set in motion? Why do we stick to the construct of SD, if the trend is
It is true to say that genuine collaboration precedes the process of establishment, which basically means that participants pursue a shared understanding about the concepts and terminology used in interaction (Clark & Brennan 1991). Wals & Corcoran (2004, 91-92) claim that pluralism does not necessarily have to block commitment and participation in relation to SD. On the contrary, the approach of diversity is regarded as a strength raising the need for openness, responsiveness and respect when encountering those who are different and do not share your worldviews and concepts. According to Vanderstraeten and Biesta (2006), human communication inherently carries all sorts of meanings which are actively interpreted and ascribed to something. When receiving information one does not give up one’s own perspective, but tries to find a sufficiently similar way to see the world in order to accomplish something. By communicating, we make things common and construct a shared understanding that is called ‘the common ground’ (Stahl 2004).

Jickling and Wals (2008) study globalisation and environmental education in their article. The conceptual farrago of SD is approached by exploring two (main) theoretical frameworks of “education”, both of which have different implications for SD. A transmissive perspective sees education as transmission of information, values, and skills from sender to receiver, from teacher to students. It indicates that learning outcomes are predetermined and education is mainly an instrument for implanting a specific ideology pre-described by certain groups and, as such, equals social reproduction. In contrast, a transformative view describes education as the co-construction of knowledge and understanding within a social context. Nothing is nailed down in advance, since interaction is not about transmission of information per se but embedded with meanings (Vanderstraeten & Biesta 2006, 165). Transformative education builds adaptive capacity for students to “step aside” from previous biases and stereotypes and to become critically aware of their way of perceiving the world (Jickling & Wals 2008, King 2004).

A primarily transformative view of education is about social learning, bringing people with diverse backgrounds together (Wals, Hoeven & Blanken 2009). By diverse or heterogeneous nothing extreme is necessarily meant. It refers to people sharing perhaps the same citizenship, but having mixed socio-cultural and educational backgrounds. As such, this constellation of participants could be students attending a class, a working community, research group or peer meeting of civil servants. We constantly confront ourselves with encounters where social learning and the construction of joint understanding of how to deal with the responsibility for “people, profit/prosperity and planet” is enabled. But have we yet realised this potential? Do we cherish this resource or is it just brushed aside due to other, more important and acute matters? Have we really taken advantage of those interfaces where boundaries are crossed (e.g. multi-disciplinary endeavours) and stimulus for transformative learning, creativity, innovation, and ultimately for change occur (ibid. 28)?

Wals, Hoeven & Blanken (2009) underline the significance of the collective goals that determine the success of social learning and are shared by the people engaging in that particular process. In the following paragraphs, current co-efforts of Oulu University of Applied Sciences (hence Oulu UAS) for promoting SD are described. Also, a general evaluation of the proceedings is given, which is based on the preliminary results of a questionnaire study implemented in spring 2010.
ENVIRONMENTAL WORK IN OULU UAS

Oulu UAS is an organisation with about 800 staff and 9000 students. It is managed by the Oulu Region Joint Authority for Education, and it consists of seven schools and four other units. This also reflects the organisation of the environmental work in Oulu UAS (see figure 1).

From the very establishment of Oulu UAS, the environmental team has played an important role being a platform for discussion and interchange. The overall emphasised focus of the operations has been until recently environmental matters rather than socio-cultural or economic aspects. Today, the Environmental Strategy 2011 of Oulu UAS examines all functioning from the point of view of SD. Also, the recently accepted Strategy of Oulu UAS states SD as one of the main starting points for operations. The short-term goal of the Environmental Strategy is to achieve public recognition for the work by 2011. It would verify that the course taken is worth pursuing, and that the consistent “bottom-up” approach has been a successful and effective approach.

The certification for the ISO14001 –environmental standard awarded to the School of Renewable Natural Resources in 2008 was a significant booster of even more systematic work. It catalysed discussion whether other schools/units should follow, and what would be an overall reasonable and exploitable con-
text for enhancing work for SD in Oulu UAS. Standards and models were defined merely as tools to implement goal-oriented and PDCA –process-like activity. However, in spring 2010 most of the schools decided to go for an ISO14001 environmental standardisation. Another option was Green Office maintained by the World Wildlife Foundation. By the end of 2010, each school/unit will define the significant environmental goals appropriate to their lines of business in the context of which the scope of system is also determined. The school- and unit-level decision-making process is recommended for implementation by using the method of participatory planning which emphasises transparency and openness when agreeing on the goals, detailed objectives and concrete measures.

Another important step was taken when it was decided to carry out internal audits with audit groups consisting of members of the working community (here referring to staff and students). Participants are suggested by the Environmental team of Oulu UAS and are usually those already actively involved in environmental work in their school/unit. Since internal audits are implemented annually, they have been seen as an excellent method making it possible to explicitly and consciously utilise the benefits of benchmarking. Exchange of knowledge, opinions and experience of setbacks and successes occur naturally. Everyone working in Oulu UAS can also leave open environmental initiatives and feedback online in the intranet to promote e.g. car pool and local food production, or perhaps give feedback about private driving.

**EVALUATION OF THE PERFORMANCE**

One could fairly claim that the structure for enhancing sustainable responsibility in Oulu UAS is viable. But what about the actual performance: does it sustain evaluation? How does Oulu UAS support or limit sustainable acts to occur daily? In what way is the working community encouraged to be a dynamic performer of SD? Is it sufficiently stressed that the SD work done results in positive impacts and cost savings? Within the framework of enhancing sustainable (or global) responsibility in Oulu UAS, the view of the environment still stands out. It is also noteworthy that there are no majors or minors in SD available in Oulu UAS.

Turku University of Applied Sciences in Finland reviews its operations from the corporate social responsibility (CSR) (Helmi & Luoto 2008). According to Helmi & Luoto (2008), the reporting of CSR is, above all, a tool for operations’ assessment and communication, and calls still for a closer connection to overall operation system and working procedures of a higher education institute. Whatever the system or method is, the abstract statement of sustainable responsibility is altered into practice with the same tools as strategies are put into action: by communication, organisation, motivation, justified incentives and by indicating public commitment. Training is inevitably necessary for the staff to comprehend and accept the required change of roles in working duties. (Halme 2004.) An example of the overall process is illustrated in figure 2.

A questionnaire study for the staff of Oulu UAS was piloted in spring 2010 to evaluate the current state of SD. The questionnaire was realised as a thesis work and by using the Webropol online application for its accessibility. The final response rate was about 18,5% even though considerable measures were taken in order to activate the target group. Two thirds of the respondents were women, and more than half of the respondents had teaching as their main job, which corresponds well to the current distribution. The analysis phase is underway, but some preliminary results of the statements are shown in figure 3. A corresponding questionnaire study will be con-
**Figure 2.** Process scheme of the SD work.

**Figure 3.** Preliminary results of some statements presented in the questionnaire study (SD = sustainable development).

<table>
<thead>
<tr>
<th>Statement</th>
<th>Can not say</th>
<th>Totally disagree</th>
<th>Partly disagree</th>
<th>Do not disagree or agree</th>
<th>Partly agree</th>
<th>Totally agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>I actively participate in promoting SD in my work.</td>
<td>4</td>
<td>16</td>
<td>26</td>
<td>34</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>Internationalisation of my school (unit) enhances SD.</td>
<td>24</td>
<td>7</td>
<td>16</td>
<td>33</td>
<td>17</td>
<td>2</td>
</tr>
<tr>
<td>Study modules have been revised to meet the competency needs of SD in working life.</td>
<td>23</td>
<td>9</td>
<td>19</td>
<td>32</td>
<td>16</td>
<td>1</td>
</tr>
<tr>
<td>SD is taught by the teachers specified in the respective field.</td>
<td>22</td>
<td>20</td>
<td>22</td>
<td>23</td>
<td>12</td>
<td>1</td>
</tr>
<tr>
<td>Carbon footprint of Oulu UAS should be measured and monitored.</td>
<td>14</td>
<td>6</td>
<td>15</td>
<td>40</td>
<td>33</td>
<td></td>
</tr>
<tr>
<td>In working life there is more need for knowhow of SD.</td>
<td>23</td>
<td>9</td>
<td>35</td>
<td>51</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SD should be a part of action development.</td>
<td>14</td>
<td>32</td>
<td></td>
<td>61</td>
<td></td>
<td></td>
</tr>
<tr>
<td>In stead of SD we should talk about social responsibility.</td>
<td>7</td>
<td>7</td>
<td>15</td>
<td>27</td>
<td>30</td>
<td>13</td>
</tr>
<tr>
<td>SD is a way to examine matters.</td>
<td>6</td>
<td>13</td>
<td>17</td>
<td>44</td>
<td>27</td>
<td></td>
</tr>
<tr>
<td>SD is easy to understand.</td>
<td>2</td>
<td>8</td>
<td>30</td>
<td>21</td>
<td>30</td>
<td>9</td>
</tr>
</tbody>
</table>
ducted for the students of Oulu UAS in the near future. A comparative group from another national or international university of applied sciences is being sought.

The relative frequencies illuminate the necessity to commence a process of making the fundamental concept explicit. There occurs obvious dispersion about the comprehensibility of the SD, which still seems to be vague and scattered (see Wals, Hoeven & Blanken 2009, 7). The fact that one third of the respondents partly both agree and disagree with the claim “SD is easy to understand”, is most likely one of the reasons blocking people from becoming effective agents and inspirers within their field (see first claim). The initiative for a new mode for thinking, working and teaching already exists: over 60% of the respondents totally agree that SD should be integrated in action development. Furthermore, more than half recognises the need for better SD expertise originating from working life and a majority of the respondents is open for carbon footprint measuring.

CONCLUSIONS AND IMPLICATIONS
The role and responsibility of universities in the context of enhancing sustainable development was reviewed in the paper. It is typical of higher education institutes that the start has been cautious and a lot of resources have been used to overcome the conceptual ambiguity. However, an undeniable fact is that working life already calls for a new kind of capacity, the capability to take action when encountering the complex and global challenges depicting our time, to which higher education institutes must respond in an appropriate, but vigorous manner. Showing an example and taking a more effective role is now expected. As stated earlier, training staff is essential and a crucial step to be performed. Sufficient joint and explicit understanding must be constructed before any transformative teaching (and working) can actually take place. Furthermore, the role of the staff is currently shifting from small-scale know-how to expertise that covers both competence in a specific field and also entails sensitivity and openness to approaches differing from one’s own.

It must also be taken into account that any organisation of global responsibility should address the importance of integrating quality work with endeavours for better SD, and by granting sufficient resources for key persons. The recognised challenge is that the expertise of SD is scattered in, and between, institutes. It is therefore suggested to look closer into the possibilities of cross-boundary projects that would make exchange of SD knowledge in and outside Oulu UAS effortless. Such projects, whether about teaching or research and development work, become interfaces for innovations, of which the online platform called Plado is an example. Plado gathers together people from higher education institutes of the Netherlands interested in issues of sustainable development, for instance to distribute best practices, documentation and to connect with peers nationwide.

As to Oulu UAS, conclusions about the weak response rate in the questionnaire study must be drawn. Perhaps vagueness of the concept and not seeing oneself in the “big picture” could explain to a certain extent the reluctance to react. Moreover, recommendations for widening the ongoing approach of environmental work into something similar to that which takes place, for instance in Turku UAS, has to be considered. It is yet to be remembered that developing sustainability does not happen overnight or not even in a year, but is an endeavour where even small steps count.

Learning in the context of sustainability is an open-ended and transformative process that needs to be grounded in the everyday worlds and lives of people and the encounters they have with each other.

(Wals, Hoeven & Blanken 2009, 28)
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**Ympäristöosaajat 2025 - what kind of environmental professionals are needed in 2025?**

_Ympäristöosaajat2025_ is a foresight project aiming to find out what kind of know-how and skills are needed in environmental and energy sectors in Finland in 2025. The results of the project will be used by e.g. education administration and by education providers in planning and development of training and education. The study is not limited to certain professionals or workers, therefore it may provide results for all levels of education: from vocational to higher education.

The skills and know-how needs will be identified by interviewing experts with extensive view and expertise in environmental and energy sectors. In the project scenarios of possible futures based on the interviews are built and then examined by different interest groups.

The project is carried out by SYKLI Environmental School of Finland. Sykli is a national specialised institution for adult further and continuing education and training, consultation and development projects in environmental sector and in environmental issues.

_Ympäristöosaajat2025_ project is funded by the Finnish National Board of Education.

The project started in December 2009 and continues until March 2012.

First challenge of the project was to define environmental sector as there is no one official or established classification. As environmental issues (e.g. material or energy efficiency) are more and more integrated in the other sectors, like construction, the boundaries between environmental and other sectors have become blurred. This development is well recognized and often identified as one feature of so called ecological modernization (see e.g. Hajer 1995).

In _Ympäristöosaajat2025_ we decided to investigate the skills and know-how needs on a large perspective: including know-how need in traditional environmental sectors and also other sectors where emerging needs are identified by interviewees.

The foresight method used in the project is Delfoi, where first round of data collection is carried out by interviews and second round by questionnaires. In _Ympäristöosaajat2025_ thirty five experts representing the environmental and energy sectors are interviewed in autumn 2010. After an analysis of the interviews the second round of data collection is carried out among the expert panel by a questionnaire in spring 2011. In the second round the experts are given an opportunity to give commentaries on statements and arguments.

Keywords: know-how needs, environmental sector, foresight project
of other members of the panel. All materials are treated confidentially so the arguments remain anonymous for the members of the panel.

The selection of the expert panel being methodically crucial was carried out with a strict criteria based on the wide expertise, experience and visions about the future development of the environmental and energy sectors. In the composition of the panel the care was taken to ensure versatile aspects by choosing representatives of private companies, R&D organizations, administration, social and natural sciences, technology and economics. Regional balance was also pursued.

The panel of interviewees was chosen in the cooperation of the expert group of the project and the steering group in which the following organizations are represented: Finnish Environment Institute (SYKE), MOTIVA, Helsinki University’s Ruralia Institute, Aalto University, Finnish Meteorological Institute, Finnish Water and Waste Water Works Association (FIWA), University of Turku, Finland Futures Research Center, Green Net Finland ry, National Board of Education, The Association of Environmental Enterprises, Ministry of Employment and Economy, Ministry of the Environment, Helsinki University, Department of Environmental Sciences, Dodo ry (NGO) and SYKLI Environmental School of Finland.

The interview is semi-structured including both open questions and some questions where the interviewees are asked to evaluate numerically the significance of given aspects. The three main themes of the interviews are:

1. What is the world like in 2025?
   What are the most significant changes and driving forces in the perspective of the environmental and energy sectors?

2. What kind of workers and professionals are needed in 2025?
   What kind of know-how and skills are needed in the environmental and energy sectors?
   What kind of environmental know-how and skills are needed in other sectors?
   What kind of skills and know-how is needed in different professions?

3. How should the needed know-how and skills be provided?
   What kind of education and training is needed?

SOME PRELIMINARY OBSERVATIONS OF THE INTERVIEWS

As the study is still on the phase of collecting the data by interviews it is too early to describe results or conclusions about the know-how needs or requirements to the education. However, some preliminary observations and notices picked up from the material are given below.

1. All workers and professionals need environmental skills
   In 2025 environmental know-how and skills should be a part of every profession. Sustainable development and environmental issues, e.g. material and energy efficiency should be mainstreamed into all existing qualifications and all education and training systems.

2. Wider know-how for environmental specialists
   In 2025 environmental specialist need new skills: system orientation, mastering large entities and broad expertise. Specialists should have good holistic understanding of ecological, technological, economical and
social systems and interaction between and within these systems.

3) More skills to apply environmental know-how in practice

Environmental experts need good communications skills and also a good practical orientation to be able to participate in problem solving and to apply environmental know-how in different sectors and situations. This requires understanding of the needs of different target groups and local conditions. The role of the environmental specialist will be more like a consultant and a partner instead of an expert.

4) New thinking and innovations are needed

Due to climate change and other environmental challenges profound changes are needed in technological, social and economical systems. This requires totally new thinking and new solutions also on system levels. New innovations should also be tested and implemented in much faster cycle. Therefore innovation and research policy should be courageous and failures should be also allowed.

CONCLUSIONS

What kind of requirements and challenges do these identified new know-how needs put to the education?

The most profound challenge is integrating sustainability and environmental issues into all degrees, qualifications and education. All sectors and branches of science should identify and define their specific sustainability aspects and integrate them into education.

One challenge concerning all education and research is the need of new thinking and new innovations. The educational establishments should promote and encourage new ways of solving problems and new system level innovations. They should also hasten the cycle from research to implementation and testing in practice.

The higher education of environmental experts should also adapt to the new know-how need. The education of environmental experts should be more interdisciplinary including ecological, technological and economical aspects. These experts should also get good communication skills and practical orientation so they can apply their knowledge in different circumstances. Building this kind of versatile and wide know-how and understanding often requires also strong practical experience and can be difficult to obtain merely via academic studies. Perhaps practical experience e.g. working on different sectors and in different roles could be recognised and acknowledged also within some further degrees, according to the idea of lifelong learning.

At European level CEDEFOP (European Centre for the Development of Vocational Training) has investigated skills needs caused by greening the economy contributing to the Europe 2020 strategy in which sustainable growth means building a resource-efficient and competitive economy. According to the latest, wide study green restructuring generates demand for new skills as existing producers change activities towards new markets and products. The most important examples are the automotive sector and shipbuilding. There is also a demand for new competencies especially in the energy sector. The main need, however, is to revise and upgrade the skills of existing workers, such as workers for insulating and renovating buildings to improve energy efficiency.
REFERENCES
Implementation challenges and possibilities of global responsibility in higher education

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Keywords: Global responsibility, sustainable development, higher education, evaluation, development

As part of the project “Education for Global Responsibility” funded by the Finnish Ministry of Education the development and evaluation tools for promoting global responsibility and sustainable development in higher education institutions were developed. The main aim was to prepare tools for higher education institutions in Finland to enhance actions for global responsibility and sustainability in education, research and development as well as in management and everyday practices. The other aim was to develop a coherent evaluation system to be used in evaluating the role of responsibility and sustainable development in higher education institutions. In this article I introduce this development and evaluation system developed in the project. At first the main political guidelines behind the project are presented. The results of the project are published in the book “Globaalivastuu ja kestävä kehitys koulutuksessa – kehittämisen ja seurannan tietopohja” (Virtanen & Kaivola 2009).

INTRODUCTION
As part of the large project “Growing to Global Responsibility” (2007-2009, funded by the Finnish Ministry of Education) the tools to develop, monitor and evaluate global responsibility and sustainable development in higher education institutions were developed. The main aim of the subproject was to produce methods to promote the role and meaning of global responsibility and sustainability in all actions relevant at universities. The other aim was to develop a coherent monitoring and evaluation system with relevant criteria and indicators to be used when evaluating the role of global responsibility and sustainability in Finnish higher education institutions.

In this article I first describe shortly the political background which sets up implementation challenges to promote global responsibility in higher education. Secondly, I introduce the development process of the project and its main results as an example of the implementation possibilities of global responsibility in higher education. As conclusion I present some viewpoints of practical implementation of the results.
IMPLEMENTATION CHALLENGES OF GLOBAL RESPONSIBILITY IN HIGHER EDUCATION – POLITICAL BACKGROUND

The implementation challenges and, thus, a general framework of the project is based on the global, regional and national political definitions, resolutions and strategies to promote global responsibility and sustainable development in higher education and wider in societies. Internationally, regionally and nationally many policies have been launched to promote global development issues and sustainability targets at higher educational level. Figure 1 shows the main political framework of this development project.

Globally remarkable is an international resolution “United Nations Decade of Education for Sustainable Development (DESD) 2005-2014” that aims to promote sustainable development in education worldwide. DESD tries to integrate the principles, values and practices of sustainable development into all aspects of education and learning, in order to address the social, economic, cultural and environmental problems faced in the 21st century. The United Nations Educational, Scientific and Cultural Organization (UNESCO) is the lead agency as a coordinator of the Decade.

The Millennium Development Goals (MDGs) constitute another globally important framework for the implementation need of global responsibility issues in higher education. MDGs are based on the actions and targets included in the Millennium Declaration adopted by 189 nations in 2000. The Declaration was adopted to reduce poverty, improve health and promote peace, human rights, gender equality and environmental sustainability, and based on these eight MDGs were defined.

Baltic Sea region is an important cooperation area for Finnish higher education institutions. Baltic Sea region has been acting to-

Figure 1. Political framework.
wards sustainability on a political level since 1998, when Baltic 21 Programme was launched. Baltic 21 Education sub-programme forms a sectoral programme taken into consideration at educational organizations in the region. The aim of the programme is to develop the educational systems in the region in a way that various dimensions of sustainable development will become a permanent element of education (An Agenda 21 for the Baltic Sea Region Sector Report – Education (Baltic 21E) 2002).

In Finnish national strategy for sustainable development one target is education that will in future include information and teaching concerning the formation of values and attitudes as well as sustainable choices. In addition, one of the aims in the strategy is that Finland should be a global actor for responsibility, and therefore education should provide skills for world citizenship and widen the perspective on environmental and development issues for more just distribution of well-being (Towards sustainable choices... 2006).

The committee on education for sustainable development set up by the Finnish Ministry of Education wrote a launching plan for the Finnish Baltic 21E Programme in 2002. In order to enhance the targets set by UN DESD and Baltic 21E programme, the Finnish Ministry of Education launched a national plan for the UN Decade of Education for Sustainable Development in 2006 (Sustainable development in education... 2006). The vision in the strategy is that all individuals can contribute to sustainable development which satisfies the needs of today’s populations without jeopardizing the possibilities of future generations to satisfy their needs. The promotion of ESD is based on a holistic view of development which addresses to ecological, economic, social and cultural sustainability. In addition, the strategy focuses on the importance of values, global ethics and the problems underlying in intra and inter generality.

The national Strategy for the Internationalization of Higher Education Institutions was launched in 2009. The strategy sets five main objectives, and one of them is to heightened global responsibility in higher education. According to the strategy promotion of global responsibility aims that Finnish higher education institutions utilize their research and expertise to solve global problems and to consolidate competence in developing countries. The activities of higher education institutions should be ethically sustainable and support student prerequisites to function in a global environment and understand their activities in a global context (Strategy for the Internationalization... 2009, 5).

All of these strategies – not forgetting many other important strategies and the general aim to transform our societies towards more sustainable and responsible future – have been behind the development project described next.

Implementation possibilities of global responsibility in higher education – results of the development work

The aim of the development project was to prepare a coherent system to develop, evaluate and monitor global responsibility and sustainable development in higher education institutions. The methodology of the project is based on constructive, collaborative, transformative, integrative and holistic approach. Constructive approach means that the project produced new ideas how to connect global responsibility issues to higher education. By collaboration it is meant that many experts in the field took part in the development process. The project as such was transformative by its nature as the idea was to encourage change in the institutions of higher education. Integrative and holistic approaches mean that the structure of the development and evalua-
tion system was based on, first of all, to cover all activities, teaching and learning, research and development, management and everyday practices and organizational culture in higher education institutions.

The development process was realized according to the constructive research approach (Lukka 2000; see Figure 2). The main problem was: how to promote and evaluate the role of global responsibility and sustainable development in higher education institutions. After the definition of the problem the process was realized according to the methodology by collecting the theoretical literature of the theme. After that, the preliminary model was constructed and tested at eight universities of higher education in Finland. The results of the piloting were analyzed basing on theoretical framework and the system to develop, evaluate and monitor global responsibility and sustainable development in higher education institutions was finalized. As conclusion the results were published (Virtanen & Kaivola 2009) and presented in seminars nationally and internationally.

As a result of the project the system to enhance and evaluate the meaning of global responsibility and sustainable development at higher education institutions was constructed. The system includes the aims of global responsibility and sustainable development and criteria and indicators for evaluation and monitoring. The criteria and indicators are useful for self-evaluation as well as for national evaluation. In addition, the final report includes theoretical starting points, description of the development process, results of the piloting and the methods and tools to promote global responsibility and sustainable development at higher education.

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<tr>
<th>Research and development process according to the theory of constructive research approach (Lukka 2000):</th>
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<tr>
<td>1. Find a practically relevant problem</td>
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<td>2. Acquiring a practical and theoretical understanding of the theme</td>
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<td>3. Innovative theoretical solutions and practical construction</td>
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<td>4. Testing the construction</td>
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<td>5. Identifying and analysing theoretical contribution</td>
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<td>6. Finalizing the construction and defining practical contribution</td>
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| Research and development process of the project: |
|-------------------------------------------------
| 1. How to promote and evaluate the role of global responsibility and sustainable development in the institutions of higher education? |
| 2. Gathering partners and research group, analysing the existing theoretical literature concerning ESD, indicators and other relevant themes |
| 3. Constructing the responsibility indicator system |
| 4. Testing the system at the institutions of higher education in Finland |
| 5. Analysing the pilot results and connecting the results to the theory |
| 6. Formulating the development and evaluation system of global responsibility and sustainable development for IHEs and preparing a report |

Figure 2. Development process of the project comparing to the theory of constructive research approach.
The aims of global responsibility and sustainable development are mostly based on strategic definitions but also on the idea of “best practices” (Table 1). Thus, the aims constitute a “vision” of the ideal situation in terms of global responsibility and sustainable development. However, these national aims need reconciliation to local conditions and, for instance, university’s own objectives, vision and actions.

The criteria and indicators are based on the structure of quality assurance system assimilated in Finland. Thus, the system includes criteria at four level (absent, emerging, developing, advanced) describing the development situation in order to promote global responsibility. The system included at first 11 indicators parallel to the quality assurance system. After later developing the aims and the indicators were systematized and combined as being seven at the new system. Table 2 describes as an example of one indicator dealing with education at degree programme level.

Table 1. Aims of global responsibility in higher education institution.

<table>
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<tr>
<th>Aim</th>
<th>Description</th>
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<tr>
<td>Aim 1.</td>
<td>Global responsibility is included in values, objectives and planning processes in higher education institution. Actors and responsibilities are specified and documented.</td>
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<td>Aim 2.</td>
<td>Global responsibility is integrated in curricula as a pedagogical approach and as specific study courses.</td>
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<tr>
<td>Aim 3.</td>
<td>Promotion of global responsibility is integrated in research, development and innovation practices and strategies. Projects promote global responsibility and sustainable development.</td>
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<td>Aim 4.</td>
<td>Higher education institution promotes proactively and systematically global responsibility among stakeholders and wider in society.</td>
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<td>Aim 5.</td>
<td>Staff and students participate in promoting global responsibility in everyday practices. The operational culture supports global responsibility and learning for sustainable development. Access to the information relevant to global responsibility is assured.</td>
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<td>Aim 6.</td>
<td>Higher education institution has a system to promote global responsibility and sustainable development in all activities. Monitoring, evaluation and communication of the progress concerning global responsibility is systematic and transparent.</td>
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<td>Aim 7.</td>
<td>Higher education institution is conscious of its own environmental impacts and carbon footprint and develops activities towards ecoefficiency.</td>
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Table 2. An example of an indicator and criteria developed in the project.

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<th>Level</th>
<th>Criteria</th>
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<tr>
<td>Absent</td>
<td>Issues of responsibility (global responsibility, sustainable development) is not included in curriculum</td>
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<tr>
<td>Emerging</td>
<td>Issues of responsibility (global responsibility, sustainable development) is included in curriculum randomly</td>
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<tr>
<td>Developing</td>
<td>Curriculum includes some study courses that promotes the issues of responsibility (global responsibility, sustainable development) and/or responsibility is partly integrated in curriculum</td>
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<tr>
<td>Advanced</td>
<td>Issues of responsibility (global responsibility, sustainable development) is included systematically in curriculum and specific study courses concerning the issues of responsibility are organised. Pedagogical solutions promote learning for responsibility (knowledge, skills, attitudes).</td>
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CONCLUSIONS

As conclusion I could say that one of the significances of this development process and its results is that the system to promote and evaluate global responsibility and sustainable development at higher education institutions offers great support for universities that have desire but not enough competences to promote global responsible and sustainable development inclusive all university activities. In addition, by implementing the evaluation system the monitoring of worthwhile information concerning global responsibility becomes possible nationally. For instance, the system enables the collection of data for international follow-ups, such as how the implementation of the United Nations Decade of Education for Sustainable Development has been actualized. The development process itself was collaborative and many experts in the field of global responsibility, quality assurance and sustainable development participated in the project. As such one conclusion of the development project was to open minds and encourage and promote new innovative ways to think, feel and behave in terms to promote global responsibility and sustainable development.

REFERENCES


