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THE ROLE OF UNIVERSITIES IN SUSTAINABILITY EDUCATION

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ABSTRACT

Sustainability is one of the most pressing issues society faces today — specifically the unsustainable nature of so many of human practices. Yet, almost paradoxically, this situation offers significant opportunities. Our current methods of production and consumption are simply not sustainable in the long term and so, for the purpose of saving the environment, the behaviour of both consumers and producers needs to change. Education can foster these behavioural changes. Sustainability is becoming the focus of much environmental education, and emphasis is shifting from traditional learning styles to a search for practical solutions. Sustainability has become a general orientation for learning. However, education in sustainability is only just now emerging despite decades of progress in recognising the importance of sustainable development. It is playing an increasingly active role in the field. This paper examines the current situation, the trends in educational activity, and the different approaches of universities. Our research reveals different methods and results from the universities analysed. Effective education can produce a change in society's attitudes, values, and actions, and the focus on education for sustainability is a key element in the creation of sustainability-focused attitudes and values. University activities in community environmental education are very useful for raising environmental awareness and helping to raise public understanding of how relevant practices are dynamic factors in the shaping of a new sustainable future. Universities can and should produce graduates with the values, skills, and knowledge to address sustainability and sustainable development. They have a responsibility to define and facilitate sustainable development within their teaching and learning. Universities should be a major contributor to society's efforts to achieve sustainability.
Keywords: sustainability, sustainability education, sustainability-focused attitudes, role of universities

SUSTAINABILITY EDUCATION (SE)

The Millennium Ecosystem Assessment (MEA) warns that the Earth and its population are in a time of severe crisis characterised by pollution, climate change, invasive species, over-exploitation, habitat change and the loss of ecosystem services. If we want to save the environment, we must to change our behaviour is affected by values and attitudes. There is a general consensus on the notion of education as an important tool in achieving change and sustainable development (*Mochizuki and Fadeeva*, 2010). To manage environmental problems we need to change human behaviour – namely, change culture. We must do more than raise awareness of opportunities; we must do it in a reasonable way. The challenge faced by human requires rethinking of our behaviour, education in many aspects of way of life.

Sustainability is becoming the new point in environmental education, and emphasis is shifting from the traditional learning style to another solution. The issue of education in sustainability has developed from studying nature to taking a new look at the way we think, in which measures to sustain standards of living are pursued and environmental burdens reduced. Many consumers have a strong desire to be eco-friendly, but cannot, due to a lack of practical information. Education in sustainability and awareness for communities can play a remarkable role in satisfying information needs, but the biggest problem lies with resource constraints. In the process of globalization relationships such as people-nature, people-groups, individuals-social institutions need to be addressed in education.

Agenda 21 was the first international document that mentioned sustainability education as a tool to achieve sustainable development. *UNESCO* (2005) defined essential characteristics of the education for sustainable development. All of them deserve attention, but we emphasize that education for sustainable development is interdisciplinary, locally relevant and culturally appropriate, and deals with the well being of all three realms of sustainability (environment, society and economy) and builds civil capacity for community-based decision-making, social tolerance, environmental stewardship, adaptable workforce and quality of life (*UNESCO*, 2005).

The sustainability education challenges basic assumptions, practices, and institutions of established disciplines. The sustainability education challenges both, what is taught in and how (*Cortese*, 2003). If our graduates are to cope creatively and successfully with society's most difficult problems, they must be exposed as students to those problems, and higher education needs to find innovative ways to develop students' capabilities (*Rowe*, 2007). Literature on education for sustainability calls for pedagogical innovations that provide interactive, experiential and transformative learning (*Steinemann*, 2003; *Rowe*, 2007; *Sipos et al.*, 2008). *UNESCO*'s (2009) Bonn Declaration calls for building the capacity for knowledge into action for sustainability, and calls for curricula to be oriented to meet this goal.

Pollution prevention, sustainable design and better (cleaner) production demonstrate our main value through industrial applications. It is, therefore, more important for students to have direct personal experience of environmental fields. The value of pollution prevention activity depends on a number of variables (e.g. the local community, regulatory drivers, technology, labour costs). The best solution depends on how well the student identifies the variables and gathers related data and how these data can be applied. Thus, learning how to identify and analyse these variables is an essential skill for implementing sustainable development.

Effective education can produce a change in societal attitudes, values and actions. The focus on education for sustainability is a key element in creating sustainability-focused attitudes and values. Providing descriptions of the technologies and applications, then teaching the students how to recognise and use the latest innovations and how to evaluate new technologies are key topics in any sustainability courses. The students learn the mechanics of identifying, analysing and creating sustainability in the classroom. *Fowler and Engel-Cox* (2006) found that, until the students have practical experience applying pollution prevention and

sustainable design recommendations to a real-life situation, they do not understand the complexity of the process. Although performing environmental assessments for real organisations is likely to involve more effort for both teacher and student than a traditional lecture-based course, the authors believe that the experiential learning activity is the more valuable investment for the students, community organisation and the university.

There is a clear trend towards education in sustainable development education in both the school system and the corporate sector. The intention of businesses which guide such educational and awareness activities in their communities is mainly to help stakeholders understand their corporate activities and so enhance their reputation. Some companies publish PR material which includes environmental advice – good also from the promotional point of view. In addition, if education is incorporated into education concerning sustainability, business can contribute more than it has done to date.

At the end of this chapter, we can define what the sustainability education means. Sustainability education is a compound of different themes to do with the environment, society, and economy in order to make sure that we leave liveable planet behind for the next generation. The sustainability education refers to a new form of education to teach student to live differently, to let them know they are the part of this world, understand their impacts, and promote to change their lifestyle and behaviour. Education will help us to achieve society's environmental goals (*Keene and Blumstein*, 2010). Sustainability education can contribute to economic progress, stability, environmental quality and societal advance.

Solutions – what can be the university's roles – theoretical framework

At present governments, employers are stepping increasingly forward to sustainability. However, fundamental skill, primarily literacy for sustainability, is being neglected. Whatever humans do, their activities require literacy practices, and it is essential to be aware of principles, opportunities and solutions. With awareness they can be critical of function of the world and can work solutions which help to achieve goals of sustainability.

The sustainability education helps students increase their understanding of sustainability problems, complement their methodological competence in applying problem solving approaches and gain hands-on experiences. Exploring, evaluating approaches makes students aware of the powerful role of values, resources, attitudes. Competence approaches are very useful and important. *Brundiers et al.* (2010) summarising key competencies in sustainability identify three clusters of them:

- Strategic knowledge, which, according to the authors, integrates systemic, anticipatory, normative, and action-oriented competencies. The cluster includes competence in analyzing and understanding the status quo (current state) and past developments (history); creating future scenarios and sustainability visions; assessing current, past, and future states against value-laden principles of sustainability; and to developing strategies to move from the current state towards a sustainable future.

- Practical knowledge involves competencies necessary for linking knowledge and action for sustainable development to bridge the knowledge-action gap. So, they are mainly implementation skills.
- The collaborative cluster involves competencies necessary to work in teams and in different knowledge communities and it includes among others competence to collaborate with experts from academia, industry, government, and civil society.

Universities can and should apply radical innovations in their educational methods, including curriculum, teaching, research and other services. Sustainability might be comprehended in different ways in different economic and cultural options, accordingly it is impossible define the appropriate competences for sustainability education. Without list of competences, universities need a deliberative and situated process of first specifying competences, and then articulating them in their educational programmes. *Podger et al.* (2010) having taken a different starting point argue for the importance of dispositional thinking in sustainability education. Dispositional thinking in this sense involves the ability to think critically integrating multiple experiences and perspectives. This is why it is suggested that higher order dispositions may be central to education for sustainability as a means of understanding the development of sustainable habits of mind. So, the authors focus on personal and social competences as the key personal qualities or virtues associated with a kind of consciousness, essential for change towards sustainability. Generic skills represent orientations towards studies, work, social interactions which open people's minds to different ways of looking at the world (*Podger et al.,* 2010). Their paper summarizes that formal learning institution to extend the agenda to comprehend the development of whole person education which cultivate critical moral consciousness. Besides, *Parker* (2010) points out that not just the intention but knowledge supports moral agency.

Dispositional thinking involves the ability to think critically integrating multiple experiences and perspectives (*Facione et al.*, 1995). Sustainability itself can be understood as a disposition towards human rights, peace, active citizenship, participatory democracy, conservation and ecological, social, and economic justice (*Sterling*, 2001). *Taylor* (2000) identifies the necessary for individuals and societies to move towards mutual understanding. *Sterling* (2001) argues that a special worldview is elemental to guide the transformation of education system, and the agents for change including teachers and students. This thinking emphasizes that choices are open and choice and action are often dependent, in addition this supports discovery of deeper themes and structures behind events.

Glasser (2004) points to the need for education that integrates reason, emotion and promotes "emotional maturity". He discusses that the pedagogy required for a sustainable world needs to foster principled action, by deepening existing concerns and helping make actions more consistent with concerns. *Orr* (2004) identifies clear relationship between sustainability and virtue. *Fien* (2001) argues that educational goal to sustainability should include concern for environmental, responsibility for sustainability, and knowledge and skills to contribute to sustainable development. That is to say: who we are, how we relate to others, what our purpose is as

individuals and as society. Research shows that familial and educational environments tend to build an increasingly responsible sense of moral identity (*Daloz et al.*, 1996). *Mustakova-Possardt*'s research (2004) shows that without the cultivation of moral motivation, critical thinking does not lead automatically to socially responsible actions.

There is a European Commission-funded project (Comenium-2-project) to develop a framework to integrate education for sustainable development in the teacher training curriculum. This project defined five competency domains: knowledge; system thinking; emotions; ethics and values; and actions. Many efforts try to define competences for education of sustainable development. Good example is the Definition and Selection of Key Competencies (DeSeCo) project, which specify competencies for higher education. The TUNING project, a European survey involving hundred European higher education institutions, proposed competencies to be developed through university degree programmes (*TUNING Educational Structures in Europe*, 2007). In addition to the efforts of UNECE, OECD and European Union to specify competences, there are important initiatives in the USA to reorient higher education towards sustainability based partly on competence approaches. For example, the 2008 Higher Education Sustainability Act authorised a $50 million grant programme at the Department of Education that annually supports hundreds projects to carry out faculty, disseminate good practices, case studies, educational guidelines, develop analytical tools.

Higher education institutions must to inspire students to change their attitudes, values or behaviour. We were arguing that university can improve the quality of education and therefore quality of life for all people.

Asks and answers about roles of university

The university means concepts of freedom of access to knowledge. The university is not just an indifferent reflection of knowledge, but set the guidelines and standards for development. However, while international declarations may provide useful publicity to encourage progress, they are not sufficient to change institutional and disciplinary practices in higher education (*Bekessy et al.*, 2007).

University's first function is providing education and training. Second, they provide professional training. Thirdly, since they are research institutions, responsible for carrying out research in a broad extent of disciplines, including interdisciplinary work. Fourth, they play significant role in regional development. And fifth, they have a social function to promote the intellectual and social development of society.

Education can build a relationship between knowledge and ecology which would influence their lifestyle. But there are little attention has been given to how to teach adequate skills. What should be taught, what should be learned, what abilities for acting, which concepts and problem solving strategies should have acquired as a learning process? What kind of complementary elements might we need in order to generate a positive cycle of change for sustainability? An environmental education programme will produce different outcomes since we have no clear goals or objectives. Education and social marketing run the risk of teaching wrong behaviour

and practice, but, if we do not know what works, how can we know what and how to teach? How university educational programmes can better preparation students to suitably deal with complex environmental issues and contribute to sustainable development. With environmental education we can cause irreparable damage to the environmental system when there is no evidence of environmental benefit.

Students and teachers try to focus on sustainability through challenge conventional methods on education and require new modes for integrative learning. Efforts to adjust curricula to meet these challenges are increasingly common (*Scholz and Tietje*, 2002; *Steiner and Posch,* 2006). These can be programme, working groups, simulations, or case studies. Many of them focus researches, real life learning, and promote creative, self-regulated learning. They need to transport theoretical knowledge into the practice. The problem is the disciplinary gaps, are rooted in differences between scientific paradigm and languages and the real world. To develop sustainable solutions for complex issues environmental scientists need boundary crossing skills next to domain specific knowledge and social skills (*Fortuin and Bush,* 2010). The scientists need to be able to intersect the barriers between theory and practice. To how to cross these barriers is an ongoing debate.

Fieldwork is very important to develop students' ability to integrate classroom based knowledge and to facilitate communication between participants (*Scholz and Tietje*, 2002; *Steiner and Posch*, 2006). Fieldwork emphasizes the importance of good planning, management and effective decision-making skills. *Brundiers et al.* (2010) words, 'bringing real-world issues in classroom' contributes the right way for sustainability education. Active learning means students are actively engaged rather than just gathering information.

What can be the teachers' role? They can stimulate to think critically, to act adequately, and to make properly decisions by asking questions and providing tools. Facilitation rather than lecturing can be better methods. They need to expose the complexity of environmental and societal problems to students. Despite the numerous discussions about evaluation, the 'more publications' system is dominant strategy for advancement in universities. Professors need to actively engage in teaching and services. Transforming and transdisciplinary learning should be supported and encouraged. University community relationships are relevant to incorporate community into the classrooms and everyday activities in universities. *Fortuin and Bush* (2010) reveal that realize that one should cross boundaries to solve problems could be one of the most important elements in the education.

Janet Moore (2005) describes a set of recommendations for planning sustainability education programs from case study of University of British Columbia (UBC). She suggests seven categories of recommendations that will aid universities to achieve goals and objectives of sustainability. These recommendations promote and support the practice of sustainability education, but do not concern campus operations, practices. These goals are: infuse sustainability in all decisions; promote and practice collaboration; promote and practice transdisciplinarity; focus on personal social sustainability; integration of planning, decision making and evaluation; integration of research, service and teaching; create space for pedagogical transformation.

Sustainable university has three main characteristics. The university is self sustaining. It contributes to a sustainable quality of human life in a society. The university contributes to the design of human activities maintain the biosphere. Universities need to be leaders to prevent ecological problems, and to create sustainable economy and society. They can generate sustainability education programs and sustainable university communities. Universities are in an exceptional position to address sustainability challenge to shape minds, attitudes, values. Not only universities can educate students to sustainability, but they are able to teach interdisciplinary knowledge related to sustainability. However universities can ensure ecological literacy, because students are not learning enough about how to live day by day. Even universities can institutionalize sustainable practices on their campuses, for example energy and water use reduction, waste management, create sustainable alternatives to transit, to eat, green buildings. Universities can contribute directly to sustainability with their research programs.

There are examples of how universities in different parts of the World are trying to facilitate students to develop competencies for sustainability. In other words, how they translate the concept of competence theory into actual learning activities, courses, programmes. There are many good examples of sustainability being incorporated into the curriculum, and other activities. Sustainability has become a general orientation for learning. But the outcome is very complex and unpredictable.

Several studies reported a positive relationship between higher education and environmental concern. Moreover, education has a stronger effect on environmental concern than has age, because, not just the intention but the knowledge that supports effective function. Universities need for better understanding of, and innovations to sustainability challenges.

The purpose of this paper is to analyze of how universities are trying to foster students and staffs to develop a range of competences for sustainability. How teachers can translate the concept of competences into learning activities, courses and programmes. Change to more creative pedagogies, attention to real-world learning has led to development of knowledge and skills of the students.

Notwithstanding numerous international and local commitments to sustainability, small percentage of student is engaged in sustainability in campuses.

Number one – the best practice

The *University of British Columbia* (UBC) (Vancouver, British Columbia, Canada) is the third largest university in Canada, with over 32.000 undergraduates and 7.300 graduate students. UBC awards 68 types of undergraduate and graduate degree from 11 diverse faculties and is ranked 38th in the 2010 Webometrics Ranking of World's Universities.

In 1990, UBC signed the Talloires Declaration, an international commitment to environmental sustainability in higher education. The Talloires Declaration outlines an action plan for incorporating sustainability and environmental literacy into teaching, research, operations and outreach practices of the university. In 1991, UBC signed the Halifax Declaration, another commitment to the importance of

university leadership on the path to sustainable development. In 1997, UBC created a Sustainable Development Policy under which all UBC students will be educated in sustainability.

The UBC is a living, learning place in which to explore and apply what sustainability means. To integrate real-world learning opportunities into sustainability programs and faculty can draw on a variety of models, including project and problem-based practice (*Blumenfeld et al.*, 1991; *Barron et al.*, 1998; *Dale and Newman*, 2005) and internship (*Linn et al.*, 2004). Campus as a living laboratory means various opportunities to support the creation and implementation of sustainable practices on campus (e.g. operations, purchasing).

There are numbers of actions, opportunities to raise staff and student awareness, including website, blog, sustainability office, internships, and work possibilities. Students come with different backgrounds. Therefore are various programs, opportunities, and website, discusses.

Wilmot (2009) highlights that field work can be the one of the most valuable learning experiences for students. She outlines numerous ways in which field work generate greater student and staff awareness and action to reduce potential impacts. These examples emphasize a practical pedagogy linking aspects of environmental impacts through everyday choices and actions, and built stronger competencies in environmental responsibility. Their active, practical and collaborative methods can produce positive student feedback and demand form students for more solutions as well. Any activities that can facilitate and achieve reductions of the environmental impact also generate a further sustainability premium for the University, helping to amend sustainability performance. UBC links academic, research, and operational sustainability to become a living laboratory. The University creates sustainability teaching and learning in and across all disciplines, and encourages students, staff, and faculty to carry daily sustainability practices out beyond the campus.

They make UBC a living laboratory in environmental sustainability by combining its sustainability leadership in teaching, research, and operations. For example, they established a baseline of the UBC carbon footprint, and they foster social sustainability through teaching, research, and community engagement.
Through campaigns, groups, programmes and events, the University offers many avenues for students to learn about sustainability and participate in one of its core missions. They have waste reduction programmes and climate action initiatives.

Website, Pledge is very useful tools to exchange announcements, to store documents and notions, and to confirm appointments.

The sustainability website (*www.sustain.ubc.ca*, 2011) offers a broad selection of courses to take, research to participate in, experts to consult (sustainability blog), and ways to get involved in campus sustainability (societal conversation). In the Sustainability Pledge, students commit to making more socially and environmentally responsible decisions. The Pledge raises awareness, promotes involvement, and demonstrates the commitment that students have to sustainability on campus. There are over 25 sustainability-related programmes, 350 courses, alternative credit options, and numerous other opportunities, internship, volunteer-run student clubs, and work that engage, inform and connect student to

sustainability challenges, solutions. UBC SEEDS (Social, Ecological, Economic, and Development Studies) is Western Canada's first academic programme to combine the energy and enthusiasm of students, the intellectual capacity of the faculty and the commitment and expertise of staff to integrate sustainability.

The Residence Sustainability Coordinator Programme is an opportunity for students living in residence to lead, inspire, and engage other residence students to find sustainable solutions and create change.

The University participates as a Charter Participant in the Sustainability Tracking, Assessment and Rating System (STARS) programme offered by the Association for the Advancement of Sustainability in Higher Education (AASHE). The STARS programme is designed to: provide a framework for understanding sustainability in all sectors of higher education; to enable meaningful comparisons over time and across institutions using a common set of measurements developed with broad participation from the campus sustainability community; to create incentives for continual improvement toward sustainability; to facilitate information sharing about higher education sustainability practices and performance; and to build a stronger, more diverse campus sustainability community.

The University's long-term goal is to achieve net positive energy on campus through conservation, waste-heat recovery and renewable energy sources. In other words, they aim to produce more energy on campus than is consumed. With these they save money and reduce greenhouse gas emissions.

The University jointed to the *Transition Towns* project that make efforts to reduce the number of cars that travel to and from campus every day - new cycling routes, pedestrian walkways, greenways and a campus shuttle service).

The campus is an ideal living laboratory to discover and demonstrate solutions for waste management. They already reduce, reuse, recycle and responsibly manage their waste. The short term goal is to divert 55% of solid waste from the landfill. The University tries to achieve a net positive water system for the campus. This means they will find innovative ways to consume water more efficiently, harvest rainwater and use technologies to reuse and recycle water on campus. In addition to, they store and exchange clean water and manage storm water.

In 2009, the University prepared its Climate Action Plan for emission reduction. The Plan identifies Greenhouse Gas emissions reductions strategies in numerous areas. UBC is developing a new Energy Management Plan to ensure accountability, maintain energy savings and identify further conservation opportunities. They operate several ambitious energy management programmes that reduce the consumption of resources across campus. They have some projects which deliver alternative energy technologies to minimise the building thermal load and greenhouse gas emissions in new and renewed buildings.

UBC has developed a handful of case studies about its campus operational and institutional sustainability experience. The Sustainable Purchasing Guide helps to purchase more sustainable products and services.

The University's collective efforts make a significant impact and provide positive role modelling on- and off-campus. Every project plays an important role in helping to make the University a sustainable and healthy community.

CONCLUSION

Human need to plan, design and built new forms of system, change attitudes, value sets, and understand natural systems, and our impact on their processes. Then change our learning system to develop technological processes in order to reduce human impacts on natural systems. Beside ecological, social and economic framework takes effect to our Planet. Without understand of this three bottom line, new technologies, new applications will not deliver the anticipated benefits.

The missions of universities are teaching, research and service, no matter how they are put into practice, should be interactive within the university and with society. Universities need for better understanding of, and innovations to sustainability challenges. However there is no universal approach, thereupon methods to sustainability. Every university needs to develop its own curriculum and other activities possibility to achieve goals of sustainability. Transformation, alternative pedagogy, new evaluative system and change leaders are needed at universities. The overall goals would be to create tools to integrate sustainability in communities.

Sustainability embraces more complex issues than transportation choices and recycling, including social, ecological, economic, political and spiritual components. Sustainability also embraces how things happen — decision-making processes, organisational structures, leadership strategies, strategic planning initiatives and collaboratively envisioning the future, and there are good examples from university-level sustainability education programmes.

Graduates leave university with understanding of the concept of sustainability, and with relevant knowledge and skills to apply sustainable development. University's function is not only teaching, but also contributing to national economic and social development, preservation of cultural heritage, values, and the protection of the environment.

There is correlation between the sustainability level of universities and the environmental awareness level of students and staff. Hence universities have unique task to develop skill level in their graduates that prepares them to confront environmental, social and economical complex issues.

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