INTEGRATING THE CONCEPT OF SUSTAINABLE DEVELOPMENT INTO ENGLISH LANGUAGE CURRICULUM OF ENVIRONMENTAL ENGINEERING SCIENCES

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The article attempts to present and discuss practical implementation of the objectives of the project *Sustainable Living Environment* carried out at the Faculty of Environmental Engineering of Vilnius Gediminas Technical University (VGTU). The project is a response to a commonly articulated and acknowledged need to infuse sustainable development principles into traditional curricula of all levels of education to pursue goals of sustainable development. Thus, the present study aims to take an account of the increasing role of Education for Sustainable Development (ESD) in a globalized world and define how the implimentation of the ESD objectives changes teaching/learning patterns at a university of technology. Moreover, it offers an interdisciplinary curriculum scheme for teaching/learning English as a second language for Environmental Engineering as an efficient means to integrate principles of sustainable development into language classroom.

Keywords: sustainable development, education for sustainable development, curriculum, learning, teaching, integration, English language.

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Introduction

The Relevance of the Research. A contemporary globalized society is facing a vast range of environmental and economical problems. An increasing awareness of the need to protect the environment has placed the concept of sustainable development on the global agenda. Thus a shift to sustainability has been repeatedly proclaimed and endorsed by the European Union and UNESCO as to tackle the challenges which are predominantly environmental. The World Summit on Sustainable Development in Johannesburg put in place the United Nations Decade of Education for Sustainable Development (DESD), spanning from 2005 to 2014. For this reason, the last decade has been a period of new demands on education institutions. They have been urged to integrate the concept of sustainable development into education processes order to raise public awareness and understanding of the issue. A number of persuasive arguments have been expressed to support ESD:

A basic premise of education for sustainability is that just as there is a wholeness and interdependence to life in all its forms, so must there be a unity and wholeness to efforts to understand it and ensure its continuation. This calls for both interdisciplinary inquiry and action. It does not, of course, imply an end to work within traditional disciplines. A disciplinary focus is often helpful, even necessary, in allowing the depth of inquiry needed for major breakthroughs and discoveries (UNESCO 1997).

As a response to the requirement to revise university curricula and study contents according to the European guidelines in terms of sustainable development, VGTU has recently participated in the project on *Sustainable Living Environment*. In order to re-orientate study programmes of Environmental Engineering sciences towards sustainable development and to introduce more integral study modules, existing study programmes have been revised. It has been acknowledged that the principles of sustainable development should be taught through different subjects. Furthermore, a need to revise existing curriculum of English language as a second language has also been identified.

The Aim of the Study. The paper aims to overview ESD principles and discuss effects of their application into the process of English language teaching as a second language for specific purposes at a university of technology. Furthermore, the paper seeks to present ESD implementation scheme for English language curriculum aimed at VGTU students of environmental engineering sciences.

The method of the study. There were several methods served in the study. First, a thorough analysis of metodological references and official documents, which have laid the foundation for ESD, was carried out. Second, the theoretical account on the issue was applied to the study to present and discuss practical implementation scheme for integration of ESD into English language curriculum.

The Concept of Sustainable Development

Before analyzing the way sustainable development could be infused into English language learning, the conceptual background of sustainable development is necessary. For the first time the expression *sustainable development* was used in 1987 by the World Commission on Environment and Development in its report "Our Common Future". There have been many attempts to define the concept of sustainable development; however, the most widely recognized definition is the United Nation's suggested definition from Brundtland Report: Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs. "It contains within it two key concepts:

1. the concept of 'needs', in particular the essential needs of the world's poor, to which overriding priority should be given; and

2. the idea of limitations imposed by the state of technology and social organization on the environment's ability to meet present and future needs." (UNESCO 2005).

Since then, the initial concept of sustainable development with a clear focus on environment has gradually evolved to a broader notion encompassing socioeconomic domain. To put it in other words, the combination of public awareness of sustainable development and reasonable environmental and economic policies has emerged as a must in achieving sustainable future. Ultimately in 2002, the Outcome Document of Johannesburg World Summit on Sustainable Development further elaborated the concept by promoting the pillars of sustainable development – economic development, social development and environment development (see Fig. 1).



Fig. 1. Three components of sustainability

In essence, the environment domain concerns the long-term impact of technological development on the environment and human lives. The economy domain deals with impact on local, national and international economies. The society domain investigates the way people's lives and cultures are affected. As seen in the diagram above, the spheres of concern in the concept of sustainable development are brought under distinct categories; however, it is important to stress that the three pillars are not isolated from each other but rather interdependent and overlapping constituent parts of sustainable development. In order to determine whether something is sustainable or not, all three standards of sustainability must be taken into account. Due to constantly changing conditions of the three domains, sustainable development cannot be treated as a static notion but rather as a process. Therefore, a complex and systematic approach must be employed to address and coordinate sustainable development both at local and global levels.

The European Council adopted a coherent EU Sustainable Development Strategy (EU SDS), which attempts to tackle the challenges of sustainable development. The overall aim of the Strategy is at identifying and developing "actions to enable the EU to achieve a continuous long-term improvement of quality of life through the creation of sustainable communities able to manage and use resources efficiently, able to tap the ecological and social innovation potential of the economy and in the end able to ensure prosperity, environmental protection and social cohesion" (European Commission 2009). The EU SDS acts as a guide for national sustainable development strategies which are designed to ensure systematic integration of sustainable development principles to all national policies and decision making processes.

Education for Sustainable Development

As has been noted before, today the concept of sustainable development encompasses the

spheres which previously were neglected. Education is the area which has been recognized by UNESCO as an integral and vital part of the overall notion of sustainable development. This is due the fact that education is one of the most effective tools to achieve some changes in public values and behavior, which is a must in striving for sustainability: "building the capacity and commitment to build such a sustainable future is, in large part, one of the tasks of education" (UNESCO 2010). Different organizations have expressed their perspectives on what education for sustainability is about. According to President's Council on Sustainable Development, education for sustainability is:

a lifelong learning process that leads to an informed and involved citizenry having the creative problem-solving skills, scientific and social literacy, and commitment to engage in responsible individual and cooperative actions. These actions will help ensure an environmentally sound and economically prosperous future (President's Council on Sustainable Development 1993).

In order to highlight a significant role of education in building sustainable future, the World Summit on Sustainable Development in Johannesburg put in place the United Nations Decade of Education for Sustainable Development (2005–2014). The Decade aims to "integrate the principles, values, and practices of sustainable development into all aspects of education and learning" (UNESCO 2005).

UNESCO is responsible for leading the Decade, raising public awareness on sustainable development for education, as well as coordinating the implementation of sustainable development into national policies and education systems at all levels. Thus, UNESCO has developed an International Implementation Scheme providing some guiding principles which should form a backbone of ESD. This strategic document sets out four thrusts of the Decade:

1. Tackling the problem of low literacy rates by improving access to basic education. It also seeks to reconsider methods, content and quality of basic education. 2. Promoting re-orientation of education programmes by integrating sustainable development into education process. Moreover, it also stresses the need for interdisciplinary approach to learning/teaching.

3. Raising public awareness and understanding of the concept of sustainable development at all levels across the globe.

4. Sharing good practices to educate and train people on tools and methods enabling to implement sustainable development in different learning situations.

Since such a realization is a complex process which involves integrating objectives, concepts and learning experiences of ESD into curricula, naturally, it has become a considerable challenge for educators and education institutions. Therefore, it can only be accomplished by the joint efforts of governments, educators, and educational administrators all working in collaboration to create a comprehensive university/ school policy and curricula.

Interdisciplinary Approach to Education for Sustainable Development

What the previous section amounts to is the assertion that in order to successfully integrate knowledge from different fields, educators should be flexible and open for consultation of specialists from different spheres. They should draw on colleagues from different disciplines to devise an integral model of teaching/learning best suited for a particular study situation. As Prof. XuHuiying puts it, "the interdisciplinary teacher cooperation mean that teachers of different disciplines can work together, planning courses, organizing team-teaching activities, where the subjects are interactive and interdependent".

Before discussing the benefits of interdisciplinary approach, the concept of interdisciplinarity in teaching should be introduced. According to Heidi Hayes Jacobs, interdisciplinary could be definedas" a knowled geviewand curricular approach that consciously applies methodology and language from more thanone discipline to examine a central theme, issue, problem, topic, orexperience" (Jacobs 1989: 8). It offers cross-curriculum teaching model which enables to expand students' understanding.

The International Implementation Scheme of ESD points to interdisciplinary approach as a very efficient tool in re-orienting a university/school curriculum towards sustainability: "Ideally, disciplinary courses with social, economic, or environmental content should be accompanied by interdisciplinary subject matter on sustainability, which draws from a number of content disciplines" (President's Council on Sustainable Development 1993). Thus, interdisciplinary approach to teaching and learning becomes inseparable from ESD. It should be noted that educators are free to employ and combine any teaching strategies to mediate a complex message of sustainability. Nonetheless, interaction with other disciplines helps to go beyond traditional curriculum, which evantually adds to a broader understanding of a subject. Thus, a special attention to how such interdidciplinary approach could be efficiently integrated into curriculum should be given.

In order to ensure efficiency of teaching and learning practices as well as to avoid unnecessary over-load of the curriculum, the International Implementation Scheme stresses that the concept of sustainable development should be infused into subjects or areas of a curriculum in a coherent way rather than adding it as an individual subject. Since sustainable development is relevant to all subjects and areas of a curriculum, the process of integration of the concept is meaningful and natural. ESD employs general educational objectives and, at the same time, emphasizes across-thecurriculum competences, such as, critical and creative thinking, problem solving, decision making, co-operative learning, leadership, and communication skills (UNESCO 2010). These interdisciplinary competences could help bring students to awaraness of existing connections among different diciplines.

It could be suggested that educators should serve interdisciplinarity as a teaching method as well as to set it as an efficient model of team practice for students. In a classroom, the significance of interdisciplinary approach to work could be highlighted through the choice of topics and examples they use, as well as practical tasks that students are to perform.

The Project *Sustainable Living Environment* at Vilnius Gediminas Technical University

The European Commission has been continuously encouraging Member States "to develop more strategic approaches to sharing knowledge and good practice in a bid to stimulate Education for Sustainable Development" (The European Commission 2009). VGTU has recently carried out the project *Sustainable Living Environment* which is a pioneering systematic application of the goals of United Nations Decade of Education for Sustainable Development at the institution.

Execussion of the project consists of different stages, the first of which is identification of the needs. An urgent need to review all study programs at the Faculty of Environmental Engineering was commonly acknowledged. After a thorough revision, the following study modules were selected for renewal: Environmental Protection, Energy for Buildings, Building Services Systems, Urban Engineering, Roads and Railways Engineering, and Geodesy and Cadastre. It was admitted that the existing study modules do not provide a comprehensive approach to sustainable development but rather refer to the issue fragmentally. Consequently, the study programs could not be used to their full potential. Meanwhile, it is generally assumed that the role of universities of technology in pursuing sustainable development could possibly be very significant as they actually contribute to breakthrough innovations. This in turn drives sustainable development. In other words, technologies actually reinforce sustainable development. However, it is important to note that technologies might

also have a negative impact on our living environment, which is another crucial reason to implement ESD principles at universities of technology and in this way lay the foundations for sustainable and "smart" technologies. At the Faculty, it was decided to integrate all six study modules to provide students with an interdisciplinary approach, which in turn could lead to enhancement of learning process efficiency and understanding of the concepts of sustainable development and sustainable living environment.

At the second stage of the project, the implementation structure of a project to refer to specific needs and goals was set out. To achieve this, a peer network was working together to devise a curriculum design which would optimally generate sustainable attitudes among students. Following the guideline of International Implementation Scheme of Education for Sustainable Development, it was agreed neither to offer sustainable developmentas a parallel discipline of the curriculum nor to leave it at the margins of different university subjects. The implementation scheme was set to avoid an isolated perspective to study subjects. First, it was agreed that the concept of sustainable development is to be incorporated into existing study modules. This model ensures the permeation of issues of sustainability into every subject area of the curriculum and their future practical applications into that area. Second, it was decided that the existing study modules had to be joined to introduce an interdisciplinary approach to studies. Third, several new compulsory study subjects embracing general principles of sustainable development in living environment had to be created. Fourth, the study content had to encourage students' social inclusion.

The third stage of the project was devoted for integration of sustainable development into the curriculum and study materials. At this stage, different study modules were renewed or created. Furthermore, participants of the project were responsible for looking at the ideas of the curriculum and using them to create unique study materials which stimulate learning for a sustainable future. Educators from different subject areas worked together to re-orientate the contents of traditional study materials or coursebooks towards sustainability. As one of the outcomes of the project, new study books which address economic, environmental and societal requirements – the three domains comprising sustainable development – were tailored. The course books for different study subjects were designed to help students perceive the interconnectedness of the three domains and problems associated with them and develop their own vision of surrounding contexts.

Integrating Sustainable Development into English Language Curriculum

Previous chapters have examined the concept of sustainable development and its implementation in education in general. This chapter looks more specifically at a practical implementation of ESD into English language curriculum at the Faculty of Environmental Engineering of VGTU.

First of all, it should be stressed that language is a powerful means of communication through which different values and experiences are mediated. What is even more, learning English as a second language is of a particular relevance in a globalized world. The potential of English language learning at university level should not be limited to developing key language skills but rather fully exploited by integrating the ESD principles. English language classroom could be served to encourage students' behavioural changes and develop their competences which are necessary to achieve sustainable development. UNESCO maintains that "Programmes in second language learning provide excellent opportunities to develop a global orientation to studies of sustainability" (UNESCO 2010). Mastering a foreign language gives a new dimension to student's overall learning experience. In other words, learning a foreign language helps to shift learning patterns from local to a global scale and could possibly broaden students' perspectives on the issue of sustainable development in other countries. Foreign language competence is necessary to address global economic, environmental and societal problems, as well as to suggest the best solutions which are tried and tested across the world. Universities of technology are particularly expected to come up with new solutions and innovative technologies that bring progress in sustainable development committmens. Ultimately, teaching and learning English for sustainable development becomes a must at any university of technology, particularly in environmental disciplines and related science and technology fields.

Thus one of the goals of the project Sustainable Living Environment carried out at the Faculty of Environmental Engineering of VGTU was to seek for living environment consciousness in students through English language curriculum. At the initial stage of the project, the need to create a single English language study module as well as a unified study book for undergraduate students of Environmental Protection, Energy for Buildings, Building Services Systems, Urban Engineering, Roads and Railways Engineering, and Geodesy and Cadastre was identified. Naturally, interdisciplinary approach to both the newly tailored study module and the study book was used. By serving this approach, it was sought to transform a conventional English language classroom into a platform where students of the Faculty of Environmental Engineering apart of studying English for specific purposes, could investigate and discuss local and global sustainable theories and develop their language skills.

At the subsequent stage of the project, ESD principles were actually integrated into English language curriculum. First of all, a new study module for English language was introduced. Topics for the study module were carefully selected to address general concerns of all six study programmes in question; however, sustainable development was to be a leading notion threading through all of them. In additition to a new study module, the content of the study materials was also reoriented towards sustainability. At the initial phase of this stage of the project, specialists from key disciplines were brought together to a working group to assist a language teacher by suggesting specialized texts for a study book. Thus a study book *English for Sustanable Environment* is the outcome of collaboration of educators from different disciplines.

The study book, in a similar vein to the study module, sets out sustainable development as a guiding topic which is threading through all the units and activities of the book. This brings specific topics from different disciplines together and prevents their traditional isolation in learning and teaching processes.

From the perspective of the development of foreign language competence, the interdisciplin-

ary model simultaneusly offers a bigger variety of study materials to practise and develop different language skills. It helps to "open" the study materials and class activities for a wider variety of topics and their contextualization, which, in turn, leads to mastering new competences. Fig. 2 depicts various students' competences which could possibly result from listed class activities of an interdisciplinary study book.

It is important to note that learning English for specific purposes at universities of technology, unfortunately, is often restricted to learning discipline-specific language, which mainly refers to developing a technical vocabulary of a particular professional group and improving essential language skills such as speaking, reading, listening and writing. Meanwhile, the



Fig. 2. The interrelation between interdisciplinary class activities and students' competences

use of interdisciplinary approach to English language learning enables students to see connections across disciplines and to refer to a relevant problem from different angles. It encourages them to critically analyze global issues and trends from related fields and in this way contextualize knowledge. Consequently, this adds to the development of analytical thinking and problem solving competences. What is even more, students are encouraged to perceive themselves as contributors to the overall field of environmental sciences and engineers of their own future. To put it in other words, interdisciplinary model of English learning/ teaching fosters students' social inclusion and responsibility.

Furthermore, the study book is designed to further students' language and personal development by learning outside the classroom. Students are asked to research on different topics, read supplementary articles, watch documentaries, or listen to podcasts on issues which are directly related to the contents of a particular unit. In this way students are encouraged to learn with minimal participation of the teacher. Consequently this approach helps students to develop their metacognitive skills such as self-direction, self-evaluation, organization and planning skills, as well as interpretation and evaluation of information from various sources.

In order to develop students' communicative and networking competence, a communicative model of foreign language teaching and learning is used in the study book. Classroom activities are focused on a cooperative rather than individualistic style of learning. To be more precise, every unit begins with the subsection 'starter' in which students are asked to interpretate given quotation, specially drawn illustration and questions, which relate to the main topic of a unit. In addition to this, every unit is accompanied by a subsection devoted for developing professional communication skills covering both written and verbal communication skills, which are necessary for any person to mediate his or her message in a fluent and intelligent manner. In addition to this, a considerable attention is paid to problem solving debates on local and global issues. Students are asked to share their insights and visions regarding economic, environmental and societal aspects of technology. This not only adds to students' language input and their ability to express and support their views clearly and concisely, but also helps to develop their personal and social skills such as negotiating and networking. As a final note, the use of communicative approach to English language teaching/learning encourages students' active involvement with peers and stimulates social dynamics in English language classroom.

Conclusions

The paper aims to overview ESD principles and discuss effects of their application into English language teaching/learning processes at technological university. Furthermore, the paper seeks to present ESD implementation scheme for English language curriculum aimed at VGTU students of environmental engineering sciences.

After a comprehensive review of ESD concept and analysis of its actual infusion into English language curriculum at VGTU, the following could be concluded:

1. The importance of integrating ESD principles into curricula of universities of technology has been acknowledged due to several key reasons. First, technical sciences can add to achieving sustainable future by developing advanced technology. Second, designers of technology are to create sustainable technologies and come up with smart solutions to handle its negative effects on our living environment.

2. English language teaching as a second language for specific purposes at a university of technology offers a valuable background to address goals of sustainable development. An integral English language curriculum, embedding principles of sustainable development, is named as the most efficient means to achieve this. It turns English language classroom to a platform where English language skills are developed through materials which refer to local and global issues of sustainable development.

3. Interdisciplinary teaching/learning model is an innovative way to approach language study content from perspectives of different disciplines and in this way to ensure its contextualization and relevance. Furthermore, this model of English language teaching/learning fosters students' social inclusionand helps to see bonds between different disciplines and meaning in collaboration.

4. Communicative approach is articulated as an integral part of the overall English language teaching/learning model for sustainable development. It not only facilitates the acquisition of English language but also fosters sociable citizens who are inclined to share their knowledge, skills and values.

5. The very last stage of the project *Sustainable Living Environment* which concerns evaluation of the project has not been realized yet. Thus a possible students' reflection on a new English language curriculum could be the focus of further research on the issue in question.

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DARNAUS VYSTYMOSI SAMPRATOS INTEGRAVIMAS Į ANGLŲ KALBOS STUDIJŲ PROGRAMĄ, SKIRTĄ APLINKOS INŽINERIJOS MOKSLŲ STUDENTAMS

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Straipsnyje pristatomas ir aptariamas Vilniaus Gedimino technikos universiteto Aplinkos inžinerijos fakulteto vykdyto projekto *Darni gyvenamoji aplinka* tikslų praktinis įgyvendinimas. Projekto vykdymas – atsakas į vis labiau aštrėjantį ir visuotinai pripažįstamą poreikį integruoti *darnaus vystymosi* principus į tradicinio ugdymo visų pakopų studijų programas. Straipsnis aktualizuoja švietimo darniam vystymuisi vaidmenį globaliame pasaulyje ir aptaria, kaip švietimo darniam vystymuisi tikslų įgyvendinimas keičia anglų kalbos mokymo (mokymosi) modelį technologijos universitete. Be to, pristatoma tarpdisciplininės programos schema, skirta anglų kalbos, kaip antrosios užsienio kalbos, aplinkos inžinerijos studentų mokymui.

Reikšminiai žodžiai: darnus vystymasis, švietimas darniam vystymuisi, studijų programa.

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