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THE ROLE OF ECONOMICS IN EDUCATION FOR SUSTAINABLE DEVELOPMENT; THE BALTIC STATES' EXPERIENCE

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Abstract:

There are often no easy answers to economics, environmental and sustainable challenges on the way to sustainable development. The relationship between education and sustainable development is complex. Education, raising awareness and modifying behaviour is one of the key elements to reduce the environmental impact of an ever-increasing population. Universities all over the world play a major role in the development and dissemination of ideas of sustainable development. This article identifies general trends in the implementation of education for economics and sustainable development into higher education in Latvia, Lithuania, and Estonia (hereafter the Baltic States). The purpose of this study is to explore to what extent and by which approach institutions of higher education in the Baltic States have been attempting to incorporate sustainability into the curricula, and what have been the results. The article consists of a research in which the first section is dedicated to scientific publications on sustainable development in Baltic States and Europe, the second section analyses the cooperation between the participants of the Baltic University programme, and the third section describes the results of a survey. The authors of the article have questioned the objective of the course as well as discussing its economic aspects, and consider whether an education on sustainable development includes a balance between nature, the economy, and society. Also, the current initiatives and practices of higher education institutions were assessed. From this analysis it is possible to determine the elements of academic development that would most likely result in a change in educational development and delivery.

Keywords:

economics, economy, education for sustainable development, teaching methods, Europe, Baltic States

JEL Classification: Q01, A29

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Introduction

Economic activity always impacts the environment, but to what degree this impact has depends on several factors, which are mainly determined by the technology used. When assessing the environmental impact on economies at a country level, such components as population, abundance, and technology need to be analysed. A relatively good environmental situation and huge current economic and social problems in Latvia have resulted in a situation where the main attention of political and mainstream research is devoted to social and economic problems.

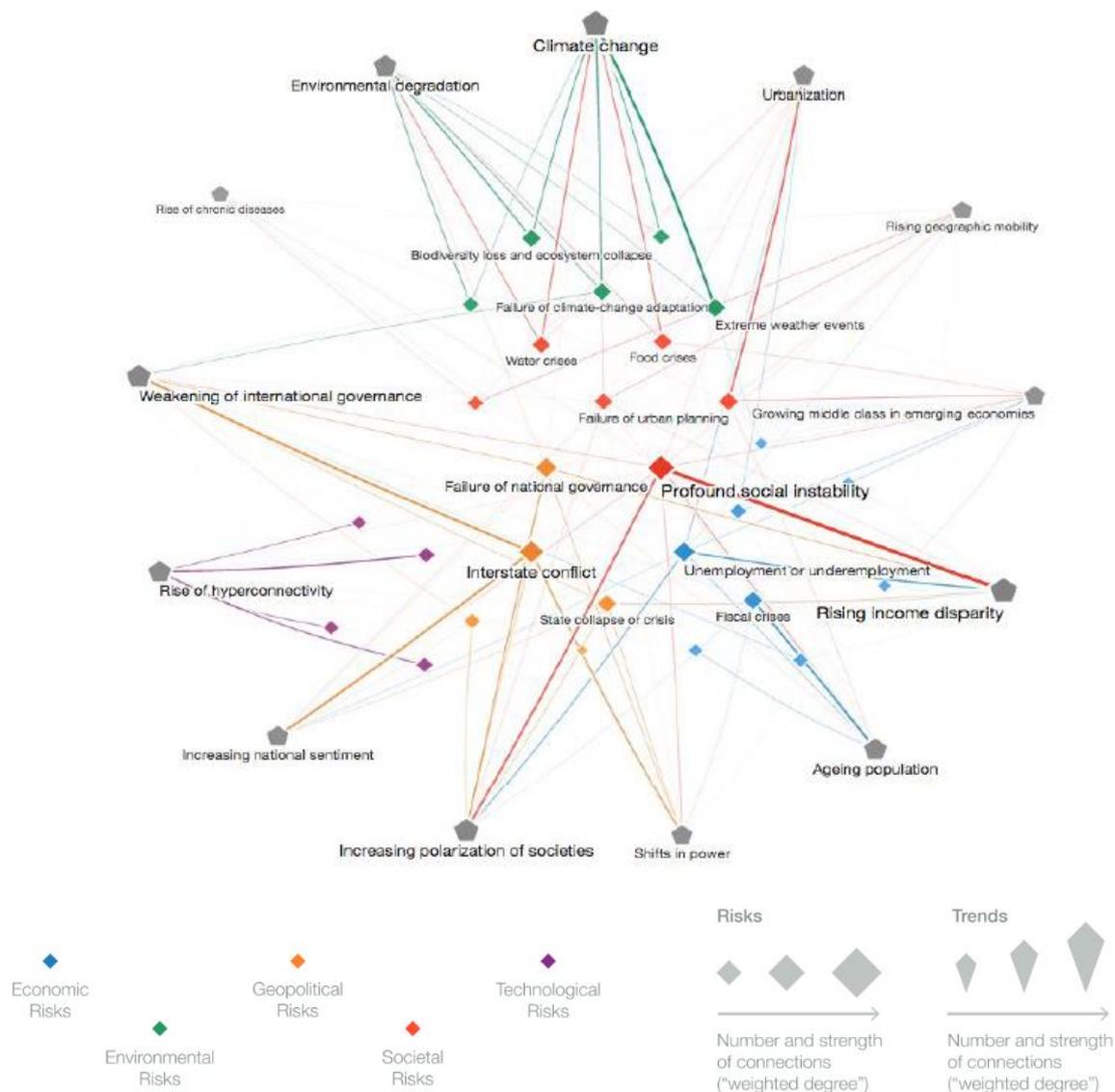
Up until the middle of the 20th century a limited understanding on the interaction between mankind and nature prevailed. Nowadays, people are aware that natural resources are not everlasting and any activity of man influences nature, both in the short and the long term. Environment management has become a theme of vital importance among entrepreneurs in all Baltic countries. Society and the world of business have changed their attitude towards the environment – very often issues connected to the latter have become serious arguments in decision-making. Ability to improve the environment is a significant task for enterprises to maintain international competitiveness. The necessity to do these influences enterprises in the Baltic States more and more as there are high environmental standards in the European Union and these standards are constantly being amended by regulating documents. In implementing an environment policy, increasing attention is paid to the use of economic instruments. Aims of using economic instruments are the following: to limit mismanagement of natural resources; to reduce the use of production processes that pollute the environment; to promote the introduction of new and advanced technologies, which reduce environmental pollution; and to create financial provision for environmental protection activities (Dimante and Atstaja, 2010). Basic questions regarding economic methods are an important aspect of informing society and involving the public in acknowledging and evaluating economic activities.

A relatively good environmental condition and huge current economical and social problems in the Baltic States have resulted in a situation where the main attention of political and mainstream research is devoted to social and economic problems, such as unemployment, reduction in GDP, inflation or deflation, the exchange rate, poverty reduction, etc. To some extent it is understandable that governments neglect environmental issues during the periods of economic downturn. On the other hand, the economic downturn can be used as a starting point for making considerable changes in the economy and human behaviour, paying more attention to the environmental constraints. Economic policy cannot eclipse the need to pay attention to such problems as the exhaustion of resources, biodiversity extinction, depletion of ecosystems, climate change, pollution, and many more. Basically, there are two ways to approach these problems – to develop an economic policy that incorporates the main principles of Green Economics and to change the consumption patterns of the population. (Atstaja, D. and Dimante, D., 2011) These matters are addressed by the Education for Sustainable development.

The principles of sustainable development in the Baltic States have been determined by the countries' **National Strategies on Sustainable Development**. These strategies comprise Acts of law that set out regulations on sustainable use of natural environment and natural resources.

The World Economic Forum recently brought together experts in economics, geopolitics, sociology, technology, and environmental sciences, and from business, academia, NGOs, and governments, to compile a list of the most pressing world trends and challenges. They graphed the interconnections between these various trends highlighting important connections, such as the links between rising income disparity and dramatic increases in the risks from social instability, as shown in Figure 1. (Fadel, C. et.al. 2015)

Figure 1 Global Trends and Risks



Source: World Education Forum

The Baltic States, also known as the Baltic countries, Baltic republics, Baltic nations, or simply, the Baltics, are the three countries in northern Europe on the eastern coast of the Baltic Sea: Estonia, Latvia and Lithuania, see Figure 2. The Baltic States have historically been under many different spheres of influence, from Danish over Swedish and Polish-Lithuanian, to German (Hansa and the Holy Roman Empire), and under the Russian sphere of influence, before independence. Currently, the Baltic States have considerable Slavic populations: Latvia is 34.5% Slavic (including 26.7% Russian, 3.3% Belarusian, 2.2% Ukrainian, and 2.2% Polish), 28.8% of Estonia is Slavic (mostly Russian), and 13.8% of Lithuania is Slavic (including 6.5% Polish and 5.3% Russian).

Figure 2 Map of the Baltic Sea Region



Source: Baltic University Programme

Since the advent of the industrial revolution, Europe has been one of the top producers of greenhouse gases. Although most of the Western European countries have gone to great lengths to cut their overall emissions, some European countries still rank high on the list of greenhouse emissions per capita. Despite a large number

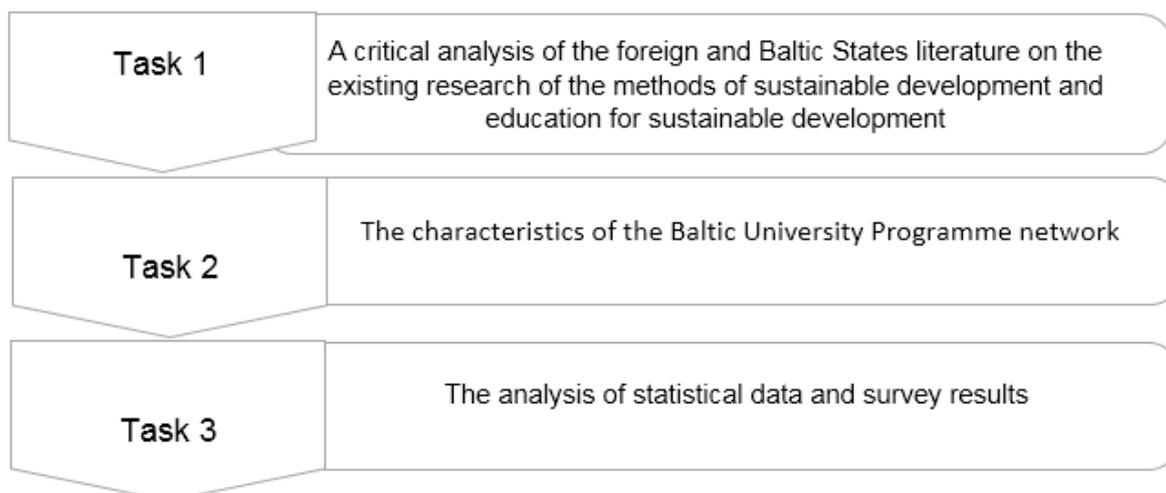
of the Baltic Sea nations working to rectify their misdeeds, there are still too many contributing to the world's level of pollution. (Baltic 21a)

The Baltic Sea States as well as Scandinavia are known for having good public education systems and universities. Many are renown around the world for providing free and high-quality education as part of an extensive social welfare state. On a per-country basis, the universities are often highly acclaimed and produce excellent talent. Estonia provides basic compulsory education through its 589 public schools. This is another top-performing country, with high levels of educational attainment across the board. Approximately 89% of the country's students have completed high school, and the average student has achieved a score of 514 in literacy, maths, and science in international assessments. Estonia is technologically-advanced with an abundance of innovative ideas. Latvia has a rich intellectual tradition based on many years of higher learning. Education includes humanities, science/mathematics, and a large vocational component. Students with vocational as well as general education backgrounds may attend higher education institutions. Lithuania's education system requires students to attend school for 12 years, with an additional vocational component. Education in Lithuania is free, and the government has recently delegated control to individual schools.

For the Baltic States, which are relatively poor in natural resources, Education holds the ticket for a better economy. As such, education has attracted a great deal of government investment in order to keep its schools internationally competitive. (Baltic 21b)

Materials and Methods. The research employed a combination of approaches; Theoretical analysis of the scientific work and practical papers in this field was taken as the research method. An analysis of statistical data and systems was performed. In the research 294 replies from respondents have been summarized.

Figure 3 Research Method



Source: authors elaboration

The objective of the article is to explore to what extent and by which approach the higher education institutions in the Baltic States have been attempting to incorporate sustainability in the curricula, and what the results have been.

The research question is: whether there is a necessity to include economic, social, and environmental issues in study courses, and if the subject of sustainable development is addressed in a balanced way?

The research method in this paper consists of three tasks (Fig. 1). In the first task, the critical analysis of the foreign and Baltic States literature has been analysed.

The research methods used in this article are an analysis of scientific research to determine the tendencies of studies. Based on analysis of the literature, the existing research of the method of measurement of sustainable development and education for sustainable development was analysed. In the next task, the analysis and selection of the education for sustainable development, the survey result was analysed. The survey was conducted in the timeframe of 2015-2016 during training courses, seminars and conferences for professors, academic personnel and teachers.

Key results of the research:

- 1) Information has been gathered from articles and scientific literature which would be useful for making new study programmes;
- 2) Areas and risks have been clarified to which more attention should be paid during the study process, in order to make study programmes comply with labour market requirements.
- 3) Conclusions may serve as a basis for further research and activities.

This article only deals with the ideas of some problems and results of the education for sustainable development and the authors would welcome any discussion, criticism and contributions to the topic under discussion.

i. Theoretical background

The research has been focused on European scientific articles. The publication can be categorised as: publications on the grounds of sustainable development; publications on realization of the study course related to sustainable development, study courses, pedagogical approach and content of study courses; practical examples of economics and households; pedagogical approaches in providing study courses on sustainable development; the analysis of results (skills, knowledge, competences, etc.), and differences in realizing study courses on sustainable development in schools, universities, in regional and national experiences; as well as principles, methods and tools of a sustainable approach in other study courses and their results.

It seems useful to consider how educators might help build sustainable futures. To understand how historical context entangles social learning in ways that complicate

policies associated with Education for Sustainable Development (ESD) and practices of Education for Sustainability (EfS),

The topic has been widely studied and included in research articles by scientists from many different countries (Sweden, Germany, Finland, Poland, Denmark, Austria, Romania, the Baltic States, etc).

According to the Lisbon Strategy, which was adopted in 2000, the European Union (EU) should become the most competitive region in the World. Goals defined in the strategy and instruments for seeking them are identified by structural indicators as well as their systems. (Balezentis, A. Et al., 2010, Chin, A. et al., 2016, Barroso, A. Et.al., 2016) The European Commission has supported several important initiatives over the last 30 years relating to environmental design and building. These included actions in undergraduate and mid-career professional education and architectural ideas competitions; and the development of innovative tools which can be used to support students and architects. Almost all have been characterised by interdisciplinary and multinational inputs, with the objectives of improving the energy and environmental performance of European buildings. (Lewis, J. O, 2008, Broman, G.I. and Robert, K.H., 2017, Michelsen, G., 2016)

The practical implementation of sustainable development depends not only on the strategies adopted, but also on everyday choices made by each individual. How we behave, what we buy, or what we are willing to sacrifice. All this translates into changes in the global consumption of natural resources and energy. Therefore, the study of human attitudes and behaviour and of the factors that determine them is an important indicator of the real possibilities for implementing sustainable development. (Barth, M. et.al., 2016, Rydzewski, P., 2013, Tambovceva, T. and Atstaja. D., 2011, Nino-Zarazua, M., 2016, Kolleck., N., 2016, Michelsen, G., 2016)

At the end of the UN's Decade of Education for Sustainable Development there are few, if any, indications of comprehensive educational reforms that meet the challenges of sustainable development. Rather, a central aim for current educational reforms appears to be to improve student performance in national and international educational assessments, such as the Organization for Economic Cooperation and Development (OECD) Programme for International Student Assessments. (Sinnes, A., 2016)

Several authors have overviewed the main methods of quantitative analysis and applied them when evaluating the Baltic States' position in the EU. Commonly conceived sustainable development is concerned with social and economic equity and maintenance of ecological stability for future generations. The Brundtland Report addresses the ethical principles of intra-generational and inter-generational equity as fundamental pillars of sustainable development. This equity is often defined in economic terms, involving fair distribution of natural resources, and in practice depends on the workings of a neoliberal market economy. At the same time, it is assumed that democratic learning enables students to be critically rational and that

ethical agents are able to make informed choices regarding sustainability challenges. This raises the questions as to whether the benefits of sustainable development should only be meant for humans, and whether concern for environmental sustainability should be limited to the environment's ability to accommodate social and economic equity. It is argued that the dominant form of pluralism employed within education is essentially anthropocentric, prioritizing social justice over other non-human interests. (Balezentis, A. et al., 2010, Kopkina, H. and Cherniak, B., 2016, Raus, R., 2016)

A conceptual framework to provide an overview of education for sustainability activities and their enablers has been proposed. This would involve activities that are related to actors and resources at both university and national levels. The conceptual framework has been developed iteratively moving back and forth trying to find a suitable structure to capture the contextual pillars of the activities in the two cases, using state-of-art technology within the research field of education for sustainable development to fill out potential blind spots in the case-material and finally, continuously shaping the storylines in the two cases to provide the required overview and understanding of the similarities and differences of the approaches. The interplay between the framework and the case-stories provides a platform for change, as the framework does not only create an overview of activities, it also points out potential routes not taken, and the case studies provide examples of activities, which can be transferred with careful consideration to an internal as well as external context. (Holgaard, J. E. et.al., 2015)

Sustainable development can exist if there is mutual interaction between the economic development of the national economy and the social sphere and the environmental protection, and an active participation of the society members in the development process is provided (Rompczyk, E., 2007, Bak, I. and Cheba, K., 2017). Changing society's mind about sustainability requires knowledge of the situation, awareness of what needs to be done and actions to change today's unsustainable behaviours. Universities are challenged to develop students' ability to appreciate the complexities of sustainability and translate sustainability knowledge of education into systemic, anticipatory and critical thinking and actions. (Samalisto, K. et.al., 2016, Dimante, D. et.al.2016, Burns, T.R., 2016, Dannenberg, S. and Grapentin, T., 2016)

The idea of "sustainability" as a core value has slowly permeated policy and practice at governmental and institutional levels, in public and private policy. However, at times when social and economic crises have revealed the fragility of existing institutions and policies, it is important to consider how sustainability is and could be integrated into educational policies. In this theoretical contribution to a special issue on "Societal sustainability" (Milana, M. et.al., 2016, Raus, R., 2016, Jirgens, M. and Atstaja, D., 2017), sustainable design integrates consideration of resource conservation and energy efficiency, healthy buildings and materials, ecologically and socially sensitive land-use, protection and enhancement of biodiversity, and an aesthetic sensitivity that

inspires, affirms, and ennobles. Sustainability demands integrated thinking. (Lewis, J. O., 2008, Michelsen, G., 2016)

There is a tendency for complex knowledge areas such as sustainable development, which do not fit seamlessly into traditional curriculum subjects, to become oversimplified when translated into teaching situations. Sustainable development commonly refers to three aspects: 'environment', 'economy' and 'equity/ethics'. The concept of participation, and how it is positioned and enacted in these fields of practice. Essentially, we argue that the concept of participation has a dual nature: it serves both as an educational ideal and as a teaching strategy. (Lysgaard, J. A. and Simovska, V., 2016, Gyberg, P. and Lofgren, H., 2016, Hasling, K.N., 2016); The Role of the Education System in the Formation of a Sustainable Attitude in the Process of Acquiring Nature Science Subjects in the Elementary Schools of Latvia (Gulane, D., 2009); The Content Reform of Education for Sustainable Development (Andersone, R., 2015), or the Changeability and Diversity of the Educational Environment (Katane, I., 2013); Socio-economic Factors Impact Evaluation on Economy Development (Kokarevica, A., 2013) Faculty of Social Sciences: Results - Achievements – Prospects (Bremze, S., 2009); The Changeable Educational Environment in Rural Schools for Sustainable Development (Katane, I., 2014)

Today, the situation in the field of sustainable development in the countries located in Eastern Europe is much better than in the countries located in Southern Europe. (Bak, I. and Cheba, K., 2017) Several authors emphasize an ecological approach for the formation and development of prospective teachers' readiness for the professional activities in Latvian schools (Katane, I. and Baltusite, R., 2007, Wielewska, I. et.al. 2017) Ecological Education of Society (Laizane, I., 2003); Specifics of Youth Tolerance: Policy Agenda and Reality in Baltic States (Bite, D. et.al. 2015a., Bite, D. et.al. 2015b, Nurdinova, S., 2013); Student views on sustainable development (Berglund, T. and Gericke, N., 2016, Gorghiu, G. and Santi, E.A., 2016) and Teachers' Responses to what is Important in Science Teaching (Sund., P., 2016).

The adolescent dip in students' sustainability consciousness-Implications for education for sustainable development (Olsson, D. and Gericke, N., 2016a), and The effect of implementing education for sustainable development in Swedish compulsory schools - assessing pupils' sustainability consciousness (Olsson, D. et.al., 2016b)

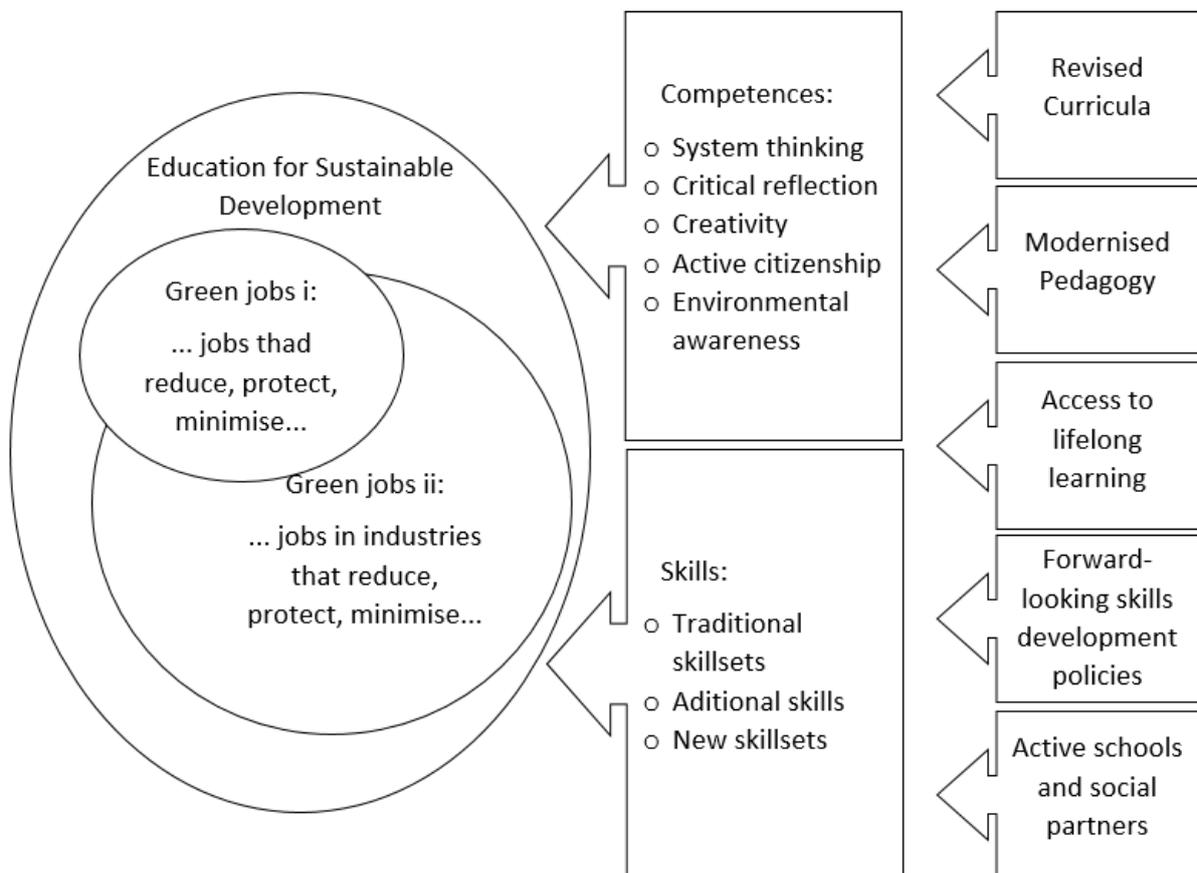
A theoretical framework is employed to analyse the teachers' reasoning - the analysis takes different approaches as to how a business ought to or could take responsibility (Andersson, P. and Ohman, J., 2016, Atstaja, D. and Dimante, D., 2011), and the aims and the philosophy of education tire the values of life and character development.... (Oseniece, G., 2008)

Traditional skillsets describe established occupations (e.g. welder), additional skills refer to new skills that are added without completely changing the nature of an occupation (organic farming methods, insulation standards in buildings, etc.), new skillsets refer to emerging occupations in low-carbon economies (bio-fuels technician,

energy consultant, etc.). However, the borders between the categories are blurred, e.g. newly emerging occupations almost always build upon traditional skills (Wells, H.G., 2012), see Figure. 4.

The majority of green jobs combine existing skillsets with additional skills relating to green technologies, applications, or processes. Developing competences such as environmental awareness, systems thinking and creativity will require as much attention as the delivery of specific skills. The promotion of competences in learners needs to be an integral part of the entire education system, from early childhood to adult education (Wells, H.G., 2012, Atstaja, D., 2013).

Figure 4. Competences and skills to the green result



Source: authors created based on Wells, H.G., 2012

Human traits and habits consist of personal values and attitude. To develop green thinking during the study process, civil responsibility and critical thinking need to be developed. At an international level, the work in the field of competences began in 1990 under the aegis of the Organization of Economic Cooperation and Development – OECD, with the international interdisciplinary programme Definition and Selection of Competencies “Education – Lifelong Learning and the Knowledge Economy”.

In reality, in the global community there is a consent concerning the importance of such competences as social, communicative, literacy (including skills in processing information, solving problems, critical thinking, processing native and foreign

languages, systemic thinking and life-long learning competence) necessary for successful participation in social life. In some countries values have become an aspect of special attention (Lobanova, T. et.al., 2008).

Some authors describe case studies as a holistic approach to teaching and learning musical cultural values: A Latvian and foreign experience (Badjanova, J. et al., 2016) Holistic philosophy based teaching approaches in Latvian primary schools: Primary education teachers' view (Badjanova, J. and Ilisko, D., 2014); Teachers' Professional Development Courses to Ensure Quality Education (Brikmane, K., 2013), or the opportunities of using the quantitative indicators of the study programmes in the quality assessment (Briska, A., 2011, Rauch, F., 2016). The results show student development, which can encourage those working with education for sustainable development in universities.

Professional training in nutrition in Central and Eastern Europe: current status and opportunities for capacity development (Gurinovic, M. et.al., 2015)

Municipal Education for Sustainability in Latvia: Self-experience and Sustainability Communication Process Prerequisites (Ernsteins, R., 2010); The Historical Aspect of Latvian Rural Schools' Development and Sustainability (Katane, I. and Laizane, A., 2010)

Some papers describe a suite of exercises that have been devised to help students develop a deeper understanding of the relevance of sustainable development to structural design. The consideration of learning as a lifelong process is paramount when trying to bring about a change in the values and attitudes of the workforce and society towards a sustainable development. Education bodies and employers are beginning to be aware of the need for training in the manifold aspects of sustainable development and today's teacher and IT skills: Latvia's experience in the professional development of teachers' IT skills (Bratucu, G. et.al., 2016, Quendler, E. and Lamb, M., 2016, Brikmane, K., 2013, McCormick, K. et. al., 2016.)

Several authors emphasize personal competences for a future labour market in the Vidzeme region (Livina, A. et.al. 2016), the role of education in promoting social innovation processes in society (Surikova, S. et.al., 2015); self-directed cross-curriculum teaching/learning process from the perspective of paradigm shift (Petere, A., 2016); and education for Sustainable Development in Home Economics (Lice, I. et.al., 2015); An analysis of young people's expectations and potential to establish enterprises (Kopeika, E. and Rudusa, I., 2013); and Home economics education development opportunities (Kula-Braze, E., 2013), or a socio-ecological based feasibility assessment for developing sustainable elderly education programmes in the Latgale region (Usca, S. et. al., 2013); Item characterization mention on sustainable coastal development in Latvia: integrated communication and indicators application (Ernsteins, R., et. al., 2011).

Knowledge and skills relevant to impact assessment can be acquired in various ways; for example, by education, training, experience (experiential or tacit knowledge), study

or research (i.e., scientific knowledge), cultural rules and norms (traditional or generational knowledge) or through the interaction of people with their biophysical environment (local or cultural knowledge). Building on this premise, at least three main paths exist to acquire knowledge and skills for impact assessment practice. Challenges of Successful Managers of Small Companies in Regions of Latvia (Kantane, I. et. al., 2013); Promotion of Adult Education in the Innovative Business (Silakalne-Araja, D. and Arajs, R., 2012); Provision of Sustainable Development of Small and Medium Size Enterprises in the Regions of Latvia (Kantane, I. and Laizane, A., 2010); Development of Study Process and Human Resources - Main Factors for the Provision of University Education Quality (Brige, A., 2008); The Role of Society in the Measure of Environment Protection (Atstaja, D. and Brivers, I., 2007); Development of Business Education for a Circular Economy in Latvia (Dimante, D. et. al., 2016); The Role of the High School in Magnifying Design Specialist Competitiveness in Latvia (Gudro, I. and Ulme, A., 2011); Creativity Principle for the Development of Teachers' Sustainable Thinking (Capulis, S. et. al. 2012); Principles, Methods and Tools of the Sustainable Approach in the Contents of Karate-Do Teaching (Capulis, S. et. al., 2016); Higher Education Materials and Intellectual Availability (Vasilevska, D., 2010).

Environmental change is an increasingly important driver of labour demand and skills supply across all sectors. Therefore, the positive impacts of the transition to a greener economy and Sustainable Development can only be maximised by developing the skills, knowledge, and competences required by resource-efficient processes and technologies, and integrating these into our businesses, study process and communities. For example, aspects of the professional development of different professionals, the engineers, artists – educators (Klasone, I., 2012) or Evaluation of the Study Environment in View of a Prospective Designer (Mezinska, S., 2011).

Engineering education plays an important role – a new approach and a new style (Civcisa, G. et.al., 2010, Vasconcelos, C. et. al., 2016); and intelligent use of energy in engineering education (Zeidmane, A. and Ozola, I., 2010). Authors will mention cross-school mentoring as a facilitator of sustainable development of rural schools in Latvia (Katane, I. and Laizane, A., 2012); and opportunities for establishing learning regions in Latvia (Kaposta, I., 2012). Specific examples illustrate the complex evaluation of sustainability in engineering education: case & analysis Kazimieras, S., Katiliute, E. (2016); and waste management (Cudecka-Purina and Atstaja, D., 2012, Cudecka-Purina and Atstaja, D., 2017).

The main issue for engineering education is "contextual awareness", i.e. the ability to view actions, problems, solutions and consequences in a broader context comprising scientific, technical, economic, legal, social or cultural aspects. Engineering education already deals, in varying degrees, with the environment, professional ethics and behaviours, matters of health and safety, as well as discipline specific problems related to engineering processes and practices. (Staniskis, J.K. and Katiliute, E., 2016).

The Self Assessment reporting and external auditing/evaluation have been performed in four dimensions:

- 1) Organization of social responsibility and sustainability education at university and institute level;
- 2) Education and curriculum of the programmes;
- 3) Student involvement and cultural development; and
- 4) Research & innovation at institute level.

A key point when defining and evaluating learning objectives is whether they include the ability to anticipate the consequences of decisions and to act appropriately (a proactive rather than reactive approach). The complex evaluation and the case clearly show how the high education institution could become a model for sustainable operations, research and development, and sustainability culture. This will require a well-defined short, medium and long-term institutional and department strategy for sustainability. The strategy should focus on objectives, planning, implementation, and on results that serve as performance indicators.

Higher education institutions in the Baltic states are at the first stage of “greening” their curricula, and the efforts to incorporate the issues of SD into curricula can be characterised more as education about sustainable development. Since the environmental dimension is particularly accented and there is a noticeable lack of holistic and interdisciplinary approaches, the limited conception of SD is widespread among the higher education institutions. The possible agents of changes promoting sustainability in university structures are the academics. Therefore, activities that focus on academic staff training and involvement in sustainable development ideas should be developed. Future studies should explore what the academic understanding of sustainable development is, and how this perception affects the teaching and learning about SD (Klavins M. and Pelneņa, M., 2010, Atstaja, D. and Dimante, D., 2011, Tambovceva, T. and Atstaja, D., 2011, McCormick, K. et. al., 2016, Atstaja, D. et. al. 2017).

The overview of publications provides information on the trends which have impacted sustainable development in Europe and Baltic States.

ii. Cooperation with the Baltic University programme network

Sustainable Development is maintaining a stable position in the study process. Technological possibilities and the creativity of teaching staff make it possible to combine diverse methods, enabling the students to not only obtain theoretical knowledge, but also strengthen the conviction about the necessity to pursue environmentally friendly lifestyles and introduce green principles in entrepreneurship. An original approach to the study process is of vital importance for an optimal result. Economics and Sustainability open wide possibilities of illustrating and presenting comparisons for creative work. To teach Sustainability we can use models developed

by other related disciplines such as ecological economics and environmental economics. (Atstaja, D. and Dimante, D., 2011)

Academic development is one means of re-orientating education within higher education to include sustainability principles. This paper identifies the experience of academic development programmes that will provide educators with the skills to engage students in the ideas of sustainability and sustainable development.

The Baltic University Programme (BUP) is a network of about 225 universities and other institutes of higher learning throughout the Baltic Sea region. Since the introduction of a participation fee in 2016, the number of Baltic universities has decreased, see Table 1.

Table 1 Baltic States universities, members of BUP

Membership in BUP	Universities
Latvia	Latvia University of Agriculture, Jelgava Liepaja University, Liepaja Riga Technical University, Riga University of Latvia, Riga Latvian Academy of Culture, Riga Rezekne Higher Education Institution, Rezekne Riga Stradins University, Riga Ventspils University College, Ventspils Vidzeme University of Applied Sciences, Valmiera
Lithuania	Kaunas University of Technology, Kaunas Vilnius University, Vilnius Aleksandras Stulginskis University (ASU), Noreikiskes Klaipeda University, Klaipeda Lithuanian University of Educational Sciences, Vilnius Lithuanian University of Health Sciences, Kaunas Mykolas Romeris University, Vilnius Siauliai University, Siauliai Vilnius Gediminas Technical University, Vilnius Vytautas Magnus University, Kaunas

Estonia	EuroacademyTallinn Tallinn UniversityTallinn Estonian University of Life Sciences, Tartu Rural Economy Research Centre, Jäneda Tallinn University of Technology, Tallinn University of Tartu, Tartu
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Source: BUP

The Programme focuses on questions of sustainable development, environmental protection, and democracy in the Baltic Sea region. The aim is to support the key role that universities play in a democratic, peaceful and sustainable development. This is achieved by developing university courses, and by participation in projects in cooperation with authorities, municipalities, and others. BUP offers study courses and study materials:

BSE - Baltic Sea Environment/Environmental Science

POB - Peoples of the Baltic/Regional Development

SBR - A Sustainable Baltic region

SWM - Sustainable Water Management

SCD - Sustainable Community Development

EE - Environmental English

EM - Environmental Management

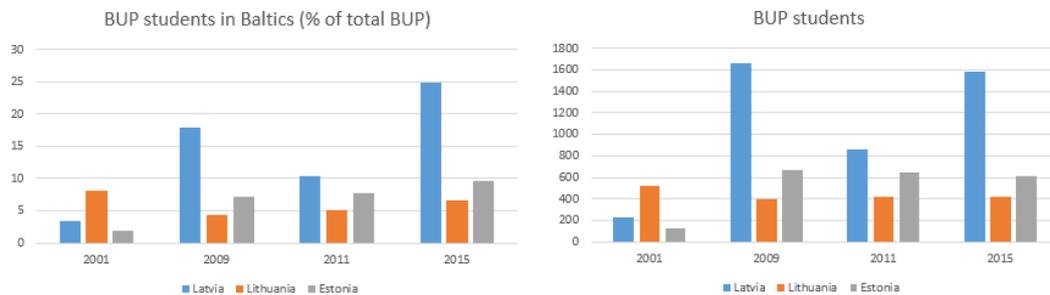
EHSA - Ecosystem Health and Sustainable Agriculture

Others – number of students using the BUP material

The data on universities using the study materials and the number of students and academic personnel are gathered annually.

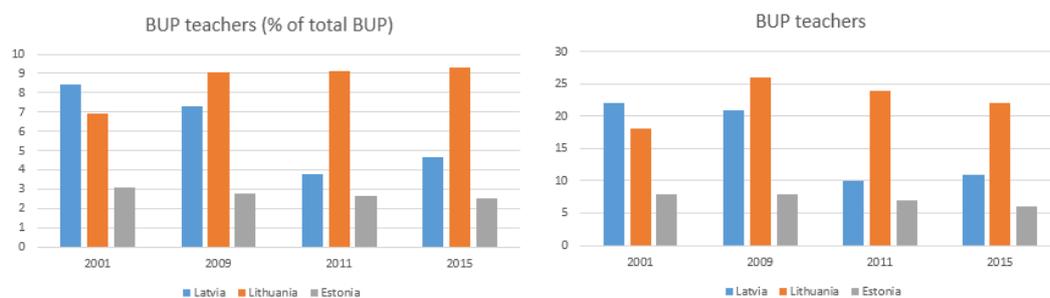
Figure 5 and Figure 6 displays an excerpt from the annual report indicating the number of students and academic personnel using the BUP materials.

Figure 5. The number of students in universities of Baltic States who have been using the study materials provided by the BUP.



Source: BUP Annual Reports

Figure 6. The number of academic personnel in the universities of the Baltic States who have been using the study materials provided by the BUP.



Source: BUP Annual Reports

The most popular course of the Baltic University programme is “*A SUSTAINABLE BALTIC REGION*”. This study course provides knowledge on environmental science and sustainable development on a global, regional, and local level. An analysis of environmental, social and economic issues and problems are given in interaction, taking in account causal relationship, as well as the possibilities of positive solutions. The course is orientated to develop the understanding that the world is a complicated, but holistic and interactive, system. Earth environment is examined at atmospheric, hydrospheric, lithospheric and biospheric levels. Functions and mechanisms of these spheres, especially natural resources and pollution, are analysed through material and energy flows. Close attention is given to a better understanding of the role and consequences of man in the natural world, building an anthropogenic environment. The original course material consisted of ten 50-page booklets and a video series called Mission Possible with over 80 individual reports from the Baltic Sea region. The course was produced between 1995-1997 and updated in 2011. The objective is to create a new framework of the course and also to start producing new written content.

Table 2. Learning outcomes

Academic knowledge:	Professional competence:
<p>1. Acquire knowledge about basic principles in environmental science and sustainable development.</p> <p>2. Acquire knowledge about the most important global, regional, and local environmental problems, and possible solutions to eradicate these problems.</p> <p>3. Get to the bottom of natural resources and environmental pollution life cycles and understanding their significance in the economy and community. Use this competency</p>	<p>1. To become acquainted with the skills to make complicated analyses of natural, environmental, economical, and social problems, as well as to analyse the current state of the environment in Latvia and Europe.</p> <p>2. Acquire skills to identify local and national resources and provide risk analysis in respect of sustainable development.</p> <p>3. Develop readiness of speech and discussion about the main principles, problems and modern solutions concerning sustainable development.</p> <p>4. Adopt practical acquisition of the use and interpretation of national and international legislation.</p> <p>5. Develop the proficiency to use different environmental and sustainable development indicators and databases.</p>

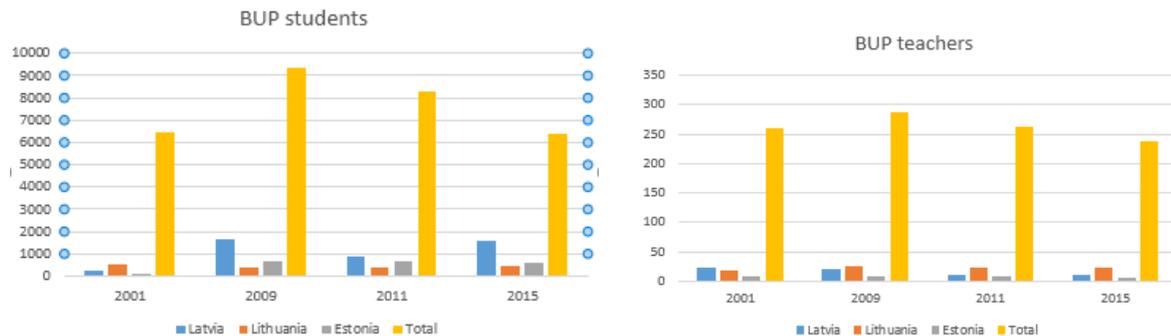
The study course includes: 2 seminars (2 hours each): Environmental stimulation game (4 hours), 'Management of the National Park' or 'Pyramid' or 'Fish game'. A screening of the documentary film (2 hours) 1. 'An Inconvenient Truth' (Al Gore) or 'The Age of Stupid' (The British Council).

The content of the study course "Environment and Sustainable Development in the Baltic Sea Region" covers the following topics:

No 11 "ECONOMICS - THE ENVIRONMENT – GROWTH". Environment, economics, development and Sustainable development. Interaction of economics and the environment. Impact on the environment - determining factors and principles. Environment as capital. Environmental economics and the market mechanism. Competitive market mechanism. Environmental problems as a result of market failure. Pollution reduction methods. Economic value of the environment and its assessment methods. Necessity to determine environmental value. Common economic value of

the environment. Methods for economic assessment of the environment. Cost and benefit analysis and discounting. Insurable risks. National tax policy as a tool for funding and implementing environmental protection projects. In search of environmental protection and balance of economic growth. (BUP, Klavins, M. and Pelnena, M., 2010)

Figure 7. The number of students and academic personnel in the universities of the Baltic States compared to the number of universities who are members of the BUP.



Source: BUP Annual Reports

There are different possibilities for the academic personnel of the Baltic States to improve their professionalism and competence by providing study courses on sustainable development. The next section of the article is dedicated to the results of a survey which includes academic personnel involved in the BUP network, as well as those who are not involved in the BUP activities.

iii Survey's Results

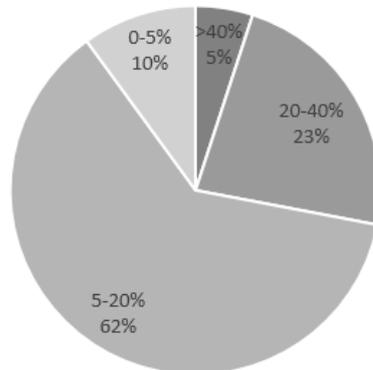
294 members of academia who have participated in the BUP related activities, programmes for qualification improvement or development of study courses were surveyed. 5 of the respondents were from Estonia, 8 were from Latvia and 9 were from Lithuania; other respondents were from different BUP member states. The key findings from the survey Education for sustainable development are being integrated in different study programmes and are supported in strategies of the member states.

The survey contained questions on the personal experience of academic personnel on teaching study courses related to the sustainable development and on the course structure, e.g.:

- study methods used and the best examples;
- whether they have studied pedagogical methods and periods;
- education and improvement of qualification etc.

Figure 8 illustrates the result of the survey question, "How do you evaluate the proportion of economics/economy in study courses on sustainable development?" The Baltic States are compared to result of a whole.

Figure 8. Impact of Economics and Economy in the content of the study course.



Source: survey's result

Analysis of the survey revealed a connection that the realisation of the study course is influenced by the fields of education of academic personnel (chemistry, the environment, economics, social sciences, etc.) and it also has an influence on the topics and the various approaches to teaching methods.

The survey concluded that overall academic personnel from the Baltic States do not show an optimistic attitude towards the results of courses on sustainable development. Figure 9 illustrates which of the methods provides the best outcome and results.

Figure 9. The study methods used, and the results achieved in the course on sustainable development.



Source: surveys result

The data has an illustrative importance for further research. The results obtained in this study can be used in subsequent years to examine the direction of changes in the education for sustainable development levels observed from the point of view of the EU Member States.

Conclusions

1. Education for sustainable development provides opportunities for every individual to obtain the knowledge, values and skills which are necessary to make decisions regarding individual or collective activities to improve the quality of life at this moment, without endangering the needs of the future generations.
2. The principles of Sustainable development in the Baltic States have been determined by the country's National Strategies on Sustainable Development, which correspond to the World Economic Forum Global Trends and Risks.
3. In 25 years, the Baltic University Programme Network has united countries around the Baltic Sea. The Programme focuses on questions of sustainable development, environmental protection and democracy in the Baltic Sea region.
4. The Baltic Sea states, along with Scandinavia, are known for having good public education systems and universities. However, up to now no research or analysis has been carried out regarding programme contents and teaching methods in study courses, comparing them between the Baltic States.
5. Analysis of scientific research shows that there are many publications about Sustainable Development and Education for Sustainable Development in the Baltic States and Europe, but only a few of them are interstate. Also, it has not been clarified how study contents are made, how are topics selected, and what their priorities are.
6. Sustainable development is maintaining a stable position in the study process. BUP offers different study courses and study materials. Each year data is collected and summarized to show which materials and how often they are used in the study process. The most popular course is "A sustainable Baltic Region" (2015).
7. The opinions of teachers and academic personnel who have participated in realising Education for Sustainable Development opinion has been garnered in a survey about study framework, learning outcomes, study contents, and study results.
8. Whilst analysing the BUP course programme a question arose – How do you evaluate the proportion of economics/the economy in study courses on sustainable development? This is significant in the light of the education of

academic personnel who determine the contents summary and teaching methods.

9. Although the topics related to sustainable development in the Baltic States are emphasized and included in the study process, and courses related to this issue are delivered, the dimension of the subject provided mostly concerns the environmental aspects of sustainable development. As the survey has concluded, the economical and social aspects are insufficiently emphasized.
10. The study courses dedicated to sustainable development in the Baltic States are consistent with the study courses provided in the Baltic Universities. The academic personnel are involved in actions dedicated to constantly improving their knowledge and pedagogical competence. Professors who do not specialize in the field of economics and are teaching courses on sustainable development are willing to improve their knowledge in courses, seminars, and in cooperation with entrepreneurs.

References

- Andersone, R. (2015). The Content Reform of Education for Sustainable Development. *Rural Environment, Education, Personality*, 8(8), pp. 75-80.
- Andersson, P., Ohman, J. (2016). Logics of Business Education for Sustainability. *Environmental education research*, 22(4), pp. 463-479.
- Atstaja, D. (2011). Economic Divergence and Convergence in the Way to Sustainable Development / Dzintra Atstāja. - Kopsavilkums angļu val. 7.lpp. - Bibliogr.: 14.-15. lpp. // Vadībzinātne. Ekonomika II. - Rīga: BA Biznesa un finanšu pētniecības centrs,. – pp. 7.-15.
- Atstaja, D., Brivers, I. (2007). The role of society in the measure of environment protection. *Environment, technology, resources, proceedings*, pp. 277-284.
- Atstaja, D., Dimante, D. (2011) "Innovative Approach for Studying Sustainable Development and Environmental Economics" RTU Zinātnisko rakstu 15. Sērijas "Tehnogēnas vides drošība" 1. sējums Rīga: RTU izdevniecība, pp. 8 – 14.
- Atstaja, D., Susniene, R., Startiene, G., Gabrevics, L. (2017). Evolution from eco-friendly solutions implementation in a enterprise. *Proceedings of the International Scientific Conference "Economic science for rural development"* No 44 Jelgava, LLU ESAF, 27-28 April 2017, pp21-28
- Badjanova, J., Ilisko, D. (2014). Holistic philosophy based teaching approaches in Latvian primary schools: Primary education teachers' view. *Rural Environment Education Personality*, (7), pp. 22-28.
- Badjanova, J., Ilisko, D., Nenkov, N. (2016). Holistic approach to teaching and learning musical cultural values: Latvian and foreign experience. *Person, color, nature, music: scientific materials of 9th international conference, 2016*, pp. 185-197.

- Bak, I., Cheba, K. (2017). Multidimensional comparative analysis of sustainable development in European Union. *Proceedings of the 2017 International Conference "Economic science for rural development"* No 45 Jelgava, LLU ESAF, 27-28 April 2017, pp. 14-20
- Balezentis, A., Balezentis, T., Valkauskas, R. (2010). Evaluating situation of Lithuania in the European Union: structural indicators and Multimooora method. *Technological and economic development of economy*, 16(4), pp. 578-602.
- Baltic University Programme [BUP] On-line <http://www.balticuniv.uu.se/index.php/annual-reports>
- Barroso, A., Chaves, C., Martins, F.V., Branco, M.C. (2016). On the possibility of sustainable development with less economic growth: a research note. *Environment development and sustainability*, 18(5), pp. 1399-1414.
- Barth, M., Michelsen, G., Rieckmann, M., Thomas, I. (2016). Routledge handbook of higher education for sustainable development introduction. *Routledge handbook of higher education for sustainable development*, pp. 1-7.
- Berglund, T., Gericke, N. (2016). Separated and integrated perspectives on environmental, economic, and social dimensions - an investigation of student views on sustainable development. *Environmental education research*, 22(8), pp. 1115-1138.
- Bite, D., Kronberga, G., Kruzmetra, Z., et al. (2015a). Specifics of Youth Tolerance: Policy Agenda and Reality in Baltic States. *Rural Environment, Education, Personality*, 8(8), pp. 81-88.
- Bite, D., Kronberga, G., Kruzmetra, Z., et al. (2015b). Youth capability in the context of sustainable development. *Economic science for rural development: integrated and sustainable regional development*, (38), pp. 81-91.
- Bratucu, G., Madar, A., Boscor, D., Baltescu, C.A., Neacsu, N.A. (2016). Road Safety Education in the Context of the Sustainable Development of Society: The Romanian Case. *Sustainability*, 8(3), art.No. 278.
- Briganti, A. (2016). Creating a Unified Foundation for Generative Sustainable Development: Research, Practice and Education: the Perspective of a Development Economist and Practitioner. *European journal of sustainable development*, 5(4), pp. 79-93.
- Bremze, S. (2009). Faculty of Social Sciences: Results - Achievements – Prospects. *International scientific conference Latvia university of Agriculture - 70: research results - actualities - prospects, proceedings*, pp. 80-88.
- Briganti, A. (2016). Creating a Unified Foundation for Generative Sustainable Development: Research, Practice and Education: the Perspective of a Development Economist and Practitioner. *European journal of sustainable development*, 5(4), pp. 79-93.
- Brige, A. (2008). Development of Study Process and Human Resources - Main Factors for the Provision of University Education Quality. *Economic Science for Rural Development*, (16), pp. 20-26.
- Brikmane, K. (2013a). Teachers' Professional Development Courses to Ensure Quality Education. *Society, integration, education*, 2013, 2, pp. 302-314.

- Brikmane, K. (2013b). Today's teacher and IT skills: Latvia's experience in the professional development of teachers' IT skills. *EDULEARN Proceedings*, pp. 791-796.
- Briska, A. (2011). The opportunities of using the quantitative indicators of the study programmes in the quality assessment. *Current issues in management of business and society development – 2009*, pp. 105-114.
- Broman, G.I., Robert, K.H. (2017). A framework for strategic sustainable development. *Journal of cleaner production*, 140, pp. 17-31.
- Burns, T.R. (2016). Sustainable development: Agents, systems and the environment. *Current sociology*, 64(6), pp. 875-906.
- Capulis, S., Dombrovskis, V., Badjanova-Lomzina, J., et al. (2012). Creativity principle for the development of teachers' sustainable thinking. *Scientific articles of 7th international conference: person, color, nature, music*, pp. 116-125.
- Capulis, S., Dombrovskis, V., Guseva, S. (2016). Principles, Methods and Tools of the Sustainable Approach in the Contents of Karate-Do Teaching. *ICPESK 2015 - 5th international congress on physical education, sport and kinetotherapy*, 11, pp. 30-38.
- Charles Fadel, Maya Bialik and Bernie Trilling (2015) Four-Dimensional Education: The Competencies Learners Need to Succeed. Center for curriculum redesign, p. 132
- Chin, A., Jacobsson, T. (2016). TheGoals.org: mobile global education on the Sustainable Development Goals. *Journal of cleaner production*, 123, pp. 227-229.
- Civcisa, G., Janauska, J., Mezinska, I., et al. (2010). Engineering education - new approach and new style. *Engineering for Rural Development*, pp. 7-12.
- Cudecka-Purina, N., Atstaja, D. (2012). Climate change and sustainable development – as experience in the study courses. *European Integration Studies* No 6. 2012. No 6, pp. 7-14.
- Cudecka-Purina, N., Atstaja, D. (2017). Assessment of business performance in waste landfills and shifting towards circular economy economic science for rural development *Proceedings of the International Scientific Conference "Economic science for rural development"* No 45 Jelgava, LLU ESAF, 27-28 April 2017, pp 30-39
- Dannenber, S., Grapentin, T. (2016). Education for Sustainable Development Learning for Transformation. The Example of Germany. *Journal of futures studies*, 20(3), pp. 7-20.
- Dimante, D., Benders, J., Atstaja, D., et al. (2016). Development of business education for circular economy in Latvia. *New challenges of economic and business development*, pp. 168-179.
- Dimante, D., Tambovceva, T., Atstaja, D. (2016). Raising environmental awareness through education. *International Journal of Continuing Engineering Education and Life-Long Learning (IJCEELL)*, 26(3).
- Education in the Baltic Sea States On-line <http://www.baltic21.org/education/education.html>

- Ernsteins, R. (2010). Municipal Education for Sustainability in Latvia: Self-experience and Sustainability Communication Process Prerequisites. *Economic Science for Rural Development*, (22), pp. 123-133.
- Ernsteins, R., Kaulins, J., Kudrenickis, I. (2011). Sustainable coastal development in Latvia: integrated communication and indicators application. *Current issues in management of business and society development – 2009*, pp. 197-201.
- Gorghiu, G., Santi, E.A. (2016). Applications of Experiential Learning in Science Education Non-Formal Contexts. *European Proceedings of Social and Behavioural Sciences*, 16, pp. 320-326.
- Gudro, I., Ulme, A. (2011). High school role in magnification of design specialist competitiveness in Latvia. *Management of technological changes*, 2, pp. 513-516.
- Gulane, D. (2009). The Role of Education System in the Formation Sustainable Attitude in the Process of Acquirement of Nature Science Subjects in Elementary Schools of Latvia. *Society, integration, education, proceedings*, pp. 314-323.
- Gurinovic, M., Novakovic, R., Satalic, Z., et al. (2015). Professional training in nutrition in Central and Eastern Europe: current status and opportunities for capacity development. *Public health nutrition*, 18(2), pp. 372-377.
- Gyberg, P., Lofgren, H. (2016). Knowledge outside the box - sustainable development education in Swedish schools. *Educational research*, 58(3), pp. 283-299.
- Hasling, K.M. (2016). Experiential values as promoters for emerging views on sustainable design education. *Design education: collaboration and cross-disciplinary*, pp. 204-209.
- Holgaard, J.E., Hadgraft, R., Kolmos, A., Guerra, A. (2016). Strategies for education for sustainable development - Danish and Australian perspectives. *Journal of cleaner production*, 112, pp. 3479-3491.
- Jirgens, M., Atstaja, D. (2017). Development on environmental regulations and benefits on enterprises. *Proceedings of the International Scientific Conference "Economic science for rural development"* No 44 Jelgava, LLU ESAF, 27-28 April 2017, pp248-255
- Kantane, I., Sloka, B., Vilcina, A. (2010). Provision of Sustainable Development of Small and Medium Size Enterprises in the Regions of Latvia. *Economic Science for Rural Development*, (23), pp. 109-114.
- Kantane, I., Vilcina, A., Sloka, B. (2013). Challenges of Successful Managers of Small Companies in Regions of Latvia. *Rural Development*, 6(1), pp. 179-185.
- Kaposta, I. (2012). Establishment of learning regions opportunities for Latvia. *Rural Environment Education Personality*, (5), pp. 51-56.
- Katane, I. (2013). Changeability and diversity of educational environment of Latvian rural schools in the twenty first century. *Rural Environment Education Personality*, (6), pp. 15-22.
- Katane, I. (2014). Changeable educational environment of rural school for sustainable development. *Engineering for Rural Development*, 12, pp. 616-622.

- Katane, I., Baltusite, R. (2007). Ecological approach for the formation and development of prospective teachers' readiness for the professional activities at Latvian schools. *Transformations in business & economics*, 6(2), pp. 114-132.
- Katane, I., Laizane, A. (2010). The historical aspect of Latvian rural schools' development and sustainability. *Society, integration, education*, pp. 246-255.
- Katane, I., Laizane, A. (2012). Cross-school mentoring as a facilitator of sustainable development of rural schools in Latvia. *Rural Environment Education Personality*, (5), pp. 43-50.
- Kazimieras, S., Katiliute, E. (2016). Complex evaluation of sustainability in engineering education: case & analysis. *Journal of Cleaner Production*, Volume 120, 1, pp. 13-20.
- Klasone, I. (2012). Aspects of the professional development of the artist – educator. *Society, integration, education 2012*, 1, pp. 322-333.
- Klavins, M., Pelna, M. (2010). Concepts and approaches for the implementation of education for sustainable development in the curricula of universities in Latvia. *Journal of baltic science education*, 9(4), pp. 264-272.
- Kokarevica, A. (2013). Socio-economic factors impact evaluation on Latvia economy development. *Rural Environment Education Personality*, (6), pp. 60-66.
- Kolleck, N. (2016). Uncovering influence through Social Network Analysis: the role of schools in Education for Sustainable Development. *Journal of education policy*, 31(3), pp. 308-329.
- Kopeika, E., Rudusa, I. (2013). Analysis of Young People Expectations and Potential to Establish Enterprises in Latvia. *2013 2nd international conference on education reform and management innovation (ERMI 2013), pt 1*, 44, pp. 326-331.
- Kopnina, H., Cherniak, B. (2016). Neoliberalism and justice in education for sustainable development: a call for inclusive pluralism. *Environmental education research*, 22(6), pp. 827-841.
- Kula-Braze, E. (2013). Home economics education development opportunities. *Society, integration, education, 2013*, 1, pp. 250-257.
- Laizane, I. (2003). Ecological Education of Society. *Environment, Technology, Resources, Proceedings*, pp. 154-165.
- Leal Filho, W., Platje, J., Gerstlberger, W., et al. (2016). The role of governance in realising the transition towards sustainable societies. *Journal of cleaner production*, 113, pp. 755-766.
- Lewis, J. O. (2008). European design education for sustainability. *Oxford conference: a re-evaluation of education in architecture*.
- Lice, I., Reihmane, S. (2015). Education for Sustainable Development at Home Economics. *Rural Environment, Education, Personality*, 8(8), pp. 230-236.
- Livina, A., Rozentale, S., Brigsa, S., et al. (2016). Personal competences for future labour market in Vidzeme region, Latvia. *Economic science for rural development: integrated and sustainable regional development, production and co-operation in agriculture*, (42), pp. 107-113.

- Lobanova, T., Shunin, Yu. (2008) Competence based education – a common European strategy. *Journal of Computer Modelling and New Technologies* 12 (2), pp. 45–65
- Paris, C. M. (2011) Lysgaard, J.A., Simovska, V. (2016). The significance of 'participation' as an educational ideal in education for sustainable development and health education in schools. *Environmental education research*, 22(5), pp. 613-630.
- McCormick, K., Neij, L., Mont, O., Ryan, C., Rodhe, H., Orsato, R. (2016). Advancing sustainable solutions: an interdisciplinary and collaborative research agenda. *Journal of cleaner production*, 123, pp. 1-4.
- Mezinska, S. (2011). Evaluation of the Study Environment in View of a Prospective Designer. *Society, integration, education*, 1, pp. 191-200.
- Michelsen, G. (2016). Policy, politics and polity in higher education for sustainable development. *Routledge handbook of higher education for sustainable development*, pp. 40-55.
- Milana, M., Rasmussen, P., Holford, J. (2016). The role of adult education and learning policy in fostering societal sustainability. *International review of education*, 62(5), pp. 523-540.
- Nino-Zarazua, M. (2016). Aid, education policy, and development. *International journal of educational development*, 48, pp. 1-8.
- Nuridinova, S. (2013). Human development and gender issues: a case of Uzbekistan and Latvia. *New challenges of economic and business development – 2013*, pp. 457-469.
- Olsson, D., Gericke, N. (2016a). The adolescent dip in students' sustainability consciousness- Implications for education for sustainable development. *Journal of environmental education*, 47(1), pp. 35-51.
- Olsson, D., Gericke, N., Rundgren, SNC. (2016b). The effect of implementation of education for sustainable development in Swedish compulsory schools - assessing pupils' sustainability consciousness. *Environmental education research*, 22(2), pp. 176-202.
- Oseniece, G. (2008). Vedic view of education for sustainable society. *Society, integration, education, proceedings*, pp. 464-472.
- Petere, A. (2016). Self-directed cross-curriculum teaching/learning process from the perspective of paradigm shift. *Society, integration, education*, 2, pp. 252-259.
- Quendler, E., Lamb, M. (2016). Learning as a lifelong process - meeting the challenges of the changing employability landscape: competences, skills and knowledge for sustainable development. *International journal of continuing engineering education and life-long learning*, 26(3), pp. 273-293.
- Rauch, F. (2016). Networking for education for sustainable development in Austria: the Austrian ECOLOG-schools programme. *Educational action research*, 24(1), pp. 34-45.
- Raus, R. (2016). Modelling a Learning Journey towards Teacher Ecological Self. *Journal of Teacher Education for Sustainability*. Volume 18, Issue 2, pp. 41–52.

- Rompczyk, E. (2007). Gribam ilgtspējīgu attīstību (We want sustainable development). Aģentūra DUE, Rīga, Latvia, p. 152 On-line paper: http://www.varam.gov.lv/files/text/darb_jomas//book_gribamia.pdf (in Latvian)
- Rydzewski, P. (2013). The Implementation of Sustainable Development vs. Environmental Attitudes in International Comparative Studies. *Problemy ekorozwoju*, 8(1), pp. 125-137.
- Sammalisto, K., Sundstrom, A., von Haartman, R., Holm, T., Yao, ZL. (2016). Learning about Sustainability-What Influences Students' Self-Perceived Sustainability Actions after Undergraduate Education? *Sustainability*, 8(6), art.No. 510.
- Silakalne-Araja, D., Arajs, R. (2012). Promotion of adult education in the innovative business. *Society, integration, education 2012*, 1, pp. 429-440.
- Sinnes, A.T., Eriksen, C.C. (2016). Education for Sustainable Development and International Student Assessments: Governing Education in Times of Climate Change. *Global policy*, 7(1), pp. 46-55.
- Staniskis, J.K., Katiliute, E. (2016). Complex evaluation of sustainability in engineering education: case & analysis. *Journal of cleaner production*, 120, pp. 13-20.
- Sund, P. (2016). Discerning selective traditions in science education: a qualitative study of teachers' responses to what is important in science teaching. *Cultural studies of science education*, 11(2), pp. 387-409.
- Surikova, S., Oganisjana, K., Grinberga-Zalite, G. (2015). The role of education in promoting social innovation processes in the society. *Society, integration, education*, 4, pp. 233-243.
- Tambovceva T., Atstaja D. (2011) Education for Sustainable Development: Case of Latvia. (in Russian) Образование для устойчивого развития в Латвии. Международном научно-техническом конгрессе «Экология и безопасность жизнедеятельности промышленно-транспортных комплексов» ELPIT-2011 (21.-25.09.2011.) pp 193. - 198.
- The Environmental Policies of The Baltic Sea Nations [Baltic 21a] On-line <http://www.baltic21.org/environment/environment.html>
- Usca, S., Lubkina, V., Marzano, G. (2013). A socio-ecological based feasibility assessment for developing sustainable elderly education programs in the Latgale region (Latvia). *Society, integration, education: utopias and dystopias in landscape and cultural mosaic - visions values vulnerability*, 2013, 3, pp. 213-222.
- Vasconcelos, C., Torres, J., Vasconcelos, L., Moutinho, S. (2016). Sustainable development and its connection to teaching geoethics. *Episodes*, 39(3), pp. 509-517.
- Vasilevska, D. (2010). Higher Education Materials and Intellectual Availability. *Society, integration, education*, pp. 152-160.
- Wells, H.G. (2012). Learning for a green future. *ETF Working together Learning for life. News and views to keep you in the know from the ETF community*. Inform, issue 11, June 2012. On-line paper: http://www.etf.europa.eu/web.nsf/pages/Publications_catalogue

- Wielewska, I., Gliniak, M., Sobczyk, W., Prus, P. (2017). Ecological education for sustainable development of rural areas. *Proceedings of the 2017 International Conference "ECONOMIC SCIENCE FOR RURAL DEVELOPMENT"* No 45 Jelgava, LLU ESAF, 27-28 April 2017, pp. 250-257
- Zeidmane, A., Ozola, I. (2010). Intelligent use of energy in engineering education. *Engineering for Rural Development*, pp. 321-326.