

# Possibilities of the Integration of the Method of the Ecologically Oriented Independent Scientific Research in the Study Process

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**Abstract** - The aim of this paper is to analyse possibilities of the integration of the method of the ecologically oriented independent scientific research in the study process. In order to achieve the set aim, the following scientific research methods were used: analysis of the conceptual guidelines for the development of environmentally oriented entrepreneurship, interpretation of the experts' evaluation of the ecologically oriented management, analysis of the results of the students' ecologically oriented independent scientific research, as well as monographic and logically constructive methods. The results of the study give an opportunity to make conclusions and to develop conceptual recommendations on how to introduce future economics and business professionals with the theoretical and practical aspects of ecologically oriented management during the study process.

**Keywords** - Corporate environmental management, eco-friendly entrepreneurship, independent scientific research, study process.

## I. INTRODUCTION

The year 2010 s marked in world history with a number of serious ecological disasters:

- April 2010 – the Gulf of Mexico Oil Spill Catastrophe – an explosion and fire on Transocean Ltd's drilling rig Deepwater Horizon licensed to the British oil company British Petroleum Plc, killing 11 workers. The rig was drilling in British Petroleum's Macondo project 42 miles southeast of Venice, Louisiana, in 5 000 feet of water and 13 000 feet under the seabed [1];
- October 2010 – Hungary Toxic Sludge Catastrophe – the disaster occurred when a reservoir burst at the huge Ajkai Timfoldgyar Zrt aluminium plant, located 165 kilometres west of Budapest. The reservoir released a tidal wave of thick red sludge, which immediately mixed with floodwaters that have built up in the region for days. The sludge-infected tide then flowed through several villages – leaving some places buried under a one-and-a-half metre layer of toxic waste [2].

As the world practice shows, companies and organizations are among the main subjects from which initiatives, decisions and actions depends the level of ecological safety, rationality of the use of the natural resources and thus the prosperity of current and future generations. These facts inevitably note that the understanding of the relationships between business activities and the environment is important

for the leaders of business companies and organizations as knowledge of economics, jurisprudence, human resource management etc. Thus, an improvement of the ecological competence of economists, financiers, business managers has become vitally important. This includes knowledge and understanding about the ways to reduce the negative environmental impact of business activities, possibilities of promotion of the ecological safety of the manufacturing and consumption processes, environmental responsibility of the company etc. Therefore, it is essential to introduce the future economics and business professionals with the theoretical and practical aspects of the ecologically oriented management during the study process.

The aim of this paper is to analyse possibilities of the integration of the method of the ecologically oriented independent scientific research in the study process. In order to achieve the set aim the following research objectives were defined:

- 1) To provide a brief description of the post-graduated studies course “Management of Ecological Systems” implemented by the Department of Civil Construction and Real Estate Economics and Management of the Faculty of Engineering Economics and Management of Riga Technical University;
- 2) To analyze an application of the ecologically oriented independent scientific research method in the process of the education of future economists, financiers, business managers, etc. in the area of environmental responsibility;
- 3) To analyze the results of the students' ecologically oriented independent scientific research developed in the academic year 2009/2010 within the framework of the study course “Management of Ecological Systems”;
- 4) To evaluate the possibilities of the integration of the method of the ecologically oriented independent scientific research in the study process.

The hypothesis of the research – for the development of the environmentally oriented management in Latvia and throughout the world, it is vitally important to improve the level of knowledge and competence of economists, financiers and business managers in sustainable development and corporate environmental responsibility. In order to achieve the set aim, the following research methods were used: analysis of the conceptual guidelines for the

development of environmentally oriented entrepreneurship, interpretation of the experts' evaluation of the ecologically oriented management, analysis of the results of the students' ecologically oriented independent scientific research, as well as monographic and logically constructive methods.

## II. BRIEF DESCRIPTION OF THE STUDY COURSE „MANAGEMENT OF ECOLOGICAL SYSTEMS”

The Faculty of Engineering Economics and Management of the Riga Technical University has been preparing internationally recognized, highly-qualified specialists, economists, managers of businesses offering them to broaden knowledge in area of corporate environmental management within the framework of the post-graduated study course “Management of Ecological Systems”. The Department of Civil Construction and Real Estate Economics and Management of the Faculty of Engineering Economics and Management have offered such an academic possibility since 2004. It is important to note that the above mentioned study course is based on students' knowledge in the area of economics, finance and management which they have obtained at the previous study level [3].

A well-balanced spectrum of the theoretical lectures and practical activities gives the following opportunities to students:

- To acquire theoretical knowledge, through attending lectures and learning new theoretical information;
- To participate in discussions about global processes, as well as the current situation in the area of ecologically oriented management in Latvia and globally;
- To reinforce theoretical knowledge through practice, working individually and in groups during the practice sessions;
- To pursue the independent researches oriented to the ecological aspects of entrepreneurship and to introduce other students with the main results.

The study course „Management of Ecological Systems” that is focused on the improvement of the theoretical knowledge and practical skills of future specialists, provides an opportunity to introduce students of the Faculty of Engineering Economics and Management of Riga Technical University to the following topics [3]:

- Course connection with business activities and management;
- An essence of the management of ecological systems and its role in the corporate environmental management;
- The corporate system of the ecological management, marketing and audit;
- The functional individualities of the company and its inclusion in the management system;
- The ecological information of the company;
- The impact of business activities on the environment and its consequences;

- Accounting of the ecological aspects of the business activities and environmental audit etc.

It is important to note that the above mentioned study course is based on the students' knowledge in the area of economics, finance and management which has been obtained at the previous study level.

The study course is based on all subjects that are related with economic, finance and business administration. Thereby it provides closer links between the study course “Management of Ecological System” and other courses that are related with the management of business activities. Thus the mutual complementary is developed and overlapping is prevented.

## III. ECOLOGICALLY ORIENTED INDEPENDENT SCIENTIFIC RESEARCH – ONE OF THE STUDY AND UNDERSTANDING FORMATION METHODS

One of the components of the study course “Management of Ecological Systems” is to conduct an ecologically oriented independent scientific research. The aim of the research is to model the impact of the business activities on the environment, to analyze the environmental responsibility of the company and to suggest ways to improve the environmental management of the company. The object of the research is one of the Latvian private or public organizations.

In order to achieve the aim of the project, the following research objectives are defined:

- To analyze and to evaluate theoretical foundations of the ecologically oriented management;
- To analyze the main features of the environmentally friendly management and to identify its position in the corporate management system;
- To assess the importance of the environmental management standards and requirements in the environmental management system;
- To identify the main issues of the development of the ecologically oriented management and to provide the potential solutions for the improvement of the environmental responsibility of the company;
- To evaluate the necessity of the implementation of the environmentally oriented management and to assess the potential benefits of the improvement of the environmental responsibility of the company.

Through the development of independent scientific research about the ecological aspects of the management of one Latvian private or public organization, students are asked to evaluate whether the company's activities and products (goods & services) are environmentally friendly in the following directions:

- Analysis of the company's development and its business activities according to the aspects of the ecologically oriented and environmentally friendly management;

- Possibilities of reducing the negative impact of the business activities on the environment and its consequences.

Analysis of object of the research is realized taking into account large variety of the companies that operate in Latvia. They differ on enterprise's size, type of economic activity, business characteristics and individualities, development history etc. Analysis of the Latvian private or public organizations is realized accordingly to the prepared indicative content that provides an evaluation and assess of the following criteria and aspects of the business activities of the company:

Company profile – brief description of the company and its business activities – introduction, company logo, company slogan, company data, products (goods & services), quality, capacity, equipment, structure, facilities, experience, infrastructure etc.;

- Impact of the business activities – brief description about the environmental attributes of products, activities and services of the company and their effects on the environment – necessary manufacturing resources, pollution and negative ecological effects on air, water, biological diversity, forest resources, public health etc.;
- Environmental policy – brief description of the environmental policy of the company – what are the main business aims and principles in relation to managing the environmental effects and aspects of its operations? How the company integrates environmental policy into its business activities?
- Environmental strategy – brief description of the environmental strategy of the company – what are the main areas and aspects of the strategy, what are the main tools for its implementation? How the company integrates environmental strategy into its business activities?
- Environmental management system – brief description of the environmental management system of the company – the organizational structure and resources, process of the planning, implementation, monitoring and measuring. Is the company's environmental management system third-party accredited (ISO 140001, EMAS, etc.)?
- Environmental responsibility reporting – brief description of the reporting environmental responsibility of the company – reports, review, etc. Who are the main target groups of the environmental responsibility information?
- Green initiatives – brief description of the green initiatives of the company – sponsoring of environmental protection, public information campaign, green IT initiatives, investments in research & development of eco-friendly innovations and products, etc.;
- Green products (goods & services) – brief description of the green products (good & services) offered by the

company – environmental attributes of products and their effects on the environment and public health;

- Suggestions – suggestions of improvement of the environmental responsibility and environmental management of the company and its business activities.

By evaluating the above mentioned indicative content of the ecologically oriented independent scientific research, it is important to note that a fairly wide range of the analyzed criteria and questions provide an opportunity for the student to choose any of the private or public organizations that operate in the territory of the Republic of Latvia without reference to the enterprise's size, type of economic activity, business characteristics and individualities, development history etc.

Providing an evaluation of the company's development and its business activities according to the aspects of the ecologically oriented and environmentally friendly management, as well as an analysis of the possibilities for the reduction in the negative impact of the business activities on the environment and its consequences, the following students' skills and competences are developed and improved:

- Social skills and competences (skills to work independently and with other people as part of a team);
- Communication, cooperation and networking skills;
- Information extraction, selection and processing skills using a variety of the information references, including the following sources of information:
  - ❖ Legislation of the Republic of Latvia, the Cabinet of Ministers, directives and guidelines of the European Union;
  - ❖ Books, handbooks, periodical publications;
  - ❖ Corporate responsibility reports, informative booklets;
  - ❖ Radio, TV, internet, blogs, social networking websites etc.
- Creative and justified collected and processed information interpretation skills;
- Skills to formulate and to strategically and analytically solve management issues providing rational, justified proposals and recommendations for the improvement of environmentally friendly and ecologically oriented management in Latvia;
- Competencies and skills of the development and implementation of the ecologically oriented independent scientific research that are focused on the improvement of the environmental responsibility of the entrepreneurs etc.

The main results and conclusions of the ecologically oriented independent scientific research, as well as proposals and recommendation for improvement of the environmental responsibility of the company are summarized and presented to other students. The following forms of media (printed or hand-produced material) or multimedia (combination of text,

audio, still images, animation, video, and interactivity content forms) presentations are used by the students:

- a scrapbook including text and pictures to provide details about the environmental management of the company;
- Power Point or multimedia presentations summarizing important events in the environmental management of the company;
- an oral report with visuals (poster, collage, digital images displayed on screen, etc.);
- a timeline, including text and pictures to provide details about important events in the development of the environmental management of the company;
- a brochure describing the environmental management of the company, including text and images using Microsoft Publisher;
- a virtual tour of the company, including text and images describing the environmental management of the company using Microsoft Power Point or Microsoft Front Page etc.

It is important to note that the above mentioned forms of summarizing and presentation the main results and conclusions of the ecologically oriented independent scientific research provide an opportunity to improve the following communication, computer and artistic competences and skills of the students:

- Presentation and oratory skills;
- Competence to prepare information for demonstration;
- Skills to create multimedia presentations;
- Listening skills, that are considered to be the “quiet side” of communication;
- Skills to express and justify your opinion etc.

Analyzing the effectiveness of the above mentioned study method, it is important to note that it provides participation of students in the creation of a information data base of ecological aspects of business activities which will serve as a foundation for the managerial decision making about environment protection, provision of ecological safety, rational use of natural resources, implementation of the Sustainable Development Strategy of Latvia until 2030, etc. This study approach helps students to apply critical thinking and a creative approach, as well as develops their understanding about the environmental impact of business activities and their consequences, basic principles of environmentally friendly management, environmental responsibility of the company etc.

#### IV. ANALYSIS OF THE RESULTS OF RESEARCH OF THE ASPECTS OF ECOLOGICALLY ORIENTED MANAGEMENT

In the academic year 2009/2010 the method of the ecologically oriented independent scientific research for the first time was implemented in the study process at the Faculty of Engineering Economics and Management of Riga Technical University. Within the framework of the study course “Management of Ecological Systems” students were

asked to choose one of the Latvian private or public organizations and to model the impact of its business activities on the environment, to analyze the environmental responsibility of the company and to suggest ways to improve the environmental management of the company.

Totally corporate environmental management of the 97 private and public organizations operating on the territory of the Republic of Latvia was analyzed. All companies, in accordance with the economic sector where they operate, could be divided in the following groups:

- Real estate management sector – 19 companies;
- Construction and building industry – 10 companies;
- Food and drink production sector – 10 companies;
- Logistic service sector – 9 companies;
- Public service sectors (including, water supply, sewerage, heat supply, waste management, natural gas supply) – 9 companies;
- Trade sector – 6 companies;
- Furniture manufacturing industry – 5 companies;
- Energy supply sector – 4 companies;
- Perfume and cosmetic industry – 3 companies;
- Passengers and cargo transportation service sector – 3 companies;
- Pharmacy industry – 2 companies;
- Banking sector – 2 companies;
- Chemical industry – 1 company;
- Metallurgical industry – 1 company;
- Printing and publishing industry – 1 company;
- Cars service industry – 1 company;
- Laboratorial service industry – 1 company.

In analyzing a fairly wide range of the above mentioned sectors of the state economy, it is necessary to note that in order to develop an ecologically oriented independent scientific research, the students chose companies that operate in the manufacturing as well as the service sectors. This is due to the significant impact on the environment which is caused by the business activities of both groups.

Nowadays, it is especially important because of the fact, that more often companies determine its mission as a service providing enterprises.

The most popular ecologically oriented independent scientific research sector among the students was the real estate management sector and the construction and building industry. This could partially be justified by the following factors:

- The nature of the economic processes and tendencies in the real estate market that, in the context of economic recession, received the attention of researchers from all over the world;
- Orientation of the study programmes that offer the Department of Civil Construction and Real Estate Economics and Management of the Faculty of Engineering Economics and Management – real estate management, real estate assessment etc.;
- Professional experience of students in the field of the real estate management and construction industry.

The main results and conclusions of the ecologically oriented independent scientific research, as well as proposals and recommendation for improvement of the environmental responsibility of the company were summarized and presented to other students. Results of the ecologically oriented independent scientific research indicate that issues related to the impact of the business activities on the environment as well as the level of ecological safety becomes more complex. This, in turn implies the importance of strategic management's decisions at the level of individual economic agents as well as at the level of the national economy. The main results of the ecologically oriented independent scientific research show that one of the most important causes of the low environmental responsibility of the companies in Latvia is the lack of uniform ecologically oriented management concept and guidelines. Thus the possibility to add socially economic surplus value to the principles of environmentally friendly management in the economic space of the Republic of Latvia does not exist and it is not possible to evaluate such decisions, actions and initiatives at the same level as the priorities and conditions of economic development and responsibility. Results of the ecologically oriented independent scientific research indicate that nowadays entrepreneurs are more often satisfied that the attitude to the questions that are related with the sustainable development and environmental responsibility must be reassessed.

As global practice indicates, the actions implemented and oriented towards nature protection, the improvement of efficient use of resources, ecological risk reduction, awareness of the level of the ecological safety, etc. should be in the centre of a company's strategic interests [4]. These activities go together with the goals of the company to improve its position in the market, to develop competitive advantages, to use available resources more effectively, etc.

#### V. POSSIBILITIES OF THE INTEGRATION OF THE METHOD OF THE ECOLOGICALLY ORIENTED INDEPENDENT SCIENTIFIC RESEARCH IN THE STUDY PROCESS

In the academic year 2009/2010 within the framework of the study course "Management of Ecological Systems" research of the corporate environmental management of the Latvian private and public organizations was implemented as a pilot project of the integration of the method of the ecologically oriented independent scientific research in the study process. The purpose of a pilot project was to evaluate the possibilities of the integration of the method of the ecologically oriented independent scientific research in the study process and to identify opportunities of the improvement of the theoretical knowledge and practical skills of the future economists, financiers and business managers in area of sustainable development and corporate environmental responsibility. The topicality of the pilot project is highlighted by the current situation when with the coming of each year comes the re-affirmation that the economic development of the European Union and Latvia is

impossible without a dimension of sustainable development [5].

The following conclusions can be drawn from the results of the above mentioned pilot project aimed at the integration of the method of the ecologically oriented independent scientific research in the study process:

- Students of the Faculty of Engineering Economics and Management of the Riga Technical University understand the importance of the improvement of the environmental responsibility of the companies, as well as integration of the dimension of sustainable development in business sector;
- Students are interested in searching the innovative improvements to business day-to-day operations and activities, as well as to goods and services in the form of lower environmental impacts and reduced use of resources across the all product's life cycle stages [6]. That is why understanding and managing the impact that business has on the environment today is crucial;
- During the presentation of the main results and conclusions of the ecologically oriented independent scientific research, very often as one of the main issues in area of sustainable business development the low level of the awareness of environmental responsibility of producers and consumers was mentioned.

Summarizing the main proposals for improvement of the environmental responsibility of the companies operating on the territory of the Republic of Latvia the following recommendations could be made:

- The establishment and development of environmental management system as a continuous cycle of planning, implementing, reviewing and improving the process and actions that an organisation undertakes to meet its environmental targets and requirements is crucial for each of the modern companies;
- For improvement of environmental responsibility and environmental management, an organization needs to focus not only on what happens but also on why it happens. Over time, the systematic identification and correction of system deficiencies leads to better environmental and overall organisational performance [7];
- An important element of improvement environmental responsibility of the company is to ensure, that staff are trained at all levels and that the workforce recognises their own contributions to improved environmental performance. It could be obtained through the continuous improvement of the theoretical knowledge and practical skills of employees.

#### VI. CONCLUSIONS AND RECOMMENDATIONS

In conclusion, it is important to note that for the integration of the principles of the ecologically oriented management in today's business activities, it is necessary to use options, tools and instruments for strategic management

and the development of a long term oriented relationship between the company and the environment, for the reduction of environmental risks and the improvement of the competitive capacity and advantages of the company.

Nowadays any company should have ecologically oriented strategic goals, as well as an appropriate mechanisms and tools for achieving these goals. It is necessary for the integration of the ethical, social and environmental concerns into business operations of the companies and in their interactions with their stakeholders – employees, customers, investors, local communities, shareholders, government etc. It will help companies to improve their discretionary responsibility – to contribute to the community and quality of life.

It is important to note that for active corporate environmental management and an integrative approach for the solving environmental issues, the engagement of the staff in all levels of the process of planning, implementation monitoring and improvement are crucial. Thus in turn is directly dependant on the staff's competence in the sphere of sustainable development and environmental responsibility.

Analyzing the main results of the research of the aspects of ecologically oriented management implemented in academic year 2009/2010 within the framework of the study course "Management of Ecological Systems", as well as references and recommendations from the students, the above mentioned pilot project could be acceptable as one but not single opportunity of the integration of the method of the ecologically oriented independent scientific research in the study process. Taking into considerations that in the academic year 2009/2010 the method of the ecologically oriented independent scientific research for the first time was implemented in the study process at the Faculty of Engineering Economics and Management of Riga Technical University its effectiveness could be evaluated only in a short-term period.

That is why it is vitally important to improve the above mentioned possibility of the integration of the method of the ecologically oriented independent scientific research in the study process accordingly to the main results of the research of the aspects of ecologically oriented management implemented in academic year 2009/2010 within the framework of the study course "Management of Ecological Systems", as well as references and recommendations from the students.

It is necessary to develop already implemented and used one of the possibilities of the integration of the ecologically oriented independent scientific research in the study process. For example, through technical inspection of the companies, interview with internal and external stakeholders of the company, etc. In addition it is important to continue the process of searching the possibilities of the integration of the ecologically oriented independent scientific research in the study process and to implement it with already used opportunities. Thus, it will provide better investment in the

learning process than the usual education methods. It will help to give students a better impression about the impact of the business activities on environment and consequences, to promote improvement in the knowledge of future economists and managers on the theoretical and practical aspects of ecologically oriented management, to improve theoretical and practical knowledge that is necessary for their professional and creative work, as well as increases the competitiveness of these specialists in the labour market. Thus, the hypothesis of the research – for the development of the environmentally oriented management in Latvia and throughout the world, it is vitally important to improve the level of knowledge and competence of economists, financiers and business managers in sustainable development and corporate environmental responsibility – is confirmed.

It is vitally important for the development of the theoretical and practical skills of the future specialists in the area of environmentally oriented management, to continue to use the method of ecologically oriented independent research within the framework of the study course "Management of Ecological Systems" providing its development and optimization in accordance with the priorities of the environmental education in Latvia and in the world.

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**Jurijs Grizāns, Jānis Vanags. Ekoloģiski orientēto patstāvīgo zinātnisko pētījumu metodes integrēšanas iespējas studiju procesā**

Pasaules prakse liecina, ka biznesa procesu vadība, neapzinoties vai ignorējot savstarpējās sakarības saiknes starp uzņēmuma saimniecisko darbību un apkārtējo vidi, izraisa dabas katastrofas un ekoloģiskās problēmas vietējā, reģionālajā, nacionālajā, bet pastiprinoties globalizācijas procesiem, arī starpkontinentālajā līmenī. Tādējādi būtiski svarīga kļūst mūsdienu ekonomikas un uzņēmējdarbības speciālistu ekoloģiskās kompetences līmeņa paaugstināšana. Tā sevī ietver zināšanas un izpratni par uzņēmuma saimnieciskās darbības negatīvās ietekmes uz vidi un tās resursiem minimizēšanas iespējām, ražošanas procesu ekoloģiskās drošības līmeņa paaugstināšanas iespējām, uzņēmuma ražotās produkcijas vai sniegto pakalpojumu ekoloģiskās drošības līmeņa paaugstināšanas iespējām utt. Konferencēs tēzē ir analizēta Rīgas Tehniskās universitātes Inženierekonomikas un vadības fakultātē lietotā uzņēmējdarbības ekoloģisko aspektu patstāvīgo zinātnisko pētījumu metodes integrēšana augstskolas studiju procesā. Ekoloģiski orientēto patstāvīgo zinātnisko pētījumu galvenais mērķis ir uzņēmuma saimnieciskās darbības ietekmes uz apkārtējo vidi modelēšana, uzņēmuma ekoloģiskās atbildības analīze un uzņēmumu ekoloģiski orientētās vadības pilnveidošanas priekšlikumu izstrāde. Ekoloģiski orientēto patstāvīgo zinātnisko pētījumu objekts ir valsts vai privāts uzņēmums vai organizācija. Ekoloģiski orientēto patstāvīgo zinātnisko pētījumu galvenais mērķis ir izvēlēties vienu no valsts vai privātajiem uzņēmumiem vai organizācijām, veikt tās ekoloģiskās atbildības analīzi, kā arī izstrādāt priekšlikumus tās ekoloģiski orientētās vadības sistēmas pilnveidošanai, kā arī prezentēt citiem studentiem galvenos pētījuma gaitā izdarītos secinājumus, izstrādātos priekšlikumus un rekomendācijas.

**Юрийс Гризанс, Янис Ванас. Способы интегрирования экологически ориентированного самостоятельного метода научного исследования в процесс обучения**

Мировой опыт показывает, что управление бизнес-процессами, не осознавая или игнорируя взаимосвязь между хозяйственной деятельностью предприятия и окружающей средой, вызывает природные катастрофы и экологические проблемы на местном, региональном, национальном, и, увеличиваясь процессам глобализации, также на межконтинентальном уровне. Поэтому становится существенно важным повышение уровня экологической компетенции нынешних специалистов в области экономики и предпринимательства. Это включает в себя знания и понятия о влиянии хозяйственной деятельности предприятия на окружающую среду, о возможностях уменьшения ресурсов, возможностях повышения уровня экологической безопасности производственных процессов, возможностях повышения уровня экологической безопасности произведённой продукции или оказанных услуг и т. д. В тезисе для конференции анализировано интегрирование в процесс обучения в вузе метода самостоятельных научных исследований экологических аспектов предпринимательской деятельности, которую используют в Рижском Техническом университете на факультете Инженерной экономики и управления. Главная цель экологически ориентированных самостоятельных научных исследований - моделирование влияния хозяйственной деятельности предприятия на окружающую среду, моделирование экологической ответственности предприятия и разработка предложений по усовершенствованию экологически-ориентированного управления предприятиями. Объект экологически ориентированных самостоятельных научных исследований страна или частное предприятие или организация. Главная цель экологически ориентированных самостоятельных научных исследований выбрать одну из стран или одно из частных предприятий или организаций, произвести анализ экологической ответственности, а также разработать предложения по усовершенствованию экологически ориентированной системы управления, а также презентировать другим студентам главные выводы, разработанные предложения и рекомендации, сделанные в процессе исследования.