

## COMPETENCE APPROACH – THE BASIS OF MODERN POSTGRADUATE EDUCATION FOR SUSTAINABLE DEVELOPMENT

### ABSTRACT

The idea of sustainable development in the world has a large number of supporters who genuinely believe its ideology most promising of this century and, perhaps, the whole of the third millennium. They are convinced that the process of deepening scientific validity, sustainable development strategy to gradually replace other philosophical ideology, which, in their opinion, is fragmented and unable to ensure a balanced development of civilization. And over time, sustainable development will be the only acceptable alternative to overcome all the other global threats facing humanity. So when decade of UN education for sustainable development is completing, our country and, above all, the scientific elite, critically need to start reforming the education and research sector to sustainable development, using as one of the options – a system of postgraduate education as part of lifelong learning.

**KEYWORDS:** *education, educational programs, European higher education, teachers, school*

### INTRODUCTION

The need to change the current educational paradigm of knowledge to competency paradigm, study new requirements for teacher and adjust consistency between objectives, content and direction of education and its results,

were outlined in the report of UNESCO (1997) with an emphasis not on the qualification, but on the competence that seen as a kind of “mix” of skills inherent to each individual, which combines qualifications, social behavior, ability to work in a group, initiative, love of risk (Report of UNESCO, 1997).

The close relationship of concepts of competence and qualifications, their impact on the ability of individuals to carry out activities considered by Zh. Talanova, O. Slyusarenko, V. Luhovoi, who complement aforesaid ability with the concept of “learning outcomes”.

Competence approach is given the important value on institutional level according to the project “Distribution and the reform of educational programs of higher education in Europe” in which competences (with their right application):

- contribute to a better understanding of teachers and students what is expected;
- increase the transparency of trades for employers.

At the national level competences have to perform certain building blocks for the creation of national and sectoral qualifications frameworks, play an important role in procedures of providing quality of training and retraining of experts in the educational and others areas.

At the international level they help to describe the overall structure of qualifications for the European Higher Education Area and the European qualifications framework for lifelong learning (Baydenko, 2009, p. 24).

## **THE COMPETENCY APPROACH**

The competency approach has been defined as the key methodological tool for achieving the goals of the Bologna process (Babyn, 2011, p. 31–33; Bologna Process, 2003; Stockholm Conclusions, 2002), methodological principle design level education (Mytyaeva, 2007), a tool for “strengthening social dialogue of high school with the world of work, one of means of its deepening and restoring mutual trust” (Baydenko, 2006, p. 10), combining education and training, leveling them to the needs of the labor market and the mobility of labor (horizontal – rotation between sectors, spatial – territorial, vertical – in career), especially for workers facing unemployment

(Van der Klink and Boon, 2002; Delamare Le Deist, 2005), a new conceptual benchmark on the formation of educational content, because it is based on standards of education-oriented education and readiness to continue to learn throughout life, self-development and creative perform professional tasks (Stepko, 2009, p. 43).

This concerns to postgraduate pedagogical education in general and teachers in particular the natural sciences. Competence approach gives teachers tools to enhance activity-component and address the discrepancy between means and results of nature study of scholars, and actually, but not declaratively involve subjectivity, the experience of students in compliance with the quality of education components, which should be controlled at various stages of training.

The common opinion is found in the writings of Karamushka V.I. (2016), Klymenko M.O. (2016). We have emphasized them in developing the concept of competence of teachers for sustainable development in the system of postgraduate education, choosing such educational forms, methods and tools that enable the addition programmatic educational material components of sustainable development, create, simulate respective situation of the educational process focused on the principles of sustainable development, synthesize knowledge, skills, how to practice, “the experience of doing” (by I. Bekh) on the principles of sustainable development, provide personal development of teachers, focus on the actual tasks of the State standard of base and complete general secondary education (State Standard for complete secondary education), as well as the formation of sustainable development competency of scholar in according to area standards of natural training.

Competence approach in education is the subject of research of such Ukrainian scientists as T. Baybara, J. Bech, N. Bibik, I. Drach, S. Kalashnikova, V. Luhovyi, O. Pometun, O. Savchenko, O. Slyusarenko, T. Smagina, Gh. Talanova and others.

The sense of the concept of “competence approach” includes “the definition and development of students’ competencies that enable the individual to effectively participate in many social areas and contributing to the development of society and quality of personal success” (Order of Ministry of Education and Science of Ukraine № 800).

According to works of H. Malik, H. Mityaeva and L. Elagina we consider the main functions competency approach, the complexity of the structure, which describe the competence, correspondence of individuality to high professional activity, accuracy of features describing, adequacy of these notions to new direction to the development of education:

- *methodological and regulatory* – lays the groundwork for building and transfer the content of education models of effective implementation of socio-cultural and professional functions (L. Elagina, H. Mitiaeva);
- *conceptual and theoretical* – defines the practice-oriented professional education content on a broad background of culture with new educational outcome – competencies (L. Elagina, H. Mitiaeva);
- *design and technological* – optimizes choice of educational technology for forming partial competences – key, basic, special, which meeting the requirements of the educational standard (L. Elagina, H. Mitiaeva);
- *predictive modeling* – is designing a new type of model educational results-oriented solutions to real problems (general cultural, socio-cultural, cognitive, research, organizational, informational) (L. Elagina);
- *orientative* – in determining the direction of formation of effective professional activity as a result of its detection characteristics and a comparison of the subject with the norms of culture; compliance professional activities of specialist to international trends; initial positions of participants in the educational process, their professional orientation, personality traits, values of culture; list of competencies (L. Elagina);
- *practice-oriented* – encourages practical knowledge and understanding of their chosen profession, perform typical occupational tasks;
- *adaptive* – provides professional socialization;
- *humanitarian or personality developmental* – (the five sub-functions: epistemological or cognitive, operational and activity, motivation, values, autopsychological, professionally important qualities of personality) is illuminated in a human desire for new personal, educational and professional achievements, constant goal-setting and achievement of certain frontiers;
- *standardization and normative* – normalizes some idea of the requirements for training in the form of professional and educational and professional standards.

Essential features of competencies – such as the constant variability – associated with changes to adult success in an ever-changing society. So the attention to the competence approach is clear, because it responds to the urgent needs of society, the labor market, industrial areas, increases the practical orientation of education, shifting its ultimate goal to competence; provides the ability to graduate school to solve the practical problems of life, the search of his “I”, etc.; allows you to really prepare professional, technologically re-equip teachers, bridge the gap between educational links, substantive content and logic of a particular science, provide humanocentric orientation and education.

As for the structure of competence for sustainable development of natural sciences teacher, specialist combines:

- motivational valuable (motives social activity, formation of motivation, desire for achievement, attitudes to social interaction, attitude to moral norms, values and personal public order);
- operational and substantive (knowledge, skills, enabling you to make a critical analysis of their own and others’ behavior, predict the result of the interaction, to communicate, to influence other people to set goals and reach of their implementation);
- emotional and volitional component (selection decisions, the ability to self-control and self-regulation, the willingness to take responsibility, determination, self-confidence).

It is necessary to pay attention to social interaction as part of competences for sustainable development, including the desired – the ability to clarify their desires and needs in the areas of social interaction, possible – the ability to assess the circumstances and its own forces, analyze acceptable behaviors and predict its consequences and necessary – knowledge of social norms, rules, ways of interacting, their willingness to adhere to the personal and social.

Agree with scientists O. Bodalev, J. Guilford, Y. Yemelyanov, V. Kunit-syn, G. Smith that the structure of individual competencies introduced the ability to anticipate changes in the development of life situations, situations of interpersonal communication regarding beliefs, attitudes partners in the joint activities.

T. Kavell offers three-component model of competences system, which contains social abilities, ideas and achievements. As T. Kavell, most Western scientists, including M. Jerusalem, J. Klyay-Heslinh include key skills to structure competencies that are most sought after in the labor market – collaboration in a team and communication skills. D. Meyhenbaum combined system of meanings, interests, cognitive processes, behavior that are in continuous interaction with each other and with the social environment in the structure of competencies. Substantial components are also empathy, communication and perceptual skills (Meichenbaum, D., Butler, L., & Gruson, L., 1981).

It is necessary to note such components in the structure of competencies of teachers passing retraining or raising qualifications: content and activity (balanced combination of social knowledge, skills) and personal components (formed position of human awareness of its need for acquiring social knowledge for future independent life) (Krasnokutskaia, S.N., 2006).

Particular importance is given to the semantic component of pedagogical activity of teachers of natural sciences to build the competence of students as a dichotomy guidance and assistance that include problematic, existential, practical orientation (Kuchyn, 2010). accessible to every age form of socio-economic, socio-domestic spheres by descriptive, prescriptive, retrospective ways, which allows to distinguish three blocks competence for sustainable development:

- *first* – includes competence that characterizes the ability to set goals, plan results, to participate in decision making, analyze, adjust, take responsibility;
- *second* – determines the competence related to the presence of differential personal human qualities that contribute to the formation of social competence (self-confidence, self-control, adaptability, persistence, resource use, trust);
- *third* – reveals social mobility, activity (independence, originality, critical thinking, willingness to moderate risk, solving complex issues, the ability to study the use of environmental resources, innovation, decision-making, responsibility etc.).

Table 1.

**The model of social and personal competence of teachers by N. Babenko**

Value-semantic – values and meanings of the teaching profession, value-semantic perception of himself as a person and teacher;
Content and informational – a system of knowledge about the society, its role in the social world, the values of culture, education, functions of the modern teacher, ways of self-knowledge and professional and personal development, the need for their development;
Emotional and volitional – positive perception of himself as a teacher, display perseverance, responsibility in achieving the goal of becoming a modern teacher;
Action-practical – knowledge and skills to conduct social reality; ways of self-actualization and self-regulation, individual creative self-development; an activity and independence in activities of professional and personal self-determination;
Communicative – social interaction with society; respect and acceptance of other people who study, tolerance; possession dialog technology communication and cooperation with students and colleagues;
Result-evaluative – display of self-esteem; the ability to own personal assessment of the life and teaching experience; ability to act independently and responsibly in addressing the social, personal and professional problems.

Based on the essential characteristics of pedagogical competence for sustainable development of teachers, as well as the age of teachers of natural sciences, and a system of postgraduate education, which will develop competence for sustainable development teacher of natural sciences, its components are: motivational value, cognitive, operational, activity, personal and professional, reflective. Their determination does not mean separation from one another, and requires, in our opinion, the integrity of their influence.

According to the expression of competence for sustainable development in various areas, human development throughout life, the meaning of which varies according to the performed roles, features experience, age, knowledge of the practical order, society, etc., it is a deep, multi-event phenomenon, which is characterized in semantic aspect by the assimilation of environmental regulations and the formation of social qualities and skills, and the procedural aspect – the interaction of society, the individual and nature and therefore affects not only the structure but also in

function of competence for sustainable development, including teacher of natural sciences secondary school.

Given the practical expertise of teachers, who come to the Faculty of re-training and advanced training, that varies with competencies on the stages of professionalization (preprofessionalism, professionalism, superprofessionalism, pseudoprofessionalism, afterprofessionalism), we can talk about the features of competence for sustainable development teacher of natural sciences secondary school, focusing on the environmental component content enrichment items, education; mastering new social roles, social and ecological innovative technologies manifestation prosocial behavior in the profession, their own life skills performed by professional social functions.

Particular attention has to be paid to the competence for sustainable development, its function on natural sciences teachers in rural schools, rural mountain areas, the latter of which, even compared to the village, has its own specifics. Defining competencies for sustainable development as achieving the relevant environmental objectives in specific social conditions by appropriate means, the ability to use environmental resources and personal resources, getting positive results demonstrating these features, update master the application of the environmental approach of the teacher schools in rural, rural mountains, as well as urban areas, each with its own specific environment takes environmental, social, transformative function.

The results of analysis makes it possible to outline the features of rural schools: 1) proximity to nature, the agricultural environment, favorable conditions to prepare for life, agricultural production, identify children independence in solving economic, life, environmental problems; 2) maintaining the traditions of folk pedagogy; 3) a deep awareness of teachers about the characteristics of children, conditions of life and relationships in families, among peers, etc.; 4) the authority of teachers, the strength of public opinion; 5) the territorial community, community problems, concerns, interests, including professional, constant communication outside of school, close relationships, chummy form of communication between people of different ages, professions, generations; 6) priming the educational process at the local historical, cultural, labor, ethical, natural and industrial values, customs and traditions of the environment; 7) uncompleteness and paucity of most of the rural schools.



Rural school of mountainous terrain, in addition to the aforementioned, has some specific features that are due, on the one hand, sustained social development, especially communication with the original nature, unstable harsh climate, landscape and natural features of the mountains, the risks that lead to certain natural disasters, sparse population, demographic and economic features of mountain villages and so on, and on the other hand, uniformity schools, the economic weakness of the material base, lack of personnel, remoteness from the cultural, scientific, administrative centers, railway stations and so on. This refers to teaching activities focus on socially open environment with the needs of the human village, town, historical and social traditions, social and cultural opportunities in the region. According to mentioned above and to previously defined competency framework for sustainable development it should specify *the functions of competence for sustainable development of natural sciences teacher of secondary school*. They are:

- 1) informational and applied function, which is associated with the process of obtaining, critical analysis, transmission of environmental information by various means, implies a socially oriented knowledge and constant updating of their knowledge and professional enrichment for social components, social and environmental activities aimed ways, humane activity treatment, involving environment, describes the use of social and environmental knowledge and skills in practical life, exchange of information and values;
- 2) adaptive function, that allows you to realize the needs, capabilities, skills, interact with other members of the community, social microgroups, institutions, organizations and society as a whole, preserve the physical, mental, spiritual health, avoid teacher burnout through flexible adaptation to the fast environmental changes, improving skills of self-control and self-regulation to achieve professional goals in specific social conditions by appropriate means;
- 3) socializing function, that promotes self-revelation of personality by external and internal factors, mutual socio-cultural (media, economic, legal, political, life, natural, etc.) environment and proactive teacher position, combining his efforts with the needs of the community subject to

fulfillment and self-regulation through inclusion in public relations, the assimilation of social experience, mastery of innovation, personal satisfaction, socially important needs, values, prosocial behavior, secondary (vocational) socialization;

- 4) value-orientation function, which promotes intelligent combination of social and personal motives, understanding the social significance of educational activities, quality performance of professional duties, social conscious choice for professional growth of educational activities and social development of scholars, focus on achieving marginal motives (values that this activity enriches its members and society) and outlined motives (the most important goals that contribute to these activities in the social and private plans);
- 5) predictive function provides pedagogical optimism, the desire of social self-development ability of teachers to predict design processes of self-life; promote socialization program established under the personal development of each student, create conditions to solve its various problems concerning the development of social competence; identify social partnership program and school community;
- 6) behavioral function, which is associated with the deepening and improvement of skills in social activities on equal treatment rights to object to another person, and nature itself, promoting, self-development and self-discipline, increased levels of readiness (personal characteristics, including the quality of the experience acquired educational activities); the ability to use the resources of the environment and personal resources to adequately respond to the statements and actions to monitor the reaction, the pleasure of communication;
- 7) status and role function, that realizes the need for confirmation and improvement (changing) social status, relevant knowledge, skills, qualifications, helps to move to a higher position in the community; extends the repertoire of social roles and socio-cultural norms conducive to social enrichment of the individual;
- 8) reflexive function, aimed at professional self-analysis, self-evaluation of actions, steps on social development of scholar (for the development of reflexive component).

Thus, competence of sustainable development is appeared in different areas, developing lifelong whose content varies according to the characteristics of the environment, social order, knowledge, social experience, age, social roles and others. It is broader than social competence, which affects the structure and function of competence for sustainable development.

## **MODEL OF COMPETENCE DEVELOPMENT FOR SUSTAINABLE DEVELOPMENT OF NATURAL SCIENCES TEACHERS**

Taking into account considered different views on scientific expertise and competence in general for sustainable development, which are mentioned in papers of Isaenko V.M., Bogoluibov V.M., Melnyk, identifying their essential features and outlining the essence of understanding the concept of “teacher competence for sustainable development” the structure and functions of competences for sustainable development of natural sciences teacher, focusing on competence components of scholar according to the State requirements for general preparation on sectoral principle have been substantiated.

Education school of natural sciences is based on understanding the content and methodology of teacher education process prevailing today, and live and work future graduates will be in reality that will arise in the future. Accurate prediction of reality is missing, but it is clear that the future will be determined by the trends of modern society that now dominate.

With the backbone positions civilization challenges, associated with demographic processes, reduction of living space, the exhaustion of natural resources, the need for fair access to all these resources and many others, will greatly affect on the society development. Today’s graduates face the need to balance the needs of social development with limited resources, the environment, and this, in turn, requires special competences. In this context we can speak of a special group of competences – competences for sustainable development.

Sustainability defines stable, focused and balanced development of economic and social spheres for the management of natural resources. Sustainable society is a society that persists for many generations and is characterized by foresight, flexibility and wisdom, which are not destroyed its physical or social support system. The goal of education for sustainable development

is the formation of thinking, based on appropriate and sustainable future life values and priorities; phased harmonious and balanced development of fully educated socially active individual who has world view formed on the basis of moral principles and norms that ensure commitment to socially responsible behavior and continuing education.

The components of the content of education for sustainable development are:

- quality of life, social justice and equality;
- preservation of cultural, social and biological diversity;
- the relationship in society, economy and environment;
- sense of responsibility to future generations;
- citizenship, rights and responsibilities of citizens;
- the needs and rights of future generations to quality of life.

Sustainable development is defined as key principle of all policies of the European Union. The entry of Ukraine into the European educational space provides the integration of the basic principles of sustainable development in the content of education. Education should form the values of man's relationship to himself and the environment, lifestyle, active life position – that is all that is needed to ensure a sustainable future. Environmental education was a prerequisite of education for sustainable development and became its base. Now education for sustainable development has affected all spheres of human activity and represents a much broader concept than environmental education.

According to the Concept of sustainable development Strategy for Sustainable Development “Ukraine – 2020” is adopted by the Decree of the President of Ukraine on January 12, 2015 №5/2015. The aim of the Strategy, the main provisions of which are education, laid the permanent introduction in Ukraine European standards of living and access of Ukraine to leading position in the world. According to the Law of Ukraine “On Higher Education” adopted in 2014 and its Article 3 – State policy in the sphere of higher education based on principles: 1) sustainable development of society by preparing competitive human capital and create conditions for lifelong learning, etc.

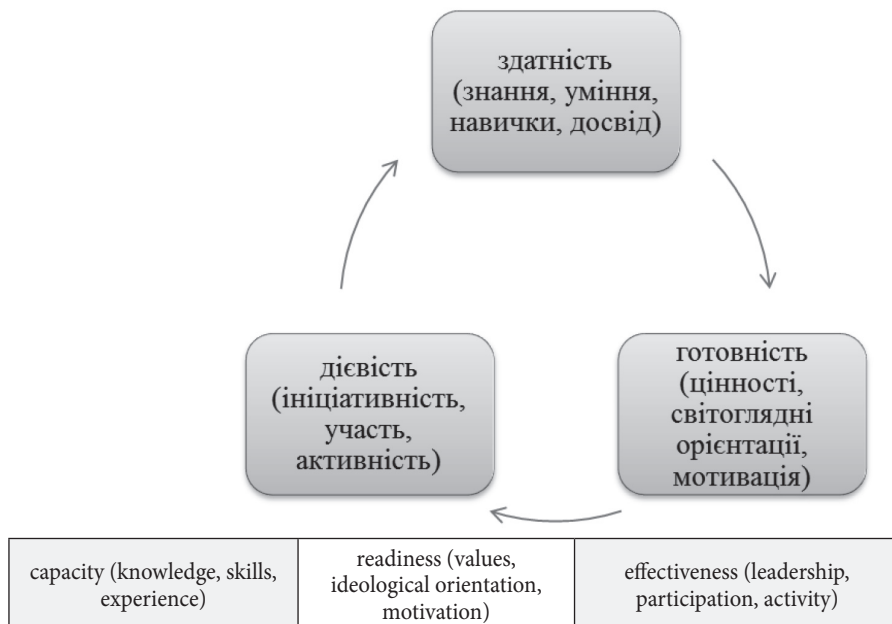
According to the Concept of sustainable development is a steady development of the individual, community and society, which aims to meet growing human needs through economic activity exclusively within the environmen-

tal capacity of the environment. Given the increasing world population as a whole, and therefore steady growth in consumption of natural resources, harmonizing the needs of disabled environment is inevitable task. In this context, the logical question round about the formation of the younger generation of competences. That's why we put in a set of common competences of scholar and environmental competences.

Formation of environmental competences must begin at school and has, to some extent, generalized nature. In some cases they can be considered as basic competencies of a general nature. But environmental expertise aimed at harmonizing human relationships with the natural environment and is a necessary but not sufficient condition for sustainable development. That is why competence for sustainable development determines the ability of the individual to plan and provide for their own development and the development of communities and society on the principles of sustainable development.

Figure 1.

**Components of competence for sustainable development of the schoolboy**



Source: own elaboration

So the following components of sustainable development competence of the schoolboy as the ability provided by the knowledge, abilities, skills, experience, readiness, defined values, philosophical orientation, motivation and efficiency, which manifests itself in the initiative, involvement, activity, can be determined.

The ability to plan development initiatives closely linked to the ability to anticipate and adequately assess the effects of planned or expected, because the activity can have consequences detrimental not only to the environment but also the health of the individual. Therefore, such activities must be neutralized at the stage of planning. Therefore, this component of competence for sustainable development as the ability, should be amended knowledge and skills to ensure the practical effectiveness of prognostic features.

Formation of scholar competencies for sustainable development requires much effort and individual approach in education. Unlike environmental education, education for sustainable development focused on the harmonization of the environmental, economic and social spheres of human activity and involves the formation of competence development and implementation of life strategies and technologies to meet the growing social needs of man through economic activities within the environmental capacity of the biosphere.

To form such competences for sustainable development in graduate schools especially curriculum should be prepared accordingly. That is why the development of methodology for sustainable development and implementation of training teachers in natural sciences is one of the key tasks in the near future. This formation of competencies for sustainable development in graduates of any level and direction is inevitable task of modern education.

The main instruments implementing education for sustainable development are:

- *dialogue*: understanding and establishing a permanent dialogue between teacher and scholars;
- *training*: development of new knowledge, skills and abilities to encourage sustainability practices in various areas of human life;
- *informing*: access to information on sustainable development and the environment;
- *marketing*: changes in the behavior of everyone in favor of sustainability.

General culture of students and teachers in issues of nature preserving, regulation of relations in the community greatly improved if the system of training and education for sustainable development can provide cultural approach to shaping the content of anticipating education as a holistic educational process with the constant increase in social dominance sustainability system Nature – Society – Man.

Especially these issues reflected in the teaching of natural training of students, according to the teaching of natural sciences teacher, where possible widespread adoption of ecological and aesthetic trends in the educational process of the scholar.

In accordance with the objectives of sustainable development education developed structural and logical scheme retraining of teachers of natural sciences, which provides a consistent logically related study in the context of sustainable development disciplines:

- General Ecology – Coursework (CW), the quantity of credits ECTS – 6 (180);
- Labour Safety in the Area (with questions of rational use of natural resources) – the quantity of credits ECTS – 3 (90);
- Civil protection (with questions of actions on environmental protection) – the quantity of credits ECTS – 3 (90);
- Methodology and organization of scientific research (using the concept of sustainable development) – CW, the quantity of credits ECTS – 3 (90);
- Sustainable Development Strategy – course work, the quantity of credits ECTS – 4 (120);
- Final master work (using the concept of sustainable development) – the quantity of credits ECTS – 15 (450).

Structural-logical scheme retraining teachers of natural sciences has been created taking into account the cultural, social and economic aspects of life student, person-centered event, priority humane- and ecocentric values and integration capabilities of any educational institution in the European educational space.

For better study of certain factors regarding sustainable development, aesthetic and environmental training and education the different types, methods

of learning, interactive exercises, information and communication and computer technology have been applied. Mandatory training is part of independent work in solving tasks, such as:

- “Healthy Planet – Healthy You!”,
- “Environmental paths”,
- “Paths of the geological past of our country”,
- “Energy conservation – a priority direction of energy policy and enhance energy security of Ukraine and the world”,
- “Innovative energy technologies and reduction in consumption of traditional fuels, alternative energy sources”,
- “Ways of solving the environmental crisis in the world and our country”,
- “Water – it’s life”.

## CONCLUSIONS

All of the structural elements of the logic circuit retraining teachers of natural sciences are aimed at forming competences for sustainable development, education of the new man, worthy builder and patriot of his land.

Thus, the acquisition of competencies for sustainable development by graduates of all levels and disciplines will contribute to training that can not only adapt to modern changes in the social, economic and environmental subsystems, but at the same time be prepared for their understanding and solving problems.

Education should be part of the initial transformation of society towards sustainable development that will meet the needs of humanity in their capacity to transform their vision of sustainable development into reality. It is not only to provide scientific and technical knowledge, but also to provide appropriate incentives to be explaining and implement social support for the skills and their use. The key task of education in the XXI century is the development of thinking, based on a sustainable future. Education for sustainable development – is the basis of our shared sustainable future.



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