

POSSIBILITIES OF USING DIDACTIC AIDS IN THE SUBJECT GREEN INFRASTRUCTURE

Anna Báreková

Faculty of Horticulture and Landscape Engineering, Slovak University of Agriculture in Nitra, Trieda Andreja Hlinku 2, 949 76 Nitra, Slovak Republic

Abstract

According to the OECD (2010), education in developed countries is a priority and the basis of economic growth, on which the well-being of the state also depends. Education reduces unemployment and increases employment in the labor market. It leads to a higher quality of life and reduces criminal activity. Education is the main source of maintaining the competitiveness of the whole society and the main factor is the achievement of prosperity not only for economic but also for social justice. Education brings independence and social stability. The number of young people who want to achieve higher education and thus obtain a degree for these very reasons is constantly increasing. In proportion to the development of science and technology, the demands on schools also increase, and therefore it is necessary to emphasize not only the content, but also the structure, process and methods of teaching. From the point of view of practice, the amount of knowledge and its passive reproduction is not important, but the understanding of the basic principles of individual scientific fields, the ability to combine knowledge, create logical links and conclusions, and creatively approach the solution of specified tasks. The submitted contribution is focused on the creation and implementation of the subject "Green Infrastructure" in the study programs of the field of Landscape Engineering. Green infrastructure is a complex system of natural territories that include terrestrial and aquatic ecosystems, elements and areas and systems of greenery in the settlement and in the country. Its importance results from the sustainable use of natural capital and the ecosystem services it provides for society. It is a multifunctional and durable system that offers a range of nature-based solutions to current problems and needs, for example in the fight against climate change and its consequences. Green infrastructure is a well-established concept in European strategies and policies. This article defines green infrastructure from the perspective of landscape planning and landscape architecture. The article deals with green infrastructure in the European Union in terms of the EU Strategy for Green Infrastructure and from the perspective of Natura 2000 and EU policies in the field of regional development, climate change and water management. This article examines the interactions between the concept of green infrastructure, the common agricultural policy and the new forestry strategy. This topic is new and has not yet been systematically implemented in the disciplines taught in the field of study Landscape Engineering.

Keywords: *green infrastructure, environment, landscape, natural landscape, landscape reclamation and revitalization, garden and landscape architecture*

1. INTRODUCTION

Issues related to the use of learning approaches in higher education are currently under constant revision due to the rapid progress of science and technology. Their use has changed significantly after the introduction of Information and Communication Technologies (ICT) in the field of education. One of the main tasks to be fulfilled by didactics in teaching at universities today is to deepen the use of rational and effective means of teaching, understood in a broader sense: from the use of traditional teaching aids to ICT. In modern universities, we have computer rooms in which teachers have the possibility of using computers, slide projectors, interactive whiteboards, and various didactic means. By using them in combination with presentation of programs, information is provided to the students. The positive changes brought about by information resources, new information environments, and information and communication technologies (ICT) do not always correspond to the actual ability to use information effectively. People need more than just information sources and tools, they are

looking for something that allows them to use information effectively. In the context of the information society, the need for information literacy and the development of basic information competences are in the center of attention. Information knowledge, skills, capabilities, habits and attitudes are important. The most commonly used and basic teaching aid is still the traditional textbook.

2. MATERIALS AND METHODS

Teaching aids and didactic technique are related to the principle of visibility in the educational process. Their importance can be illustrated as follows, while knowledge retention based on input information (Turek, 2010) is as follows: 10% of what they read 20% of what they heard 30% of what they saw in the picture 50% of what they saw and simultaneously heard 70% of what they saw, heard and actively performed, and 90% of something they found out for themselves based on their own experience and activity. Teaching aids, modern didactic technologies and didactic technologies have a unique position in the entire educational process. Learning aids serve to achieve clarity of teaching and enable a comprehensive adoption of the curriculum. They can be divided into auditory, visual, audiovisual, cyber, multimedia and hypermedia resources. In the learning process, teaching aids have motivational, informative, application, simulation, repetitive and control functions. Choosing a suitable teaching aid can significantly increase didactic efficiency. The most frequently used teaching aids are the traditional textbook and the blackboard. The textbook becomes interesting for the student when it is didactically well processed, includes appropriate images and fulfills its functions. In technical areas, this involves the use of teaching aids such as 3D models, figures, etc., because they allow students to imagine the real function of an individual and his position in technical practice. Modern educational technologies and didactic techniques refer to technical means, processes and skills that are used for specific purposes and bring practical results (Hrmo et al., 2009). The term technology is used as an equivalent to the term equipment in the case where it is understood the method of carrying out the activity, or some ability production (Hašková et al., 2012). With the expanding development of information and communication technologies, which offers quality tools for working with information and information resources, very effective technical education means getting into the education system. This means a big change in work and high demands on the level of knowledge of teaching staff. Given their broad mission, universities in the information society should offer comprehensive education. The competencies necessary for life in this society are the so-called information competencies. These competencies can be acquired and developed through e-learning. E-learning is a form of distance education. At the same time, it should be added that with this method there is no personal contact between teachers and students. Another example is using a PC in combination with a slide projector and projecting it onto a screen. This way of mediating the subject is provided with the help of interactive whiteboards. It combines the advantages of a classic blackboard, touch screen and PC. A control panel can be connected to the interactive whiteboard, which includes presentation and control functions for the audio-visual equipment of the lecture room. The advantages of interactive whiteboards consist in conveying the subject matter, paying more attention to the choice of subject matter, and writing with a finger or a special pen (Vargová et al., 2011, Hrmo et al., 2009, Depešová et al., 2010). In modern times, E-Learning is one of the most important life priorities for each of us in society (Kučerka, 2011). E-learning is an alternative form of education that has recently seen development; it is one of the possible forms of further education. E-learning in our concept includes theory and research as well as any real educational process in which information and communication technologies are used in accordance with the ethical principles of working with data in their electronic form. The use of ICT and the availability of teaching materials mainly depend on the educational goals, content, nature of the educational environment and the needs and possibilities of all actors in the educational process (Zounek and Sudický, 2012). Education through e-learning is a process based on the interaction between the student and the teacher. This method of education requires key competencies in the field of computer technologies and communication via the Internet. Among the advantages of conducting e-learning courses, we can mention the saving of travel costs and time. The

disadvantage of such courses is, for example, the lack of personal interaction between the teacher and the students.

We live in a world in which products, services and information change rapidly, people have to constantly update and develop their knowledge and skills willy-nilly, and it is necessary that education and practice also evolve and change for the better. A hybrid of online learning and practice with traditional forms of learning has the best chance of success. However, such a hybrid must respect and use the results of scientific research in the learning process. The hybrid form of learning must be based on creating an environment conducive to learning, the way of learning should respect all individual learning styles, learning should be equally accessible to all users of new knowledge, getting feedback and having the opportunity and time to reflect. The methods of education that can currently be applied in the teaching process are as follows:

- **Conventional traditional teaching** - These are currently commonly offered forms of education at schools and universities. Its characteristic structures are dialogues, lectures, seminars, laboratory exercises, excursions and study in libraries or research centers. Typical technologies used in such teaching are a projector and blackboard, for study, students visit various institutions (museums, exhibitions).

- **Distance Education** - The history of this teaching lasts approximately 100 years. Distance education would have been impossible without the development of technology, especially transport and communications during the Industrial Revolution. Distance education is characterised by the separation of the teacher from the student and the student from the study group and the replacement of the interpersonal method of communication that we encounter in conventional education with an impersonal method of communication ensured by technology. This form of education is offered by correspondence schools, open universities and remote workplaces at traditional universities and schools. Typical technologies in such education are electronic services, e-mail.

- **Virtual teaching** - This teaching model would not be possible without modern information and communication technologies. Virtual classrooms are connected by networks. Lecturers and students are not in the same room at the same time. The lecturer can see and hear his students in the classroom and at the same time, they can see and hear themselves or their lecturer in different places. Currently, they have already been developed for educational purposes in an ICT-based environment at such a level that they offer freedom in the selection of information, in access to it and in its processing. At the same time, this information is not only in the form of texts, but also in multimedia form. The digital environment today offers a wealth of information and communication tools. The digital multimedia world also offers the interested party freedom in how to get to new knowledge. Working with information requires new learning strategies from the student so that he does not get lost in the flood of information in hypermedia form. Everyone has had a different history of education behind them, differs in the structure of knowledge, differs in motivation, etc. The best way to learn is to study what one is interested in studying intensively (by observing, experimenting, reading). Individual interests and learning techniques are currently supported by wide variety Internet-based teach technologies. When deciding on a particular model of teaching (traditional classroom teaching, distance learning using fax, telephone, e-mail, distance learning, via a video conferencing system), it is necessary to consider all aspects of the available technologies (their benefits, possibilities, availability, functions, price, quality) and based on the given conditions (number of students, goal and content of teaching, tasks to control learning results, need for communication, availability of study materials) for a specific form of teaching and technology.

3. RESULTS

Green infrastructure is a successfully tested tool for ensuring ecological, economic and social benefits through natural solutions. It helps us to understand the value of the benefits that nature provides to human society and mobilize investments to sustain and increase them. It also helps prevent the use of infrastructure that is expensive to build, when nature can often provide cheaper, more permanent solutions, many of which create local job opportunities. Green infrastructure is based on the principle

that the protection and enhancement of nature and natural processes, and many the benefits that nature provides to human society, are consciously integrated into the spatial planning and territorial development. Green infrastructure has a number of advantages over single-purpose gray infrastructure. It does not limit territorial development but supports natural solutions when they are the best option. Sometimes it can provide an alternative to standard grey solutions or can complement them. Several definitions of the concept of green infrastructure have been developed. Therefore, it is difficult to include all aspects in one short paragraph. For the purposes of this article, we will use working definition. Green infrastructure is a strategically planned network of natural and semi-natural areas with other environmental features that are designed and managed to provide a wide range of ecosystem services. It includes green areas (or blue if it's aquatic ecosystems) and other physical properties in terrestrial (including coastal) and marine areas. On the mainland, green infrastructure is located in rural and urban areas. Green infrastructure solutions are especially important in urban environments, where more than 60% of the EU's population lives. Elements of green infrastructure in large cities provide benefits for residents health, such as cleaner air and better water quality. The based on healthy ecosystems, the spread of vector-borne diseases is also reduced. Introducing elements of green infrastructure into urban areas creates a greater sense of community, cooperation in the framework of volunteer activities of the civil society is strengthened society and contributes to the fight against social exclusion and isolation. Elements of green infrastructures have physical, psychological, emotional and socio-economic benefits for individuals and society. Opportunities are created through green infrastructure connections between urban and rural areas and places are created where it is pleasant to live, and he works. By producing food in cities and through community gardens, which are an effective tool for educating schoolchildren and in particular for arousing the interest of young people, green infrastructure addresses the issue of decoupling food production from food consumption and contributes to increasing its perceived value. Investments in green infrastructure have a large potential to strengthen regional and urban development, including the preservation and creation of jobs cities.

Ecosystem approaches are strategies and measures that take advantage of the adaptability of nature. They represent the most usable, economically viable and effective tools to combat the impacts of climate change. Wherever appropriate, such approaches apply green infrastructure solutions by using biodiversity and ecosystem services as part of an overall adaptation strategy to help people adapt to or mitigate the adverse impacts of climate change. The recent EU Climate Change Adaptation Strategy¹⁸, therefore, aims to explore the need for additional guidance for relevant authorities and decision-makers, civil society, private enterprises, and conservationists to ensure that ecosystem-based approaches to adaptation are fully mobilized. Green infrastructure initiatives in agriculture and forestry, that have positive impact on carbon and carbon dioxide balances in the Member States, will be taken into account within the framework LULUCF¹⁹ and thus contribute to the implementation of EU and UNFCCC climate change policies to practice. Green infrastructure will also make a significant contribution to reducing the carbon footprint of transport and energy provision, mitigating the negative impacts of land grabbing and fragmentation, and promoting opportunities to better integrate land use, ecosystem, and biodiversity considerations into policy and planning. Green infrastructure solutions can make an important contribution to the development of green transport corridors, e.g. through the use of the potential of the healthy ecosystems to permanently mitigate carbon emissions. The Energy Performance of Buildings Directive²⁰ will support the development and use of new materials and new design features in the construction of buildings, as part of efforts to reduce the high level of greenhouse gas emissions from the sector. Green infrastructure solutions such as green roofs and walls can contribute to the reduction greenhouse gas emissions. This is because such buildings consume less energy for heating and cooling and provide many other benefits such as water capture, air purification and biodiversity enrichment. Green infrastructure solutions that increase disaster resilience are also integral part of EU disaster risk management policy. Climate change and infrastucture development in disaster-prone areas are among the main factors that increase vulnerability to extreme weather and natural disasters such as floods, landslides, avalanches, forest fires, storms and tidal waves, which cause loss of life and billions of euros in damages and insurance claims in the EU every year. The impact of these events on human society and the environment can often be reduced through green

infrastructure solutions such as functional floodplains, forests along major rivers, protective forests in mountainous areas, coastal embankments and coastal wetlands which can be created together with disaster reduction infrastructure such as river protection measures. Green infrastructure can also contribute to reducing vulnerability to hazards by supporting local livelihoods and economy. Investments in the ecosystem reduction of disaster risks and green infrastructure can thus have multiple benefits for innovative approaches to risk management, while adapting to climate change risks and maintaining sustainable livelihoods and promoting green growth.²¹ The immediate consequences disasters are primarily dealt with by cities and local authorities, which play a decisive role in the implementation of preventive measures, such as green infrastructure.

4. DISCUSSION

The development of green infrastructure in the EU is at a crossroads. Over the last 20 years, more and more green infrastructure projects have been implemented and many experiences show that this approach is flexible, appropriate and cost-effective. Green infrastructure projects are implemented on local, regional, national or cross-border level. In order to achieve however, the optimal functioning of green infrastructure and its maximum benefits is necessary, so that activities at different levels of green infrastructure are interconnected and interdependent. This means that the benefit from these activities will increase significantly when different levels achieves a minimum degree of connection and continuity. If no action is taken at the EU level, there will be few independent initiatives that will not realize their full potential to restore natural capital and reduce the costs of heavy infrastructure³⁷. Stakeholders, therefore, expect a clear, long-term commitment to creation and implementation green infrastructure. In addition to technology, there is also a need for those working with green infrastructure to acquire the appropriate skills and competencies to enable them to take an innovative approach. In the context of ensuring an adequately skilled workforce in the medium term, a key issue is to address skills shortages through retraining and further education of skilled workers. A very important part of the educational process at the University of Agriculture in Nitra is the creation and implementation of the subject "Green Infrastructure" in the study programs of the field of Landscape Engineering. With changes in society, the natural environment and the status of their individual components, it is necessary to respond to these changes when updating study plans at universities. Our workplace also sets itself such a challenge. Although some topics in the issue of green infrastructure are not entirely new, its focus on addressing climate change as a synthesis of a set of measures is an innovative approach. It overcomes many dogmas accompanying education in the recent past, which could not even reflect the development and approaches introduced today in a comprehensive view of this phenomenon. The proposed course will provide students with guidance on the implementation of adaptation measures in the strategic planning of the country in its individual components, in intravillage, extravillage, but also on watercourses. Each proposed location must be assessed comprehensively and especially professionally with regard to functionality, spatial and ecological conditions as well as the aesthetic and architectural value of the territory, and it is also necessary to start from the analysis of the vulnerability of the territory of the municipality, or her surroundings. The project will provide students with the knowledge needed to design adaptation measures in rural areas as well as in urban areas to improve and improve the quality of the environment. The basis is the creation of the content of the subject, detailed syllabi with a detailed elaboration of the content and form of individual exercises, and the content of the lectures. The pilot task will be the processing of a semester project for a specific cadastral territory using the latest knowledge. The basic aid will be the book publication Green infrastructure. The outputs are used in the practical creation of green infrastructure projects, but the prepared publication will also find application for students of related fields, for example, the study field of garden and landscape architecture, horticulture, fruit growing, winemaking, where the technologies used are similar, in detail significantly simpler, applied to larger areas. Another target group is students from other Slovak universities, but also the general professional public, or a university of the third age, which has a rich history at our faculty. The main benefit will be the understanding of the issue, the acquisition of practical skills and knowledge for designing and

implementing design measures, not only for students in various forms of education, but also for the general professional public.

5. CONCLUSIONS

The number of people interested in studying at universities is growing. The number of people interested in education in addition to employment is also increasing. The study of specific courses is also on the rise. Courses are offered by universities and private agencies. These services are starting to be offered online. The young generation and all those who already have some experience with ICT means will find it more and more convenient. Many parents will also look for such forms of teaching for their children because they will have technical equipment at home so that children can learn from home. Parents can consult their children's study problems electronically with teachers. Education is an absolute necessity for a knowledge-based society. Although the forms of education will change rapidly, one thing is certain: the world will continue to invest a large part of its resources in them to secure an educated citizenry for the future. Green infrastructure can significantly contribute to the achievement of several main goals EU policies. The best way to support the development of green infrastructure within the EU is to create enabling framework to incentivize and enable green infrastructure projects within existing legal, political and financial instruments. Member States are encouraged to use these existing possibilities to support the implementation of green infrastructure and use its contribution to sustainable development. The fulfilment of this goal lies in the education of the young generation for the preservation of sustainability.

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