



Academic education in the field of cooperation between science and society

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ABSTRACT:

The aim of the article is to present the educational activities undertaken by the scientific community at the Faculty of Civil Engineering, Czestochowa University of Technology related to architectural design and spatial and sustainable development. The community contributed to the education of not only students, but also members of the public. The article covers projects conducted by researchers on topics related to construction, architectural design and shaping public spaces. The participants of the classes organized as part of the projects were school students and activities were adapted to different age groups as well as for the residents of Czestochowa and the surrounding area. The age of the participants determined the selection of topics and the use of creative didactic methods. Attractive forms of communication were used to stimulate development from an early age and instil among the whole society an ethos appreciating the quality of architecture and public spaces, the value of the cultural environment and understanding and undertaking activities in the field of architectural and landscape design.

KEYWORDS:

architecture; construction; education; public space

1. Introduction

At the Faculty of Civil Engineering in the Czestochowa University of Technology, the projects are carried out to evoke interest in architecture through the participation of all those who are interested in improving the quality of life of inhabited space through participation in workshops, lectures, and other forms of communication with content related to architectural design and perception of urban space. Undertaking all kinds of communication, it is aimed at awakening sensitivity among society and at the same time intensifying the activation and care for the beauty of the city, its surroundings, and the environment.

The main objective of the research was to analyse the educational activities conducted by the university regarding construction, architecture and landscape spaces. Various forms of communication were used to develop interest in children and young people and to provide knowledge for future use by meeting participants.

2. Scientific and didactic activities of the university

The Faculty of Civil Engineering at the Czestochowa University of Technology educates the engineering staff in two fields of study. The first is construction, which deals with the science of erecting buildings. The implemented didactic education process is adapted to modern educational

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requirements and has an innovative form that develops the professional competences of future graduates so that they can create modern regional and national solutions.

The second field is construction using BIM technology. **Building Information Modelling** is an informational technology that creates a multidimensional, digital model of an object, allowing the effective design and implementation of the investment process and to effectively manage the facility during its operation. The Czestochowa University of Technology is a pioneering institute and the first university in Poland to offer this innovative and future-oriented field of study. During their studies, the students will learn modern computer modelling techniques, innovative technologies related to building objects and new techniques in building information management using BIM systems. They acquire practical skills in using programs in a BIM environment, learn about the implementation of the construction process based on BIM technology and are educated in professional competences related to innovative solutions. This all provides professional training that is extremely necessary for the labor market in the light of the requirements set by European directives.

From 2022, the Faculty of Civil Engineering together with the Faculty of Infrastructure and Environment began the implementation of a course called Landscape Architecture, combining issues from natural, technical, and artistic fields. The study program provides for the acquisition of the skills needed to design and manage cultural and natural spaces. Students also learn the principles of design and landscaping, the objects accompanying these fields, as well as modern computer modelling techniques and the innovative technologies of building objects. In addition, graduates are prepared to work in their own design and executive offices. Since the academic year 1999/2000, the Faculty of Civil Engineering has been participating in the implementation of the European Community Socrates-Erasmus program. Since the academic year 2007/2008, the Live Long Learning program has been implemented, under which our students can undergo professional internships in associated countries in the European Union and take semester studies at partnering universities.

3. Shaping the architecture of a city through social education

Universally understood social education is an essential element affecting the awareness and knowledge of residents, who should participate in discussions on new buildings being built, the shape of new housing estates, as well as spatial development of parks and squares. One of the paths leading to social education is the implementation, using didactic methods, of architectural and landscape design and the ability to use public spaces. The Faculty of Civil Engineering at the Czestochowa University of Technology participated in the Operational Program Knowledge Education Development co-financed by the European Social Fund under the name Architectural and Construction Workshops "House of my dreams" (2019-2022) [1]. Classes, conducted in the form of workshops, were aimed at the youngest primary school students aged 10-14, they covered the architectural design of residential buildings, interior design, and development of space around buildings. Young participants got acquainted with the basic issues in the field of architectural and construction design and the principles of interior design. They underwent practical exercises in drawing (ability to use a pencil, diligence, colouring and the use of the surface of a sheet) and also took part in classes on computer modelling. The aim of the classes was to stimulate the development of spatial imagination, transferring one's own ideas onto paper, as well as acquiring the ability to use colors in the design of landscape spaces.

During the classes at the Building Materials Laboratory, they learned about materials used in construction, prepared concrete samples and conducted strength tests. The lecturers used modern didactic methods: "brainstorming", working in small groups and discussion to exchange ideas and agree on the unalterable version of the project. With great commitment, the students proceeded to make a model of the "Dream House" from cardboard and to develop the area around the house, which they presented to their colleagues and teachers during the school exhibition. The aim of the workshops was to awaken interest in architecture from an early age, to design urban space in conditions of sustainable development and to acquire basic drawing skills that

would reflect a child's plan for the form of the planned house and the area around it. Figure 1 shows the projects of students participating in the architectural and building workshop "The House of My Dreams".



Fig. 1. Architectural and construction workshop "The house of my dreams"

The Faculty of Civil Engineering joined the University's program under the name "Studenciak", preparing for secondary school students aged 15-19, from Czestochowa and the surrounding cities, a computer course "Using ArchiCAD for architectural and construction design" (2018-2022) [2]. During the classes, innovative functions of the program were presented, facilitating the implementation of design works of newly created objects, reconstruction of existing ones, as well as modernization and revalorization (Fig. 2). The advantage of the program is individual work confirming the talent, competence and commitment of the contractor, and teamwork, in which interdisciplinary competence brings measurable benefits in the form of innovative, original and creative solutions that meet the investor's expectations. The program, transferring the vision of the invented project into a virtual space, contributed to the creation of interesting and modern projects related to housing, greenery, and public space [3]. The course leader developed a didactic aid in the form of a monograph: "Architecture and Construction in ArchiCAD. Design and Application" with examples of the practical use of ArchiCAD and its special application, which helps participants to consolidate the knowledge provided during classes on an ongoing basis [4].



Fig. 2. „Studenciak” – workshop "Use of ArchiCAD for architectural and construction design"

Competitions are widely recognized as a determinant of trends in architectural design. Their organization encourages young people to present their skills in the field of construction and architecture.

The Faculty of Civil Engineering at the Czestochowa University of Technology and DREIER – a manufacturer of insulation systems in 2018-2019 jointly organized two editions of the "Design the façade" competition, which was available only to high school students (15-19 year olds). The competition received ninety entries from twenty-three schools. The task of the participants was to make, using any technique, the concept of colouring the façade of one of the three buildings proposed by the university. Material solutions in the form of structural façade plasters and Dreier wall detail solutions were helpful. Each of the students was to convey only one idea (one selected object). The competition committee gave awards the best entries. In 2022, the "Young Master of Construction" competition was organized for secondary school students studying to be construction technicians. Each school submitted a three-person team to the competition, who had to demonstrate their theoretical knowledge and practical skill in construction. The competition took place simultaneously in two parts. Part of the project took place at the Faculty of Civil Engineering, consisting of the completion of tasks, by one person from the team, and submission of a design, including the preparation of: quantities of works, a list of the necessary tools and equipment, the means of personal protection, as well as the schedule of project. At the same time, the practical part of the competition took place at the construction studios of the Vocational and Further Education Center, a school, which co-organizes the competition. During the competition, not only does the time to complete the tasks count, but also the accuracy of the task given. The students showed their inventiveness, skills, creativity, and thus a lot of knowledge. The competition was held by the best construction schools in Czestochowa and the surrounding region and more importantly prepared the young people for their potential future profession.

During the competition, the committee evaluated the projects and selected the winners, taking into consideration: the quality and method of project implementation, innovation, ecology, sustainable development, efficiency of the project presentation. Systematic, annual organization of various types of educational projects are undertaken by the employees of the Faculty of Civil Engineering together with schools, concerning the subject of construction, architecture and urban planning (shows, presentations, thematic lectures) – this is an important role of the university in the education of upcoming generations. With the community of the region in mind, the University systematically organizes a series of open lectures for the inhabitants of the city and the region. Since 2018, lectures on contemporary trends in architecture and architectural and landscape design as well as urban and public transformations in the 21st century have been conducted in direct contact with participants or via online meetings. During some of these lectures that were held during the Silesian Festival of Science in 2021/2022, a review of completed architectural objects and public spaces in Poland and in the world was presented. The role of modernization and revitalization of monuments of cardboard, which play a pro-social role, was emphasized, drawing attention to the changes that have occurred in the perception of how they are used.

Science Festivals are one of the largest popular science events in Poland and Europe. The Silesian Science Festival in Katowice [5] includes many shows, experiences, exhibitions, presentations, and lectures. It is divided into three parts: the program of lessons, diverse topics of meetings and exhibitions, festival lessons for organized school groups, and each day is devoted to a different area of knowledge. The program was developed in a way that allows one to participate in classroom activities. Such forms of education are an excellent opportunity to seek scientific inspiration, broaden students' knowledge and encourage them to develop their interests.

The events attempt to identify the most important trends in the design of the twenty-first century, and among the main aims to show the care which architects have for the standard of living in society. These include construction, modernization, reconstruction, public space design, transport systems and active landscape spaces with the purposing and appropriate adaptation for different age groups. Contemporary trends are characterized by the creation of projects

which are friendly to the environment in which we live in. For the participants of the lectures, a monograph was prepared, in which selected design examples of contemporary urban spaces characterized by a harmonious combination of urban and green areas were presented. These projects have a positive impact on the quality of life and the improvement of the environment and are a component of sustainable development. At the same time, they improve the aesthetics of the city, and through their unique solutions become an interesting focal point for society [6].

Employees of the Faculty of Civil Engineering participated in events which have been organized for 12 years by the Czestochowa University of Technology, under the name *Industriada* – the Festival of the Industrial Monuments Route (scientific picnic, workshops, meetings). This event takes place at the same time, in thirty-eight facilities and twenty-five towns in the province of Silesian. The academic staff of the faculty also participated in the Science Picnics organized by the University (June 4, 2022, Piotrków Trybunalski), intended for both children and adults, and the Science Picnic of the University of Technology (May 27, 2022, Czestochowa), addressed to students of all types of schools, where, among other activities, scientific experiments were presented and classes on diverse topics were organized, also related to design, drawing and architecture.

A wide range of classes in the field of architecture were conducted by the Faculty of Civil Engineering with the aim of increasing interest in architectural design and landscape architecture among schoolchildren. This is visible in the organization of extracurricular art workshops in schools, as well as in the choice of further education by students. Many graduates of primary schools report a desire to continue their education by going to technical schools that educate future construction technicians, construction technicians with elements of architecture, landscape architecture technicians, as well as in fine arts high schools.

4. Conclusion

Participation of children and youths in various forms of education arouses interests and passions and encourages further education in this area. Systematic educational activities contribute to the undertaking by subsequent generations of activities aimed at the implementation of modern architectural projects. Their role is visible in the activation of residents who initiate processes of renewal and greening of urban space for recreation. Properly conducted activities contribute to the shaping of spatial order. Undertaking various forms of education adapted to different age groups and disseminating awareness in the society in the field of architecture, urban planning, ecology, and sustainable environment is a way to build cultural values in the surrounding landscape. This the challenge posed in the landscaping space and construction of the 21st century.

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Edukacja akademicka w zakresie współpracy nauki ze społeczeństwem

STRESZCZENIE:

Celem artykułu jest przedstawienie podejmowanych przez środowisko naukowe Wydziału Budownictwa Politechniki Częstochowskiej działań w postaci różnorodnych form edukacyjnych w zakresie projektowania architektonicznego, przestrzennego i zrównoważonego rozwoju, przyczyniających się do edukacji nie tylko studentów, ale i całego społeczeństwa. Artykuł zawiera omówienie zrealizowanych przez pracowników naukowych projektów o tematyce związanej z budownictwem, projektowaniem architektonicznym oraz kształtowaniem przestrzeni publicznych. Uczestnikami zajęć organizowanych w ramach projektów są dostosowani do różnych grup wiekowych uczniowie szkół, mieszkańcy Częstochowy i okolic. Wiek uczestników decyduje o doborze odpowiedniej tematyki i zastosowaniu kreatywnych metod dydaktycznych. Atrakcyjne formy przekazu mają na celu wypracowanie już od najmłodszych lat wśród całego społeczeństwa etosu doceniającego jakość architektury i przestrzeni publicznych, wartości środowiska kulturowego oraz rozumienia i podejmowania działań w zakresie projektowania architektoniczno-krajobrazowego.

SŁOWA KLUCZOWE:

edukacja; budownictwo; architektura; przestrzeń publiczna