

Architectural education for primary school students mentored by university students

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ABSTRACT: The focus of this article is experience gained during spatial education lessons for fourth-grade students of elementary school No. 50 in Kraków during the Single Family Architectural Design course, in the first cycle of studies in architecture. Based on the workshop outcomes it was found to have benefits for primary school students, as well as second-year Bachelor of Architecture student mentors. This event takes place each year as a part of celebrations of the Cracow University of Technology Day. The group of about 25 primary school students was hosted by fourth-semester students in year two of architecture during a design studio in the Faculty of Architecture at Cracow University of Technology (FA-CUT), Kraków, Poland. During the workshop, supervised by teachers and academic tutors, a discussion was held on the contemporary needs of housing. The result was a working model of a single family house and immediate surroundings, prepared by combined groups of the younger and older students.

INTRODUCTION

There are three main goals of universities, according to H.R. Bowen: education, research and social functions, such as citizen education and social communication. [1] These latter activities are commonly described as the university's third mission. Several aims of the present Polish Law for Higher Education, Article No. 11 are:

- educational programmes;
- research and research services, transfer of technology;
- promoting the academic staff;
- providing equal opportunities for people with disabilities;
- disseminating the effects of research;
- acting in favour of local and regional society.

Consistent with its strategy, the Faculty of Architecture at Cracow University of Technology (FA-CUT), Kraków, Poland, is performing actions in each of the fields placing much attention on assisting primary school students' education by helping public schools in implementing the elements of spatial education in their programmes.

SPATIAL EDUCATION AS A KEY TO CREATIVITY AND INNOVATIVE THINKING

According to many recent studies creativity is essential in technical education. R. Keith Sawyer in his metastudy on understanding teaching and learning for creativity refers to experimental studies conducted in art classes based on the definition, *possibility thinking, which includes seven habits of mind: posing questions; play; immersion; innovation; risk-taking; being imaginative; and self-determination* [2] which are essential skills for technical process thinking. Encouraging creativity in the classroom has become a main goal in many countries [3-6].

It has been proved that creativity has *immense benefits both for the individual and the society* [7] and that it should be recognised and fostered in technological design education. [8] The creativity should be developed starting at the level of pre-school education, for *creative behaviour is indispensable for any innovative performance*. Therefore, the pre-service teachers' attitude towards technology is important, and it can be supported by the skills and abilities to encourage innovative thinking and engagement in active learning [9].

There are many studies showing the impact of the teacher-student relationship and its role in launching creativity. Another aspect important in spatial training is developing the ability to assess space aesthetics; and societal involvement and participation is crucial for active decision-making regarding spatial issues, especially in cities. In this case a correlation was found between teacher-student and student-student relationships in primary school, as well as between commitment and active social participation [10].

SPATIAL EDUCATION AT PRIMARY SCHOOLS IN POLAND

Primary school level education is obligatory in Poland. Children start the first year at age seven and they continue until the 8th grade, when they leave primary school at age 15. The educational process follows the core curriculum released by the Ministry of Education. The first three grades are early school education, which is the first stage of education. The skills required by the core curriculum at this level are developed during the early education. In the second stage, in grades 4th to 8th, the lessons are organised according to the subject. During primary school the spatial education is mostly represented in mathematical education.

The issues of scale and proportions are covered, also the students learn of the components of the city, rural landscape and the layout of residential buildings. Starting from the fourth grade, there are also some elements of history of architecture and art in the curriculum, showing the historical plans of the cities and construction, as well as the details of the types of building from different periods of the past (covered by the core curriculum for primary education in Poland, Ministry of Education). Unfortunately, there are no references to contemporary, modern architecture and urban planning, and the students are not fully trained to take part in participatory activities, e.g. city planning. They are also not properly educated to evaluate the aesthetics of surrounding space, so they might avoid or be excluded from improving their surroundings.

The aim of this study is to explore the benefits of spatial education workshops for both primary school students and students of the Faculty of Architecture. Are these workshops beneficial for both groups? What are the skills developed by both groups, and do they comply with the core curriculum in primary school education and the major-related learning/educational outcomes as presented by the Ministry of Higher Education? The research evaluated the planned outcomes and achieved results of the workshop programme, according to both educational requirements.

EDUCATIONAL STANDARDS FOR ARCHITECTURE IN POLAND

In Poland, architecture education at high school is a part of the National Qualifications Framework and is conducted by universities. This is in accordance to the standards issued by the Ministry of Higher Education. The educational process is supervised externally by the accreditation committees and internally by the education quality committees. The standards of education have changed recently and the new programme of studies started in the academic year 2019/2020.

A general outcome of the study is:

- Knowledge of the relations between man and architecture and between architecture and the surrounding environment, and the need to adapt architecture to human needs and to human scale.
- The social competence of respect for the diversity of views and cultures and to show sensitivity to the social aspects of the profession; as well as the competence of lifelong learning, including by undertaking second-cycle and post-graduate studies or participating in other forms of education.

These were the issues included in the curriculum, which were addressed during the workshops that were held.

FOURTH-GRADE PRIMARY SCHOOL STUDENTS' SPATIAL EDUCATION WORKSHOP

The first edition of the spatial education workshop for the fourth-grade primary school students and second-year architecture students (see Table 1) took place as the part of a second-year single family residential buildings design studio. It was prepared in co-operation with *Włodzimierz Tetmajer* Primary School No. 50 in Kraków. The activity took place as a part of celebrating the Cracow University of Technology Day. It was found that not only primary school students took advantage of participating in the event, but also architecture students benefited from it, so the workshop was repeated in the following years (see Table 2).

Table 1: Workshop aims of both participating groups of students.

Primary school	Second year
<p>Aims:</p> <ul style="list-style-type: none"> • learning career opportunities; • learning about university facilities; • conducting functional programme analysis; • creating original designs; • design project co-operation; • presentation of the work. 	<p>Aims:</p> <ul style="list-style-type: none"> • developing knowledge transfer skills; • creating methods of gaining information on the needs of the final user; • respecting preferences of the final user of the design; • working with the final user; • leading the design group; • passing on knowledge on principles of architectural design.

Table 2: Benefits for the two participating groups.

	Primary school students	1st degree, 2nd year students, major: Architecture
Assumptions according to the core curriculum and the general outcomes of the study	<ul style="list-style-type: none"> • Knowledge of the elements of the history of architecture and architectural details. • Skills in spatial composition. • The skill of understanding and using scale. 	<ul style="list-style-type: none"> • Knowledge of the relations between man and architecture and between architecture and the surrounding environment, and the need to adapt architecture to human needs. • Social competence: respect for diversity of views, sensitivity to the social aspects of the profession. • Competence of lifelong learning, including participating in other forms of education.
Outcomes: gained knowledge and competence	<ul style="list-style-type: none"> • Learning about career opportunities. • Learning about university facilities. • Conducting functional programme analysis. • Creating original designs. • Design project co-operation. • Presentation of the work. 	<ul style="list-style-type: none"> • Developing knowledge transfer skills. • Creating methods for gaining information on the needs of the final user. • Respecting the preferences of the final user of the design. • Working with the final user. • Leading the design group. • Passing knowledge on the principles of architectural design.
Results: improved skills	<ul style="list-style-type: none"> • Creative skills; • Mathematical abilities (scale). • Discussion. 	<ul style="list-style-type: none"> • Leadership skills. • Argumentation and reaching compromise.
Impact: other benefits (soft competencies)	<ul style="list-style-type: none"> • Student - mentor relationship. • Respect. 	<ul style="list-style-type: none"> • Mentor-student relationship. • Self-assurance.

WORKSHOP AGENDA AND PROGRAMME

The workshop began with a tour around the Faculty of Architecture building in Podchorążych Street in Kraków. The primary school students had the opportunity to learn about the history of the building, as well as the contemporary use of the structure. The visit was followed by a short, open lecture on *Who an architect is?* After the introduction, the children started to work in groups of two to four, supervised by a second-year student.

The first task was analytical; the students were asked to come up with a functional, spatial and aesthetical programme for a single family house designed according to the needs of this age group of users. After completing the task, the design teams moved on to creating a working model of the house, according to the previously discovered assumptions in the scale of 1:100. The final part of the workshop was presenting the designs by each group and spatial arrangement of the models in a shape of the single family housing complex.

DISCUSSION OF THE RESULTS

The study involved two occurrences of the spatial education workshop. Participants in the workshop were: in the first case - 25 fourth-grade primary school students and 14 second-year architecture students (see Figure 1); in the second case - 22 fourth-grade primary school students and 14 second-year architecture students (see Figure 2). The results were gathered from interviews with the students conducted by primary school and academic teachers.

The primary school students had to respond to initial and final questions regarding improving their knowledge about the architects' work. The inquiry was based on three questions:

- *Who an architect is?*
- *Do you know what is urban, architectural and interior design?*
- *What is the concept of scale used for in architecture?*

Students also had an opportunity to describe other impressions of the workshop in an open part of the interview. The same questions were asked before and after the design workshop.



Figure 1: 2017 Workshop participants: 4th grade primary school and 4th semester Bachelor of Architecture students (Photo: Patrycja Haupt).



Figure 2: 2019 Workshop participants: 4th grade primary school and 4th semester Bachelor of Architecture students (Photo: Patrycja Haupt).

The knowledge on the architects' work ranged from the initial answer, which was a person who designs houses, to the statements that architects design buildings and even cities. The children had an idea of the different, scaled objects that architects deal with and they could practically use scale in their design using triangular rulers. The additional open responses mostly were that they want to become architects in the future. The students also stressed the positive impact on the design teams of teamwork with their classmates and older colleagues.

The second-year students had to state whether the workshop was an educational experience for them and from what they benefited the most:

- *Do you find the workshop beneficial?*
- *If yes, in what way?*

These were the questions they had to answer after completing the design activities. The students' responses stressed they did not expect to benefit from this activity and they even considered it a waste of time. After the workshop was conducted, the students found it useful in predicting the needs of users; they learned to defend their stand and convince others through logical argumentation, thereby developing an analytic and empathic approach.

Apart from the developed skills, they felt much more self-confident in the design after being appreciated as mentors by the primary students. Some of the students also mentioned that experiencing unlimited creativity and out-of-the-box thinking by their younger colleagues have triggered a new way of solving the design problems they were facing in their course design projects.

SUMMARY AND CONCLUSIONS

The core curriculum, as well as programme of studies may be carried out fruitfully by unconventional activities, such as design workshops. The benefits of conducting such events can be mutual in learning different approaches and various perspectives. The architectural space is a place of mutual interest to different groups of people so it creates a bridge for education. Learning by design raises awareness of the social role of an architect and the role of space. This may correlate with involvement in participatory activities regarding the surrounding space.

There is a still, in a way forgotten, need of the student: mentor relationships helping primary school students develop awareness of their future career possibilities, helping in developing positive role models for their future education, job and lifestyle. These are the soft competencies that are important especially in user-sensitive branches of technical education, therefore there should be further studies carried out in this field.

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