A HOLISTIC APPROACH TOWARDS TEACHING
ARCHITECTURAL CONSERVATION

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Abstract. This paper attempts to analyse the results of two projects focused on the holistic approach to education in the field of architectural conservation with an extensive use of computer technology. The adopted didactical method of training students, which has been run two times to date, is explained and the guidelines of the future are suggested. Concurrently the paper contributes to the discussion on integration of IT within design studio.

1. Introduction – contemporary trends in the CAAD education and the architectural conservation

The pace of change in communications and information technology continues to accelerate, bringing with it opportunities and challenges in seemingly equal measure. The education of architects in the field of architectural conservation should, therefore, keep up with new technology, which opens potential innovations in teaching, learning and research. It is clear new impulses are needed to develop the added value of CAAD to the architectural conservation design process.

Recently the widespread discussion on the place of computer technology within curricula has taken place and two major different approaches have been identified (Mark, Martens, Oxman, 2001). These can be accurately defined as follows:

− isolated course focused on computer-based drafting skills;
− integration of computer technology within design studios.

Concurrently the controversial role of IT in the field of architectural conservation has been stressed by some authors (Ashton, 1995). The computer-aided drawings are often being considered by some traditionalists
too mechanical and sanitised, and therefore inappropriate for such application. More recently, tremendous success of the Tavernor’s study of Alberti (Tavernor, 1998) with extensive use of 3D modelling, drawing and digital photogrammetry has, however, indicated that history of architecture and architectural conservation benefited from the use of computer technology and so deserve to be taught in conjunction with the use of computing tools (Dumont, Hughes, 2001; Seebohm, 2001).

2. The CAAD education and the architectural conservation at the Institute of Architecture and Urban Planning at the Technical University of Lodz

At the Institute of Architecture and Urban Planning at the Technical University of Lodz, Poland, students are taught according to the traditional curriculum, which has not been modified significantly for some twenty years. All courses are compulsory and a number of them is run in parallel during each semester. For example the third-year students work on architectural conservation design and, concurrently, they have a course of 3D modelling, during which they work on a 3D model of chosen masterpiece of architecture. The both projects are usually elaborate and therefore time-consuming. What is more the students dealing with conservation project use CAAD even if tutors did not require it. Unfortunately, the results of application of computer technology are often confused mainly due to the lack of professional guidance. Not surprisingly, the outcomes achieved by students are, thus, not satisfying. What is more, many students use CAAD only for producing plans. The staff from the Architectural Conservation and CAAD units wanted, therefore, to improve the quality of students’ work within the existing curriculum and to provide students with a comprehensive education. In this way the experiences of tutors from different units were brought together to develop a new vision on the creative use of CAAD. The idea was developed through the conservation project integrated with a corresponding 3D modelling. Such projects were run during two subsequent years and this paper presents their results.

2.1. CASE STUDIES

During the first year students worked on the modernisation and extension of the industrial museum housed in the old 19th-century textile mill, while during the following year the re-use of the site of medieval castle was chosen as a design subject. The projects followed a “task-force” pattern and, what is more, the briefs for the students’ designs were given by the real would-be investors. In addition the projects at their preliminary stages embraced the
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site surveying including a participation in archaeological excavations and inventorial measurements done by students. Both projects concluded with exhibitions of students’ designs. Finally, the project dealing with the re-use of castle remnants was done in co-operation with the School of Architecture at the Technical University of Mainz, Germany, what created an opportunity for the transnational and interdisciplinary comparisons, which was achieved through the international conference summing up the whole project.

2.1.1. Modernisation and extension of the industrial museum in the old 19th-century textile mill

Lodz, with the population of some 800,000 is the second largest city of Poland and the biggest complex of surviving 19th-century architecture in Poland. One of the most important groups of buildings of the period are the textile factories. The most important example of early mill architecture in Lodz is so-called “White Factory”, built in 1835-37 and extended in 1838-48 (Figure 1).

The four-storey building had plastered, elevations severely classicist in design. The main façade, overlooking Piotrkowska Street – the main street of the town, was arranged with three projections surmounted by the pediments. The mill had originally three wings built around the courtyard with an engine-house (where the first steam engine in the city had been located) and octagonal chimney. 120 years after establishing the enterprise by Ludwik Geyer the mill hosted the Museum of Textile History (presently the Central Museum of Textiles). Museum was gradually overtaking factory from the industry. The process was completed in the late 1990s, when the production had been ceased in the last, fourth wing of the mill. This resulted in necessity of re-organisation the functional layout of museum.
The task was to be dealt with by third-year students during the academic year 1999/2000. The students during the course of architectural conservation were designing an extension of the museum housed in the factory, while concurrently they were building a 3D model of the “White Factory” as it was existing then. The Architectural Conservation Unit provided the measured drawings done by the same students during the summer training preceding the course of architectural conservation. Two-person teams were expected to create virtual models based on those plans and elevations. The figure 2 shows selected examples of students’ works done during the course of computer techniques.

![Figure 2. Examples of students’ works.](image)

During the project students worked with professional architectural software (ArchiCAD) which proved to be flexible tool to deal with both drafting and modelling. The internal structure of the building remained untouched since the time frames were limited to two hours per week only according to the existing curriculum (30 hours in total). The main focus was, therefore, the shell of the mill and its external architectural treatment. Students, had to, however, create their own library elements, e.g. windows to achieve accurate reconstruction of the “White Factory” (Figure 3).
2.1.2. Re-use of the site of medieval castle
Lubawa is a small town located in the North-East of Poland. It was founded by the Teutonic Knights’ Order whose castle was built on the nearby hill. Nowadays Lubawa is provincial town lacking distinction and image. The massive castle walls were reduced to the basement level and the whole structure remains in ruin occupying large area in the town centre (Figure 4).

Local authorities understand the importance of the local heritage and seek opportunities to unlock its potential. The first stage was archaeological dig done by research staff and students from the University of Lodz. The knowledge about the history of the castle increased significantly but there...
was not still any clear vision what should be done with the site. The
to produce feasibility study to find the
most suitable use of the castle ruins.

Students from the Institute were expected to make concept designs during
their course at the Architectural Conservation Unit. Having the experience
from the previous project dealing with the textile museum and done in co-
operation with the CAD Unit it was decided this scheme would follow the
similar pattern and should be conducted simultaneously in both units. What is
more, the Institute’s German partner – the School of Architecture at the
Technical University of Mainz – was invited to participate in this project.

The two-person teams worked during this project on the architectural
proposals of re-use of the castle hill to fulfil requirements of the course of
architectural conservation. Another issue was to be solved to fulfil the
requirements of the CAAD course. No plans and photographs have survived
of the original appearance of the castle. Students were, therefore, asked to
make 3D models of castle being hypothetical reconstructions of the original
structure (Figure 5).

Figure 5. Examples of students’ works.
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Figure 6. The exhibition summing-up the Lubawa project.

The results were shown to the public during the exhibition of students’ designs. It was organised during the international conference summing up the whole project with participation of local authorities as well as the staff and students from the universities participating in the Lubawa project (Figure 6). The project was supervised simultaneously by the tutors from the CAAD and Architectural Conservation units providing students with comprehensive consultations, depending on the nature of the problems.

3. Conclusions

3.1. LESSONS FROM THE PROJECT

The paper presents analysis of the outcomes of the two-year scheme, which proves to be successful in a few ways. The project reached a maximal effect by making it a short intensive course. The close co-operation of architectural historians, conservators and CAAD tutors throughout the project not only has achieved aimed goals but also it seems to be a good source of lessons for similar projects in future and, furthermore, for educating students of architecture in general. For example the real learning effect for students was the experience of designing in response to the real needs. This required the on-demand CAD learning within the course. Concurrently modelling revealed unsatisfactory understanding of structure of old buildings, e.g. the use of wrong texture (bricks) for columns’ capitals. Through the creation of a small, yet complex task, the students were faced with solving several different aspects simultaneously. Despite the short time available, all groups were able to present interesting outcomes. Finally, the competitive nature of the course was an important motivating factor.
The architectural conservation is the field in which the computer technology cannot be considered merely as electronic alternative to the traditional methods. CAAD offers a lot of new possibilities and there is an increasing number of examples showing the new technologies support and change the design process in a positive way. The analysed project proved that the CAAD systems can indeed be the key for unlocking the full potential of computer technology in architectural conservation with the focus on 3D modelling employed in architectural interpretation and reconstruction. Due to the nature of architectural conservation design it would be difficult to eliminate the hand-made drawing but the progressive education of architects would open the new opportunities and the ramifications of IT in the field of architectural heritage are going to be immense.

3.1. GUIDELINES FOR THE FUTURE

The existing course of computer techniques provides students only with knowledge of chosen software supporting architectural design. There is lack of education of the skills necessary in the further transformations of the project and its linking with various information.

The use of computer techniques is, however, extremely important from the point of view of professionals involved in conservation practice. Multimedia can be particularly useful in documentation and creating old prints archives, in work with various records and registers. Digitising the most valuable files has become popular recently. The files can be accessed electronically and the work with originals is becoming not necessary. This enables better conservation of the precious documents.

The traditional registry files store data about architectural structures in the form of text sometimes enhanced with drawings and photographs. Even the best photographs present the monuments only to a certain extent. Numerous architectural details may be omitted. The successful management of traditional registry entries is also problematic.

The CAD and virtual reality tools already used by architects, due to their advantages described above, may be adopted in this field as well. Moreover, the system of multimedia presentation of historical buildings should be established. The registry managed in this way enable all interested persons to analyse collected data comprehensively and retrieve easily required information.

Another interesting use of multimedia techniques is reconstruction of not existing buildings (both, demolished and not executed). Such models can be also created for the most important architectural monuments heavily affected by the great numbers of visitors. In this case 3D models can form bases for exhibitions enabling virtual tours of mentioned buildings.
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In the light of the above statements it is clear that the gap exists in architects’ education. Thus, there is a necessity to extend curriculum. The new educational program should include the following aspects:

− digitising (scanning and editing) the existing files (photographs, architectural hand drawings, measured drawings;
− photogrammetry;
− building virtual models (architectural, urban, conservational);
− gathering various kinds of information and creating databases;
− preparing multimedia presentation and providing on-line access through the Internet.

In the times of dynamic growth of the importance of IT technologies is visible in almost all fields of life. Also preservation and conservation should employ the latest techniques, especially those already used in architecture and urban planning. The rapid transformations result that yesterday advanced technologies are becoming standard solutions nowadays. This should lead to revision of the methods employed by conservation officers to the gathering and archiving data on the historical monuments. The introduction of computer techniques can result in the growth of efficiency form one hand and in improved access to the most valuable monuments of our cultural heritage from another.

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