Maria HELENOWSKA-PESCHKE
Gdansk University of Technology
Faculty of Architecture, Department of Visual Art
rd Narutowicza 11/12, 80-288 Gdansk
phone/ fax: 58 347 15 20   e-mail: mhelen@pg.gda.pl

SOFT GEOMETRY – CHALLENGE
FOR ARCHITECTURAL EDUCATION

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The subject of this paper is related to the challenges facing the faculties of architecture at the Polish universities in the context of increasing significance of the applications in which the geometry is defined by the user by the means of a computer script. In western countries, a growing need to enhance the educational curriculum with programming skills and algorithmic thinking was noticed at the beginning of 2000. Today, many leading universities offer the opportunity to learn scripting languages in the framework of the program of study. Important role in promoting the culture of using a new generation of graphic algorythm editors is played by the Smart Geometry Group established in 2003.

In her article the author raises various aspects of implementation of computer technology in the faculties of architecture in Polish universities pointing out some backwardness in relation to the needs and progress in the AEC industries. The current state is on one hand the result of the academics' commitment to traditional methods of designing and on the other hand binding force of outdated standards provided by the Ministry of Science and Higher Education. The current recommendations for information technology at engineering faculties include basic competencies placed within the timetable of the first semester. Defining the full model of education in the field of computer technology in architectural design is the responsibility of individual Faculties Programme Councils and depends mainly on the personal preferences and of its members and their's awareness of the changes in the field of digital modeling and designing. A strong impetus for change comes from genuine interest in the mastery of computer tools shown by numerous group of students.

This article presents in brief changes in the current western design practice related to the implementation of advanced associative-parametric methods of defining geometry and form finding. This presentation seeks to answer the following question: How much programming knowledge is likely to become essential design competence in the coming years for all young architects, not just those with inclinations for seeking innovative formal solutions and the use of advanced building technologies? On that background the need to update and revise the objectives of teaching material such as descriptive geometry, mathematics and computer technology is also discussed. For instance,

according to the author it would be beneficial to put the emphasis in teaching content on issues related to curvilinear surfaces and their characteristics within descriptive geometry courses and mathematical description of curves and surfaces within the subject of mathematics. Also discussing geometric procedures (which are sequential by nature) written in the form of computer script would allow for the change in the position of input elements and in consequence favor the development of students' spatial imagination, geometric intuition and algorithmic thinking. This entails the necessity for introducing scripting preferably by means of visual algorythm editor in the first year so that students would gradually assimilate necessary competence during the whole study. As experience shows, visual algorithmic editors such as Grasshopper are easy to learn at a basic level but very difficult to master. Limited freedom of movement in the digital environment leads typically to overuse of several easily digestible options such as automatic population of components on curvilinear surfaces. Another example is the abuse of Voronoi diagrams automatically generating interesting geometric patterns. In architectural practice scripting allows for optimization and form finding in respect to certain design criteria such as surface developability, minimizing stress, etc.

Conclusions from the changes in architectural practice in western countries documented in the literature and observation of CAD environments development directions lead to a conclusion that the skills associated with the use of scripting languages should be included in the architectural education curriculum. In Ali Rahim words: *"We do not believe in 'style', we believe more in the mastery of technique as this always yields the most sophisticated architecture."* (Ali Rahim, 2013)

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