

Buildings typology education in the Faculty of Architecture at Slovak University of Technology in Bratislava, Slovakia

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ABSTRACT: Typological education has a long history in the Faculty of Architecture at Slovak University of Technology in Bratislava, Slovakia (FA-STU). In the history of Slovak architecture and education, there have been periods when architectonic creation was subsumed by social conditions and this was reflected in typology education. The portfolio of typology education at FA-STU is concerned with production and engineering structures, among others. The educational content and methodology have undergone major changes, which are reflected in content and societal factors, such as the number of students and the attraction of the discipline. Special attention is paid to the knowledge and skills obtained by students. The authors explore the application of typological education to production and engineering buildings.

INTRODUCTION

With the development of society the attitude to architecture and its importance has changed. This leads to paradigms of architectural education in methodology and typology. Typology in architecture is perceived as a professional activity that is a basis of architectonic creation. As such it should be acquired by students of architecture and not perceived as a *necessary evil*. Typology in architecture is not fixed but dynamic and changeable [1]. Typology is the comparative, taxonomic study of physical or other characteristics of the built environment [2].

The etymology of the word typology points to its wider meaning. In connection with architecture, it is mainly a study of types and their classification, sorting into categories and groups based on differences and conformities. The biggest benefit of using typology in practice is to collect data about the functioning of buildings and their architectonic creation.

The education in these subjects focuses on a required level of competence gained by students. It is exceptionally important that there is a connection between academic knowledge and reality, to counter the perception that *school is detached from practice*. It is the synergy of theoretical knowledge and practical skills that is necessary for architectonic design.

TRADITIONS AND CONTEXT OF TYPOLOGY EDUCATION

For many years, the Faculty of Architecture at Slovak University of Technology in Bratislava, Slovakia (FA-STU) has been noted for its buildings typology education as a basis for building design. Typological disciplines, which are taught at the Faculty include traditional typologies focused on building design and subjects aimed at land and garden architecture, monument restoration, interior design and surroundings context. Each area, despite common typological characteristics, will have specific features, which require different educational procedures. Individual typologies have gone through gradual development, which is a reflection of social and technological development. As well, there has been a gradual change in approach to educational methodologies.

Architecture is evaluated by specialists and artists from other areas and many times this is done aptly. Buildings (in the broadest sense) should be built typologically right. They should be built to be lived in and not looked at - this is a well-known statement of Francis Bacon's reported by Koula [3].

The first requirement of architecture is to fulfil its purpose; architecture should serve people and should not be characterised only by the aesthetic. Koula goes on to opine *...it is a pure building organism which merges material, structure, disposition and function in one logical, harmonious unit* [4]. Permanence is important nowadays in production buildings. As far as possible, a building designated for a particular purpose should express that purpose in all its parts *...the force with which that function is expressed measures its value as a work of art* [5].

It is necessary to set typological education into a wider social-political and economic context. The start of architecture education in Slovakia (1946) was marked by the social surroundings, the influence of architectural professors Karfík, Belluš and Lacko and by the need to produce industrial buildings, as well as the type of building production which was reflected in the education. The top representative of this trend was the architectural professor Karfík.

A close relationship with a world-famous industrialist, Tomáš Baťa from Zlín (Czech Republic) in the period between the world wars influenced typology building education at the FA-STU and demonstrates the importance of co-operation between the worlds of business and architecture. Baťa in his reflections about advances in production claims they are based on making small improvements at every step [6]. The task of an architect is to facilitate these advances by the architecture and typology.

In the 1970s, when FA-STU was founded, its typological orientation was reflected in the names of departments, e.g. *Department of Architectonic Design, Typology of Residential and Public Buildings* and the *Department of Industrial and Agricultural Typology*. Nowadays, institutes have a typological focus both organisationally and thematically. Education models contain typologically focused subjects and their application to the design of residential, public and production buildings.

Keeping traditions should not mean stagnation. The application of typology is a reaction to new kinds of modern buildings, and reflects the changing needs and requirements of users in residential buildings, public buildings (catering, retail, culture, sport and leisure, education, healthcare), production (industry and agriculture) and engineering. Typological variety increased after the change of social conditions in the 1990s, also under the influence of cosmopolitanism.

Dealt with in this article are changes to the teaching of building typology for agriculture, industrial production and engineering buildings.

Typology Education for Production and Engineering Buildings

The important place of production buildings in the development of architecture was noted by many architects, e.g. theoreticians Miľjutin, Garnier and Le Corbusier, who stressed functional-space relationships [7]. They are dominant opinions from the period of functionalism, but are still valid today. The beauty of the architecture of production equipment had not gone unnoticed by the great Frank Lloyd Wright, who saw inspiration in the English countryside and in new factories [8].

Production buildings, which were often characterised *only* as halls are nowadays becoming a valid typology kind. New characteristics arise from the combination of types of buildings in industrial parks and farms, which reflect the development of society, industry and agriculture. A modern school has to reflect this new status in projects and practice.

New typology kinds reflect functional relationships; connections show space links and new demands on surroundings which impact on education. The investment boom in Slovakia is nowadays oriented mainly towards residential and public buildings, where there is a *higher added creative value*. Academia reacts to this with a decline of interest by students in production buildings. After 1990, there has been a decline in specialisation in education.

Despite this, it is necessary to maintain, develop and innovate in typology education, which is part of the profile of an architecture graduate. This does not only affect the Faculty of Architecture at STU in Bratislava, but can be seen in other European schools of architecture, which traditionally also covered the design of production buildings.

An example from Kazakhstan makes the point. Currently, the main areas of training are the architecture of residential and public buildings, as well as urban construction. However, despite the lack of specialisation, there is a need to train architects for the growing production sector. In the past, students of architecture had to find structural-technical solutions for specific production projects. Special attention is being paid nowadays to projects that involve innovative technologies, such as the use of renewable energy sources, as well as waste-free and environmentally friendly manufacturing [9].

Other reasons for a decline in interest can be found in academia. It is evoked by a relatively demanding study caused by:

- wide range of study involving the integration of other subjects;
- the need to think about construction;
- low level of direct experience, which is not as common as with other typology kinds of buildings.

In the past, FA students learnt typology at a Bachelor level of study. Nowadays, so-called common year topics are taught because of greater efficiency. A task that all students undertake in a study year would form a good basis for comparative evaluation of student choice [10]. Such a task involves a student choosing from nine typology options at the second level of study. Production buildings are not attractive as mentioned above. That is why a new methodology of teaching is being looked for in typology education at the Bachelor level.

Typology education related to production buildings has evolved over time in Slovakia:

- *First period:* 1946-70 (start of education, strong influence of social-political and economic trends, limited possibilities for non-typical development). Education was by traditional methods of memorisation of then-known types of building, plant, functional detail and structural connections by additive tasking. Typology featured a dispositional diagram, which did not place functions into space and by a graphic to indicate connections and sequences [11]. A final typological output was an annotated graphical work.
- *Second period:* years 1970-90 (unification of design and attempts at typology differentiation). In education, complex designs appeared for production segments with elaborated compact parts. Education reflected legislative changes in building design and changes in education at universities. Methodology combined methods with a practical connection of typology for buildings for production (see Figure 1).
- *Third period:* years 1990 - present (variety, lower dependence on technological - production sphere of engineering). More possibilities of architectonic innovation and typology. A change of legislation in connection with integration into the EU. There were dynamic changes in education with more freedom in teaching. Methodological experiments over the content of education. Overall education has a direction towards sensible practice (see Figure 2).

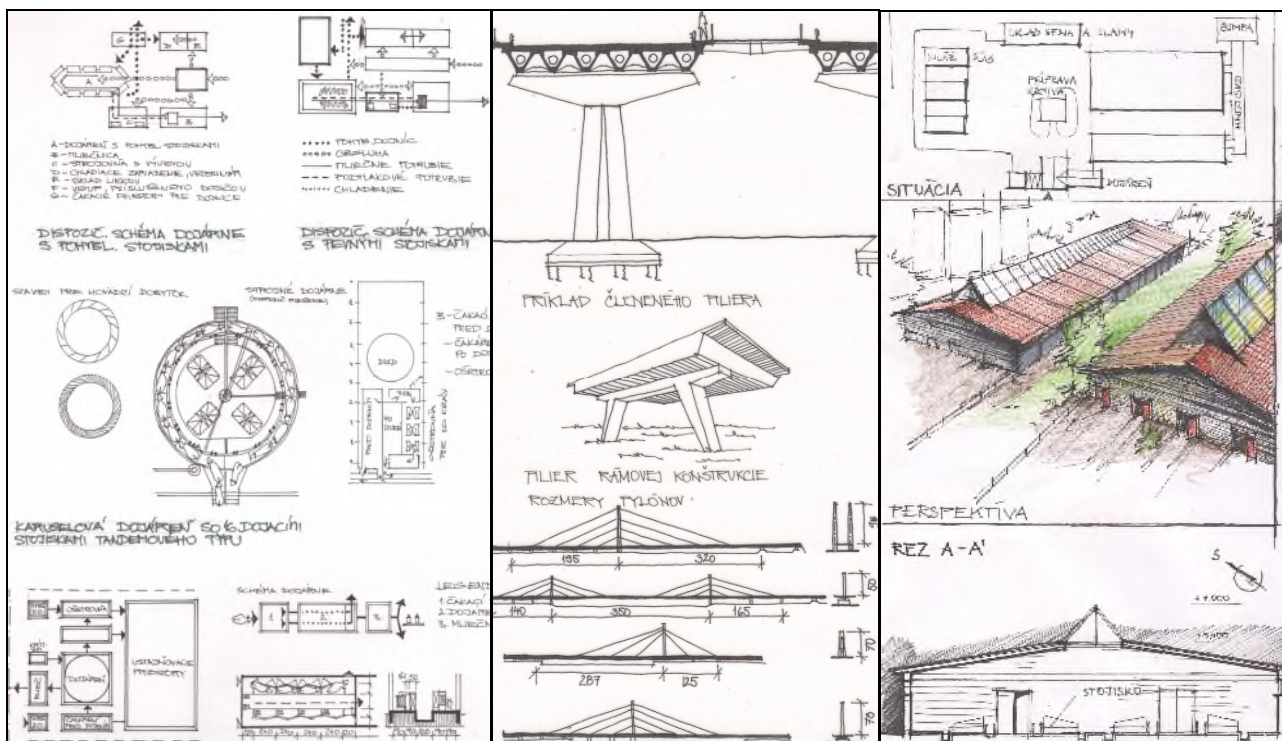


Figure 1a) and b): Examples of typology-oriented outputs.

Figure 2: Typology application.

Third Period of Typology - Production and Engineering Building Education

A change occurred in education in the second period 1970-90. Education for industrial, agricultural and engineering buildings was narrowed, driven by social change and a lower number of teachers. There were two crucial problems to solve:

1. How much education will there be in individual areas, such as industrial, agricultural?
2. How to change the methodology to lower the number of lessons, while retaining the knowledge and skills?

The authors have maintained the content of the typological education. However, lectures and practices must be oriented to changes and trends. The content of typology subjects at FA-STU is shown in Table 1.

The priority is for a student to understand basic typology items, as well as their relationships and connections. The student can then apply the principles to the specific conditions characteristic of the operation of production buildings (e.g. higher static and dynamic loadings, security, hygiene, humidity and warmth). Such factors influence typology in building design. Typology is not a dogma, but is dynamic and changeable.

Methodology addresses architectural relationships and creativity with tasks oriented towards continual learning. The methodology developed by the authors featured a modified 4-phased Kolb cycle [10]. Comparison and summary of methods used for typology subjects is shown in Table 2.

Table 1: Building typology subjects.

		Kind of subject	1st period (hours a week)	2nd period (hours a week)	3rd period (hours a week)
Building typology	Residential Buildings	C	4	4	4
	Public Buildings I	C	4	3	3
	Public Buildings II	C	4	5	3
	Agricultural Buildings	C	3	4	3
	Industrial Buildings	C	3	4	
	Engineering Buildings	C	-	1	
Specific typology	Monuments Restoration	C	-	1	3
	Interior	C	-	2	3
	Architecture and the Environment I	C	-	-	3
	Landscape Architecture	C	-	-	3
	Hours of education a week		18	24	25

Note: C - compulsory subject

Table 2: Methods used in typology subjects.

		1st period			2nd period			3rd period		
		A	B	C	A	B	C	A	B	C
Building typology	Residential Buildings									
	Public Buildings I									
	Public Buildings II									
	Agricultural Buildings									
	Industrial Buildings									
	Engineering Buildings	-	-	-						
Specific typology	Monuments Restoration	-	-	-						
	Interior	-	-	-	-	-	-			
	Architecture and the Environment I	-	-	-	-	-	-			
	Landscape Architecture	-	-	-	-	-	-			

Note: A - teaching methods: based on additive principle, memorising and mechanical exercises
 B - teaching methods: memorising in combination with some creativity (fragments design)
 C - teaching methods based on practical verification with some creativity (whole parts design)

Education must address the questions of how to teach, what to teach and how to evaluate. Knowledge verification is important and is part of subject evaluation. Examinations mainly reflect subject teaching, while subject evaluations are a part of departmental evaluation, which makes testing very important.

Many universities set up standardised teaching with content, solutions to coursework and assessment criteria clearly defined. This is less applicable to oral examinations, focus-group discussions, course projects and reports. The single examination mode is not conducive to talent cultivation at universities. Examination reform should be advanced to become multi-course, progressive and integrated [12].

Examinations reflect teaching and content with three levels of examination to verify knowledge:

- Simple tests - sets of questions and answers based on memorisation;
- Level tests - questions which differentiate essential knowledge from less important details;
- Application tests - two levels: substantial and less-substantial application tasks.

In examinations (tests), the weightings should be increased for the application of typology knowledge. *To be able to apply* what is learnt and to *verify model solutions* is the most essential skill that a student can acquire. Students can be successful, if they are creative and think in terms of architectural connections.

The oral test is important in measuring a student’s ability at precise oral expression. It is also a tool for a teacher to determine the real depth of knowledge. Figure 3 shows the testing model.

When evaluating a subject, the stress is on tasks connected with the lectured topics. Tasks are set to enable the students to apply taught and practised knowledge, and to be creative.

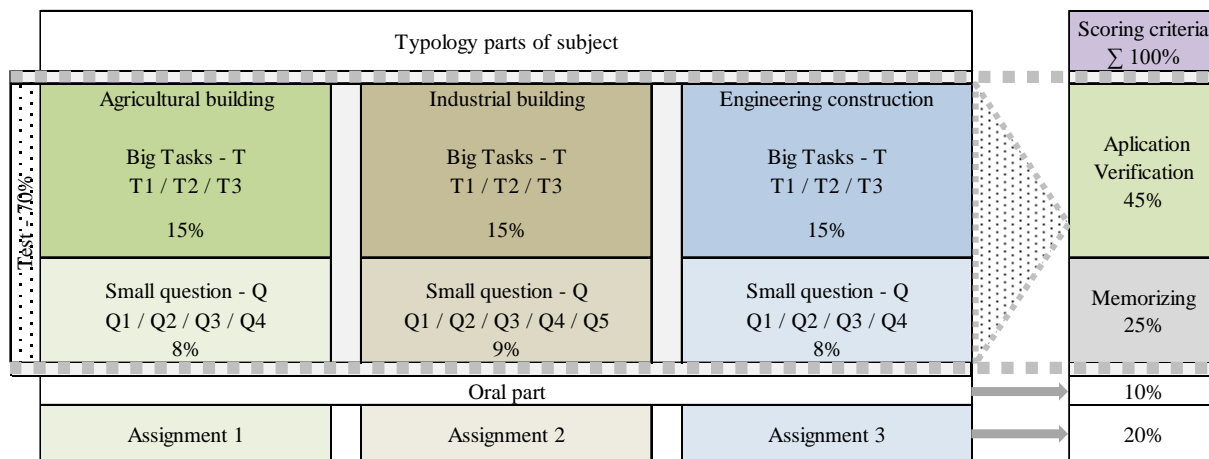


Figure 3: Examination evaluation.

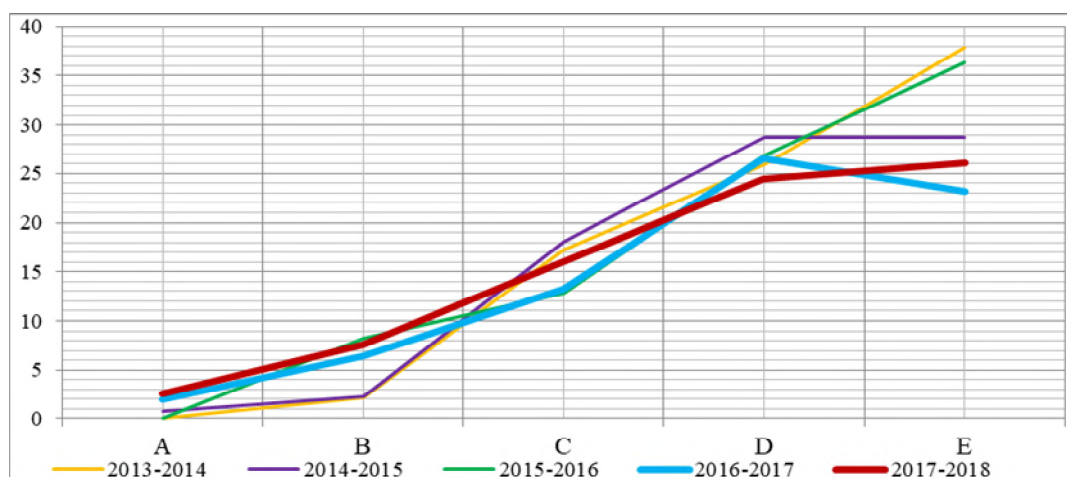


Figure 4: Graphic comparison of results from the subject in view.

Student results were compared over five years, which showed a positive effect of the change of methodology (see Figure 4). There were better results for students on application tests. The number of students with evaluation A and B increased and the number of students with evaluation E decreased. Verification of knowledge by practical application also improved. There was a greater motivation for students in education, as well as for teachers in the challenge of working with weaker students.

CONCLUSIONS

The aim of typology is to introduce basic knowledge of building types. Innovative methods of education encourage creatively in the introduction of these basics.

Theoreticians have dealt with architectural typology since the Enlightenment, which characterises its unique position in the theory of design. It is important to understand typology not only as a tool in architectural design, but also as a tool for the analysis of relationships and connections. It is necessary to put this typology tool into the hands of students who are architects-to-be.

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