Routledge
Taylor & Francis Group

The Design Journal
An International Journal for All Aspects of Design

ISSN: 1460-6925 (Print) 1756-3062 (Online) Journal homepage: https://www.tandfonline.com/loi/rfdj20

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To cite this article: Burkay Pasin (2017) Rethinking the Design Studio-Centered Architectural Education. A Case Study at Schools of Architecture in Turkey, The Design Journal, 20:sup1, S1270-S1284, DOI: 10.1080/14606925.2017.1352656

To link to this article: https://doi.org/10.1080/14606925.2017.1352656

Published online: 06 Sep 2017.

DESIGN FOR NEXT
EAD12-ROME

doi: 10.1080/14606925.2017.1352656

Design for Next

12th EAD Conference
Sapienza University of Rome
12-14 April 2017

Rethinking the Design Studio-Centered Architectural Education. A Case Study at Schools of Architecture in Turkey

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Abstract: The design studio is still at the core of curricular structures in schools of architecture worldwide, and considered the norm for architectural design practice. However, the central role of the design studio in the conventional pedagogical structure of architectural education needs to be re-considered, in order to respond to current social, economic, ecological and technological changes. This study investigates the theoretical bases and practical challenges of the knowledge/skill dichotomy in the design studio. It follows a case study research methodology by conducting a questionnaire survey with the students of the three schools of architecture in Izmir, Turkey. Based on comparative analyses of the survey data, it discusses what sort of knowledge/skill dichotomies can be observed in these schools and how these dichotomies affect career targets of the students. It further aims to draw guidelines for alternative (trans-/multi-)disciplinary structures for the future of architectural education.

Keywords: design studio, architectural education, knowledge/skill dichotomy, multi-disciplinary, trans-disciplinary

1. Introduction

Despite the transformative impacts of the interdisciplinary Bauhaus School as well as various critical approaches to design in the late 20th century, the design studio is still at the core of curricular structure of the schools of architecture worldwide, and is considered as the norm for architectural design practice. However, as the architect has to update herself in accordance with the current changes in society, global economy, ecology, and advances in information technologies, the central role of the design studio in the conventional pedagogical structure of architectural education needs to be re-considered, in order to respond to these changes.

Considering the lack of substantial research on this topic, this study investigates the theoretical bases and practical challenges of the knowledge/skill dichotomy in the design studio. It follows a case study research methodology by conducting a questionnaire survey with the students of the three schools

of architecture in Izmir, Turkey. The first section initially provides a historical overview of the design studio from the atelier system in *École des Beaux-Arts* to the interdisciplinary education in Weimar and Chicago Bauhaus Schools. It also explains how various scholars theorize the implication of architectural knowledge and skills in the design studio, as well as the evolution of the design studio in architectural education in Turkey under the influence of changing social, cultural and political contexts. Based on comparative analyses of the survey data, the third section discusses what sort of knowledge/skill dichotomies can be observed in these schools and how these dichotomies affect career targets of the students.

This study further aims to draw guidelines for alternative (trans-/multi-)disciplinary structures for the future of architectural education, within which various theoretical and technical knowledge on design are cross-related with practical and mental skills.

2. History and Theory of the Design Studio

2.1 A Historical Overview of the Design Studio

The first application of the design studio in architectural education dates back to 1819 when the classical atelier system of the French Royal Architectural Academy transformed into *École des Beaux-Arts*. The *atelier* system in the *Beaux-Arts* program not only aimed to improve "artistic" but also "analytical and structural thinking skills" of the students (Drexler, 1984, p. 92).

The curricular structure of the *Beaux-Arts* School was twofold: practical and formal, in which the design studio was not central but lateral. The practical education was more like a craft training in which the students were learning to work with different materials such as stone, timber, metal, clay and glass. The formal education concentrated on the problems of architectural form through observation, representation and composition, and introduced the theories on space, colour and design (Balamir, 1985, p. 12). In this twofold structure, particular knowledge was gained by means of certain skills, i.e. learning materials by giving form to them, learning geometry, colour, space and structure by drawing, painting and model making.

The Weimar Bauhaus School, founded by Walter Gropius in 1918, brought an "architectonic approach" to architectural education covering various branches of art and design within a broader perspective. Focusing on three-dimensional perception in comparison to the two-dimensional compositional approach of the Academy, the Bauhaus School differed from *École des Beaux-Arts* by providing the students with an ability to unfold their creativity, imagination and personal expression (Balamir, 1985, p. 12). Gropius introduced the philosophy of the Bauhaus in 1919 by manifesting that "there is a close relation among all disciplines of arts and craft" (Benton et. al., 1975, p. 119).

The curricular structure of the Weimar Bauhaus School consisted of three periods: the Introductory Course introducing knowledge on form and composition, the General Course introducing knowledge on space and surface design as well as construction, and the Architectural Course focusing on steel and reinforced concrete buildings (Figure 1). The required knowledge and skills advanced as the student passed into an upper class. While the basic knowledge on form, composition and color were introduced by means of analytical drawing, painting, observation and bodily performance during the Introductory Course, the advanced theoretical knowledge on space, material, function, economy and aesthetics were taught in various theoretical and technical courses and the design studio in the Architectural Course (Salama, 1995, p. 54).

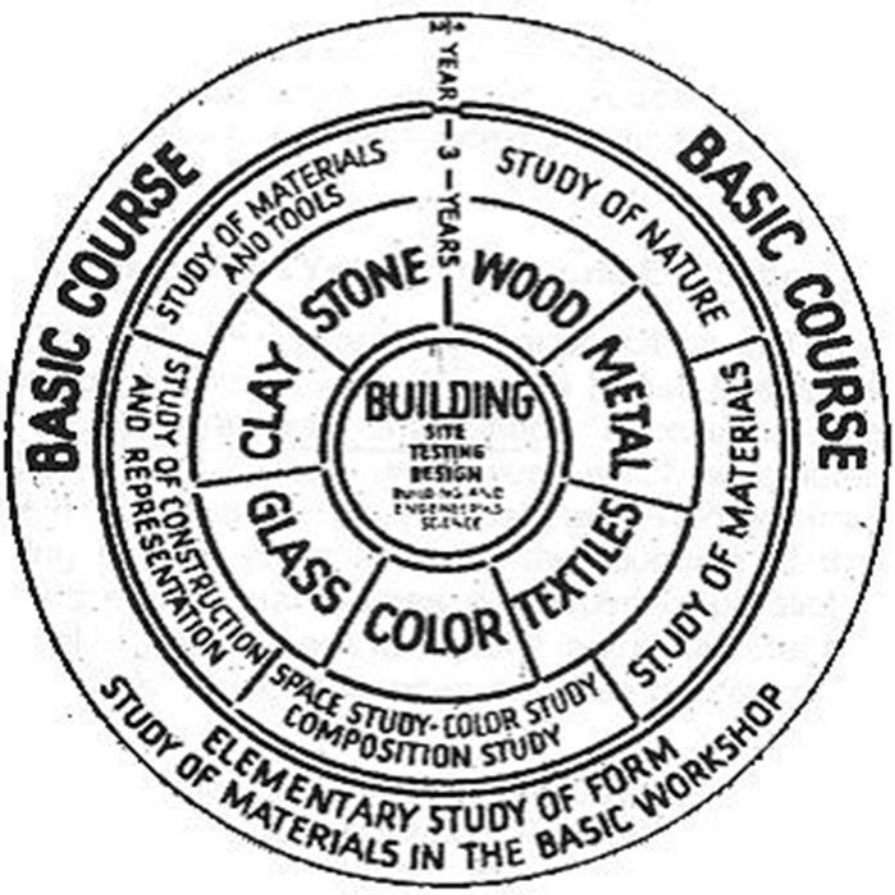

Figure 1. Main organization scheme of the Weimar Bauhaus School (Source: Roters, 1969, p. 14)

The Bauhaus education may be considered as the basis of a design studio-centered architectural education, in which the theory and the practice of architecture were integrated within an inter-disciplinary environment. In contrast to the twofold structure of *École des Beaux-Arts*, practical studies in material workshops of the Weimar Bauhaus School were closely integrated with theoretical studies of color, composition, construction and nature, especially in the last three years of education.

Between 1930 and 1960, schools of architecture in various countries followed two different approaches: the twofold structure of *École des Beaux-Arts* in which *ateliers* were separated from theoretical courses and the three-staged Bauhaus system in which practical and theoretical studies were integrated in *ateliers*. The architectural education in the US had been under the dominance of *École des Beaux-Arts* until the foundation of the New Bauhaus School by Sibyl Moholy-Nagy in Chicago in 1936. As each student in the Chicago Bauhaus was required to take a two-year introductory education including basic design, analytical and structural drawing, model making and basic scientific knowledge, the integration of architectural theory and practice in the design studio seems to have started in an earlier stage than it did at Weimar Bauhaus (Figure 2).

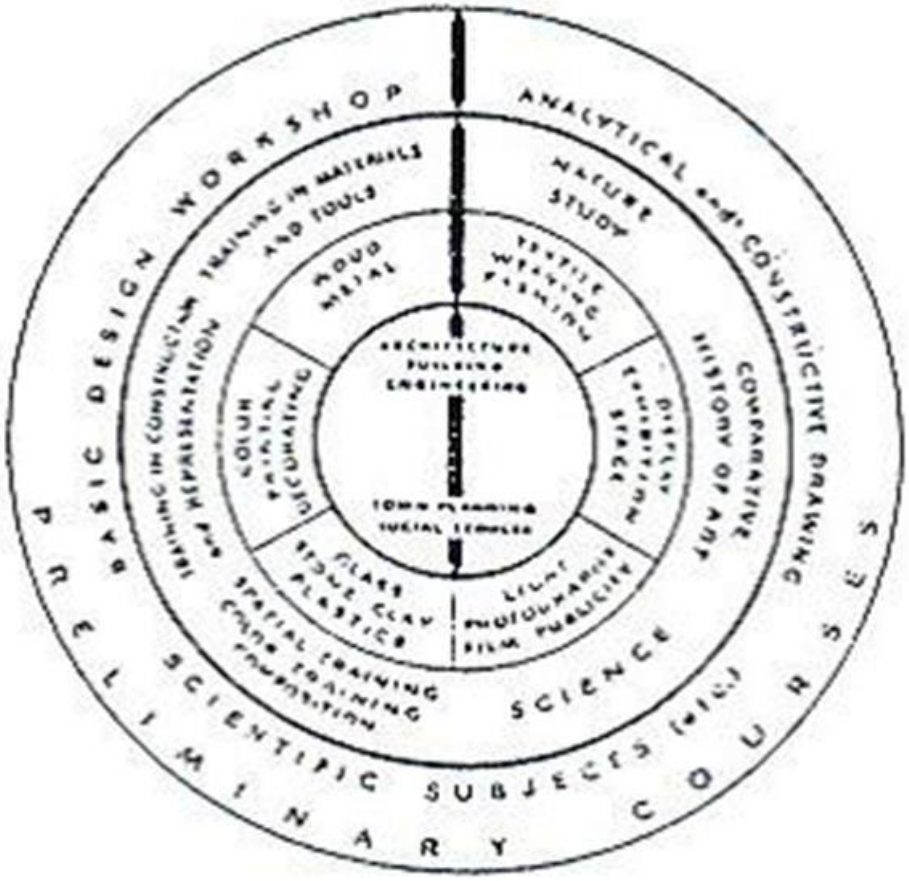

Figure 2. Main organization scheme of the Chicago Bauhaus School (Source: Wingler, 1975, p. 199)

Despite the emergence of alternative studio teaching models such as the case problem model, the analogical model, the interactional model, etc. in the 1960s, as well as the Critical Inquiry and Process-Oriented Design Pedagogy in the 1990s, the current approaches to teaching architectural design continues to follow principles, rules, and practices developed under the influence of the traditional *Beaux-Arts* and Bauhaus models (Salama, 2015). Whether following traditional or critical models, the design studio education in many schools of architecture around the world is characterized at two extreme poles, either abstracted from problems of the real built environment or directed towards the expectations of the construction sector, both of which reflect themselves in the acquisition of various knowledge and skills required from the students of architecture.

2.2 Theorizing Knowledge and Skills in the Design Studio

Contemporary scholars of architectural education approach the design studio from different theoretical and methodological perspectives, yet mostly defending its central role in architectural education. Donald Schön defines architectural design a particular kind of inquiry, “a making of representations of buildings to be built”. This inquiry, he suggests, is “one derived from reflection on spontaneous knowing-in-action implicit in architecture making” (Schön, 1984, p. 4). Accordingly, he considers the architectural design process a “reflective practicum” in which disciplinary knowledge is produced through “reflection-in-action” in the design studio.

Furthering Schön’s approach, Tsungjuang Wang proposes the emerging “paradigm of complexity” for design studio education derived from Complexity Theory. Considering the design studio “the norm or status quo for design education practice”, Wang proposes a paradigm shift “replacing positivist theory with complexity theory, rethinking the epistemology of design, becoming more aware of the

systematic processes of design, and integrating multidisciplinary approaches to design projects and activities (Wang, 2010, p. 174). Fathi Bashier highlights the need for a "reorientation of architectural design education toward an engaging policy that considers the social responsibility of architects" (Bashier, 2014, p. 424). He proposes "an integrated design paradigm" in which rational problem solving and reflective-in-action are integrated within the design process (Bashier, 2014, p. 425).

Few scholars question the central role of the studio by providing emphasis on knowledge production regarding various areas of the built environment. Ashraf M. Salama critically argues that the current culture of architectural education "socializes its members through high emphasis on form and abstract aesthetics while superficially adopting fragmented pieces of knowledge on technology, ecology, social sciences, sociopolitical and socioeconomic aspects" and that the impact of this culture on students could be observed in their lack of communication with public, testing hypothetical solutions during design process as well as knowledge on technology, environment and users (Salama, 1995, p. 106). To overcome this problem, he advocates a trans-disciplinary approach to architectural education, integrating three types of knowledge production: the disciplinary, the cognitive-philosophical and the inquiry-epistemic (Salama, 2007, 2015).

David Nicol and Simon Pilling (2000) emphasize the lack of interpersonal communication and teamwork skills in the design studio, which prevent the students from engaging with a changing society and developing a sense of community. In a similar approach to Salama, they suggest a multi-disciplinary approach to bridge the gap between knowledge and skills required in the design studio. Richard Foqué (2011) proposes a comprehensive approach that establishes an epistemological base for architectural education by means of research and a skill-based curriculum for schools of architecture, in which multi-disciplinary knowledge on architecture could be gained by means of intellectual, communication and social skills. He considers research by design "an essential cornerstone as it conceives possible realities, investigates their desirability, changes the existing reality by implementing a new one and evaluates the resultant reality" (Foqué, 2011, p. 3).

2.3 The Design Studio in Architectural Education in Turkey

A studio-based design education in Turkey in the form of an *atelier* system was first applied in *Sanayi-i Nefise Mekteb-I Alisi*, a royal school, which was founded by Osman Hamdi Bey in 1881 and consisted of four clusters: painting, sculpture, calligraphy and architecture, partially conforming to the *École des Beaux-Arts*. In 1920, the school turned into the Academy of Fine Arts (AFA) but nothing much changed in terms of the school organization or the curriculum of architecture. Between 1920 and 1931, the education at the Academy was based on the study of classical architectural styles (Pamir, 1987, pp. 134-136).

In 1937, the first department of architecture in Turkey was opened at the Engineering School of Istanbul Technical University (ITU). Under the influence of Sedat Hakkı Eldem, Bruno Taut and Ernst Egli, the architectural education at ITU aimed to teach traditional and local construction techniques as part of the design studio. The first architectural school in the capital city of Ankara opened in 1957 in Middle East Technical University where the architecture curriculum emphasized design and summer practice, as well as frequent site visits to parts of Anatolia for a better understanding of settlement issues (Pamir, 1987, pp. 137-138).

Introducing the modernist design principles of Bauhaus and urban issues in the design studio, METU Faculty of Architecture presented a clear alternative to the academic establishments of Istanbul. There was a basic design course in the first year that introduced new concepts and ways of seeing and understanding environments. In addition, the open jury system in the design studio enabled

students to evaluate themselves as well as others in terms of conceptual frameworks and to develop their personalities and architectural values (Pamir, 1987, pp. 138-139).

In mid-1960s, a new program was established at METU Faculty of Architecture that continued until 1982 with minor changes. What had been required subjects were dropped, and a wider selection of electives was offered by new tutors. These electives, especially those with a theoretical content, affected the level of student progressiveness at METU. The structural integration of the course developed around the following schema: design was 40.8 per cent of the total course (TC), the building science course (structures, construction and mechanical equipment) was 25.3 per cent, the history-theory courses were 12.6 per cent, general courses (mathematics, physics, English) were 12.6 per cent, and electives were 8.7 per cent. There was a chance that those who wanted to have a different role than that of designer could do so by taking all of their electives and theory courses in one area. As a result, a significant number of graduates became planners with a social and economic focus, or philosophers, psychologists, computer scientists and the like (Pamir, 1987, p. 140).

In the 1970s, there were a number of empirical studies made on architectural education. A study by Özalp et. al. (1972) revealed that METU emphasized design more than other schools, and that structure, building science and city planning courses were emphasized at ITU. Another study by Aktüre and Birkan (1976) showed that design (including drawing, and urban design) was the most emphasized course in the METU curriculum (49 per cent; lTU: 44 per cent; AFA 40.5 per cent). In this regards, Pamir (1987, p. 142) highlights that the following categorical dimensions in the teaching contexts of architecture in Turkey, which can be considered prevalent dichotomies of knowledge/skill at the end of the 1970s:

- Scientific research and/or explanation of architectural and environmental phenomena vs intuitive uses of architectural traditions and resources
- Social consciousness in architectural design vs consciousness of architecture as art
- Theoretical approaches as the foundation of true architecture vs learning by pragmatic applications and practice
- Regional values of building vs universal traditional values of conceiving architecture

After the military takeover in September 1980, a new control on higher education was set by the Higher Education Council (YOK) which decided on the alternative programs possible both at the graduate level (organized in departments around faculties) and post-graduate level (organized in departments around institutes). YOK proposed a basic infrastructure for architectural education upon which each school was left free to establish its own program. This area of freedom comprised about 37 per cent of the total teaching hours of an academic to be filled through electives, while the percentages of major professional courses were reduced to the following figures: building science 16 per cent, theory and history 3.8 per cent and design about 37 per cent (Pamir, 1987, P. 145).

Although this freedom can be observed today in different curricular structures of state and private schools of architecture in Turkey, the role of the design studio in these schools have followed a similar path to those in other countries in terms of its centrality and adaptation of teaching models. However, the gap between theoretical architectural knowledge and technical skills has considerably enlarged since the 1980s, as a result of the disciplinary taxonomies set by the Higher Education Council. Today, this gap has turned out to be a dichotomy imposing that certain knowledge are believed to be derived out of certain skills, which also affects the career targets of students.

3. Case Study

3.1 Questionnaire Survey

In order to reveal the knowledge/skill dichotomies in the design studio and to understand how they affect the career targets of students, a questionnaire survey was conducted at architecture schools of three universities in İzmir, Turkey. The two of these universities, Izmir University of Economics (IUE) and Yaşar University (YU) are private institutions, where multi-disciplinary approaches are followed in the design studio, while Izmir Institute of Technology (IYTE) is a state institution, where the design studio education is more limited within disciplinary knowledge and skills. Nevertheless, not only the learning outcomes of the design studio in their schools of architecture, but also the profile and background of their students are quite similar. The questionnaire was conducted among only sophomore, junior and senior students considering that freshmen students are not capable enough to give reliable answers since they have not taken a full year of design studio yet.

Based on the architectural education standards of the National Council of Architectural Registration Boards (NCARB) and the professional validation criteria of the Royal Institute of British Architects (RIBA) as well as the Bologna program outcomes of the three schools, the questionnaire was composed of four sections: architectural knowledge, architectural skills, the relation between knowledge and skills, and career targets (Figure 3). In the first section, the students were asked in what level various knowledge were covered in their design studios. In the second section, they were asked in what levels technical, practical and mental skills were covered in their design studios. In the third section, they were asked with which skills those specific knowledge were gained. The fourth section was about their career targets, questioning in which field they are planning to take a position after graduation: design, construction and/or academy.

QUESTIONNAIRE **Date:** .....

This questionnaire has been prepared as part of a research project in order to find out relations between knowledge and skills in the design studios at schools of architecture and their effects on career targets.

ARCHITECTURAL KNOWLEDGE

Please indicate (with an **X**) in what level the following architectural knowledges are given in the design studio.

	Very High	High	Medium	Low	Very Low	Not Known
History of Architecture, Art and City						
Spatial Planning						
Art and Design						
Structural Design						
Material and Construction						
Urban Design and Planning						
Landscaping						
Environmental Control Systems						
Computational Design						
Building Regulations						
Project Management						
Economy and Sustainability						

KNOWLEDGE/SKILL RELATIONS

Please indicate (with an **X**) by means of which skills the following knowledges are gained in the design studio. You may mark multiple cells.

	Sketching	Technical Drawing	Model Making	Analytical Thinking	3D Thinking	Critical Thinking	Reading Comprehen	Graphic Present.	Oral Present.	Time Management
History of Architecture, Art and City										
Spatial Planning										
Art and Design										
Structural Design										
Material and Construction										
Urban Design and Planning										
Landscaping										
Environmental Control Systems										
Computational Design										
Building Regulations										
Project Management										
Economy and Sustainability										

ARCHITECTURAL SKILLS

Please indicate (with an **X**) in what level the following architectural skills are gained in the design studio.

	Very High	High	Medium	Low	Very Low	Not Known
Sketching						
Technical Drawing						
Model Making						
Analytical Thinking						
3D Thinking						
Critical Thinking						
Reading Comprehension						
Graphic Presentation						
Oral Presentation						
Time Management						

CAREER TARGETS

Which of the following positions are you planning to take after graduation? You may mark multiple cells.

Freelance Architect		Project Manager		Supervisor		Project Developer	
Site Architect		State Architect		Academician		Other	

Please make any additional remarks if necessary:

Thank you for participating.

Figure 3. Blank Questionnaire Survey Sheet (prepared by the author)

3.2 Survey Results

In IUE, 208 students in total (85 sophomores, 61 juniors and 62 seniors) participated in the survey. The initial results of the survey have shown that for both the sophomores and juniors, art and design and spatial planning are considered the two most covered knowledges in the design studio while building regulations is the least for all the three levels of students. For the seniors, urban planning and design is considered as the most covered knowledge, yet in quite a similar percentage to those of art and design and spatial planning, following in the ranking. This may be due to the different aims, content and scale of the projects conducted in their studio than those of the sophomores and juniors. In terms of architectural skills, model making is considered the most gained skill for all the three levels of students, while analytical thinking, time management and reading comprehension are the least, respectively. In terms of career targets, a great percentage of the students in all the three levels tend to take a position in design process as a freelance architect while very few of them are willing to work in the construction sector as a project advisor and/or a state architect (Figure 4).

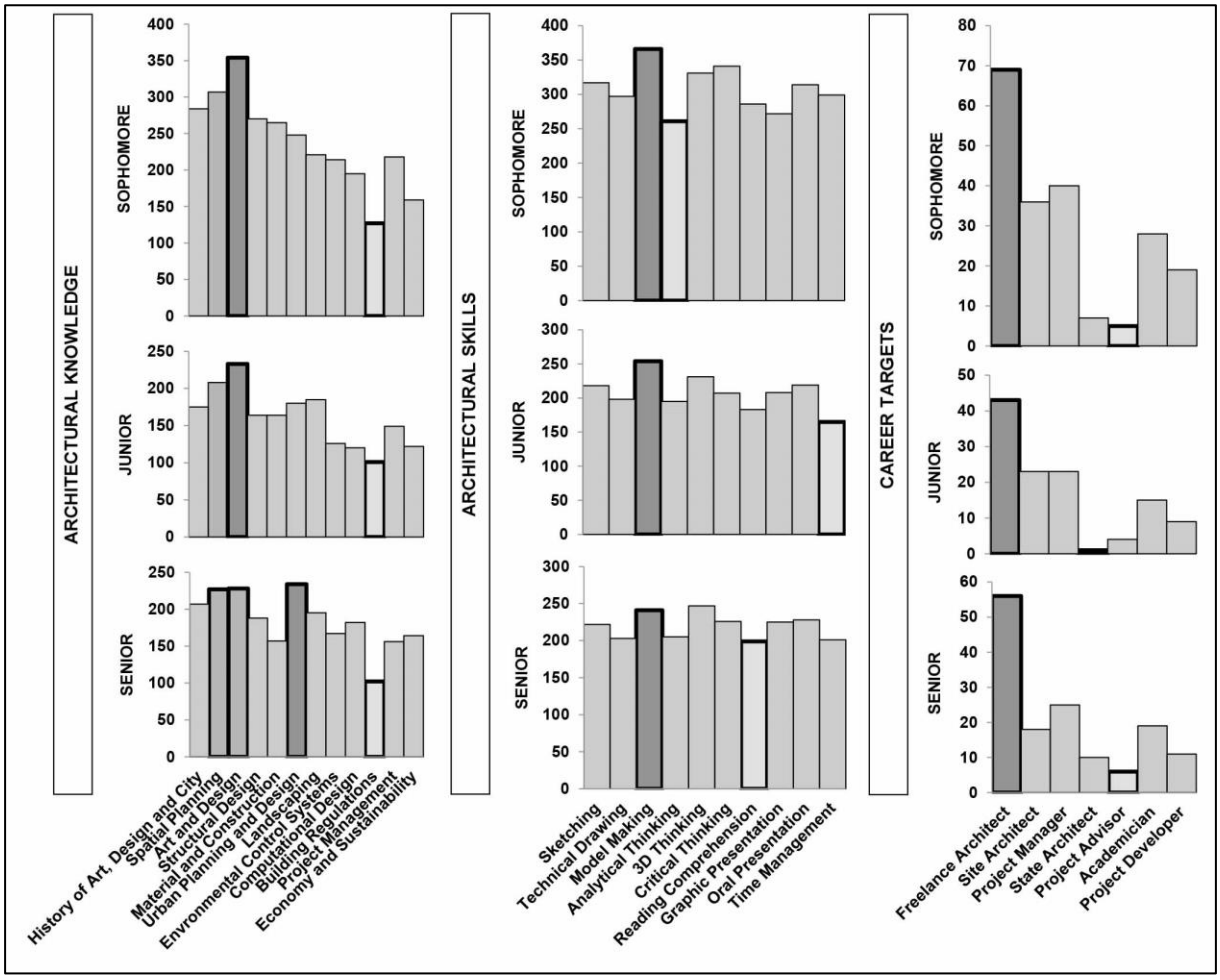

Figure 4. Initial Results of the Questionnaire Survey at IUE (prepared by the author)

Further analyses of the data show that for the sophomores and the juniors, the art and design knowledge is gained by means of model making and critical thinking, respectively, while for the seniors urban planning and design knowledge is gained by means of sketching. In addition to becoming a freelance architect, the same sophomores and juniors are willing to work as a project manager and a site architect respectively, while the same seniors are willing to become a project manager. The building regulations, the least covered knowledge in all the three studios, are gained mostly by means of mental skills such as critical thinking and oral presentation for the sophomores

and juniors and by means of sketching for the seniors. For the same students, becoming an academician, a project manager and/or a project developer are the second career targets in the ranking after the freelance architect (Figure 5).

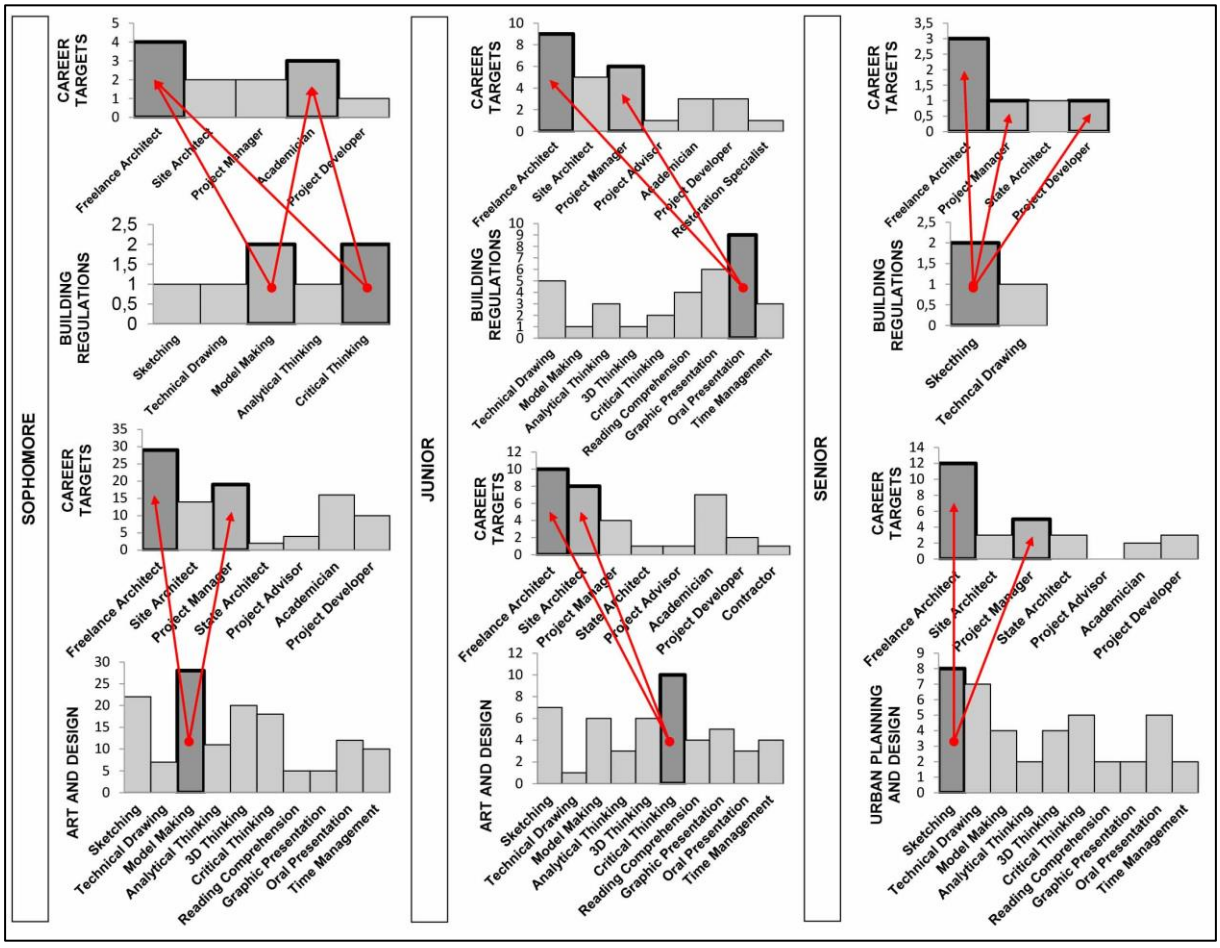

Figure 5. Further Analyses of the Data of the Questionnaire Survey at IUE (prepared by the author)

In YU, 194 students in total (78 sophomores, 75 juniors and 41 seniors) filled in the questionnaire survey. The initial results show that the most covered knowledge in the design studio is spatial planning for both the sophomores and the seniors, and structural design for the juniors. The least covered knowledge vary among the three levels of students: building regulations for the sophomores, landscaping for the juniors and environmental control systems for the seniors. In terms of architectural skills, the sophomores and the juniors consider model making the most covered knowledge while they consider sketching the least covered one in the design studio. The seniors diverge from them as they consider 3D thinking the most covered knowledge and analytical thinking the least. Similar to the architecture students of IUE, most of the students in all the three levels tend to become freelance architects while very few of them are willing to become a state architect and/or a project advisor (Figure 6).

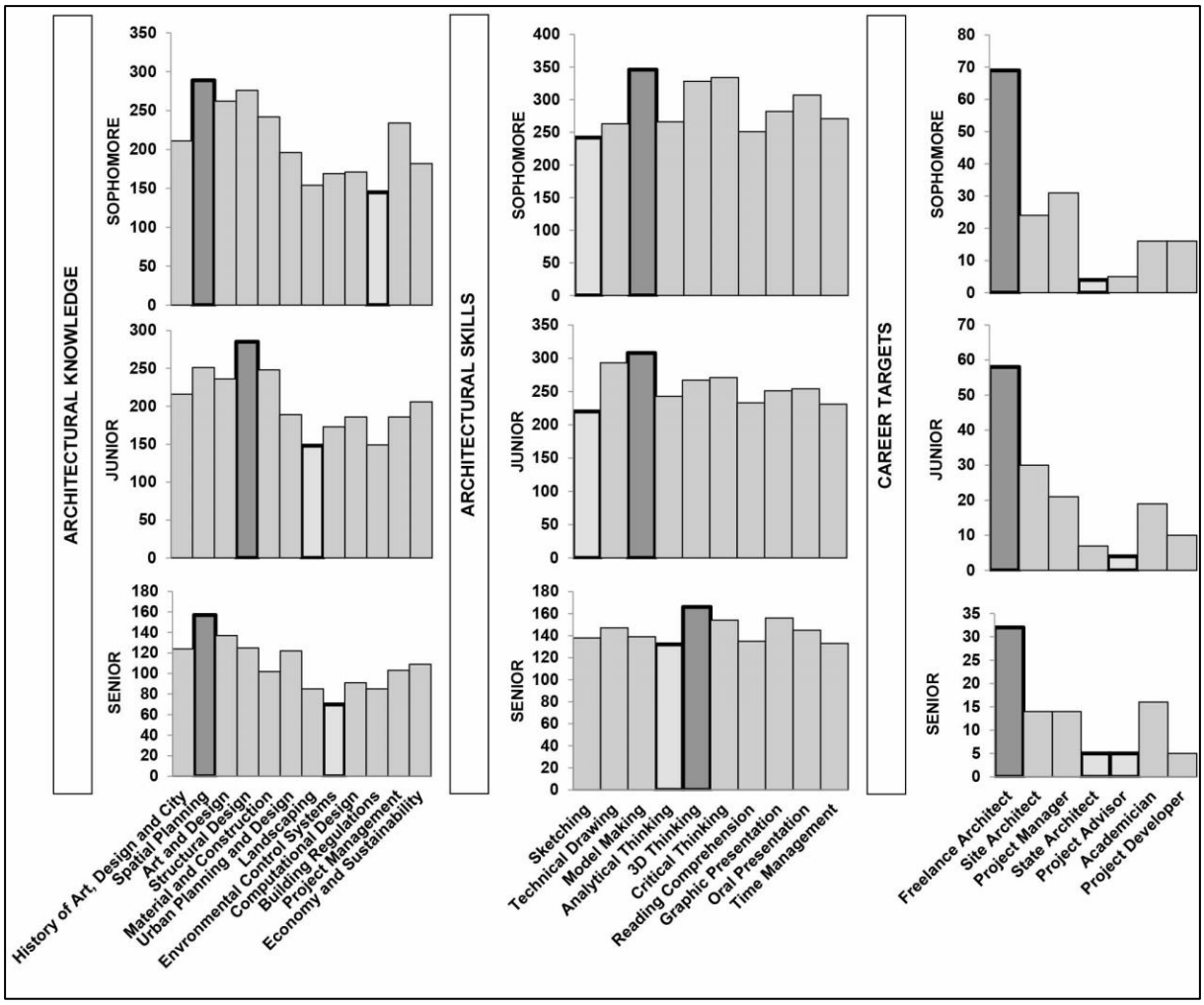

Figure 6. Initial Results of the Questionnaire Survey at YU (prepared by the author)

Further analyses of the data show that the relation between knowledge and skills in the design studio varies among the three levels of students. Spatial planning is gained by means of model making and 3D thinking for the sophomores, and by means of sketching for the seniors. A similar variation is evident in their career targets that apart from becoming a freelance architect, the sophomores tend to become project managers while the juniors and seniors tend to become academicians. A further variation occurs in relating the least covered knowledge with the skills by which it is gained. For the sophomores, building regulations are gained by means of oral presentation; for the juniors, landscaping is gained by means of sketching; and for the seniors, environmental control systems are gained by means of technical drawing. The second career choice after freelance architect is site architect for the sophomores and the juniors and academician for the seniors (Figure 7).

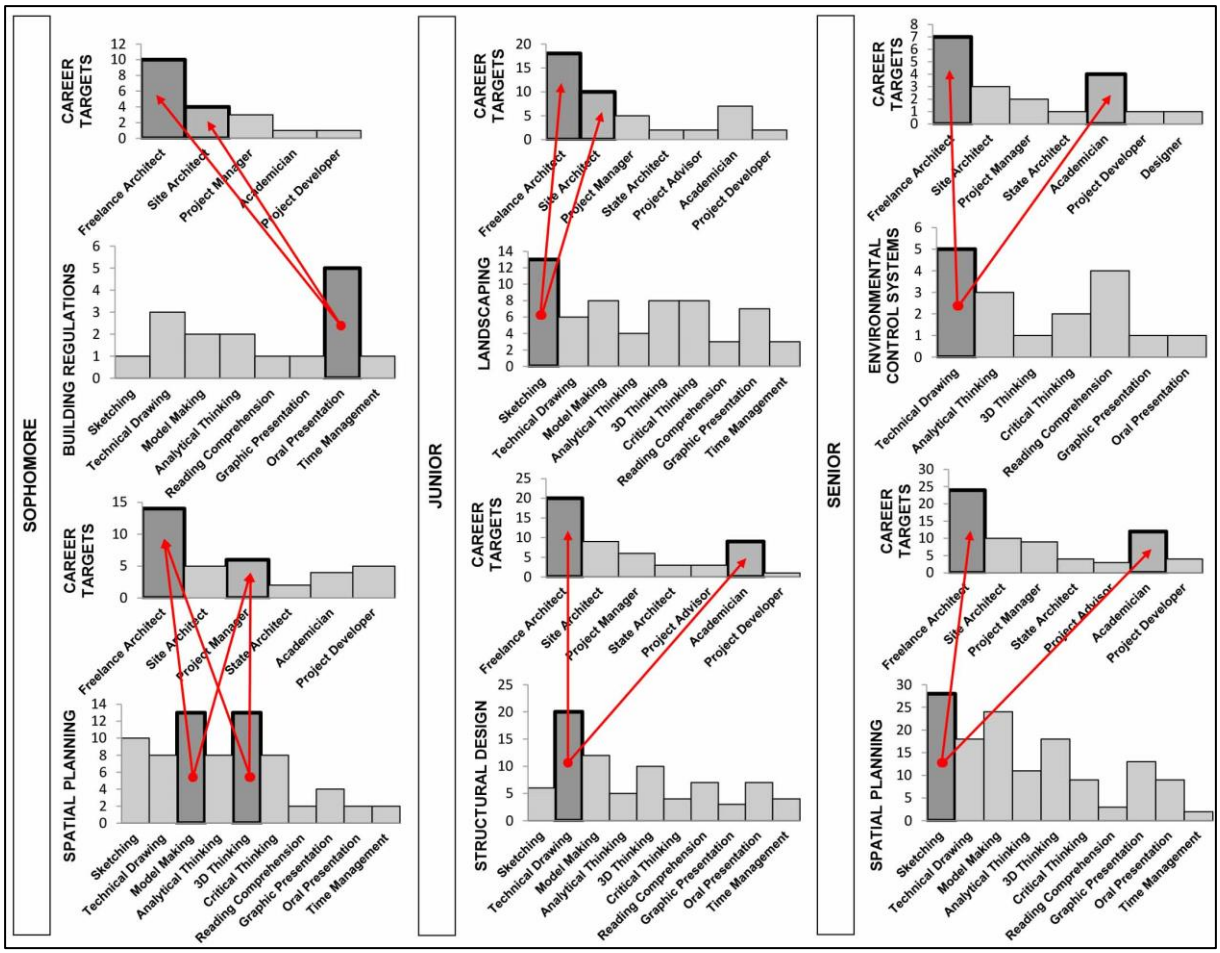

Figure 7. Further Analyses of the Data of the Questionnaire Survey at YU (prepared by the author)

In IYTE, 111 students in total (52 sophomores, 19 juniors and 40 seniors) participated in the survey. The initial results show that there is a consistency among the sophomores, the juniors and the seniors in terms of their emphasis on knowledge, skills and career targets. For instance, spatial planning is the most covered and building regulations is the least covered knowledge in the design studio for all the three levels of students. In terms of architectural skills, the most gained skill for the sophomores is model making, while for the juniors and the seniors, it is critical thinking. In a similar vein, time management is the least gained skill for all the three levels of students. In terms of career skills, project manager is the second profession in the ranking after freelance architect, for all the three levels of students. The last chosen profession is project manager for the sophomores and the seniors, and project developer for the juniors (Figure 8).

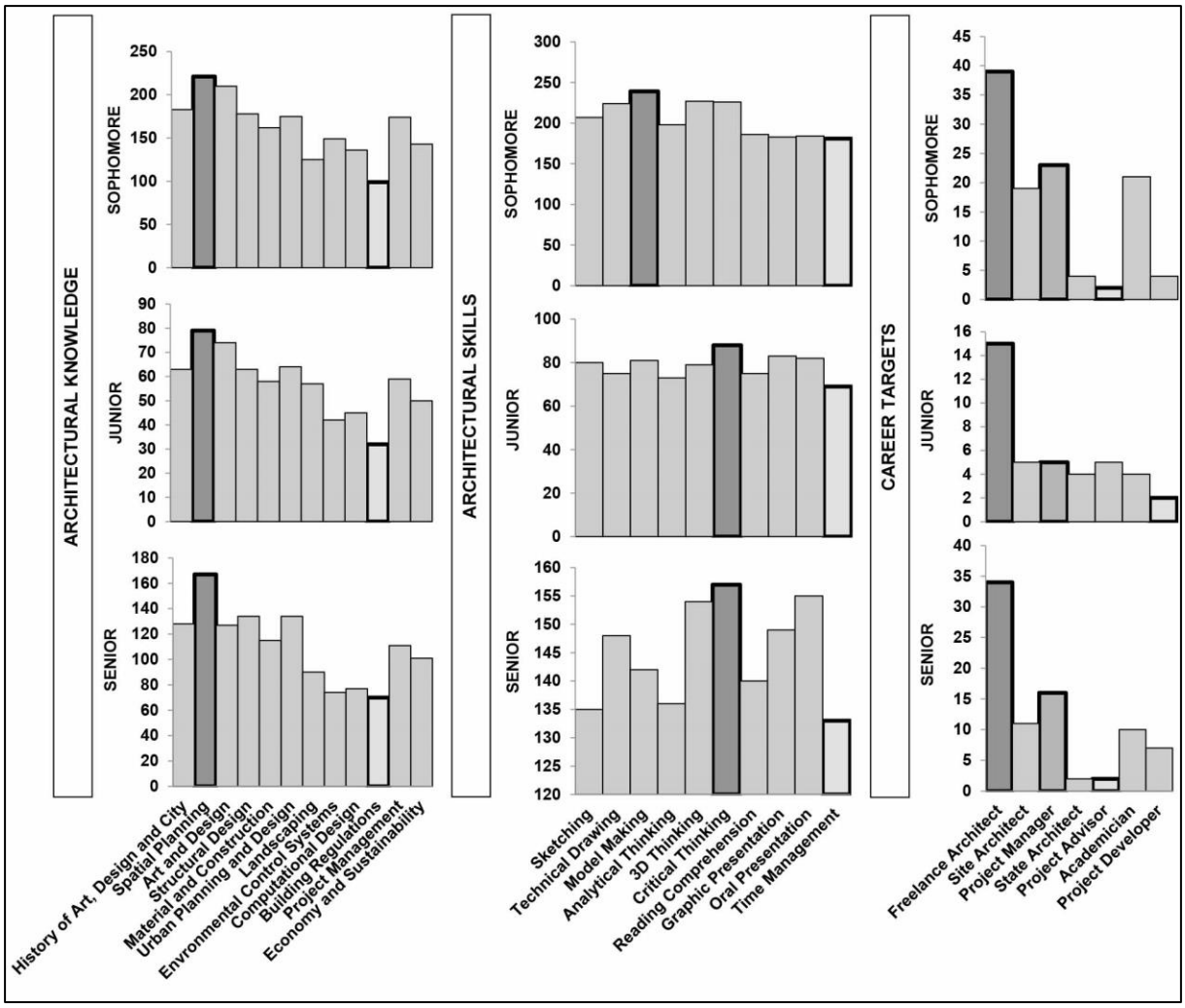

Figure 8. Initial Results of the Questionnaire Survey at IYTE (prepared by the author)

It is possible to read a similar consistency in further analyses of the data. Accordingly, spatial planning, the most covered knowledge in all the design studios in IYTE, is gained mostly by sketching while building regulations, the least covered one, is gained mostly by analytical thinking for the seniors and by oral presentation for the juniors and the sophomores. Those who emphasize spatial planning knowledge are willing to become site architects and/or project managers while those who emphasize building regulations knowledge are willing to become academicians or project managers, in addition to becoming a freelance architect.

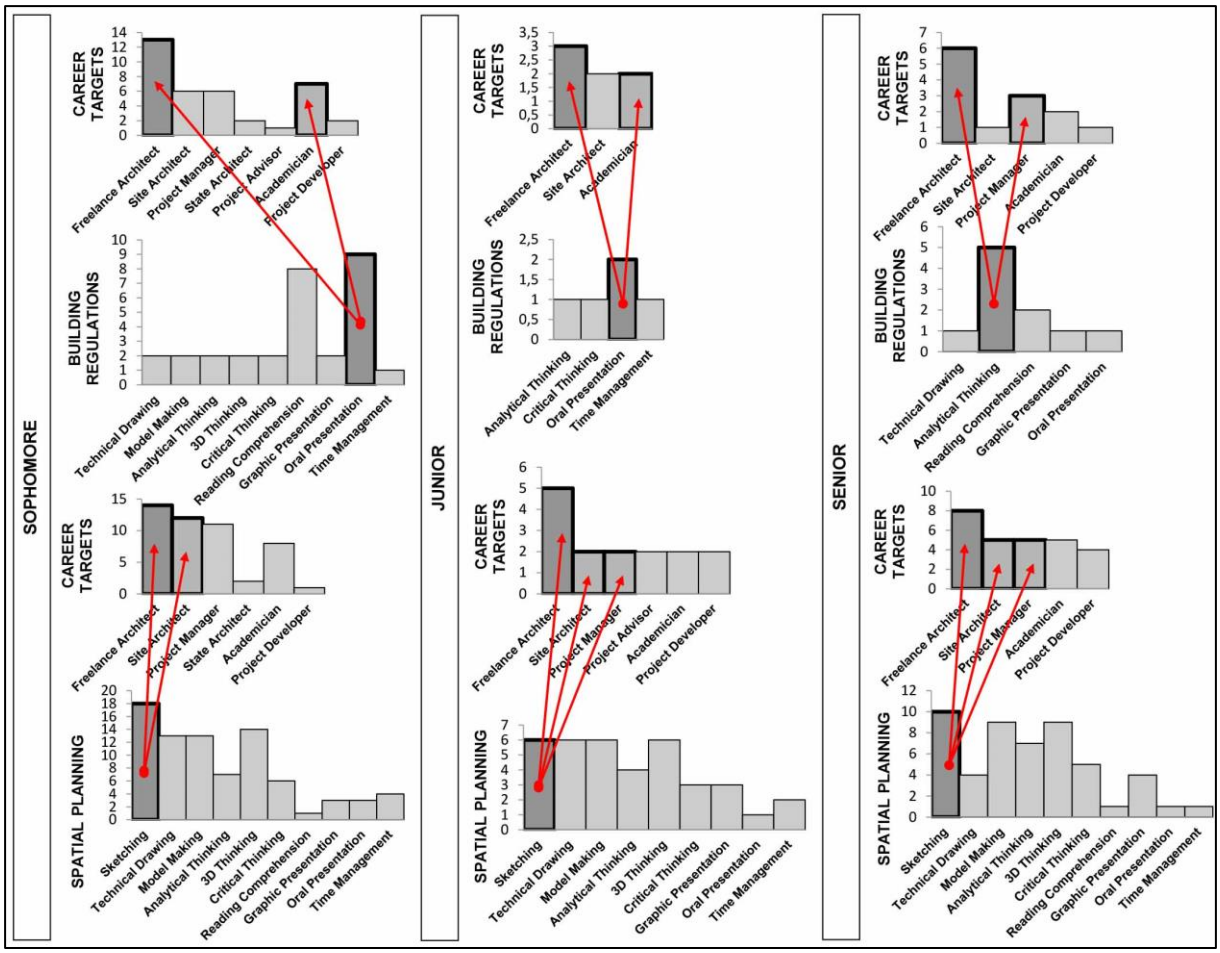

Figure 9. Further Analyses of the Data of the Questionnaire Survey at IYTE (prepared by the author)

3. Conclusion

A comparison of the questionnaire survey results shows that there are certain knowledge/skill dichotomies, which are similar in design studios of the three schools (Table 1). For instance, designerly and technical knowledge such as art and design, urban planning and design, spatial planning and structural design are mostly related to practical skills such as model making, sketching and technical drawing. In comparison, theoretical knowledge such as building regulations is mostly related to mental skills such as critical thinking and oral presentation. Among these, the most obvious dichotomies are building regulations/oral presentation and spatial planning/sketching, both of which are more dominant in three levels of IYTE than in IUE and YU.

It is significant to note that in IYTE, the students conforming to the spatial planning/sketching dichotomy are mostly willing to work in the construction sector as a freelance architect, site architect or a project manager, whereas the students conforming to the building regulations/oral presentation dichotomy are mostly willing to become academicians. This may show that the categorical dimensions set by YOK in the 1970s not only created various dichotomies of theory/practice in terms of knowledge and skills but also affected the career targets of students in state universities.

Even though the two private universities are legally bounded to the regulations of YOK, their students seem to have more flexibility in gaining certain knowledge with various skills and show variety in their career targets. For instance, theoretical knowledge on building regulations can be gained by practical skills such as model making and sketching in IUE, while technical and designerly

knowledge on spatial planning can be gained by mental skills such as 3D thinking in YU. In both cases, the career targets of the students are not limited to either becoming a practicing architect or an academician. In terms of next architectural design education, this brings forward a significant concluding remark that multi- and trans-disciplinary approaches in the design studio enable the students to subvert the knowledge/skill dichotomies created and/or promoted by the central YÖK system, as well as to be more flexible in their career targets.

Table 1. A comparison of selected knowledge/skill dichotomies and career targets in IUE, YU and IYTE

University	Level	Knowledge	Skill	Career
IUE	Junior	Building Regulations	Oral Presentation	Freelance Architect Project Manager
YU	Sophomore	Building Regulations	Oral Presentation	Freelance Architect Site Architect
YU	Senior	Spatial Planning	Sketching	Freelance Architect Academician
IYTE	Sophomore	Spatial Planning	Sketching	Freelance Architect Site Architect
IYTE	Sophomore	Building Regulations	Oral Presentation	Freelance Architect Academician
IYTE	Junior	Spatial Planning	Sketching	Freelance Architect Site Architect
IYTE	Junior	Spatial Planning	Sketching	Freelance Architect Project Manager

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