HANDS-ON BUILDING PRACTICES IN ARCHITECTURAL EDUCATION: METU SUMMER CONSTRUCTION PRACTICES

ÖZCE TURGAY

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HANDS-ON BUILDING PRACTICES IN ARCHITECTURAL EDUCATION: METU SUMMER CONSTRUCTION PRACTICES

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I certify that this thesis satisfies all the requirements as a thesis for the degree of Master of Architecture

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This is to certify that we have read this thesis and that in our opinion it is fully adequate, in scope and quality, as a thesis for the degree of Master of Architecture.

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I hereby declare that all information in this document has been obtained and presented in accordance with academic rules and ethical conduct. I also declare that, as required by these rules and conduct, I have fully cited and referenced all material and results that are not original to this work.

Özce Turgay

ABSTRACT

HANDS-ON BUILDING PRACTICES IN ARCHITECTURAL EDUCATION:
METU SUMMER CONSTRUCTION PRACTICES

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This thesis explores the position of hands-on building practices in architectural education by focusing on METU Summer Construction Practices (ARCH190), which has been conducted in the rural sites of Turkey since 1958. It is believed that the summer construction practice is a tool of education to acquire knowledge of architecture by building 1-to-1 scale constructions. METU Summer Construction Practices are examined by asking the questions of "what is learned" and "how is learned" in order to understand both the content and objectives and also the pedagogic strategies, learning methods of the summer construction practices. The main purpose of summer construction practices is learning how to build and ways of making architecture. The basic learning methods of METU summer construction practices are determined as learning by doing, learning with collaborative working, task-oriented and student-based active learning, integrating the tasks of designing-building, and learning from working with and for the context.

This study emphasizes that learning by building 1-to-1 scale constructions are complementary of learning in design studios, and it should become an integral part of the whole learning process in the design education. Hands-on building practice is a productive process that supports the design education. Students are expected to derive and produce knowledge by building full-scale constructions in

the real site. The thesis argues for the fact that hands-on building practice is to be more than the obtaining of knowledge and skill of making architecture only by instructions. Learning process is to be based on the simultaneous involvement of thinking-doing (taking action)-skill-production of knowledge rather than a linear process of knowledge-skill-taking action.

Keywords: architectural education, hands-on building practice, METU Summer Construction Practice, learning by doing/building, knowledge acquired in action

ÖZ

MİMARLIK EĞİTİMİNDE UYGULAMALI BİNA PRATİĞİ:
ODTÜ YAZ YAPI STAJLARI

Turgay, Özce
Yüksek Lisans, Mimarlık Bölümü
Tez Yöneticisi: Yrd. Doç. Dr. Berin F.Gür

Aralık 2005, 91 Sayfa

Bu tez, Türkiye'nin kırsal alanlarında 1958 yılından günümüze kadar gerçekleşmiş ODTÜ Yaz Yapı Stajlarını (ARCH 190) inceleyerek uygulamalı bina pratiğinin mimarlık eğitimindeki yerini araştırmaktadır. Yaz yapı stajları, öğrencinin bire bir inşa ederek ve uygulama yaparak mimarlık bilgisini edindiği bir eğitim aracıdır. ODTÜ yaz yapı stajları, yapı stajlarının amacını, içeriğini, pedagojik stratejilerini ve öğrenme yöntemlerini anlamak üzere, "ne öğrenildi" ve "nasıl öğretildi" soruları sorularak çalışılmaktadır. Yaz yapı stajlarının ana amacı bir binanın nasıl inşa edildiğini ve mimarlık yapmanın yollarını öğrenmektir. Yaz yapı stajlarının temel öğrenme yöntemleri şu şekilde belirlenmiştir: yaparak öğrenme, birlikte çalışarak öğrenme, öğrenci esaslı aktif ve görev yönlendirmeli öğrenme, tasarım ve inşa etme süreçlerinin bütünleşmesi, bağlamdan öğrenme.

Bu çalışmada bire bir inşa ederek öğrenmenin tasarım stüdyolarındaki öğrenimin tamamlayıcısı olduğu ve tasarım eğitiminin bir parçası olması gerektiği vurgulanmaktadır. Yaparak öğrenme tasarım eğitimini destekleyen üretici bir süreçtir. Öğrencilerden, gerçek ölçekte ve arazide bir binayı inşa ederken, bilgiyi elde etmeleri ve üretmeleri beklenmektedir. Bu tez, uygulamalı inşa pratiğinin, doğrudan bilgi ve komut verilerek kazanılan mimarlık yapma bilgi ve becerisinden daha fazlasını içermesi gerektiğini savunmaktadır. Öğrenme süreci, bilgi-beceri-

faaliyet gösterme doğrusal ilişki sürecinden daha çok eşzamanlı var olan ve karşılıklı ilişki içinde olan düşünme-yapma-beceri-bilgi üretme şeklinde olmalıdır.

Anahtar kelimeler: mimarlık eğitimi, uygulamalı yapı pratiği, ODTÜ yaz yapı stajları, yaparak/inşa ederek öğrenme, faaliyet esnasında kazanılan bilgi

To My Mother

ACKNOWLEDGEMENTS

I would like to express my appreciation to Asst. Prof. Dr. Berin F. Gür for her insightful guidance and patience in every stage of the study. I would like to thank Asst. Prof. Dr. Arzu Gönenç Sorguç, Asst. Prof. Dr. Soofia Tahira Elias-Özkan, Assoc. Prof. Dr. Nur Çağlar, and Inst. Dr. Mine Özkar for their valuable comments and suggestions.

To especially my mother, aunt-in-love and uncle, and other members of my family, I offer sincere thanks for their support at all times.

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INTRODUCTION

I hear, and I forget;
I see, and I remember;
I do, and I know.[1]

The aim of this thesis is to study the importance of hands-on building practices in architectural education. It is important in the sense that hands-on building practice is a tool of education that contributes to acquire knowledge of architecture, and provides a learning environment for students to discover different aspects of architectural design by practicing architecture, by building architecture in 1-to-1 scale.

By hands-on building practice, the thesis refers to a process of education where knowledge of "doing" is learned. The main aim in "doing" is to choose right means for the action. Actually, this underlines the position and role of hands-on building practices in the curriculum of architecture; it is a vehicle for the students to learn how to choose the right means for the action, how to use architectural devices of problem solving. Therefore, hands-on building practice is a way of "active learning" that involves the full participation of the student in the construction of real building, and in turn suggests student-based, productive and operational process, in which knowledge of architecture is discovered, discussed, produced, shared and applied by the students.

In particular, the thesis will focus on the program of Summer Construction Practices (ARCH 190), which is organized and conducted in the rural sites by the department of Architecture at the Middle East Technical University (METU) for the

[1] Words of Confucius quoted from Emile Vestuti, "Learning by Doing: A Complementary Design Studio Method," *Beginnings in Architectural Education- Proceedings of the ACSA/EAAE Conference Prague 1993*, (New York: ACSA Press, 1994), p. 94.

first year students. Summer Construction Practice is hands-on building practice that takes place in the architectural curriculum, and integrates different components of the curriculum. In this summer training, students are expected "to derive knowledge of architecture from their own experiences,"[2] and from their actions they take in the process of building architecture. By building 1-to-1 scale construction students simultaneously begin to both obtain and produce knowledge of architecture, and also become aware of different aspects of architecture, such as human interactions, technology, construction, environment, society.

There are various buildings realized as a requirement of the program of Summer Construction Practice dating back to 1958. Until 1974, these buildings were constructed mainly in rural areas of Turkey. After an interruption (from 1974) till 1999, the tradition of going to villages has started again. In the 9th Turkish Architectural Exhibition and Awards organized by the Turkish Chamber of Architects (Section of UIA in Turkey) in 2004, the educational program of METU Summer Construction Practices (1958-2003) is awarded a prize in the category of contribution to architecture. Relating to this award, an explanation is made by the jury:

> Award for Contribution to the Architecture; to METU Department of Architecture Summer Practice Program, because it is an original implementation aimed at providing experience in architectural construction through compulsory summer practices included in the undergraduate program; because the program has become a sustained institution carried out in rural areas since 1958; and for its contributions aimed at introducing in local environments architectural culture with improved building and space production.[3]

This thesis will focus on those summer construction practices, which are realized in the rural sites. It is believed that, compared with working in the urban areas for summer construction practices, working in the rural areas brings extra benefits for the students in a way that they can learn from communal living by sharing their bedrooms and even lavatories with their classmates. As stated by Selahattin Önür[4] summer construction practices realized in the villages help "to

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[2] Kim Tanzer, "When Practice Leads Theory", *Phı Kapa PhıForum,* Volume 83, No.3, p. 33.
[3] *9. Ulusal Mimarlık Sergisi ve Ödülleri* (*9th Turkish Architectural Exhibition and Awards*) (Istanbul: Yapı Yayın-116, 2005), p.26.
[4] Selahattin Önür is the current head of the Department of Architecture at METU.

increase students' familiarity with the rural areas of Turkey where the majority of the population live."[5] One of the aims of the summer construction practices realized in the rural areas is to contribute to underdeveloped areas by constructing buildings giving public services. These construction practices are complementary of the architectural education. This is in the sense that they express the relation of architectural education with social issues, and underline the social aspect of architecture and community work. Moreover, they help to develop awareness of cultural and environmental aspects of architecture, and also to learn the local architecture and the local way of making architecture, which is peculiar to the rural area.

1.1 Problem Definition

This thesis is a contribution to the research field of architectural education. Exploring METU Summer Construction Practices is significant in evaluating the role and position of hands-on building practices in architectural education. This thesis not only makes the documentation of METU Summer Construction Practices, but also aims to understand the objectives of the summer construction practices and the pedagogic strategies, learning methods that ensure the fulfillment of these objectives.

Although architectural education is mainly centered on the design studios where students learn ways of making architecture by using different mediums (drawing, model making, computer, etc.), 1-to-1 scale constructions in actual site is one of the main pedagogical tools of learning architecture. Architectural education should be organized not only around theoretical knowledge but also around knowledge gained in action. That is to say that discovery, application, and sharing of knowledge by building/doing (architecture) is to have a central role in the education of an architect.

[5] Selahattin Önür, "Önsöz" in *1/1 Yaz Uygulamasi,* Berin Gür and Onur Yüncü (eds.), (İstanbul: 124/3, 2004) p. 2

According to Christopher Alexander, who was one of the keynote speakers in the 19th EAAE Conference, titled "Re-integrating Theory and Design in Architectural Education,"[6] architectural education should include the methods accepting the integrity of design and construction process as a basic principle.[7] During his speech, as an answer to the question "how to learn to build and construct a livable thing," he stated:

> *You don't learn how to make buildings from playing around on pieces of tracing paper.* […] *My students, they learn about concrete pouring, they learn to plane pieces of wood, they learn all these things.* It is not because they are going to become 'lowly laborers' or something, it is just *they want to make real buildings so therefore of course they want to learn these things.* And then *they can also tell other people how to do them.*[8]

Actually, here, Alexander underlines the significance of hands-on building practice, which is one of the tools for "arriving at knowledge" in architectural education in order to learn how to design and make "real buildings."

In his report of 19th EAAE Conference, François Claessens makes a review of Alexander's presentation on architectural education, and highlights his emphasis on the integrity of design-and-building in architectural education: "The gap between design and building is too big. *In order to be able to design a good building, one should by experience know how to build -one should have done the work of a craftsman, a carpenter, a bricklayer, etc*."[9]

Tuğyan Aytaç Dural defines education in general and architectural education in particular in her doctoral thesis as:

> Education is 'neither the act or process of imparting knowledge or skill' nor 'the obtaining of knowledge or skill through schooling'. It should be conceived as a special task, and it's transformative –rather than informative—power should be underlined.[10]

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[6] The 19th EAAE Conference, which was titled *Re- Integrating Theory and Design in Architectural Education*, was held in Ankara, Turkey, at the Gazi University Faculty of Engineering and Architecture, Department of Architecture in 23-26 May 2001.
[7] Alexander, 71-89.
[8] Alexander, 88. Emphasis mine.
[9] (www.eaae.be)François Claessens, Report of 19th EAAE Conference titled *Re- Integrating Theory and Design in Architectural Education*, Gazi University Faculty of Engineering and Architecture, Department of Architecture, in Ankara, Turkey, on 23-26 May 2001. Emphasis mine.
[10] Tuğyan Aytaç Dural, *Theatre – Architeture Education: Theatre as a paragdigm for Introductory Architectural Design Education,* Unpublished Ph.D thesis, Department of Architecture, METU, 1999.

This quotation supports what the thesis argues for the fact that architecture cannot be learned simply by theoretical knowledge, but must be also learned by taking actions. That is to say that acquiring knowledge of architecture by taking action or by building, as in the case of METU summer construction practices, provides an educational context where students can improve their ability in architectural design. That suggests, in fact, a constructive and "transformative" process in education.

José Depuydt and Gerard Van Zeijl point out that, "[…] learning should be seen as a qualitative change in a person's way of seeing, experiencing, understanding, and conceptualizing something in the real world."[11] They remark that: "To learn is to change. Education is a process to change the learner."[12] In speaking so, they emphasize the idea of "student-based" and "constructivist learning environment."[13] The program of summer practices in construction supports the idea of "student-based" and "constructive" learning; it suggests a process, which bases upon "learning by doing" and doing right action. Student's learning activity is based upon *reflection on* and *in action*.

In the symposium organized by Architectural Association (AA) in 2004, which is on the future of architectural education, Ben Nicholsan offered a model for architectural education, which is based on "giving and taking." [14] He suggests that architectural education should not limit itself to its own institutional boundaries, but could collaborate with society/community. Nicholsan remarks that, social responsibility is neglected at many architectural schools, which is the application of the learning experience (taking) to actual built work for communities (giving).[15] Actually, METU Summer Construction Practices is a learning environment where students' responsibility to society/community is developed, and the gap between the school and community is bridged.

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[11] José Depuydt and Gerard Van Zeijl, "Integrating 'Outside' and 'Inside' of Architectural 'Thinking' and 'Doing'," In *Re-integrating Theory and Design in Architectural Education: Proceedings*, Nur Çağlar (ed.), (Ankara: EAAE, 2001) p. 325.
[12] Depuydt & Zeijl, 324.
[13] Depuydt & Zeijl, 321-335.
[14] For detailed information see www.aaschool.ac.uk/symposium/
[15] For detailed information see www.aaschool.ac.uk/symposium/

1.2 Contemporary Discussions on the Future of Architectural Education

The first attempts to establish architecture as an autonomous discipline, begun in 1671 with the Royal Academy of Architecture in France. Ecole des Beaux Arts in Paris is accepted as the very beginning of formal architectural education. The groundwork for western architectural education as we know it today was then laid in the early nineteenth century by the architecture program of the Ecole des Beaux Arts, and later on by the Bauhaus education with its insistence on practical experience on actual buildings under construction. Today, there is a considerable number of schools of architecture giving access to education and thus to the profession of architecture.

Technological, social and political changes effect various professions as well as architecture. As a result of these changes the responsibilities and position of architects change. Question of *what should be the place of the architect in this changing world* will be significant in shaping the program of architectural education. Then, in parallel to these changes and inventions on data processing and communication technologies, transformation in the curriculum of architectural education is inevitable. Today, contemporary discussions on the future of architectural education particularly in Europe are developed under the influences of European Union.

> As is widely known, the EU policies towards a cohesive European Higher Education Area, as expressed by the Sorbonne-Bologna-Prague-Berlin process, stimulated a vigorous mobility of ideas and views on the future of architectural education in Europe. The perspective of the creation of a European Higher Architectural Education Area is presented not only as a demand, or as an EU request, but principally as a great challenge: to re-form, creatively, architectural studies in Europe for a more coherent, more qualitative and more attractive European architectural education worldwide. […] The central issue in the debates on architectural education today is the way […] that each school will manage its reform processes in order to be an active, valuable and influential part of this new European environment.[16]

[16] Constantin Spiridonidis (ed.) "Preface." *Monitoring Architectural Design Education in European Schools of Architecture*. Transactions on architectural education: no 19. Socrates, EAAE, ENHSA, 2004, p.ix.

Moreover, suggestions of UNESCO/UIA Charter for Architectural Education in 21st century, give shape to the discussions on the future of architectural education.

> We, the architects are responsible for the improvement of the education and training of future architects to enable them to meet the expectations of 21st Century societies worldwide for sustainable human settlements in every cultural heritage.[17]

As stated in UNESCO/UIA Charter for Architectural Education 2004, which emphasizes the integration of hands-on building practices to the education, the main objective of architectural education is that:

> Architectural education develops the capacity in students *to be able to conceptualize, design, understand and realize the act of building within a context of the practice of architecture which balances the tensions between emotion, reason and intuition, and which gives physical form to the needs of society and the individual*.[18]

As the debates on architectural education advances, the content of the architectural education program, and the methods of teaching-and-learning become a central issue. In order to meet the challenges of the 21st century in the discipline of architecture, the following questions become essential to the education of an architect: How the pedagogy of architecture should support developments in technology; how the curriculum enhances the collaboration with other disciplines; how the practical experience on actual buildings under construction during the education contributes to the development of knowledge of architecture.

Today, the content of the architectural education, and the improvement of the quality in architectural education are discussed by various international organizations, such as European Association for Architectural Education (EAAE), European Network of Heads of Schools of Architecture (ENHSA) and Association Collegiate Schools of Architecture (ACSA). At the national scale, Communication Group for the Head of Architectural Departments (MOBBİG) and Chamber of Architects discuss reform processes related to the future of architectural education in Turkey.

[17] UNESCO/UIA Charter for Architectural Education, Revised Version, (2004) p. 1.
[18] UNESCO/UIA Charter for Architectural Education, Revised Version, (2004) p. 2. Emphasis mine.

In light of discussions taking place in the process of adaptation to European Union, today in Turkey, future of architectural education, which is already a 4-year education, is on the agenda. 2-year professional practice following the architectural education at universities is being discussed in order to have an authority to perform the profession of architecture as an active architect in an accreditated office or public institution. Then, in parallel to the discussions on the duration and content of architectural education in Turkey, professional practice after the education at universities, and construction practices during the education at universities gain more importance.[19] According to Metin Karadağ, who was a speaker in the congress of Architecture and Education-2 (*Mimarlık ve Eğitim Kurultayı*-2), practice of architecture in education must be carried out in parallel to the courses on theory of architecture. [20] In this sense, construction practices during the education of an architect become inevitable.

1.3 METU Summer Construction Practices as the Focus of the Thesis

Students graduate from METU Department of Architecture as an architect at the end of the 8 semesters, after completing 3 summer practices (duration of each is 2 months). Summer practices carried out in each summer ensure that students are introduced to building and professional practice in the field, on construction sites and in architectural offices.[21]

In this thesis, particularly the program of "Summer Construction Practice" (coded as ARCH 190) for the first year students at METU, the Department of Architecture will be inquired in relation to the thesis argument, which believes that 1-to-1 scale construction practice during education is a productive process that supports and contributes to design education. METU Summer Construction Practices are really about fostering the learning habits needed for the discovery, integration, application, and sharing knowledge over a lifetime. In these summer

[19] Today, it is being discussed to regard construction and office practices during the education at the schools of architecture as a part of the 2-year professional practice.
[20] Metin Karadağ, "Staj ve Meslekiçi Staj," *Mimarlık ve Eğitim Kurultayı-2,* (İstanbul: Çizgi Basım Yayın, 2004) p. 191.
[21] For detailed information see http://archweb.metu.edu.tr

construction practices students derive theoretical principles from practical experiences.

The thesis will study the METU Summer Construction Practices particularly organized in the rural areas by asking the following questions:

1. What is learned in summer construction practice (hands-on building practice)? That is the content and objectives of the program of summer construction practice.

2. How is this content learned? That is the pedagogic strategies, learning methods that ensure the fulfillment of the objectives of the program of summer construction practice.

1.4 Structure of the Thesis

In this first chapter, the object of the thesis is introduced; the thesis problem is defined. Contemporary discussions on the future of architectural education are mentioned.

In the second chapter, the focus of the thesis, namely METU Summer Construction Practices that have been conducted in the rural areas of Turkey, is introduced. In this chapter, there is a compiling of METU summer construction practices from 1958 to 1974, and from 1999 to today. Moreover, a well-known example to hands-on building practice, namely the Rural Studio at Auburn University School of Architecture, which in terms of the method of learning architecture has similarities to METU Summer Construction Practices, is introduced.

The thesis will try to address several questions. In the third chapter, "what is the position of the summer construction practices in the curriculum of METU Department of Architecture," will be studied in reference to *METU General Catalogs* (published regularly starting from 1957 till 2005). And also, "what is learned" and "how is learned" in the summer construction practices, will be explored in reference to examples from the construction practices realized in the rural areas during the period of 1958-1997, and 1999-today.

In the fourth chapter, the thesis will examine the benefits and effects of METU summer construction practices in learning ways of making architecture by giving reference to the examples in the second chapter.

In the conclusion chapter, the thesis will derive some general conclusions for the hands-on building practices in the education of an architect from a particular case, METU Summer Construction Practices. The thesis will question how hands-on building practice in architectural education should be, and why hands-on building practice is integrated into curriculum of architecture and how.

CHAPTER 2

METU SUMMER CONSTRUCTION PRACTICES

In this chapter, the thesis aims to introduce the main focus of the thesis, the program of METU Summer Construction Practices. Rural Studio at the Auburn University School of Architecture is also introduced as a well-known example to hands-on building practices in the architectural education.

2.1 METU Summer Construction Practices

In this part of the thesis, METU Summer Construction Practices, which are particularly organized and conducted in the rural sites, are introduced in the form of a table (See Fig.2.1). On the basis of the book, *ODTÜ Mimarlık Fakültesi Yaz Uygulamaları* (*METU Faculty of Architecture Summer Practices*), which is compiled by Süha Özkan, and contains those construction practices from 1958 till 1974, the summer construction practices, from 1958 to 1974 and from 1999 to today, are compiled not only for illustrative purposes but also to be able to evaluate the learning process embraced within the summer construction practices.

Table 1. List of METU Summer Construction Practices

If it is not mention, illustrations are taken from the book *ODTÜ Yaz Uygulamaları* (by Süha Özkan, 1974)

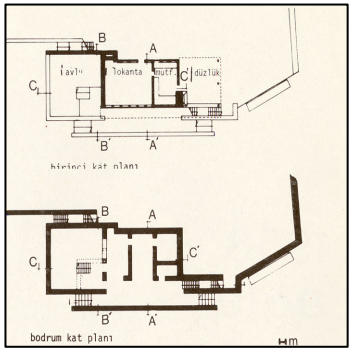
YEAR	PROJECT/ PLACE	DESCRIPTION		
1958	COFFEHOUSE AĞLA/ MUĞLA By Jaako Kaikonnen	Together with many other international associations, METU Department of Architecture participated to the project to improve the living standards of Ağla village, which was selected as a pilot area by the "Association of Developing Mediterranean Countries".		
1961 1962	BOATHOUSE EYMİR/ ANKARA By Yıldırım Yavuz Ekmel Derya	Boathouse was built to supply vacation possibilities for the Eymir Lake, which is in the territories of METU campus.		

Table 1. Continued

If it is not mention, illustrations are taken from the book *ODTÜ Yaz Uygulamaları* (by Süha Özkan, 1974)

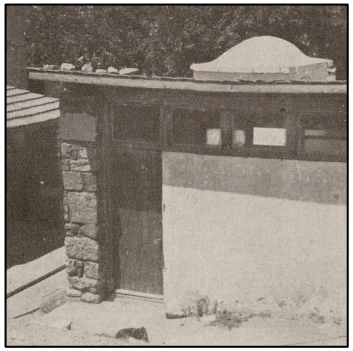
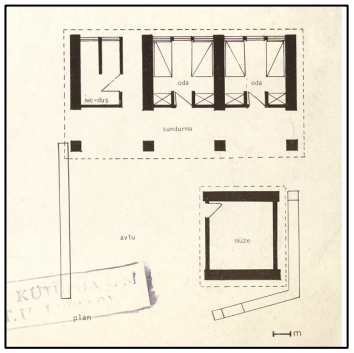
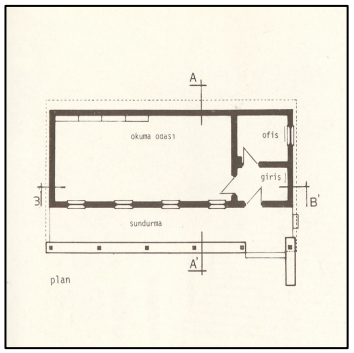
YEAR	PROJECT/ PLACE	DESCRIPTION		
1963	LIBRARY YASSIHÖYÜK/ANKARA By Yıldırım Yavuz Turhan Vural	A library was designed and built to contribute to the education of children living in Yassıhöyük.		
1964	MUSEUM ILDIRI/ İZMİR By Yıldırım Yavuz Tekin Akalın	A museum was built in Ildırı, which was called *Erythrea* in history, to protect the valuable antique foundlings		

Table 1. Continued

If it is not mention, illustrations are taken from the book *ODTÜ Yaz Uygulamaları* (by Süha Özkan, 1974)

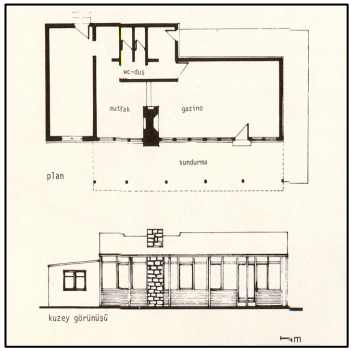
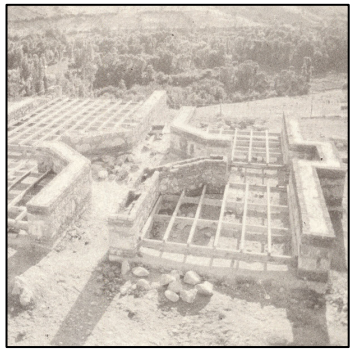
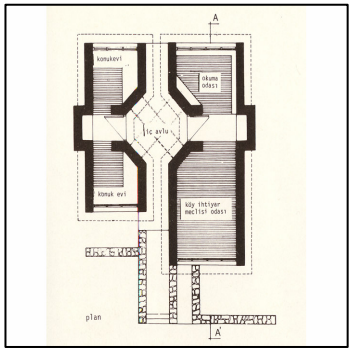
YEAR	PROJECT/ PLACE	DESCRIPTION		
1965	REFRESHMENT- BAR (*gazino*) GÖLEVİ/ ORDU By Sümer Gürel	A refreshment-bar was built to contribute to the development of tourism in Gölevi.		
1966	MULTIFUNCTIONAL BUILDING KUTLUDÜĞÜN/ANKARA By Sevgi Aktüre Yılmaz İnkaya	The village required a building, which would contain a guesthouse for accommodation and also a small library. First group of the students of the year 1966 completed the building in eight weeks.		

Table 1. Continued

If it is not mention, illustrations are taken from the book *ODTÜ Yaz Uygulamaları* (by Süha Özkan, 1974)

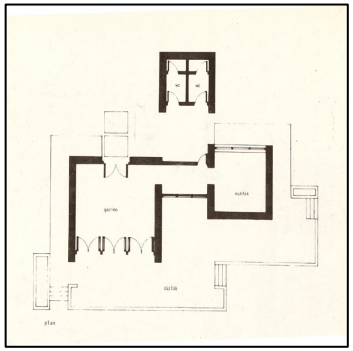
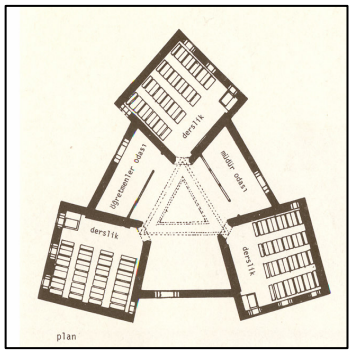
YEAR	PROJECT/ PLACE	DESCRIPTION	
1966	RESRESHMENT- BAR (gazino) GÜNEYKÖY/ELAZIĞ By Nejat Erem	The second group of the students of the year 1966 designed and built a refreshment bar, for the village to provide a source of income.	  
1967	HIGH SCHOOL EMİNLİK/NİĞDE By Ahmet Gülgönen	An educational building, reflecting the local architectural characteristics, was built as the second project of the 1967 summer practice program.	 

Table 1. Continued

If it is not mention, illustrations are taken from the book *ODTÜ Yaz Uygulamaları* (by Süha Özkan, 1974)

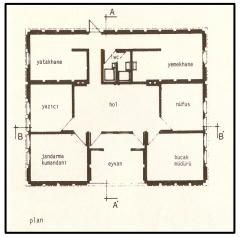
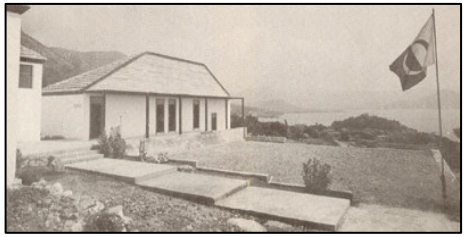
YEAR	PROJECT/ PLACE	DESCRIPTION	
1968	HIGH SCHOOL GİLİNDİRE/İÇEL By Feyyaz Erpi	The project is composed of an administrative unit and four independent units of classrooms.	 
1968	GOVERNMENT OFFICE PINARBAŞI/ KASTAMONU By Kadriye Seyithanoğlu Mehmet Adam	The building was designed and built to house offices of gendarme, registry of births and administration.	 

Table 1. Continued

If it is not mention, illustrations are taken from the book *ODTÜ Yaz Uygulamaları* (by Süha Özkan, 1974)

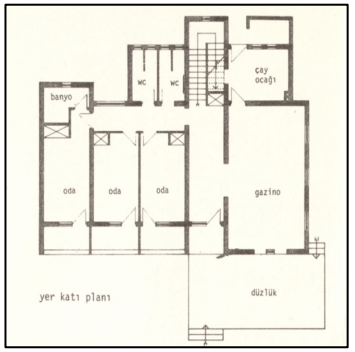
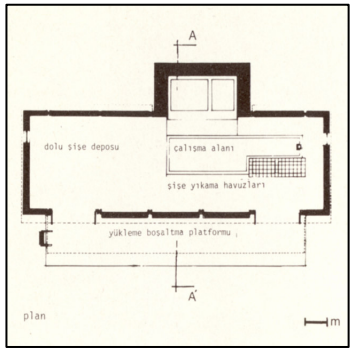
YEAR	PROJECT/ PLACE	DESCRIPTION		
1970	A BUILDING TO BOTTLE SPRING WATER ILICA/SİVAS By Arda Düzgüneş Fahrettin Tolun	The project was thought to be an economical investment for the village.		
1970	MOTEL OCAKLAR/ BALIKESİR By Enis Kortan	Second group of the students of the year 1970 worked in the construction of the motel, and completed the first floor where are the guest rooms, tea house, lavatories and laundry.		

Table 1. Continued

If it is not mention, illustrations are taken from the book *ODTÜ Yaz Uygulamaları* (by Süha Özkan, 1974)

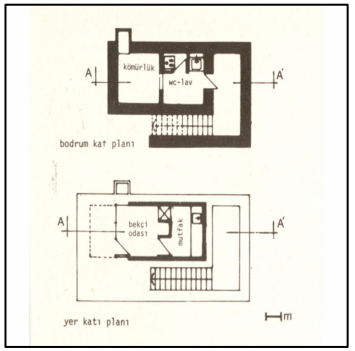
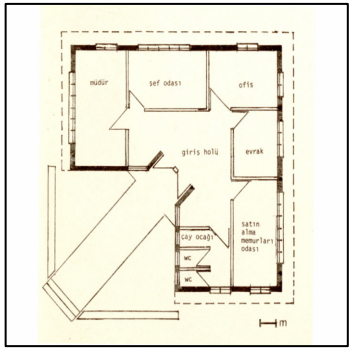
YEAR	PROJECT/ PLACE	DESCRIPTION	
1973	GUARD BOOTH EYMİR / ANKARA By Eşber Yolal	To control the entrance to the Eymir Lake, two guard booths for west and east entrances were built.	 
1974	STOREHOUSE OFFICE METU/ ANKARA By İlhan Kural Davran Eşkinat	Upon the request of the presidency of METU, storehouse office was built at the campus. For the realization of the project a competition was organized among the architectural students, and one of the proposals was selected and applied.	 

Table 1. Continued

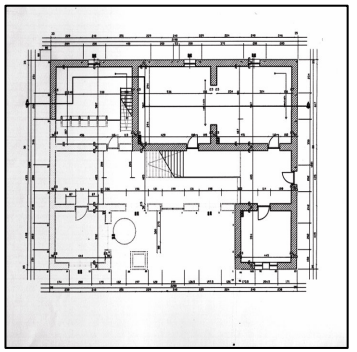
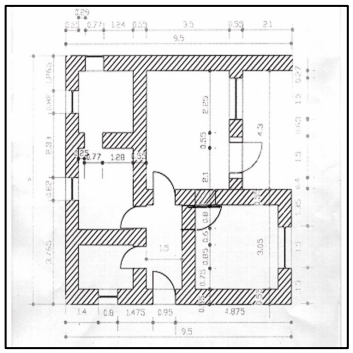
YEAR	PROJECT/ PLACE	DESCRIPTION	
1999	MULTIFUNCTIONAL BUILDING EMİNLİK/NİĞDE By Haluk Zelef, Nihal Bursalı, Selahattin Önür, Tuğyan Aytaç Dural, Türel Saranlı	An old school was repaired and changed to a multifunctional building containing a computer room, library and meeting room.	 
2000	HOUSE (PROVIDED TO TEACHERS OF THE PRIMARY SCHOOL) EMİNLİK/NİĞDE	Two old buildings were repaired as extensions of the previous year project to accommodate the teachers of the primary school.	 

Table 1. Continued

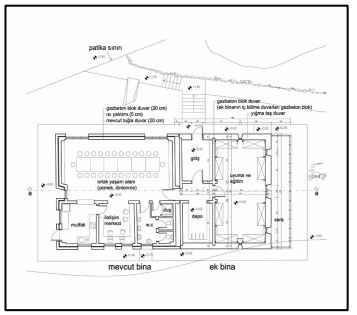
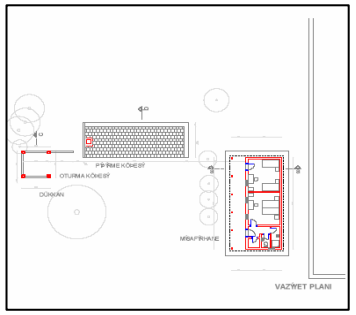
YEAR	PROJECT/ PLACE	DESCRIPTION	
2002	ADDITIONAL BUILDING TO ORDOS MOUNTAIN HOUSE ÇAMARDI/ DEMİRKAZIK/ NİĞDE By Onur Yüncü	One bedroom, multifunctional room and storage areas were designed and built as addition to the rescue station of ORDOS.	  Photographed by Onur Yüncü
2003	COMPUTER WORKSHOP FINDIKLI/RİZE By Berin Gür Onur Yüncü	Upon the request of the primary school of Arılı Village, computer workshop was built.	  Photographed by Onur Yüncü

Table 1. Continued

YEAR	PROJECT/ PLACE	DESCRIPTION	
2004	LIBRARY MODIFICATION YASSIHÖYÜK/ POLATLI/ANKARA By Haluk Zelef Onur Yüncü Cengiz Özmen	The library building that was constructed in 1963 METU summer construction practice, was transformed into a guesthouse and its environment was rearranged.	  Photographed by Onur Yüncü
2005	VILLAGE CLINIC HISARKOY/ YAHŞİYAN/KIRIKKALE By Mine Özkar Alper Semih Alkan	To educate the inhabitants of the village on the subject of birth control the village clinic with an examination room, midwife room and, waiting room was built.	  Photographed by Bilge İmamoğlu & Mine Özkar

2.2 Rural Studio: Auburn University School of Architecture

In his book *Learning by Doing: Design and Construction in Architectural Education*, William J. Carpenter presents some samples of designing-building studios. Departing from the Carpenter's book, a research on the architectural schools around the world, which applies hands-on building or "design-build" program as a tool of learning design activity in their curriculum in various forms like courses, workshops and etc. is done, and a table is prepared (see Appendix A).

The most well known example to hands-on building practice is the Rural Studio. The Rural Studio has some similarities with METU summer construction practices, and both are projected to contribute to the education of an architect and in turn professional life after graduation. In the Rural Studio, as a part of their education, architectural students of Auburn University design and build houses for the rural poor (Fig.2.2, 2.3).

Professors from Auburn University School of Architecture, Dennis K. Ruth and Samuel Mockbee, established the Auburn University Rural Studio in 1993. They aim to guide students of architecture in the act of design and building for people in need. The Rural Studio tries to find solutions to the needs of the community. The mission of the Rural Studio is "[…] to enable each participating student to cross the threshold of misconceived opinions to create/design/build and to allow students to put their educational values to work as citizens of a community."[1] Rural Studio offers an architectural education system that supports learning by building. The studio proposes a new model for architectural education, one in which construction practice is a part of the curriculum, and leads theory. It advocates an educational pedagogy, which uses "[the act of] building as a learning tool."[2]

[1] www.ruralstudio.com (last visited in 07.02.2005)
[2] www.ruralstudio.com (last visited in 07.02.2005)

Rural Studio has determined four main goals:

> 1. To give students of the School of Architecture an opportunity to develop the critical skills of planning, designing, and building in a concrete, practical, and socially responsible manner.
> 2. To form leadership qualities in students by instilling the social ethics of professionalism, volunteerism, individual responsibility, and community service.
> 3. To help communities, through partnerships with the state and local welfare agencies, provide suitable and dignified housing.
> 4. To develop materials, methods, and technologies that will house the rural poor in dignity and mitigate the effects of poverty upon rural living conditions.[3]

Unlike most architectural studios, students of Rural Studio face with the real world, they have to fulfill client's demands, and consider their budgetary and legal constraints. In Rural Studio, students learn by doing, they derive theoretical principles from practical experiences.[4] Their method is basically: "build what you design."[5] Students are responsible from both the act of design and building. The Rural Studio makes architectural students to test their abstract notions, their initial design ideas by "crossing over the real world, smelling it, feeling it, experiencing it."[6]

It is not only the buildings (that they constructed in rural areas) but also and the most substantially their methods of learning architecture (that is designing-building) that make the Rural Studio significant. It provides students a context for learning by experience, which is inseparable from the conception of design. Students improve their ability to generalize knowledge from their own experiences. Students build and construct what they design. They gain self-confidence and develop their creativity by building their own designs. One of the students of Rural Studio, Lerone Smiley said "It taught me things that will carry me the rest of my life, and it would always teach me by example."[7] Rural Studio proves the fact that an architect must know the *concept of construction.*

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[3] www.ruralstudio.com (last visited in 07.02.2005)
[4] Tanzer, 33.
[5] Bruce Lindsey, "Samboo Mockbee (1944-2001) and the Rural Studio", *Phı Kapa PhıForum,* Volume 83, No.3, p. 37.
[6] Robert Ivy and Andrea Dean, "Samuel Mockbee: A life's work", *Architectural Record,* Volume 192, Issue 6, June 2004
[7] Lindsey, 38.

Figure 2.2 Harris “Butterfly” House Mason’s Bend, Hale County, Alabama, 1997

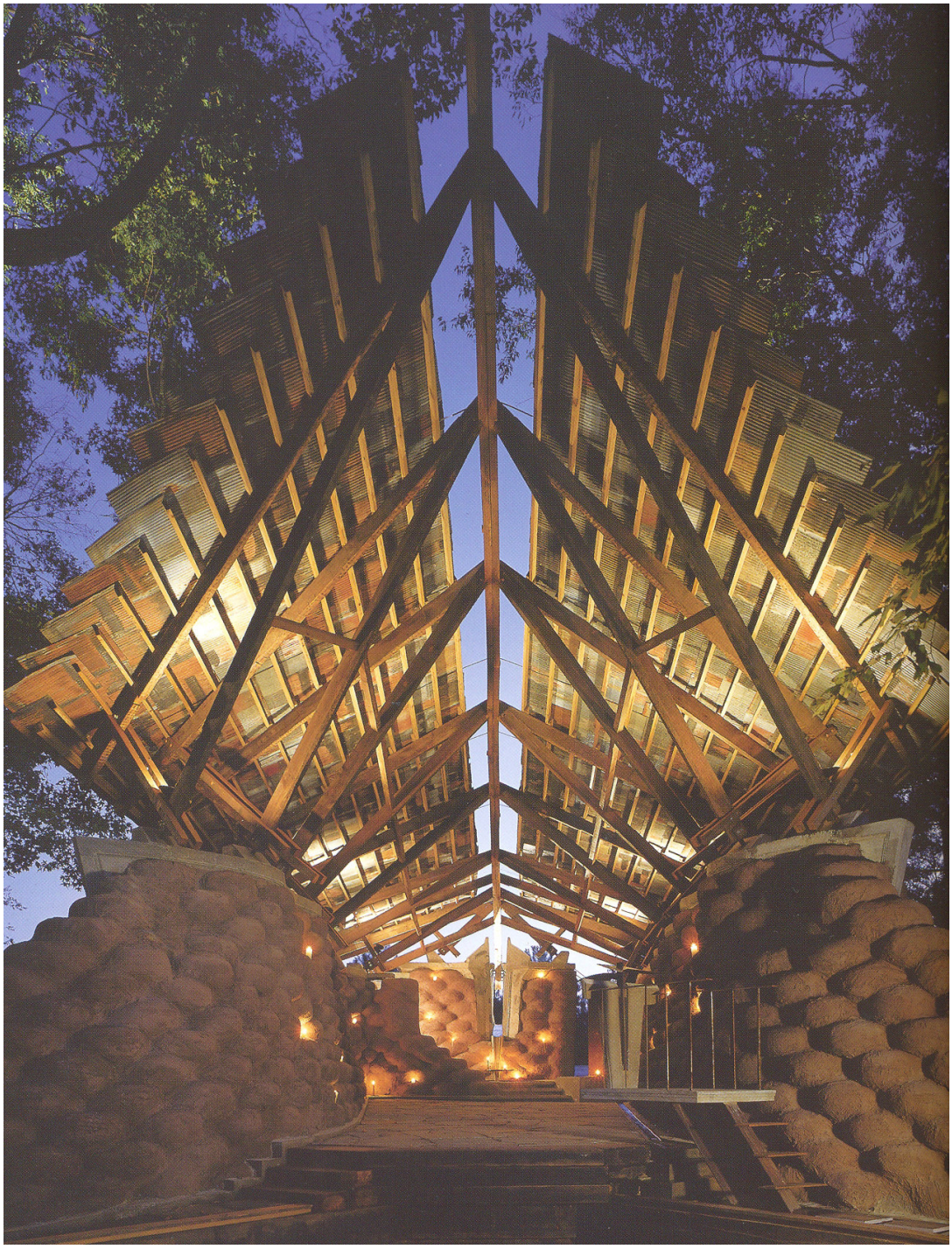

Figure 2.3 Yancey Tire Chapel Sawyerville, Hale County, Alabama, 1994-1995

CHAPTER 3

SUMMER CONSTRUCTION PRACTICES IN THE CURRICULUM OF METU DEPARTMENT OF ARCHITECTURE

In this chapter, the thesis aims to examine the position of the summer construction practices (ARCH190) in the curriculum of Department of Architecture, METU. Examination of the changing content of the summer construction practices since the foundation of the Department of Architecture is done in reference to *METU General Catalogs* that introduce curriculums of the various departments, and describe the courses. The thesis tries to understand the content and objective of the program of summer construction practices and how this content is learned.

3.1 Summer Practices in the Curriculum of METU Department of Architecture

The Faculty of Architecture at METU was established in 1956. It was the first faculty and department at METU. In the faculty, there was only the Department of Architecture. As stated by Charles Abrams, who was one of the prominent figures in the foundation of METU, in the chapter "Education and Research: A University is Born in the Middle East," in his book *Man's Struggle for Shelter*, main justifications for the institution were:

> 1. "There was a shortage of architects and planners qualified to help in properly developing the country."[8]
> 2. "[…] to train Turkish architects and planners both in teaching and in the practice of the professions over the long term."[9]

[8] C. Abrams, *Man's Struggle for Shelter in an Urbanizing World,* (Cambridge, Massachusetts: MIT Press, 1964) p. 203.
[9] Abrams, 203.

The faculty aims to graduate students not only as an architect, but having accumulation of knowledge from different branches that provides an interdisciplinary approach to the profession.[10] As it is mentioned in the METU catalog of 1957-58,

> It is the purpose of the Faculty to introduce the student to basic methods and a creative approach to the problems of the designer. The course of instruction is designed to develop an awareness of the human, the technical and aesthetic components of architecture. The Faculty believes that creativity stems not from inspiration nor taste alone, nor yet from classical sources, but rather from the capacity of the designer to mould the many technical and human components of the environment into a meaningful and imaginative relationship. To accomplish this requires an understanding and insight into men and materials.[11]

It is understood from this quotation that the main aim of the Faculty was to encourage students to think in a wider sense by integrating other cross-disciplines, such as landscape architecture, literature, art, construction and etc., in solving the architectural design problems. Students were expected to develop their knowledge and skills of design, and awareness to various aspects of design such as human interactions, technical and aesthetic values. The curriculum was organized to introduce knowledge of architecture, knowledge of making of architecture to the students by integrating different types of knowledge from other disciplines related to architecture.

In the early years of the Faculty of Architecture, there was a 5-year education program (10 semesters) that students graduated as having a master degree.[12] Curriculum was composed of design courses; basic science lessons like physics, mathematics; technical courses under the topics of materials, methods of construction, structure; history of art and architecture, theory of architecture, drawing, urban planning and landscape courses; 3 summer practices and a thesis to complete 10 semesters.[13]

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[10] Yeşim Uysal, *A Survey on the System of Education at the Middle East Technical University Department of Architecture,* Unpublished master thesis in the history of architecture, Department of Architecture, METU, 2003

[11] M.E.T.U. Catalog, 1957-58, Ankara

[12] Abrams, 206.

[13] M.E.T.U. Catalog, 1958-59, Ankara

In the early years of the faculty, starting from 1958, after completing the first year, students of architecture had to complete eight-week practice; the title of the course was "Field Practice in Construction Surveying" (ARCH 190). "Office Practice in Architecture" (ARCH 290) at the end of second year of the program, and "Office Practice in Planning Office" (ARCH 390) at the end of third year of the program were required to complete the architectural education at the university.[14]

During 1960s, the education system in the department of Architecture was "supported with the architectural theory [and design methodology] that the Bauhaus followed."[15] As it is stated in the master thesis done by Yeşim Uysal on the basis of the METU general catalogs, in the 1960s,

> […] [T]he educational concern of the Department was transformed with new interests in the social issues of architecture and the developments in the architectural thought of the country. [16]

Therefore, during the 1960s, the curriculum in the Department was re-organized systematically as a combination of design, technology, history, theory and elective courses.[17] Design education as the major component of architectural education played a significant role in re-shaping the curriculum. Design education became the core of the curricula as in most of the architecture schools all over the world. The difference in pedagogical approach to "Basic Design" (first year studio) and "Architectural Design" courses (second, third and fourth year studios) became clear. Courses on technology, science, art, history and structure that were enclosed within a general purpose for design education were planned to support the curriculum. As emphasized in Uysal's thesis, number of technology courses increased and the existing courses were re-organized with some additions to support the design education at the studios.

[14] M.E.T.U. Catalogs, 1957-58, 1958-59, Ankara
[15] Uysal, 82
[16] Uysal, 82.
[17] Uysal, 88.

The summer practices were re-named as "Summer Practice in Surveying and Construction," which was done in the school after completing the first year education; "Summer Training in Construction," which was done at the end of the second year in the rural areas of Turkey with the supervision of the faculty teaching members; and "Summer Experience in an Architectural or Planning Office."[18] The third phase of the summer practices, which was done after completing the third year, took place in the architectural offices for the duration of eight weeks.

The eight-week program of "Summer Training in Construction" was realized in rural sites of Anatolia, which were chosen in accordance to the needs of villages. Students were working as a labor man in sites to learn construction techniques by experience and to contribute to the developments of villages in rural sites of Anatolia. Actually, that underlines one of the missions of the faculty, which was to increase social consciousness and to contribute to the society's development. The summer training programs illustrate the influences of Bauhaus education system that applied hands-on building practice as a tool of learning in the education of architects. Bauhaus education system embraced all practical and scientific fields of creative production, and gave emphasis to practical experience on actual buildings under construction. It was argued that students learned architecture during the practical work, which was to be interwoven to the formal education.

Therefore, summer training programs in general (in construction, surveying and architectural or planning offices) in the METU Department of Architecture were not only the reflection of Bauhaus education that aimed to unite theory and practice, but also highlighted the social mission of the education that was related to "the idea of community development of the period."[19] In particular, the "Summer Training in Construction" program at the end of the second year, which were done in rural sites and lasted till the end of 1974, illustrated the social mission of the Department that was to introduce the students to the social ethics of professionalism, to contribute to the community development, to give community service, and to increase social interaction with the inhabitants of the rural area.

[18] M.E.T.U. Catalog, 1959-60, Ankara
[19] Uysal, 106.

During the period between 1958 and 1974, as a requirement of "Arch 290 Summer Practice in Construction," nearly 20 such buildings were constructed in various parts of Anatolia by second year students under the supervision of professors and assistants from the department. Due to some difficulties faced, the shortage of funds and socio-political condition of Turkey at that period, this mode of summer practice was replaced by internship in individually chosen professional construction sites. A long period after, during the summer of 1997, as a requirement of "Practice in Building Construction and Surveying (Arch 190)" the first year students worked in the historic village of Cumalıkızık in Bursa, and surveyed and recorded the old traditional houses.

The contents of the summer practices were explained in the METU Catalog of 1995-97 as the following:

> **(Arch 190) Practice in Building Construction and Surveying:** Introduction of building materials and their simple use and application techniques (one month), introduction to use of surveying equipment, topographic readings, measurement techniques and their applications (one month).
> **(Arch 290) Summer Practice:** Building construction procedures and techniques and active participation in construction work. The student can be engaged in an archaeological site work upon approval of the Department.
> **(Arch 390) Summer Practice:** Experience in an architectural office environment observing and participating in project development, relations of projects and implementation, and various office procedures. Student can be engaged in an archaeological excavation team upon approval of the Department.[20]

In 1999, the tradition of constructing small-scale buildings in rural areas as a requirement of summer practice in construction has resumed. METU Department of Architecture has started to reorganize for its students in the first year (not the second year, as it was in the past), a summer construction practice in the rural areas as a requirement of the "Arch 190, Summer Practice in Construction and Surveying."

[20] M.E.T.U. Catalog, 1995-97, Ankara

3.1.1 METU Summer Construction Practices (ARCH190) in the Curriculum of the First Year Education

METU summer practices in construction organized for the first year students in the rural areas, which is the main concern of this thesis, and will be more elaborated in the following pages in this chapter, have a significant position and role in the curriculum. This is in the sense that, as it is remarked in the 19th EAAE conference, *Re-integrating Theory and Design in Architectural Education*, by the teaching members of the first year design studio:

> Beginning design courses in the first year stand a certain distance away from the constructional aspects of building. Though essentially affiliated with the Bauhaus idea and principles, the approach in these courses cannot fulfill the scope foreseen in the original Bauhaus methods, of merging crafts as well as the industry into the creative design process, due to student numbers and inadequacies of workshops. The summer practice has been seen as the means to eliminate the distance mentioned.[21]

To better evaluate the role of the first year summer construction practices in the curriculum of the Department of Architecture, it is needed to examine particularly the first year curriculum. This examination on the first year curriculum helps to understand the architectural background of the first year students.

In the first semester of the first year education, in the "Basic Design" course (ARCH 101), students are expected to learn basic concepts and principles of design. As mentioned in the 2003-2005 METU Catalog, Basic Design course includes "exercises to develop mental and manual skills to cope with design problems,"[22] and helps students to develop "visual values for structuring and articulating two and three dimensional spatial compositions in different media."[23] In the second semester, in the "Introduction to Architectural Design" course (ARCH 102), the basic aim is to "prepare the students for architectural design by developing the skill for rapport between basic design principles and architectural design."[24] In the

[21] H. Zelef, N. Bursa, S.Önür, T. Aytaç-Dural, T.Saranlı , "METU Summer Practices: A Model of Integrating Theory and Practice in Architectural Education," In *Re-integrating Theory and Design in Architectural Education: Proceedings*, Nur Çağlar (ed.), (Ankara: EAAE, 2001) p. 277.
[22] M.E.T.U. Catalog, 2003-05, Ankara
[23] ibid, p.26
[24] ibid, p.26

"Graphic Communication" courses, in the first semester (ARCH 103) the main aim is to "furnish students with basic skills of graphic expression,"[25] and in the second semester (ARCH 104) the emphasis is given to "analytical study and presentation of natural and man-made environments, and analysis of part/whole, figure/ground, form/structure, mass/space, form/function relations."[26]

"Introduction to Architecture" courses that are given in two semesters aim to "introduce students to the scope and vocabulary of architecture,"[27] and give emphasis to the "study of the design activity at different scales and levels of space; order and character of places; and analysis of form, structure, use and meaning; physical and cultural influences on architectural form."[28] In the second semester, the course focuses on "the conceptual and material aspects of architecture introduced in connection with the development of contemporary architecture; and the study of selected traditions, styles and movements with reference to the formative ideas, intentions and techniques."[29]

"Graphic Communication" and "Introduction to Architecture" courses are given in the first year architectural education as complementary of design courses ("Basic Design" and "Introduction to Architectural Design"). The general approach in the first year of the education is to introduce students to analytical thinking. The objective of the first year:

> [...] is to familiarize the students with basic concepts about the built environment, and with creative methods and techniques. Development of skills and aptitude in recording observations, experiences and thoughts, in reading and critical evaluation, in incorporating knowledge acquired from studies in other disciplines into design, and in expressing ideas verbally and through methods of visual communication are expected.[30]

[25] ibid, p.26
[26] M.E.T.U. Catalog, 2003-05, Ankara, p.26
[27] ibid, p.26
[28] ibid, p.26
[29] ibid, p.26
[30] http://archweb.metu.edu.tr/people/index_faculty.htm (last visited 30.12.2005)

It is in the second year that for the first time "students are introduced to basic principles and conventional technologies for building structure, construction and environmental control. They are expected to develop the skill to use and experiment with these in designing simple environments for small groups of people with sensitivity for site and context."[31] As it is observed from the examination on the first year curriculum, there are not any courses on building structure and technologies, construction and material. Therefore, summer construction practice that takes place between the first year and second year education becomes essential component of the curriculum by providing an architectural learning environment, in which architectural reasoning/thinking and architectural doing are integrated, and the school and society are related. It is an essential component since it introduces students, who supposedly do not have any knowledge of construction and building structure, to constructional aspects of architecture, and in turn establishes a bridge between the first and second year education. Actually, the construction practice might help the first year students to easily adapt to the second year courses. In ARCH 190, students find a chance not only to experiment what they learn during their first year education but also to broaden their knowledge by doing architecture in 1/1 scale, and to carry this knowledge to the following years of their education.

3.2 METU Summer Construction Practices (ARCH190) as a tool of learning architecture

At the end of the first year education in the METU Department of Architecture, during the summer, students have to take the course of "summer construction practice," (ARCH190) which aims to introduce students to the construction of a small-scale building from foundation to roof, in the rural areas of Anatolia. Between the years of 1958 -1974, this program was carried on by building nearly 20 buildings as a contribution to public services. After a long period of interruption, in 1999 the summer construction practice took its place again in the curriculum of architectural education.

[31] http://archweb.metu.edu.tr/people/index_faculty.htm (last visited 30.12.2005)

Under this heading, the thesis will study the first year summer construction practices (ARCH 190) as a tool of learning architecture, which are organized in the rural sites. In doing so, the thesis seeks to answer,

1. What can be learned in summer construction practices?
2. How is the content of summer construction practices learned?

By examining what can be learned in summer construction practice, the thesis will make clear the content and objectives of the program of summer construction practice. By searching how this content is learned, it will make clear the pedagogic strategies, learning methods that ensure the fulfillment of the objectives of the program of summer construction practice.

Although each of the projects done as a requirement of the summer construction practice has their own characteristic properties, components that operate within the process of construction practice are basically:

1. Participators: architecture students and instructors as a team, community of the village as a client, sponsors, local administrations and etc.
2. Context: the physical setting in which the project is built, including regional, geological constraints, climatic conditions, site boundaries, accessibility, transportation
3. Program: determining needs and requirements that the project must accommodate within the given scope, time and budget
4. Resources: the budget within which the project should be realized

Summer construction practices are organized for two months (July and August) with different groups of students for each month. It is usual that both groups work for the realization of the same project but there are also exceptional situations, such as in the years of 1966, 1968 and 1970, when two different projects in two different sites were realized.

3.2.1 Aim and Content

As it is stated earlier, summer practice in building construction (ARCH 190) in the METU catalog 1995-97 is described as the introduction of students to building materials and their simple use and application techniques. It suggests a learning process with the active participation of students in construction work. Related to this subject, Berin Gür and Onur Yüncü remark:

> The aim of the summer construction practice, which is conducted at the end of the first year of the education, is to provide a context for students to acquire knowledge of making architecture by building/doing. 1/1 full-scale construction by students is a process where knowledge of making architecture is produced, shared and discussed. The act of building becomes an educational, pedagogical tool. Hands-on-building practice, by 1/1 building, experiencing, observing and touching the material, contributes to students' knowledge and ability of making architecture.[32]

"1/1 full-scale construction, by students, [as a requirement of the first year summer construction practices] is a continuation of architectural education in the actual site."[33] Therefore, the program of summer construction practices in the Department of Architecture is organized as a part of a whole design education. The first year education in architecture is supplemented by the experience in the field during summer. As the first year education stands a certain distance from the constructional aspects of building, summer construction practices aim to eliminate this distance.[34] In doing 1/1 scale construction, first year students mainly learn from their experiments of particular situations, and start to gain ability how to generalize knowledge of these particular situations and how to extract relevant knowledge from their experiences and integrate it to their whole life experience.

Then, the question is: What can be learned from the summer construction practices? Essentially, the summer construction practices aim to reveal the way a building is done. The main purpose is learning: learning how to build, ways of making architecture, how to manage changes that might occur during the

[32] Berin Gür and Onur Yüncü (eds), "1/1 Yaz Uygulaması 2003: Arılı Köyü İlköğretim Okulu Bilgisayar İşliği," In *1/1 Yaz Uygulaması* (İstanbul: 124/3, 2004) p. 9.
[33] Gür & Yüncü , 25.
[34] H. Zelef, et al., 277.

construction process. This is actually to learn the process of thinking-and-doing/building, which is *not* similar to producing good design objects.

In these practices, students begin to learn the potential of construction and its conception, and the essential link between construction and design process. By introducing the constructional aspects of building in the field, students start to broaden their knowledge of materials and elements of architecture.

Besides its educational dimensions, working and living in the rural area, and communication with the inhabitants of the village underline the social significance of the summer construction practices.[35] The summer construction practices put emphasis not only on "thinking-and-doing," but also on collaborative working, development of communication skills (e.g. how to communicate with clients, with the inhabitants of the village), management of work schedule and finance, working with and for community. Departing from this point, it can be said that summer construction practices realized particularly in the rural areas are complementary of the architectural education; it helps to develop an awareness of social, cultural, environmental, local aspects of architecture; it helps to learn the local architecture and the traditional way of building (with the available materials in the area), which is peculiar to the rural area. Among the summer construction projects that indicate the emphasis to the local architecture, Arılı Village Primary School Computer Workshop (Rize, Fındıklı, 2003) (Fig. 3.6) and High school project (Eminlik Village, Niğde, 1967) (Fig. 3.5), which the thesis will mention under the heading of "Learning from *working with* and *for* the context," can be given as an example.

Moreover, "ethic" dimension of the summer construction practices is underlined by the authors of the article, "METU Summer Practices: A Model of Integrating Theory and Practice in Architectural Education," such as the following:

> Beside educational, pedagogical and social dimensions of the summer practice program, students' introduction to the *ethic* dimension, an understanding about the values in architecture constitutes priority amongst the principal aims. Students are expected to identify the taxonomy (values) of architecture, and the contradictions or mutual support amongst these values. They also develop appropriate conduct to support these values.[36]

[35] Gür & Yüncü, 25.
[36] H. Zelef, et al., 279.

3.2.2 Method of Learning

Here, the thesis tries to understand how the objectives of the summer construction practices are fulfilled, and how its content is learned by the students. In doing so, the thesis elucidates methods and tools of learning embraced within the construction practices.

3.2.2.1 Learning by doing

> One must learn by doing the thing; for though you think you know it, you have no certainty, until you try.[37]

The act of "doing" or "building" as a learning tool, is to be an integral part of the learning process in architectural education. In the book *Learning by Doing: Design and Construction in Architectural Education*, William Carpenter describes the act of building in the education of an architect as "a cyclical process capable of connecting the realm of idea to its reality through the act of construction."[38] Walter Gropius insisted that "without the experience of doing the theoretical learning of a student remains static and not tested."[39] Gropius continuous to remark that, "knowledge will only come by individual experience."[40] Ultimately, as knowledge is used, as results are shared and tested in application, learning comes into process.

"The issue of knowledge revolves around the relationship between theory and practice. […] Theory must be linked to working practice."[41] Therefore, if related to hands-on experience, elements of architecture may begin to have relevance in the learning process. When students learn by doing, they experience failures too, and start to learn from these failures. They make experiments, and seek

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[37] By Sophocles in http://www.gurteen.com/gurteen/gurteen.nsf/id/X002462BA/ (last visited in 26.11.2005)
[38] William J. Carpenter, *Learning by Doing: Design and Construction in Architectural Education*, (USA: Van Nostrand Reinhold publication, 1997) p. 3.
[39] Quoted in William J. Carpenter, p. 17.
[40] Quoted in William J. Carpenter, p. 17.
[41] K. Friedman, "Design Science and Design Education," *The Challenge of Complexity* (Helsinki: University of Art and Design, 1997) pp. 54-72, quoted from Ken Marsden, "Theory in Practice: Practice in Theory- Strategies for Integration", p. 290.

to find out what is true by trying things out and attempting to make generalizations about what might be true in the future.

Practical application in actual site is a valuable activity, different from scholarly learning. Architecture cannot be learned simply by theoretical knowledge, but must be learned also by taking actions, by trying something, seeing how well or poorly it works, reflecting on how to do it differently, then trying it again and seeing if it works better. That is to say that acquiring knowledge of architecture by taking action or by building provides an educational context where students can improve their ability and skill in architectural design.

Summer construction practices directly engage the student in learning process. When learning is active, student becomes the major actor of the learning process, who controls and operates the process. That is to say that s/he seeks for possible ways of making progress towards a solution to the (architectural) problem. Of course, s/he needs some instructions and information to solve the problem, but the important point is that it is the student that looks for the ways to solve the problem and to realize the architectural solution. This is active learning, which suggests a productive and operative process. It is a way of learning that students involve with immediate, direct, concrete experiences.

In architectural education, design studios are the most important context for learning how to produce architecture, ways of making architecture, and acquiring knowledge of making of architecture. Actually, “ideal” projects are made but students cannot know the realization of the projects. At this point, importance of “learning by doing” is understood. The concept of “learning by doing” refers to a process in which passive learning - sitting at the desk, listening to teacher- is replaced by activity involving the full participation of the student in the construction of “real” building. Design process is not finished only in the classroom setting but continues in the actual site. Students get a certain feedback from what they are building, and start to reconsider, reformulate their initial design ideas. It is in this sense that they start to see the actuality of their ideas.

Design studios form the main core of architectural education. Learning in studio by designing is an effective way of active learning. Depending on my previous experiments as a student of architecture at METU, I could say that in the design studios, students are always in relation with their friends, who provoke them during their learning period. Yet trying to solve a problem in a design studio is very different from solving the problem by building, seeing, observing and experiencing in the actual site. It is different in the sense that, learning by practicing in the actual site is an active learning where students learn by taking actions, by seeing, observing, touching, experiencing the material. Actually, learning is not one-shot event, it takes several exposures to material it, long enough to understand it.

In training students by practicing architecture in 1-to-1 scale, knowledge is obtained by the act of investigation and discovery. Yet, it should be pointed out that students might not be aware of what they are learning in (particular) action, which is "invisible knowledge hidden behind intelligent action."[42] Actually, students can learn more than they can tell, in other words they may not express what they have learned because it relates to experience or practice. Although students focus on the particular task they are working on, they are open to embracing unexpected outcomes of the practice.

As declared by Aristotle, "If, then, a man has the theory without the experience, he recognizes the universal but does not know the individual included in this."[43] By practicing, students better learn how to apply universal knowledge in different particular situations.

"Learning by doing" is central to the METU summer construction practices. The emphasis is on the direct interaction of students with the construction process, in which they are expected to learn from what they are doing and what they experience while doing. This suggests a continuous learning cycle: the act of "thinking" and "doing" simultaneously exist in the learning process embraced within the summer construction practices. By doing or by taking actions, students are expected not to simply observe, but to *reflect on* what they did, and *reflect in*

[42] C. Bereiter & M. Scardamalia, *Surpassing ourselves: An inquiry into the nature and im-plications of expertise* (Chicago: Open Court, 1993)
[43] Aristotle, *Nicomachean Ethics*, Book Alpha (I), (*Metaphsics)*, Translated with introduction and notes, by Martin Ostwald. (New York: Macmillan Publishing Company, 1987) Chapter 1, 980b26.

what they are doing. Actually, this is the process of production, discussion and sharing of architectural knowledge.

Then, the practice in a full-scale construction in the actual site, as opposed to an instruction-based learning environment, provides a learning environment where not only knowledge is produced and applied simultaneously but also its production and application is discussed and brought into reflection. Therefore, learning process is based on the simultaneous involvement of thinking-doing (taking action)-skill-production of knowledge rather than a linear process of knowledge-skill-taking action. Learning process should not be understood as the act of obtaining knowledge or skill through instructions but rather as an act of investigation. This actually reminds us Alexander's argument on "arriving at knowledge" in architectural education by doing "real buildings."[44]

Relating to these arguments above, the teaching members of the first year education of the year 1999 make a notice in reference to METU summer construction practices:

> Beginning design courses in the first year stand a certain distance away from the constructional aspects of building. [...] The summer practice has been seen as the means to eliminate the distance mentioned. Yet, if this means is used to convey technical knowledge didactically, with an instrumentalist frame of mind, it is considered as drudgery by the student and helps to support its opposite; architecture as an elitist, design-oriented profession.[45]

Depending on my personal experiences in the summer construction practice done in Eminlik Village (in August 1999), we, as students, observed that construction period is more complex and multifaceted process than we imagined before. We experienced how our ideas can be materialized in the actual site, and the reality of our ideas. We learn how to relate what we learned before in the classroom with what we already start to learn in the site, and learn how to think.

[44] Alexander, 71-89.
[45] H. Zelef, et al. , 277-78.

3.2.2.2 Task-oriented and student-based learning

The summer construction practices are student-based, task-oriented learning environment. In these construction practices, students are assigned a series of tasks, and most of these tasks are done in groups. Active participation of the students is important in a task oriented practice period. Students are expected to act that is to choose right means for the action rather than to make a thing. Doing a task initiates the learning activity. When students involve with a group work in a task, they are expected to augment their understanding of architecture, develop knowledge-forming skills and social skills as well, and acquire skills of life-long learning, communication and team building. Task is about making propositions, refining them and gaining knowledge in action. Tasks involve several activities in which students conduct direct interaction with the environment by taking actions, doing, observing and touching. Students start to think about a task that is to say that they start to question what they are doing and learning.

Learning by doing is related with problem solving. There is a problem to be solved and while trying to solve, students learn by taking action. It is a learning process that results from working with problems; problem derives learning. Learning in the context of the need to solve a problem tends to store knowledge in memory. The learning process is therefore inherently iterative, non-linear and unpredictable. In some cases, problems may never be resolved and thus the task might remain open ended and uncertain.

> The student has to acquire the appropriate knowledge, build up a knowledge base, assimilate the knowledge, develop the necessary skills, and then summarize and integrate the knowledge and skills thus acquired.[46]

[46] H.K. Banerjee & E. De Graaff. "Problem-based Learning in Architecture:Problems of Integration of Technical Diciplines," *European Journal Of Engineering Education*, Vol.21, No.2, 1996, p. 191.

In task-oriented learning, students not only learn what they need but also gain knowledge that they might ignore in the future. In the learning process, students realize what they know and more importantly what they don't know. Students are expected to search possible ways of making progress towards a solution to the problem. This suggests a learning process, which is often speculative and exploratory in nature.

In task-oriented learning, students learn from their errors. Depending on my personal experiences in Eminlik, we were given the task of doing a column. In the first trial, we poured the concrete, and when we disassembled mould we saw big cracks in the column since we couldn't do the task properly. We were obliged to break the column with a lot of effort. In the second trial, we made the column mould by dividing it into three parts, and poured the concrete in three phases to make a column properly.

Therefore, students are the main actors of their own learning process; they play the major role within the learning process.

> Student-based education claims imagination (in terms of activating possibility), attitude (in terms of activating view) and complexity (in terms of activating making choices). Therefore, student-based education is (as deconstruction is in philosophy) creative, initiative and critical.[47]

The summer construction practices are student-centered and "constructive learning environment."[48] Students coming from high school are accustomed to teacher-centered education. The construction practices for the first year students of architecture, prepares a ground for students with different backgrounds and abilities to adjust to student-centered learning. In order to learn, students don't only receive knowledge; they process knowledge so that it can be stored and recalled.

In the student-based education process, the content and knowledge occur as a result of student's capacity and interest to learn.[49] To enable the students to gain the most from their learning process, it is very important that the students understand the objectives of the construction practices.

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[47] Depuydt & Zeijl, 332.
[48] Depuydt & Zeijl, 321-335.
[49] G Light & R. Cox, *Learning & Teaching in Higher Education: The Reflective Professional,* (London: Paul Chapman, 2001)

> […] *skills are learned much more effectively when the student is aware of the need for them, and has a personal interest in acquiring them*, and the equality and depth of the learning experience is usually found to be enhanced when practice and theory are taught within the framework of a project.[50]

In summer construction practices, students experience different problems that they cannot experience in design studios. For example, the refreshment bar (gazino) in Güneyköy (Elazığ, 1966) was built by the students in the leadership of Nejat Erem (Fig.3.1). The building was constructed as a wooden roof supported with thick stonewalls, and in turn students found a chance to observe various methods of construction in accordance with different materials, and different stages of construction process.[51] Yet, during the construction process, the most important lesson was derived from the natural and environmental problem, which was the lake flooding. The ground of the building became inappropriate for construction because of not thinking the risk of flow during both design and construction processes.[52] Students were expected to learn the significance of the environmental conditions to design, and learned to think the building with its environment.

Figure 3.1 The refreshment bar, Güneyköy-Elazığ (1966)

[50] J. Cobb, 'Overview of the Teaching and Assessment Practices Commonly Used in Art and Design Education', paper delivered at the *Improving Student Learning: Through the Disciplines Conference,* (University of York: 8th September, 1999) quoted from Ken Marsden, "Theory in Practice: Practice in Theory– Strategies for Integration," p. 292. For further information see http://www.cltad.ac.uk. Emphasis mine.
[51] Süha Özkan, *ODTÜ Mimarlik Fakültesi Yaz Uygulamaları,* (Ankara: Arp Yayınevi, 1974), p. 27.
[52] Özkan, 27.

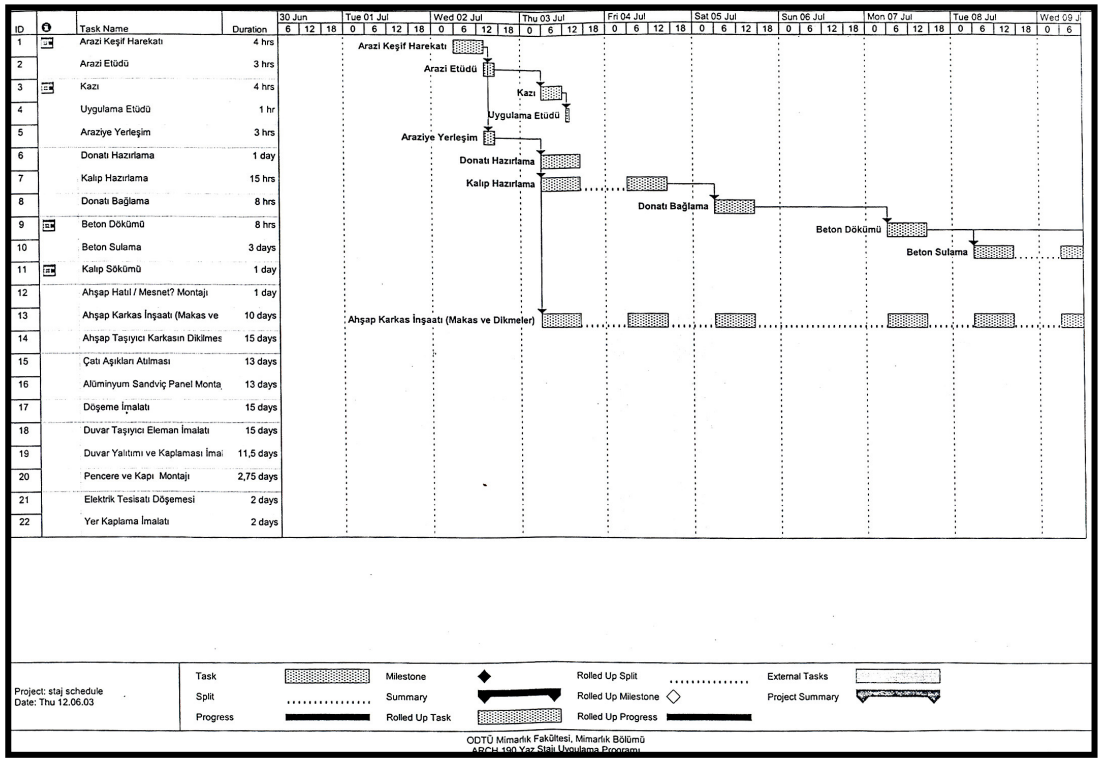
Considering its pedagogical dimension, programming of construction process is also very important: "*Practice requires leadership, management, team building, communication, decision-making, negotiation and collaborative abilities, in addition to technical skills*."[53] For example, considering the summer construction practice, Arılı Primary School Computer Workshop (2003), Gür and Yüncü state:

> Work schedule is organized in a way that different work groups can simultaneously act. Students are encouraged to participate in different work groups. In that way, students have the opportunity of observing and experiencing different construction processes and materials.[54]

Based on my own experiences in the construction practice in Eminlik, I worked in different task groups to observe various construction processes, such as bonding stonewalls, nailing stair moulds, pouring concrete, and etc. Then, as a result of professional planning of time and organization in the site, we, students, could have a chance to experience every stage of construction.

Generally speaking, in the summer construction practices, the budget is limited, and construction materials are mainly sponsored by private construction firms/offices, therefore delays in the provision of materials can occur during the summer practices. Actually, these situations make students learn why the site management is essential to the construction process. An example to this construction management is the construction practice in the Arılı village (2003). The organizers of the construction practice planned the two months construction period beforehand; they prepared a time and work schedule (Figure 3.2). Although the delay in the provision of concrete occurred, because of the organization of the construction process, students continued to work in preparing the wooden parts of the building. The learning process continued without any interruption.

[53] www.aia.org. (Last visited in 19.10.2005), Emphasis mine.
[54] Gür & Yüncü, 22.



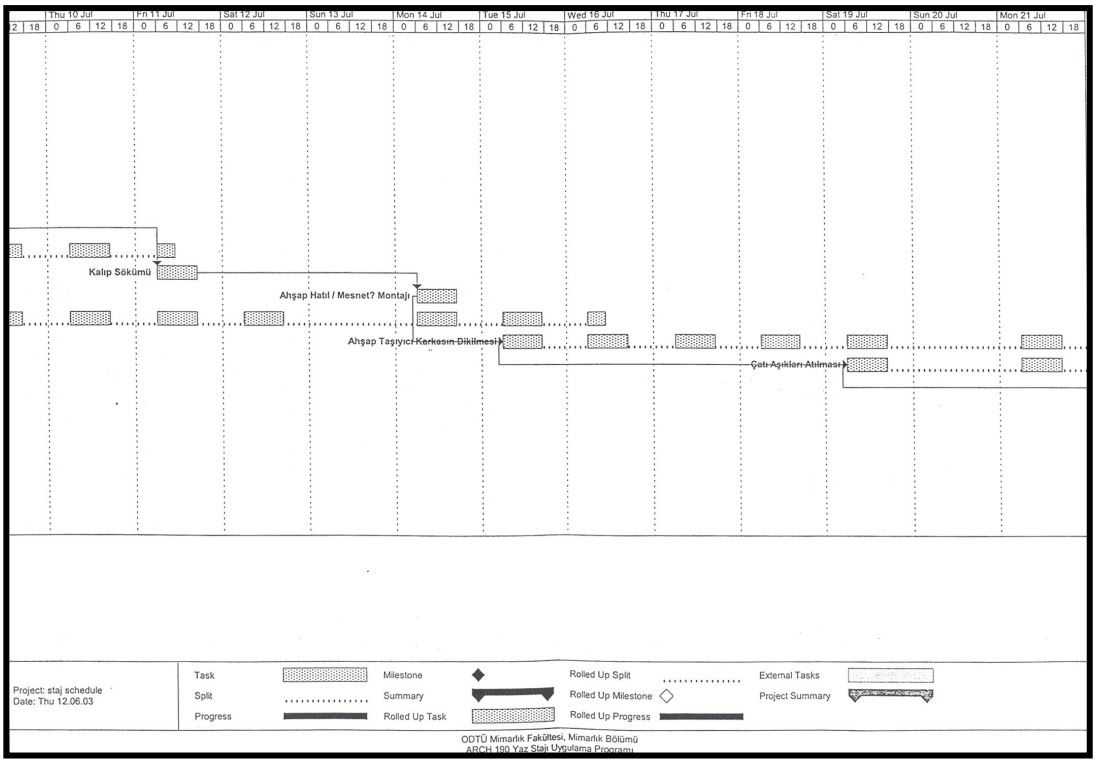


Figure 3.2 Time and work schedule for construction practice in the Arılı village (2003).

3.2.2.3 Learning with collaborative working

Learning with collaborative working involves students, who work in teams to accomplish a common goal, answer or generate questions, explain and share observations, solve problems, brainstorm together with their team members. All students in a group are held responsible for doing their share of the work. Team members are obliged to rely on one another to achieve the goal. If any team members fail to do their part, everyone suffers from consequences.

Students are encouraged and helped to develop skills of leadership, decision-making and communication by collaborative working. Although some of the group work may be done individually, some must be done interactively with group members by providing one another with feedback, challenging one another's conclusions and reasoning, and perhaps the most importantly, teaching and encouraging one another.

Students learn more by doing or taking actions than by simply watching and listening. Learning with collaborative working is by nature an active method, which enhances learning in several ways. Students tend to become more engaged in learning because they are doing the task with their peers by actively participating in the construction process. Once involved, they also need to talk about what they are experiencing with others, which leads to further connections. Depending on Mine Özkar's observations in the 2005 summer construction practice in Kırıkkale, Hisarköy[55], (Fig.3.3) introverted students that keep themselves away from collaborative working, and prefer to work individually during the semester in the studio works, are likely to give up working when they get stuck, yet in the construction process they start working cooperatively, and keep on to work. They realized their different abilities and skills that they can teach others, and this situation encouraged them to be a part of the team as a member.

[55] Mine Özkar and Alper Semih Alkan are the teaching members of the Faculty of Architecture at METU, who organized and conducted the summer construction practice in 2005, done in Hisarköy, Kırıkkale, and designed the building. From a personal correspondence with Mine Özkar, as an anecdote from this construction practice in Hisarköy, when it became obliged to pick wild sherry from trees for breakfast, few students who were keeping themselves apart from the working group, teach others how to pick black sherry from trees and a social interaction started. They felt themselves useful as a team member.

When a student faces with the task of explaining what and how s/he is doing to other members of the group, s/he often finds the gaps in his/her own understanding and starts to fill them in. What a student discusses with others and what a student teaches others enable him/her to broaden his/her understanding of architecture. Students working alone may tend to delay completing the tasks given, but when they know that others are counting on them, they are often driven to do the work in a timely manner. Students that are used to work alone could have incentives not to help one another but by working cooperatively, they learn how to help others to complete the task on time, which is given for the group achievement.

Figure 3.3 Village Clinic, Hisarköyü-Kırıkkale (2005)

3.2.2.4 Integrating the tasks of designing and building

The project realized as a requirement of summer construction practice in 1999 summer was re-designing and construction of an abandoned old primary school building in the Village of Eminlik (Ulukışla, Niğde) dating from 1936 (Fig.3.5). In the same place there is also a high school, which was constructed in the summer of 1967 by the second year architecture students (Fig.3.4). The construction practice in Eminlik is a unique case in which students participated in actual designing/building workshop; the summer construction practice was linked to the basic design course. I was one of the students who participated to this exercise.

As their final spring term project, the first year students of 1999 were given the re-design of this old primary school building in Eminlik; they were asked to design places for new facilities, like small library, a computer workshop, teachers' meeting room and a kitchen. The instructors[56] that organized and conducted the summer construction practice in 1999 were also the instructors of the first year Basic Design Course in the department. They described the training in short:

> The summer practice in 1999 had the uniqueness of being linked to the core program of the Spring Term in the Academic Year. Process of architecture, continuing from the initial design to completion of building is considered to be more fulfilling than informing the students on the separate design and construction phases. […] This assignment created an opportunity for the student to be acquainted with the building and also develop a bond with it through the creative process of developing design ideas within the given parameters. [57]

[56] Haluk Zelef, Nihal Bursalı, Selahattin Önür, Tuğyan Aytaç Dural, Türel Saranlı
[57] Haluk Zelef, et al., 208.

Figure 3.4 High School building, Eminlik-Niğde (1967)

Figure 3.5 Multifunctional Building, Eminlik-Niğde (1999)

The thesis believes the importance of participation of students in every stage of both design and construction processes. This is because of the fact that they gain self-confidence and develop their ability to design by building their own designs.

Although construction is often seen as a distinct subject from design, the summer construction practice in Eminlik Village showed the students the interrelation of design process and construction process. Theory and practice run concurrently, and supported each other in this summer practice. Design process did not finish in the classroom setting yet continued in the site. Students got feedbacks from what they were building; designing (thinking) and building (doing) mutually constituted each other. As correctly stated by Vytenis Gureckas;

> *The site is also a classroom where education continues.* Design/build in architectural education confronts with two realms, which are not going parallel but "leapfrog each other," the ideas and the materials. *Thinking and making overlaps each other*.[58]

In 1999 summer construction practice, students learned ways of making architecture by working back and forth; their designs had to include realizable solutions, which would be constructed in the site. It provided a ground for the students to see the built reality of their designs. Actually, drawing a building into existence is a complex task for the students. The process from drawings and models to the reality and to the construction necessitates testing initial design ideas in the real site.

Having been one of the students in the summer construction practice in Eminlik Village (in August 1999), I can easily say that although the design decisions of the multifunctional building were given in the studio before, during the spring semester, these initial ideas and decisions were changed in many ways in the actual site while constructing the building. This suggests a productive and operational process, which is not merely the means to an end product, but is constantly open to negotiation, redefinition and transformation of its initial goals. Students were influential in the decision-making process in the real site. We, as students and the builders, mainly concerned with what works rather than absolute truths. This suggests to use the right means for the action or in other words, to do right action. We were encouraged to seek any possible alternatives in finding solution directly to various problems occurring in the site.

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[58] Vytenis Gureckas, "A House for Two," *Learning by Doing: Design and Construction in Architectural Education* (USA: Van Nostrand Reinhold publication, 1997) pp 70- 82.

Actually, the problem-based learning is valid for all of the summer construction practices, which integrates the processes of design and building. Students are expected to learn how to do right actions, how to choose right means for the action and how to manage the changes when they face a problem (of any scale). That is to say that they come across with situations in which they have to negotiate and redefine the initial design decisions, and then to redesign. In other words, "Students produced solutions directly by doing, seeing, evaluating and modifying. The truth was out there in front of them, rather than filtering down to them from drawings or models."[59]

3.2.2.5 Learning from *working with* and *for* the context

> Contextual aspects are physical context and social context. Physical context is characteristics of *where* we are designing, and the social context is the characteristics of *for whom* design is made.[60]

Context both in the physical and the social sense acts as a setting for learning architecture. In the summer construction practices, students learn various aspects of architectural design, to be critical in their approaches to design, and to develop social consciousness by *working with* the context (that is to consider contextual forces, physical characteristics of the local environment; to collaborate and work with the client and the users; and also to derive benefit from the community) and by *working for* the context (that is working for the community, for the favor of the society).

The summer construction practice of the year 2003 was realized in the Arılı Village (Fındıklı, Rize) (Fig.3.6, 3.12). The students of architecture after completing their first year education constructed a computer workshop, which was designed by Berin Gür and Onur Yüncü. In 9th Turkish Architectural Exhibition and Awards in 2004, Arılı Primary School Computer Workshop is nominated for prize

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[59] Emile Vestuti, "Learning by Doing: A Complementary Design Studio Method," *Beginnings in Architectural Education- Proceedings of the ACSA/EAAE Conference Prague 1993*, (New York: ACSA Press, 1994) p. 93.

[60] Ahmet Gülgönen, "Architectural Ethics as the Basis of Practice and Theory and Architectural Education," In *Re-integrating Theory and Design in Architectural Education: Proceedings*, Nur Çağlar (ed.), (Ankara: EAAE, 2001) p. 98.

in the category of "living environment".[61] In explaining the design process, Gür and Yüncü state,

> The context, in which the timber computer workshop is built, has a long-established timber building tradition. One of the significant examples of local timber building types, which become a source of inspiration in the design process, is *Serender*. *Serender* is a storage, which is raised above the ground to protect the food from humidity and animals. [62]

And, they continue to explain their approach to the design of the computer workshop in reference to local architecture:

> The building should be connected to its environment; the contextual factors such as climate and the local timber building tradition should be reconsidered in the design of the computer workshop. Therefore, the building is raised above the ground on concrete walls to protect the timber from humidity. Elevating above the ground also contributes to the transparency of the building. Working with timber is a challenge for both students and instructors. This is a chance to recognize and discover the potentials of timber as a construction material. [63]

Figure 3.6 Computer Workshop, Arılı village, Fındıklı-Rize (2003)

[61] *9. Ulusal Mimarlık Sergisi ve Ödülleri* (*9th Turkish Architectural Exhibition and Awards*) (Istanbul: Yapı Yayın-116, 2005), p.112.
[62] Gür & Yüncü, 10.
[63] Gür & Yüncü, 10-14.

One of the main objectives of the summer construction practice in 2003 was to make students to learn the intricate relation between the context, *place*, and the building. By building their own constructions in 1-to-1 scale, students are also expected to learn local architecture and also the practical properties of local material (i.e. timber). Student acquires knowledge of the material during the building process. The learning process is achieved through doing, stimulating and observing; experiencing and creating; simulating interaction and argumentation. Visual and tactile perceptions are part of a learning process in which one discovery leads to another. Knowledge of the local architecture is obtained through sharing experiences between the students themselves, and also between the local craftsmen and the students.

Another specific example that considered the local characteristics of the area is the library building with a local lean-to roof, which was constructed in Yassıhöyük (Ankara) in 1963 (Fig.3.7).[64] Refreshment Bar (*gazino*) in Gölevi (Ordu, 1965) was also designed by taking into consideration the local architecture peculiar to the Black Sea region, and built out of timber, which is the local material (Fig.3.8).[65] Concerning the multifunctional building, which was constructed in Kutludüğün (Ankara, 1966), Süha Özkan states that one can see "traces of Anatolian style by using combination of brick and stone" [66] (Fig.3.9). The summer construction practice done in 2002 in Demirkazık Village in Niğde is another example, where stone as the most available construction material in the area was used yet in a different way (i.e. stones were placed diagonally) to explore the potential of the stone (Fig.3.10).

[64] Özkan, 13.
[65] Özkan, 15.
[66] Özkan, 23.

Figure 3.7 Library, Yassıhöyük-Ankara (1963)

Figure 3.8 Refreshment Bar, Gölevi-Ordu (1965)

Figure 3.9 Multifunctional Building, Kutludüğün-Ankara (1966)

Figure 3.10 Additional Building to Ordos Mountain House, Demirkazık-Niğde (2002)

High school building was done in Eminlik Village (Niğde) in 1967 under the supervision of Ahmet Gülgönen (Fig.3.4). In explaining his thoughts on design teaching, which lacks "the continuous dialogue with the client and users in all stages of design until the building is built,"[67] Gülgönen refers to the school building done with the students in Eminlik, as an activity in which the potential dimensions

[67] Gülgönen, 99.

of the local context were searched for, and the dialogue with the users gave shape to the design-construction process:

> It was inspired by the use of local materials and other particular design givens related with the time […]. The decisions taken on site (related with the qualities of the materials and their potential) were good example of phenomenological approach.[68]

Another high-school building was constructed as a summer construction practice in Gilindire (İçel, 1968) (Fig.3.11). Four units of separate classrooms, each opening to an open courtyard, which is one of the local characteristics of the area because of the hot climate, were built.

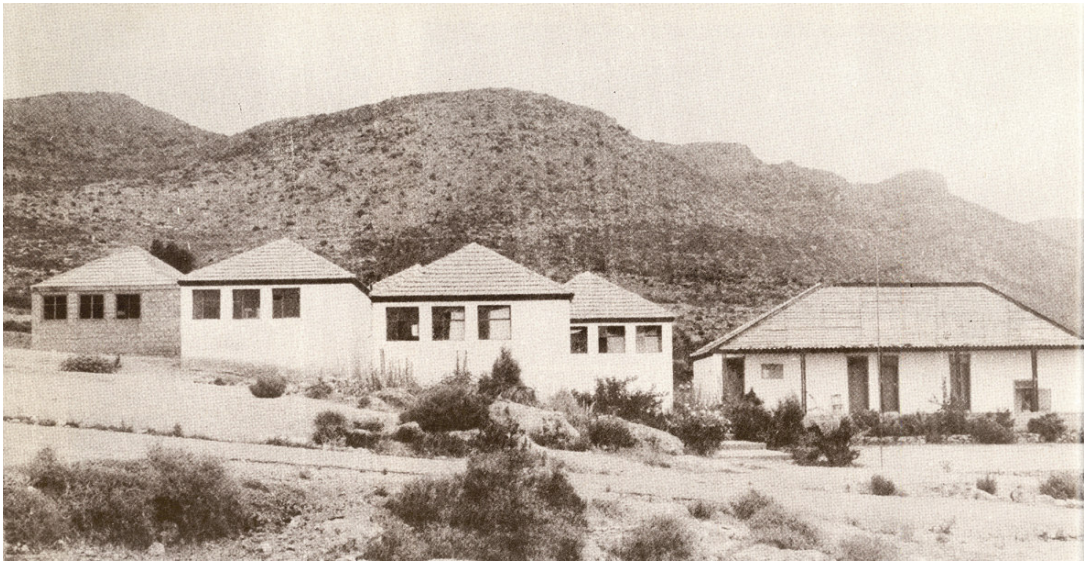

Figure 3.11 High-school building, Gilindire-İçel (1968)

In summer construction practices students and local builders/craftsmen work in collaboration; not only the students but also the local inhabitants and builders start to experience and observe the contemporary construction techniques and other possible ways of using the materials available in the area. Then, it should be noted that both students and local inhabitants and builders become the actors of the same learning process. This is an interactive learning process that includes both the students and the local inhabitants.

[68] Gülgönen, 99.

Students find a chance to work with local craftsmen, whom they can learn local way of making architecture and techniques of local construction. This is a kind of learning, which reminds the former system of apprenticeship, the process of becoming a master-craftsman under the leadership of the master craftsman, through making mistakes, experimentation and etc.

Then, of the construction process, not only the teaching members of the Department of Architecture but also and the most importantly the local craftsmen take a significant part in the learning process. For example, considering the case of Arılı Primary School Computer Workshop (2003), Gür and Yüncü say, "local craftsmen are the significant actors of the 1/1 building education process. They act as the role models for the students."[69] (Fig. 3.12) Actually, this quotation underlines the significance of doing a full-scale construction practices in the rural sites in the sense that students work in collaboration with the inhabitants of the villages, who are both the users and the clients and also the builders. Local builders work with the students, and in turn students have an opportunity to observe and discover the local way of building.

Figure 3.12 Computer workshop, Arılı Fındıklı-Rize (2003)

[69] Gür & Yüncü, 24-25.

Besides the students, the local builders also find an opportunity to observe the contemporary ways of making architecture, and of using the available materials in the area in a way to derive the potentials of the materials.[70] For example, in Hisarköy (2005), the inhabitants of the village did not know the contemporary materials used in the construction of the village clinic and their application methods (Fig.3.13). The walls of the clinic were out of aerated concrete, and extruded polystyrene was used in the insulation of the roof, which were not used in the village before.[71]

Figure 3.13 Village Clinic, Hisarköyü-Kırıkkale (2005)

Common point of all of these practices is, partly because the students are the builders and partly because the process includes trial-and-error exploration, the physical outcomes of the processes might seem rough, and far from perfection. The outcome may not represent the tidiness of material and construction that is usually found in the practice of architecture. However, the emphasis here is on the students'

[70] Gür & Yüncü
[71] From a personal talk with Mine Özkar.

understanding of construction process, therefore the process becomes much more important than the final physical outcomes. The intention is to help students think architecturally about building structures.

> Departure point of these activities [hands-on building practices] is the understanding of activating the creativity skills of students by obtaining an education atmosphere based on not the end product but the process, which is also aim of the contemporary education.[72]

Yet it should be also pointed out that, although the process is more important, a successful end product adds value to hand-on education in a way it encourages the students, and also shows the achievement of the process. Each building constructed as a requirement of the summer construction practices reflects the architectural characteristics of their own era; they can be thought as the reflection of the architectural practices of the period it belongs to.

[72] Ayşen Ciravoğlu, "Workshop'ların Mimarlık Eğitimine Katkısına İlişkin Bir İnceleme: EASA 2000 Örneği", *Mimarist*, Vol. 1, 2001, p. 100.

CHAPTER 4

BENEFITS AND EFFECTS OF METU SUMMER CONSTRUCTION PRACTICES FOR THE STUDENTS OF ARCHITECTURE

> Opportunities for integrating practice into education include case studies, cross-disciplinary projects, in-studio teams, pre-graduation internship experience, and community design involvement. These experiences serve to enrich the students' education, and prepare them to become leaders not just within the profession, but also in their broader communities.[73]

In this chapter, the thesis aims to clarify benefits and effects of METU summer construction practices in learning knowledge of making architecture. Although most schools of architecture have components of technology of built environment and construction as a part of their curricula, the main problem is the lack of integration of these subjects of technology and construction into architectural design processes. Usually, students think construction in isolation from studio design projects. H.K. Banerjee and E. De Graaff evaluate results of the problem of lack of integration (between design and construction processes) as "alienation of student body and ineffective knowledge transfer,"[74] in their articles in which they analyze the architecture curricula at the faculties of Architecture in Newcastle (Australia) and Delft (Holland), and propose problem-based learning as an educational methodology in order to integrate different subjects of architecture.[75]

METU Summer Construction Practice is introduced as a solution for the integration of knowledge from different domains, and of subjects constituting the curriculum. Students find a chance to practice architecture, to think on what is done/built and think in what s/he is doing/building. Students learn "how to do" and "how to learn" while practicing architecture in full-scale.

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[73] www.aia.org (Last visited in 19.10.2005)
[74] H.K. Banerjee & E. De Graaff. "Problem-based Learning in Architecture:Problems of Integration of Technical Diciplines," *European Journal Of Engineering Education*, Vol.21, No.2, 1996, p. 185.
[75] Banerjee & Graaff. 185-195.

Learning process embraced within the construction practices is also a productive process. Actually, that is the production of knowledge; learning what is to be learned by doing architecture. It suggests a continuous cycle of thinking-and-doing; students both think on what they have done and think in what they are building. As mentioned before in the quotation from Aytaç-Dural, education is not "the act or process of imparting knowledge or skill," and its "transformative -rather than informative- power" should be underlined.[76] By means of the construction practices, instead of direct transfer of knowledge, the process of learning is facilitated. Students both practice architecture to learn and also to produce and discuss knowledge of architecture.

Hands-on building practice plays an important role in design education in a way that it helps the individual development of skill and enlightenment through building architecture in 1-to-1 scale. Students learn how to find and use appropriate learning resources; in other words they learn how to learn. As stated in AIA web page, hands-on building practice emphasizes the following points:

> […] leadership development; collaboration; community engagement and service; the importance of people, clients, users, communities, and society in design decisions; confidence without arrogance; communication; constructive critique; clear expectations and objectives for professional development; an environment that respects and promotes diversity.[77]

In METU summer construction practices at the end of first year education, students learn from their personal experiences by practicing architecture. They might explore the potentials of hands-on approaches to pedagogy in the form of full-scale construction in the site as a critical and constructive activity in their future education and professional life. The true value of the methodology becomes apparent when students can adopt their previous experiences to the design problems in future.

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[76] Tuğyan Aytaç Dural, *Theatre – Architeture Education: Theatre as a paradigm for Introductory Architectural Design Education,* Unpublished Ph.D thesis, Department of Architecture, METU, 1999.

[77] www.aia.org (Last visited in 19.10.2005)

Agnar Aamodt and Enric Plaza described this situation in their paper, "Case-Based Reasoning: Foundational Issues, Methodological Variations, and System Approaches":

> A previously experienced situation, which has been captured and learned in a way that it can be reused in the solving of future problems, is referred to as a past case (previously experienced situations). […] Extract relevant knowledge from the experience, integrate a case into an existing knowledge structure, and index the case for later matching with similar cases.[78]

Selahattin Önür explains the core functions of METU summer construction practice as an educational model:

> To give chance to young students of architecture to examine the real life applications of architectural approaches in basic and simple construction models,
> To provide familiarization to students with construction and materials,
> To increase their familiarity with rural areas of Turkey where majority of the population live. This would increase their level of social consciousness by building close relations with local population.
> Working together as a group to strengthen friendship and team sprit.
> And finally, contribution to public services. [79]

METU summer construction practice is a tool of education to structure and integrate the components of curriculum. In the construction practices, buildings that are produced by the students in a concentrated process of education are the end products of a learning activity. This is in a sense that students are given a chance to augment their understanding of architectural devices of problem solving by exploring these devices as they confront their first concrete architectural problems in the site. Then, in the training of an architect both the act of building and the building itself become "a lecture titled *Introduction to Architecture*."[80]

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[78] Agnar Aamodt and Enric Plaza, "Case-Based Reasoning: Foundational Issues, Methodological Variations, and System Approaches," *AI Communication,* IOS Press, Vol. 7: 1, pp 39-59.
[79] Önür, 2
[80] Emel Aközer, "İnşa Edilmiş Paradigmalar," in *1/1 Yaz Uygulamasi,* Berin Gür and Onur Yüncü (eds*),* (İstanbul: 124/3, 2004) pp.50-56. In this article, Aközer brings into discussion two exemplary architectural problem solutions. One of them is the *Cabanon* at Cap-Martin, which was designed by Le Corbusier in December 1951 for himself and for his wife. The other is Arılı Village Computer Workshop designed by Berin Gür and Onur Yüncü. She remarks that: "The first paradigm may be headed as a lecture on the topic 'What is architecture?' and the second as another lecture titled 'Introduction to Architecture'."

To sum up the summer construction practices regard construction as an indivisible part of the design process, the activity of building as a learning tool, and communication with other students, local inhabitants, (local) craftsmen and clients as a part of collaborative work.

4.1 Collaborative Working

Hands-on and applied experiences provide students a practical network for communication, meeting and exchange of knowledge. METU summer construction practices are places of collaborative working that help students for the development of interpersonal skills and responsibility, of heightened self-esteem.

During the hands-on building practices, with collaboration, architectural students can discuss their ideas with the other students, work together and exchange their experiences concerning architecture, education or life in general, and also develop sensitivity to others and a sense of community. There are various effects of collaborative learning on student's achievement, such as the development of skills of communication, and the formation of leadership, decision-making, trust-building, self-esteem and positive disposition toward others. By means of collaborative work, students learn how to manage both teamwork and task work successfully.

Carpenter points out that "architecture is such a profession that is both including all required knowledge in his body but also having connections with other related disciplines" such as civil engineering, mechanical engineering, electrical engineering and so on.[81] Summer construction practices aim to integrate knowledge of other disciplines related to architectural design, and consider these disciplines as not separate and instrumental, but as an integral part of a whole. 1-to-1 scale practices prepare a ground for collaborative working, and students learn to work with their classmates as a team that will help them in their professional life.[82]

[81] Carpenter, 29
[82] Carpenter, 29

Max Bond makes an evaluation of the architectural education: "we don't train architects to work as part of a group - not only as a group of architects, but as a group of architects and other professionals, such as engineers."[83] Collaborative working shows students the fact that architects are not the sole decision-makers in building projects, and architects, to be effective, must learn to work in-group situations. As Rainier Hoddė mentioned in his article titled "Towards Reasoned Beginnings in Architectural Education," "Practice aims at making the students *sensitive to interactions,* typical of their future professions."[84]

In the summer construction practices, students learn collaborative working, which is based on communication, negotiation, discussion and sharing of ideas. Working within a team not only help students for the development of the abilities to communicate ideas and to collaborate their capabilities for the completion of a task, but also provide further advantages such as making students to learn how to control and use time in an efficient way. Working in company within a team in the whole building process becomes a valuable learning experience in the education of an architect. Within cooperative activities individuals seek for the outcomes that are beneficial to themselves and beneficial to all other group members.

By collaborative working, students feel connected to other people and feel included in a group. This feeling of belonging enables students to face the challenges. The group support makes the individuals to learn their capacities, and helps them develop their individual skills and knowledge. Related to this point, C. Bereiter and M. Scardamalia state: "When they [students] are learning with others rather than alone, *they have available the emotional and intellectual support that allows them to go beyond their present level of knowledge and skill*."[85]

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[83] J. Max Bond, as quoted by Thomas A. Dutton in "Architectural Education and Society: An Interview with J. Max Bond," *Voices in Architectural Education*, p. 87.

[84] Rainier Hoddė, "Towards Reasoned Beginnings in Architectural Education", *Beginnings in Architectural Education- Proceedings of the ACSA/EAAE Conference Prague 1993*, (New York: ACSA Press, 1994), p. 53.

[85] C. Bereiter & M. Scardamalia, *Surpassing ourselves: An inquiry into the nature and im-plications of expertise* (Chicago: Open Court, 1993), p. 65. Emphasis mine.

It should be pointed out that not only by means of group support but also by practicing different phases of construction in collaboration with the other students, students realize their personal skills, what they can do and what they like to do. It is in this sense that learning becomes multifaceted, enriching and enjoyable experience.

What students learn about collaboration are experimentation of different approaches to a problem, cooperation, and responsibility to those they are working with and for. Therefore, students benefit from collaborative working by gaining greater ability to view situations from others' perspectives, by more positive and supportive relationships with peers.

In summer construction practices, students work with local craftsmen and also with the local community. By collaborative working with locals, the gap between the local/society and the school is eliminated. Students live with the local community, they try to understand and adapt themselves to the (local) inhabitant's way of life.

It should be underlined that the main aim of the summer construction practices is not only to experience a building process but also to understand the content of architectural profession by decreasing the distance between the school and the real world. The construction practices enhance the curriculum in the sense that it develops student's ability of working within a group, and diminishes the distance between the school and the society, between the architectural education (academic world) and the architectural profession (professional world). The benefits of referring to outside world in all its dimensions such as profession and society make the students to learn the context of realism.

4.2 Awareness of different aspects of architecture

> To prepare students in design process implies a *pedagogical project of three directions:* acquisition of "personal dispositions," becoming sensitive to "social efficiency" and development of "reflective thinking. Students must first know how to design and to anticipate the development of architectural projects, secondly *to understand that these projects have to be built* […], and third *to develop their understanding and their awareness of the process*. [86]

In METU summer construction practices students acquire awareness toward physical and social aspects of architecture or in other words, human, social, cultural, and environmental aspects of architecture. Social aspects of architecture relate to *for whom* the building is constructed, and those attitudes toward society, community. Physical aspects of architecture relate to *where* the building is built, and also elements of architecture, devices and materials of architecture.

4.2.1 Social Aspects of Architecture

One of the purposes of the summer construction practice is "to design/build with a moral sense of service to community."[87] Design requires communication with the ones you design for so it is a social act: "Architecture is, and always has been, built by people for people."[88] Considering the summer construction practices realized in the rural areas of Turkey, it is very important to work for villagers who are in need, and building close relations with the local population helps to increase architectural students' level of social consciousness. In these construction practices, students construct buildings that mainly give public services for the villagers. For example, in the 1970 summer practice, two buildings were constructed (a building to bottle spring water in Ilıca, Sivas and a motel in Ocaklar, Balıkesir) to be an income for the villages (Fig.4.1, 4.2).

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[86] Hoddė, xi.

[88] Melissa Harris, "Social Dynamics and built form: Design Studio Investigations", *Learning by Doing: Design and Construction in Architectural Education*, AIA publication, 1997, p. 113.

Figure 4.1 Building to bottle spring water Ilıca-Sivas (1970)

Figure 4.2 Motel, Ocaklar-Balıkesir (1970)

By developing an understanding of the design process, which embraces the interrelated and interdependent processes of construction and design, students learn the fact that architecture is not only a design-oriented profession but also a profession that has social responsibilities for the improvement of the quality of

physical environment and the quality of life. As declared in 2004 Unesco/UIA Charter for Architectural Education, architectural education needs to include the following points:

> an understanding of the relationship between people and buildings, and between buildings and their environment;
> the need to relate buildings and the spaces between them to human needs and scale;
> an understanding of the profession of architecture and the role of the architect in society, in particular in preparing briefs that take account of social factors.[89]

Practicing in rural areas has other benefits for the students of architecture. For example, they face with living conditions in villages, and learn how to adapt themselves to living in different conditions, which could be necessary in their future professional life. Students learn how to behave, how to contact and communicate with the inhabitants of the villages whose concerns, needs and way of behavior are different from theirs.

4.2.2 Physical aspects of architecture

By physical aspects of architecture, the thesis refers to *where* the building is built, and elements, devices and materials of architecture. Hands-on experience in summer construction practices helps for individual development of skills for design activity. Students are active actors of the learning process in which he or she can practice their skills that need to be developed. Hands-on experience eliminates the line between the acts of design and building, and in turn increases student's knowledge of design and tectonic quality of material. By building in 1-to-1 scale, architectural students face with concrete problems and start to learn architectural tools to solve these problems.

Giving an existence what is drawn on the paper or in the computer, or in other words to materialize the design ideas, might be a difficult task for the first year students. Yet this process from drawing to building is a critical and productive act by which students as future architects explore the tectonic aspects of architecture. Student acquires knowledge of the construction material during the

[89]Unesco/UIA Charter for Architectural Education, 2004, quoted from unpublished document titled *Mimarlik ve Eğitim Kurultayı-3 Mimarlık Lisans ve Lisansüstü Eğitimi Çalışma Grubu Belgeler*

building process. Students have a chance for the rich experience of various materials, surfaces, and textures as in the example of Arılı village computer workshop where students worked with local material (i.e. timber) and experienced the practical properties of timber.

The tasks given to the students are aimed at activating and sharpening their skills. It is vital for the students to have an opportunity to experience the construction materials by touching, observing and testing them. Knowing and observing the characteristics of materials in the actual site enforce students to think simultaneously in different scales (from the smallest part to the whole) during the design process. By building architecture, students become more responsive to materials' practical and applicable properties.

Figure 4.3 Multifunctional Building, Eminlik-Niğde (1999)

Dan Hoffman, depending on his experiences as a teacher at the department of architecture at Cranbrook Academy of Art, remarks that, "students learn the realm about materials while making. Students resolve problems through the direct manipulation of actual materials, at full scale. *They realize that building process is slow, not like the ideas in their heads*."[90] Students clearly understand the connections between design and construction processes. They become aware of the properties, the weight and texture, qualities of hardness, roughness, coldness, and warmth of materials, by experiencing, touching and observing materials. That is "knowledge acquired in action." They both practice and learn architecture at the same time.

Hands-on building practice suggests also learning from natural environment, from social and physical context; it is learning in the real situation with actual problems. This learning process offers direct experience and interaction with environments.

As mentioned in the book *ODTÜ Mimarlik Fakültesi Yaz Uygulamaları*, in the construction of the Refreshment Bar (*gazino*) in Gölevi (Ordu, 1965), not only the *gazino* was constructed but also the relation between the building and the sea was considered (Fig.4.4). Then, a ramp to the beach and cabins for changing cloths were constructed, and the beach was cleaned out as part of the summer construction training to face students with different aspects of architecture such as environmental and social aspects. Students learn the fact that an architect is not only responsible from the construction of a building but also from its relation and connection to the environment; an architect has social responsibilities for the improvement of the quality of life and physical environment.

[90] Carpenter, 42. Emphasis mine.

Figure 4.4 The Refreshment Bar, Gölevi-Ordu (1965)

The teaching members and organizers of the construction practice that was held in the Eminlik village (1999) make some remarks to overcome some problems pertaining to the summer construction practices in general:

> The work that wished to be realized during the summer practice is to be planned to the minutest detail in order to finish it within the capacity of the students and time limitation.
> The project has to be developed with close interaction with governmental bodies (like ministry of education), local authorities (like municipalities) or non-governmental organizations to figure out the appropriate sites and programs.
> Such close connection with the aforementioned agencies as well as sponsoring bodies are to be organized to secure building materials, collaborating craftsman and necessary logistics related with the accommodation and food for students.
> Conventional technologies and construction materials are sufficient for both constructional as well as for the educational objectives of this summer practice. However, contributions by construction companies to these summer practice programs may enable the student's acquaintance with more advanced techniques and materials as well.[91]

The teaching team also continues to explain how to enrich the education process in the summer construction practices:

> It can be organized in association with other departments of the university, like civil engineering, to incorporate the students and the capacities of their disciplines.
> It can be organized in association with the architectural departments of other universities, which can increase cooperation in the education for the same discipline.

[91] Haluk Zelef et al. , 209.

Depending on my previous experiences as a student in the summer construction practices, it would be better if the activities of design(ing) and building could be more integrated like in the Eminlik example (1999). Although the summer construction practices are student-based learning process, learning activity is to be carefully designed by the instructors, and the experience needs to be carefully reviewed and analyzed afterwards for learning to take place. In order to achieve the maximum benefit of the summer construction practices, it is necessary to work out an optimal solution to balance instruction-based knowledge and knowledge acquired in action, so that students learn how to learn from their actions. Timetables, deadlines, checklists, the organization of groups that all support experiential learning are to be planned better to increase the benefits.

CHAPTER 5

CONCLUSION

> Architecture without practice is comparable to sheet music. Music needs to be performed. Architecture needs to be executed. Then its body can come into being.[92]

The thesis has studied hands-on building practices as a tool of education that contributes to learn ways of making architecture by doing full-scale constructions in the actual site. The education continues in the site where students learn architecture by building/doing, by touching, observing and experiencing the material. In particular, the thesis has focused on the program of METU Summer Construction Practices, which are organized and conducted in the rural sites for the first year students of architecture. The construction practice aims to introduce the students to knowledge of architecture by practicing architecture in 1-to-1 scale.

The thesis has studied the METU Summer Construction Practices organized in the rural areas by asking the following questions:

1. What is learned in the summer construction practice? That is the content and objectives of the summer construction practice.

2. How is this content learned? That is the learning methods that ensure the fulfillment of the objectives of the summer construction practice.

The thesis has firstly determined basic learning methods of METU summer construction practices, which are namely, learning by doing, learning with collaborative working, task-oriented and student-based learning, integrating the tasks of designing-building, and learning from *working with* and *for* the context. Secondly, it has tried to reveal benefits of these learning methods for the students of architecture. Working in the rural sites for summer construction practices rather than in the cities or urban areas prepares a ground for community work and collaborative working in the sense that students take part in the studies for the improvement of the public services in the underdeveloped areas, and experience

[92] Alain Findeli, "Rethinking Design Education for the 21st Century: Theoretical, Methodological, and Ethhical Discussions," *Design Issues*, Vol. 17, No. 1, 2001, p. 6.

both communal living by sharing their bedrooms, lavatories and social lives with their classmates and the way of life in the rural area.

In this conclusion chapter, the thesis tries to derive some general conclusions for the hands-on building practices in the education of an architect from the particular case, METU Summer Construction Practices. It tries to explain how hands-on building practice in architectural education should be, and why hands-on building practice is to be integrated into curriculum of architecture and how.

In hands-on approaches to education, students are expected to derive knowledge while doing architecture: "We learn by doing what we have to learn."[93] Learning by building as a tool of learning suggests a process in which "thinking" and "doing" are interrelated to each other; both simultaneously exists in the learning process. When students get involved in the practice of architecture, they naturally ask questions, and they are ready to learn from those questions. It is in that sense that hands-on building practices must be integrated into the curriculum to decrease the distance between thinking and doing, theory and practice, imagined and real.

According to D.K. Ruth, architecture is such a profession that is abstract in many ways but by the help of hands-on construction experience it comes close to more real world: "We wanted the students to share the sweat and swing the hammer. Architectural education is in lots of ways very abstract. A design/build studio takes one layer of abstraction away**."**[94] Hands-on building practice in the curriculum helps to bring studio work more close to the real world, and to experience the reality of architectural ideas.

Nil Akpınar Wilsing and Markus Wilsing state, "[...] architecture is not only the creation of ideas but it also requires the capability of realizing them by taking into consideration theoretical knowledge and principles in practical applications."[95] Theoretical and practical components of curriculum should not be thought as separate and independent. They must be integrated in the education, and hands-on

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[93] Tone Saugstad, "Educational Theory and Practice in an Aristotelian Perspective", *Journal of Educational Research,* Volume 46, No.4 (2002) p. 378.

[94] Quoted in William J. Carpenter, *Learning by Doing: Design and Construction in Architectural Education*, (USA: Van Nostrand Reinhold publication, 1997) p. 67.

[95] Nil Akpınar Wilsing and Markus Wilsing, " 'Theory-Arch-Practice' Model in Architecture Education" In *Re-integrating Theory and Design in Architectural Education: Proceedings*, Nur Çağlar (ed.), (Ankara: EAAE, 2001) p. 366.

building practice prepares a learning environment where various components of curriculum are integrated.

In architectural schools, there are various courses such as history of architecture, city planning, design principles, construction technologies, materials, and so on. Yet, knowledge of all these courses has to be integrated, synthesized in the design process. Students must learn knowledge and skill of all. At that point, hands-on building practice becomes significant in the curriculum in the sense that learning by practicing architecture helps to bridge the gap between doing and thinking, design and construction.

The thesis does not intend to argue that learning by doing in the actual site is better than learning in the design studios. Rather, it is believed that "learning in action" by building full-scale construction is complementary of learning ways of making architecture in design studio, and it should become an integral part of the whole learning process in the design education. Design studios are where active learning takes place. However, learning in the studio is different from learning by taking action in the real site, in the sense that students build architecture, and give an existence to the drawings and ideas.

Studio works supported by hands-on building practices will enhance the architectural education. For many students of architecture, the concept of construction is usually peripheral to their main task of architectural design. Yet, the development of the idea of construction by building architecture in 1/1 scale can enrich and enhance the architectural design process.

One of the goals in integrating hands-on building practice to architectural education curriculum is to reveal architectural knowledge through building in 1-to-1 scale, and learn how to use this "knowledge acquired in action" in their future education and profession life. Knowledge mentioned here bases itself upon practice and experience. The thesis argues for the fact that architecture can not be learned only by theoretical knowledge; it is required to learn architecture also by practice. Learning through practice is an intellectual activity, which involves exploration, interpretation and application of general principles. By experiencing

construction process in 1-to-1 scale in site, architectural students become more conscious of the essential link between design and construction processes and between architecture and context, and start to integrate knowledge of various courses in the curriculum to their designs.

In the education of architectural students, hands-on-building practice prepares an educational environment "[…] where knowledge of making architecture is shared, produced and discussed."[96] We can say that production of knowledge through dialogue and social interaction suggests a more productive, constructive and active learning process. It is in this context that while practicing architecture, students support and assist each other's learning through explanation, discussion, negotiation and elaboration of ideas. Actually, this is what collaborative learning is; it helps students improve their communication and interpersonal skills, and increase achievement through "development of critical thinking skills and through an increase in social interdependence and support."[97] Hands-on building practices in the curriculum make students to learn how to collaborate with others (with their peers), and how to learn architecture with collaboration.

To experience architecture in a concrete way means to touch, see, hear, and smell it. Chris Abel remarks that "the complex forms of knowledge and skills involved in architectural design cannot be learnt by explicit means alone."[98] The term "explicit" used in this quotation refers to "knowledge gained through instruction-based learning." It is in this sense that hands-on building practices can be put in the category of "implicit" because students are expected to discover "the hidden knowledge in action" by doing architecture in 1-to-1 scale. Actually, they know or learn more than they can tell.[99] Students do not know what they do know or have learned at the moment.[100] Comparing "explicit" and "implicit" knowledge helps to better understand knowledge gained through hands-on building practices:

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[96] Gür & Yüncü, 9.
[97] R. E. Slavin, "Research on collaborative learning and achievement: What we know, what we need to know" *Contemporary Educational Psychology*, 1996 issue 21, pp 43-69.
[98] Chris Abel, "Function of Tacit Knowing in Learning to Design", *Design Studies* (October, 1981)
[99] This argument in fact is related to "tacit knowledge." For more information on "tacit knowledge", see Michael Polanyi, *The tacit Dimension*, (New York: Anchor Books, 1962)
[100] J. S. Atherton (2004) *Teaching and Learning: L and T template* [On-line] UK: Available: http://www.learningandteaching.info/learning/tacit.htm Accessed: 2 August 2005

> The distinction between implicit knowledge and explicit knowledge has sometimes been expressed in terms of knowing-how and knowing-that, or in terms of a corresponding distinction between embodied knowledge and theoretical knowledge. On this account knowing-how or embodied knowledge is characteristic of the expert, who acts, makes judgments, and so forth without explicitly reflecting on the principles or rules involved. The expert works without having a theory of his or her work; he or she just performs skillfully without deliberation or focused attention. Knowing-that, by contrast, involves consciously accessible knowledge that can be articulated and is characteristic of the person learning a skill through explicit instruction, recitation of rules, attention to his or her movements, etc.[101]

Student may not relate what they are doing with what they are actually learning but whenever s/he re-uses her/his previous experience in the solving of future problems s/he starts to conceptualize this experience, and in turn this particular experience turns into a general knowledge of architecture. Students are expected to learn how to learn in action and how to extract relevant knowledge from their previous experiences and re-use it in the solving of future problems.

> [...] every discipline has its own realization of knowledge. Since architecture tends to deal with unique projects, a good deal of the knowledge involved is experience-based. [...] In architecture, as in other design domains, design is learned primarily by experience. *Architects' education heavily relies on learning in action, learning through the practice without being aware of what is learned.*[102]

Concerning the education of architects, in hands-on building practice, "the process [i.e. action] is more important than the end product."[103] It suggests a process where knowledge of "doing" is learned. The main aim in "doing" is the perfection of the action, to choose right means for the action. Actually, this underlines the position and role of hands-on building practices in the curriculum of architecture; it is a vehicle for the students to learn how to choose the right means for the action, how to use architectural devices of problem solving, how to seek for possible ways of making progress towards the solution, how to do well.

The contrast between "making" and "doing" better explains the content of hands-on approaches to architectural education. Hands-on building practices in the education concern with those activities that are themselves their own end (that is doing) and not those activities that produce an end external to these activities (that

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[101] http://www.artsci.wustl.edu/~philos/MindDict/tacitknowledge.html (last visited in 04.08.2005)
[102] A. Heylighen, W. Mike Martin, H. Cavallin, **"**How to Teach and Archive Tacit Design Knowledge**,"** *Design Intelligence,* Vol 11, No 6, 2005, p. 1. Emphasis mine.
[103] Gür & Yüncü, 9.

is making).[104] Therefore, hands-on building practice indicates the act of "doing." "Doing" refers to process while "making" concerns with an end product.

No matter whether the final product is successful or not, the main concern is process in which students learn ways and processes of making architecture while practicing. However, as mentioned before, successful end product also adds value to the learning process, in the sense that students gain self-confidence about what they achieve; the building as a concrete end product stands for a "material form" of a learning process. It materializes what is achieved and learned during the process. End product becomes a tool by which one can evaluate and discuss the learning process.

Hands-on building practices can be integrated to the curriculum in the form of workshops, design/build studios, as a part of design studios or as an extension of design studios that can take place in the summer as in the case of the program of METU summer construction practice. It would be better if these practices could be more integrated with the design studios.

Today, discussions on the future of architectural education, in terms of both its content (quality of education) and duration, are on the agenda. Architectural education should be based both on practice and on theory. Hands-on practice should take place in the curriculum in a way to support design education by revealing the way a building is done, by integrating different components of the curriculum (design, technology, construction, environment, theory, art, history, etc.). The main reasons why hands-on building practice should be integrated to the curriculum of architecture are:

1. To give students the opportunity to learn how to be critical in their approaches to design in a concrete and socially responsible manner;

2. To introduce students to building materials and their simple use and application techniques by doing in 1-to-1 scale;

3. To form some qualities in students such as decision-making, communication, construction-site management, leadership, and social and individual responsibility;

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[104] Geoffrey Hinchliffe, "Situating Skills", *Journal of Philosophy Education*, Volume 36, No.2 (2002) p. 191.

4. To bridge the gap between the society-community and the university, the academic world and professional world.

To conclude, speaking in reference to Christopher Alexander, hands-on building practice is one of the tools for “arriving at knowledge” in architectural education in order to learn how to design and make “real buildings.” Hands-on building practice is to be more than the obtaining of knowledge and skill of making architecture by instructions. However, learning process is to be based on the simultaneous involvement of thinking-doing (taking action)-skill-production of knowledge rather than a linear process of knowledge-skill-taking action.

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Table 2. List of Examples for Hands-on Building Practice in Architectural Education

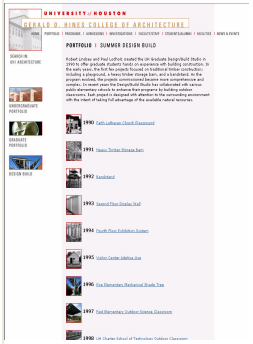
UNIVERSITY / SCHOOL	NAME OF COURSE/PROGRAM/ WORKSHOP	AIM/OBJECTIVE		EXAMPLES
YESTERMORROW: DESIGN / BUILD SCHOOL (USA)	DESIGN / BUILD	"Design and Build" is an educational program founded in 1980, which integrates design/build process, and bases on direct student experimentation and on continuous contact between student and teacher. The school has in its curriculum the design-build programs, which aims at making the students understand the interrelation between design, construction process, materials and the environment. www.yestermorrow.org		 May 2004 "Straw Bale Construction"
THE UNIVERSITY OF HOUSTAN-GERALD D.HINES COLLAGE OF ARCHITECTURE (USA)	DESIGN BUILD	 Robert Lindsey and Paul Lodholz created the Graduate Design/Build Studio in 1990 to offer graduate students hands on experience with building construction. In the early years of the studio, the projects focused on traditional timber construction; including a playground, a heavy timber storage barn, and a bandstand. As the program evolved, the projects commissioned became more comprehensive and complex. In recent years, the Design/Build Studio has collaborated with various public elementary schools to enhance their programs by building outdoor classrooms. www.arch.uh.edu		 1998 UH Charter School of Technology Outdoor Science Classroom Houston, Texas

Table 2. Continued

THE UNIVERSITY OF OKLAHOMA-DIVISION OF ARCHITECTURE (USA)	ARCH 4970 DESIGN. BUILD	  www.ou.edu/architecture/darch	
SCHOOL OF ARCHITECTURE. MC GILL UNIVERSITY (CANADA)	ARCH 301-304 DESIGN & CONSTRUCTION	One of the features of this Design and Construction studio is the introduction of the students to hands-on experience by working with different construction materials. D&C studio emphasizes the development of a sensitivity and understanding of materials. www.mcgill.ca	
CRANBROOK ACADEMY OF ART (USA)	BUILDING ARCHITECTURE	Design/build activity started with constructing their own school. The architecture department has continued this tradition by studying full-size constructions as actual building process. Students took lessons such as pouring concrete, welding metal and stacking wood. Building training in 1-to-1 scales is a part of architectural education of the school, which is programmed as to give a feedback to studio works. www.cranbrook.edu	 

Table 2. Continued

UNIVERSITY OF WASHINGTON (USA)	DESIGN/BUILD STUDIO	"Design and Build" is an elective studio, which lasts at least ten weeks mostly during the spring semester in the school. There is a real client with a limited budget. The students are responsible from everything such as, scheduling, planning, design and the construction process. The students design and build small community projects for nonprofit groups. The students gain experience with real clients, and hands-on construction. Steve Badanes, *Progressive Architecture*, March 1994, p 87 Quoted from William J., Carpenter, *Learning by Doing: Design and Construction in Architectural Education*, (AIA publication, 1997) p. 44. www.washington.edu	
YALE UNIVERSITY (USA)	BUILDING PROJECT	Presenting a complete professional experience of design, offering hands-on construction experience, and allowing a view of architecture within a social context are goals of the building project. www.architecture.yale.edu	

Table 2. Continued

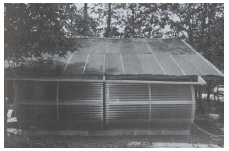
AUBURN UNIVERSITY (USA)	RURAL STUDIO	The Rural Studio focuses on developing students' building skills and their understanding of social concerns. The studio emphasizes the significance of hands-on construction experience, and relationship between process and built work, between traditional and non-traditional experiences in learning. www.auburn.edu	 
CLEMSON UNIVERSITY (USA)	CONSTRUCTION STUDIO	Construction has been an integral part of the curriculum at Clemson University. Students practice architecture in the actual site. www.clemson.edu	 

Table 2. Continued

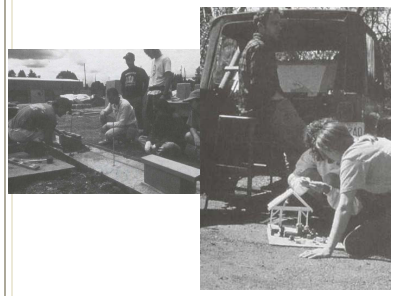
THE UNIVERSITY OF OREGON (USA)	DESIGN/BUILD STUDIO	A design/build project is engaged in the process starting from the programming phase to the completion of a full-scale construction by groups of environmental design students. The project is chosen from a list of possible projects submitted by public and non-profit agencies. A spring term seminar completes the pre-design, programming, schematic design and permit documents phase of the work, meeting with the client and consultants to determine and refine the nature of the project. It completes all the detailed design development and final construction details. A summer studio takes over where the seminar leaves off (seminar members also participate in the studio), completing the planning for the project and its final execution. www.architecture.uoregon.edu	
PENN STATE/UNIVERSITY OF WASHINGTON (USA)	AIHI	The American Indian Housing Initiative is a research and education program based at Penn State. In collaboration with tribal organizations and the University of Washington, AIHI explores the adaptation and deployment of sustainable building techniques on American Indian Reservations. This initiative provides hands-on and applied experiences for students in many disciplines including Architecture and Architectural Engineering, as they participate in laboratory research, design, planning, and construction of much-needed homes and community facilities for tribal members. David Riley, Scott Wing, Michael Rios, Sergio Palleroni, *Northern Cheyenne Demonstration Home,* (Penn State/ University of Washington; USA, 2003) www.engr.psu.edu/greenbuild	

Table 2. Continued

SOUTHERN POLYTECHNIC STATE UNIVERSITY (USA)	CONSTRUCTION WORKSHOP	The program continues the design education with construction in field. The workshops is structured in two parts; the first part includes the design and preparation of construction documents; the second part includes the actual making on-site. www.spsu.edu	
UNIVERSITY OF OKLAHOMA (USA)	WORKSHOP in 2000 ACSA West Regional Meeting	***"Guerilla Architecture"*** *by* *Thomas Mical* The workshop, "Guerilla Architecture" at the University of Oklahoma, began with the evaluation of "exquisite found materials for probable construction logic." "The group acted as a whole to collect materials that were then installed without prior design." Jori Erdman & Robert Weddle, "Designing/Building/Learning," *Journal of Architectural Education,* Volume 55, Issue 3 (2002) pp 175-175.	

Table 2. Continued

UNIVERSITY OF ILLINOIS (USA)	WORKSHOP in 2000 ACSA West Regional Meeting	***" Syntactic Transformation: From Part to Whole"*** *by* *Jeffery S. Poss* The workshop, "Syntactic Transformation: From Part to Whole" at the University of Illinois at Urbana-Champaign, "began with a study of a particular object and developed the design as an exploration and transformation of the object and its characteristics." Jori Erdman & Robert Weddle, "Designing/Building/Learning," *Journal of Architectural Education,* Volume 55, Issue 3 (2002) pp 174-179.	  
UNIVERSITY OF ILLINOIS (USA)	WORKSHOP in 2000 ACSA West Regional Meeting	***"Copper: In(s)cite and Insight"*** *by* ***Kevin Hinders & Ken McCown*** The workshop, "Copper: In(s)cite and Insight" at the University of Illinois at Urbana- Champaign, "began from an exploration of copper as a specific material, and then an object was designed to clarify its characteristics properties." In the workshop, students "explored the interactive qualities between material and designer, the act of making, the collaborative design process, and phenomenon of place." Jori Erdman & Robert Weddle, "Designing/Building/Learning," *Journal of Architectural Education*, Volume 55, Issue 3 (2002) pp 174-178.	  

Table 2. Continued

UNIVERSITY OF ARIZONA (USA)	WORKSHOP in 2000 ACSA West Regional Meeting	***"Renga: A Colective Model for Design/Build"*** ***by*** *Chris Taylor* At the workshop, "Renga: A Collective Model for Design/Build" at the University of Arizona, the project was designed as it was built. Therefore "the process had no predetermined outcome, and participants were aware of this indeterminacy." Jori Erdman & Robert Weddle, "Designing/Building/Learning," *Journal of Architectural Education,* Volume 55, Issue 3 (2002) pp 174-179.