International Design and Art Journal

IDA: International Design and Art Journal
ISSN: 2687-5373
Volume: 5, Issue: 1 / 2023

Research Article

Inquiring the generative capacity of urban abstraction and mapping for first-semester basic design studio

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Received: 24.01.2023
Accepted: 16.03.2023

Citation:
Yorgancıoğlu, D., Aman, D. D., Şat, B. (2023). Inquiring the generative capacity of urban abstraction and mapping for first-semester basic design studio. *IDA: International Design and Art Journal*, 5(1), 42-56.

Abstract
The development of students' critical and creative thinking skills is at the core of the first-semester basic design studio. Students' perceptual experiences of their environment form the key references of abstraction in this beginning phase. This paper inquires studio approach based on abstraction and mapping as tools for intertwining visual reasoning and bodily experiences in the design process. Focusing on the case study of a basic design studio assignment, the authors analyze the structure, application, and products of the "Urban Abstraction and Mapping" project. The study adopted the case-study method as part of qualitative research approach and dwelled on researchers' first-hand interaction with a phenomenon within its real-life context, ARCH/MIM101 studios. The findings showed that abstraction and mapping strategies based on students' bodily experiences in urban contexts raised awareness of design as a generative and iterative research process. Students who were able to reveal and reconstruct the relationship between different forms of knowledge through experiential and conceptual levels of the design process managed to develop heuristic 2D and 3D design strategies. The findings of this study provide a ground for discussions on the effectiveness of teaching/learning methods applied in the introductory level of design education.

Keywords: Basic design, First year design studio, Abstraction, Urban mapping, Critical-creative thinking

Extended Abstract

Introduction: First-semester basic design studio has the critical responsibility to provide a constructive learning environment for students who encounter design studio pedagogy for the first time. In the basic design studio, students are encouraged to develop new ways of looking, seeing, observing, analyzing, and visualizing through the exploration and use of different media. In a basic design course, students are exposed to the basic elements of design (point, line, plane, volume, form, orientation, scale, etc.). They learn the basic principles of design (color, shape, texture, rhythm, balance, contrast, continuity, repetition, etc.) and develop a new geometric language by using 2-dimensional and 3-dimensional design elements based on these principles. The emphasis on *form* and *space* in the early design phase is considered the legacy of the *modernist tradition*, which is also made manifest in basic design education. However, giving priority to the geometric language of abstraction in composition design may cause limitations when visual perception dominates other perceptual realms. Rather, integrating visual perception with other perceptual dimensions may evoke and enlarge the designer's awareness of the tangible and intangible features of the physical environment. This would, in turn, help integrate conceptualization and materialization in design for foundation design education. Hence, the present study raised the following questions: how can we develop an inclusive model for a basic design studio to stimulate a better understanding of the dynamic commingling of visual reasoning and bodily experiences in the design process? What are

the pedagogical potentials of experiencing physical space and of walking as a performative act for achieving this in basic design education?

Purpose and scope: This paper inquiries about a design studio approach to stimulate a dynamic commingling of visual reasoning and bodily experiences in the design process. This study aims to present and discuss a studio approach that was undertaken as part of the first-semester design studio at the Department of Architecture at Özyeğin University in Turkey. This studio approach is analyzed through the structure, application, and products of a four-week project entitled "Urban Abstraction and Mapping." The main objective of this project was to generate new ways of grasping the complex and multi-dimensional nature of urban space in a critical and creative manner by going beyond the geometric language formed through abstraction in composition development. The analysis and abstraction of the physical environment are utilized as a tool for synthesizing conceptual thinking with the concreteness of sensory experiences and bodily perception. The cyclical relationship between the trio of perception-experience-conceptualization constitutes the basic components of this project. For this purpose, *urban abstraction* and *urban mapping* are inquired and used as methodological tools, and İstanbul, as a case of a complex urban city, is experienced through bodily perceptions of the students walking on a predetermined route. The bodily experiences of students as *flaneur* constituted the basis firstly for conceptualizing the tangible and intangible features of urban city and secondly, transforming this conceptualization into an experiential and perceptual design process through testing material-color-texture-light/shadow-scale of volumetric explorations.

Method: The analysis is based on the structure, application, and products of a four-week project entitled "Urban Abstraction and Mapping," as the final stage of the ARCH/MIM 101 Design studios. Qualitative case study methodology fits well with the objectives of the present study that aims at presenting and discussing a studio approach developed for the basic design studios in the first semester of the first year of the bachelor's degree in Architecture and the bachelor's degree in Interior Architecture and Environmental Design in Özyeğin University. The study dwells on the final exercise of the basic design course entitled "Urban Abstraction and Mapping," which aimed at introducing the students to context-based design knowledge through the embodied interaction of the body/subject with the physical space. The "Urban Abstraction and Mapping" project is described and analyzed by the authors of the present study, who were the tutors of ARCH/MIM 101 studios while conducting the case study research. The methodology is based on a detailed examination of a phenomenon, part of qualitative research approach. Data sources cover the first-hand observations and reflections of studio tutors and the evaluations of students' projects.

Findings and conclusion: The findings showed that urban abstraction and mapping strategies developed through students' bodily-sensory experiences in urban contexts helped raise awareness of design as a generative and iterative research process. Students who were able to reveal and reconstruct the relationship between different forms of knowledge and to cyclically convert them through the experiential and conceptual levels of the design process managed to develop distinctive heuristic 2D and 3D design strategies. Implementing this studio approach in subsequent terms and increasing the number of participants would help make further analysis of the potentials/constraints of urban abstraction and mapping strategy for basic design education. Nevertheless, the findings of this study provide a ground for discussions on the effectiveness of teaching/learning methods applied in the introductory level of design education.

Keywords: Basic design, First year design studio, Abstraction, Urban mapping, Critical-creative thinking

INTRODUCTION

First-year design education has a critical responsibility to provide a constructive learning environment for students who encounter design studio pedagogy for the first time. In the basic design studio, students are encouraged to develop new ways of looking, seeing, observing, analyzing, and visualizing through the exploration and use of different media. As noted by Özkar (2017: 2), "a basic design course tries to equip the beginning student with fundamental design skills that will universally apply to any form and material in future contexts," and this is facilitated through "experimental use of abstract forms and materials to respond to abstract problems." In a basic design course, students are exposed to the basic elements of design (point, line, plane, volume, form, orientation, scale etc.), they learn the basic principles of design (color, shape, texture, rhythm, balance, contrast, continuity, repetition, etc.) and develop a new geometric language by using 2-dimensional and 3-dimensional design elements based on these principles. Consequently, they start to develop "designerly ways of knowing" and cultivate "visual and spatial reasoning" (Cross, 2004; McDonnell, 2016; Özkar, 2017).

The emphasis on form and space in the early design phase is considered as the legacy of the modernist tradition, which is also made manifest in basic design education. However, giving priority to the geometric language of

abstraction in composition design may cause limitations when visual perception dominates other perceptual realms. Rather, integrating visual perception with other perceptual dimensions may evoke and enlarge the designer's awareness of the tangible and intangible features of the physical environment. This would, in turn, help integrate conceptualization and materialization in design for foundation design education (Figure 1). Hence, the present study raised the following questions: how can we develop an inclusive model for a basic design studio to stimulate a better understanding of the dynamic commingling of visual reasoning/critical conceptualization and sensory experiences/bodily perception in the design process? What are the pedagogical potentials of experiencing physical space and of walking as a performative act for achieving this in basic design education?

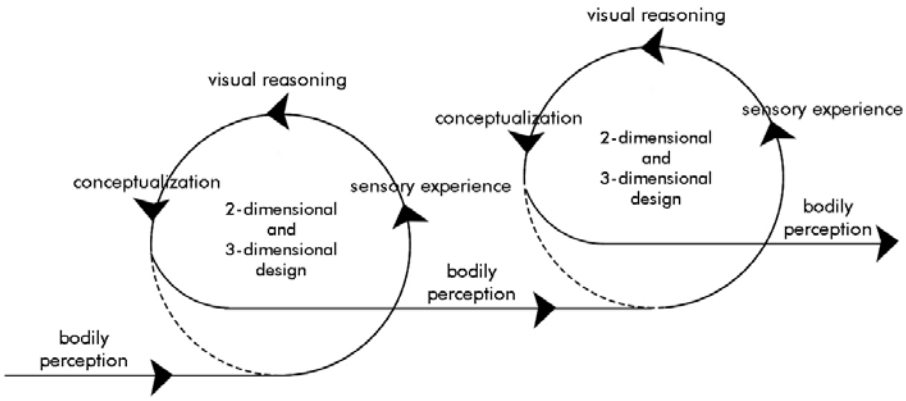


Figure 1. Conceptual framework of basic design education

This study aims to present and discuss a studio approach that was undertaken as part of the basic design studio at the Department of Architecture at Özyeğin University in Turkey. This studio approach is analyzed through the structure, application, and products of a four-week project entitled "Urban Abstraction and Mapping." The main objective of this project was to generate new ways of grasping the complex and multi-dimensional nature of urban space in a critical and creative manner by going beyond the geometric language formed through abstraction in composition development. The analysis and abstraction of the physical environment are utilized as a tool for synthesizing conceptual thinking with the concreteness of sensory experiences and bodily perception. The cyclical relationship between the trios of perception-experience-conceptualization constitutes the basic components of this project. For this purpose, *urban abstraction* and *urban mapping* are inquired and used as methodological tools, and İstanbul, as a case of a complex urban city, is experienced through bodily perceptions of the students walking on a predetermined route. The bodily experiences of students as *flaneur* constituted the basis firstly for conceptualizing the tangible and intangible features of urban city and secondly, transforming this conceptualization into an experiential and perceptual design process through testing material-color-texture-light/shadow-scale of volumetric explorations.

Although there are many articles that examine architectural design studio approaches at different grade levels with the case-study method (Hisarlıgil, 2012; Lizondo-Sevilla et al., 2019; Yorgancıoğlu & Genel, 2022), the number of articles focusing on the first semester of the first year, which has a critical role in design education is very few (Çelik, 2014; Acar et al., 2021; Çil & Demirel-Özer, 2021). Moreover, very few case study analysis discusses the theoretical and pedagogical framework of project approaches in the design studio beside the project itself (Love, 2019; Qureshi, 2020; Saghafi, 2021). This study contributes to the body of knowledge on first year design education as it inquiries about a threshold between basic design education and architectural design education by integrating the notions of form, space, structure, and scale to abstract design principles and elements. This study investigates the potential of mapping methodology for the development of critical-creative thinking and making skills of beginning design students.

In what follows, the paper lays out the theoretical context of the study by emphasizing, firstly, the goals of basic design education, secondly, *mapping* as a generative tool in basic design education, and thirdly, the theoretical implication of *urban flaneur* for mapping studies. Then, it describes the methodological framework of research by explaining why the case study methodology fits well with the present study and explains the structure and stages of the "Urban Abstraction and Mapping" project. This is followed by the evaluation of the

outcomes of project stages in terms of the educational goals, educational achievements, and limitations and constraints encountered by the first-semester design students. It inquiries about the ways design is transformed into a research process for first semester design students, in which representation techniques are utilized as analysis and knowledge production tools. The paper ends with conclusive remarks about the possibilities of enhancing the generative role of mapping methodology to support the development of first semester design students' critical thinking skills as part of basic design education.

Theoretical Context

In the view of Temple (2006: 5), the first-year design studio is concerned with the "issues related specifically to perceptions, processes, and definitions but also necessitates the formation of habits of mind, habits of hand, habits of reflection, and habits of communication, as a basis for continued learning, exploration, and development." For Boucharenc (2006: 1), this critical role of beginning design education necessitates "a holistic, creative and experimental methodology that develops the learning style and cognitive abilities of students with respect to the fundamental principles of design." The design projects are structured in a way to help students develop abstract, analytical, diagrammatic, and creative thinking skills, combined with skills of doing through hands-on experiences. First year design students are encouraged to go beyond the familiar perceptions of space, look at alternative perspectives, explore relationships, and design the tools necessary to express those relationships in new and creative ways. Thus, the formation of a critical learning and design culture in the studio is supported (Akoury, 2020; Çil & Demirel-Özer, 2021). Students critically analyze and re-frame the design problem and develop solution alternatives (Kuhn, 2001; Salama, 2008; Nabih, 2010; Mackintosh, 2014). Design critique -a principle pedagogical method used in the design studio- plays an important role in the development of critical thinking skills of students (Schön, 1984; Wilkin, 2005; Gray & Smith, 2016; Belluigi, 2016). The positive/negative aspects of the projects are discussed, different perspectives are developed iteratively, and each actor in the studio publicly shares his /her own viewpoints and open them up for the evaluation by others (Christensen & Ball, 2016; McDonnell, 2016; Demiri, 2021). The new ways of thinking necessitate being open-minded, creative, and critical and have high awareness (Ennis, 1994; Yorgancıoğlu & Tunalı, 2021). Alternative and creative ways of thinking enable an individual to look through multidimensional perspectives and integrate mental constructs of different knowledge fields to (design) knowledge production processes (Erkök et al., 2005; Aydınlı & Kürtüncü, 2014).

Critical and creative thinking triggers the reorganization of knowledge and the production of new knowledge, and when it comes to design, this is a type of knowledge that is "conceptually learned and experientially grasped" (Erkök et al., 2005: 63). "Sensory experience" is fundamental in learning how to design and learning-by-doing, an essential component of studio-based pedagogy, is based on hands-on experiences and working with physical materials through the design process (Özkar & Steino, 2012). The learning-by-doing approach serves not only for making visible and materializing abstract ideas through 2D drawings and 3D physical models but also for exploring and generating new ideas and creative solutions to design problems. Beyond the visualization of knowledge, the reproduction of knowledge through critical-creative means of representation is encouraged. Students examine the visual and structural qualities of different materials and the principles of tectonics. Thus, an experimental, iterative, and experiential approach based on the unity of thinking and doing introduces first year design students to a new learning paradigm.

Mapping as a generative tool in basic design education

The transformation of the design into a research process and the use of representation techniques as tools of analysis and knowledge production in this process constitute important dimensions of design studio pedagogy. Students are encouraged to use multiple visualization methods in research processes (Gray & Malins, 2004; Yorgancıoğlu & Turgut, 2022). In this context, mapping is utilized as a research tool in design studio practices for representing and restructuring knowledge through conceptual, schematic, or diagrammatic explanations and visualization of the stages and the outcomes of design as a research process (Al-Kodmany, 2001; Şenel, 2019). Mapping serves for the visual representation of varied forms of data by revealing the relationships between different forms of knowledge and the principles and insights that can be derived from this relationality (MacEachren, 1992; Moere, 2007). As a performative act that combines conceptualization and visualization, mapping becomes a method that has as much generative potential as representation (Arslan, 2019).

Mind mapping is a mapping technique commonly used in design studios. Bodily perceptions and sensory experiences of individuals regarding the outer world intertwine with the subjective, cognitive, and intuitive responses of their inner world. For design students, the layering and overlapping of these two realms have the potential to generate design knowledge (Aydınlı & Kürtüncü, 2014). Such an experience is usually activated by spatial stimuli resulting from the displacement of individuals from their current contexts and encountering a new environment, which opens the perceptual realm. All the inputs gathered via such encounters are filtered through the individuals' perceptual, experiential, and conceptual realms and pave the way for the development of a subjective interpretation of the situation. The perception of the physical environment through bodily experiences and its leading to an intellectual inquiry and conceptualization process fits well with the goals of basic design education as it supports the integration of conceptual and experiential knowledge through design.

The theoretical implication of "urban flaneur" for mapping studies

The concept of *flaneur* has theoretical implications for the present study. *Flaneur* has been a concept used for explaining varied responses of the modern persona to the modern city. For Baudelaire (2017), the *flaneur* makes observations of urban space, walking through the crowds but at the same time hiding himself/herself from the crowds, as for Benjamin (1999) the observations of the *flaneur* as a walking citizen lead to production of ideas about the modern city. Gros (2014) introduces the concept of "urban *flaneur*" whose experience of the city, through all his/her senses, dwells on his/her daily routines such as walking to work, going through the crowds, and then going back home after work. Gros (2014) points to urban heaps of crowded city spaces that cover up gates, sudden changes, dangers, and surprises, all being part of the experiences of the urban *flaneur*. The sensory qualities of walking are also emphasized by Urry (2016) who describes the relationship between citizens and the modern city through the concept of walking. Beyond a displacement of the body, walking becomes a performative act, and the city generates an interactive realm for the citizens, allowing one to better grasp body-space-time relationality. In the view of Le Breton (2008) walking in the city requires the participation of the whole body and activates all senses in the background of visual, auditory, and haptic stimuli.

Within this framework, the embodied and sensory engagement of *flaneur* to the modern city through walking is rooted in phenomenological concepts of the human body based on a criticism of a dualistic understanding of mind/body or thinking/perception. Rather, as it is discussed in contemporary body theories (Merleau-Ponty, 2002; Pallasmaa, 2014), such engagement dwells on the particularity of the body's interaction with space through perception and experience. This particularity stems from a way of accessing and re-constructing knowledge of space through different strategies of experiencing and perceiving (Yorgancıoğlu & Çalak, 2020). Movement is key to those strategies, since the body's movement in space leads to constant changes of his/her experiences and, thus, of the knowledge derived from those experiences. Experiencing space through movement, especially walking, has a dynamic structure, enabling unexpected or contingent encounters and grasping multi-layered phenomena in urban space. Accordingly, the body is re-contextualized to the center of urban space and becomes "actualizers of the city" whose active engagement with the city through embodied experiences leads to producing knowledge of urban space (De Certeau, 1988).

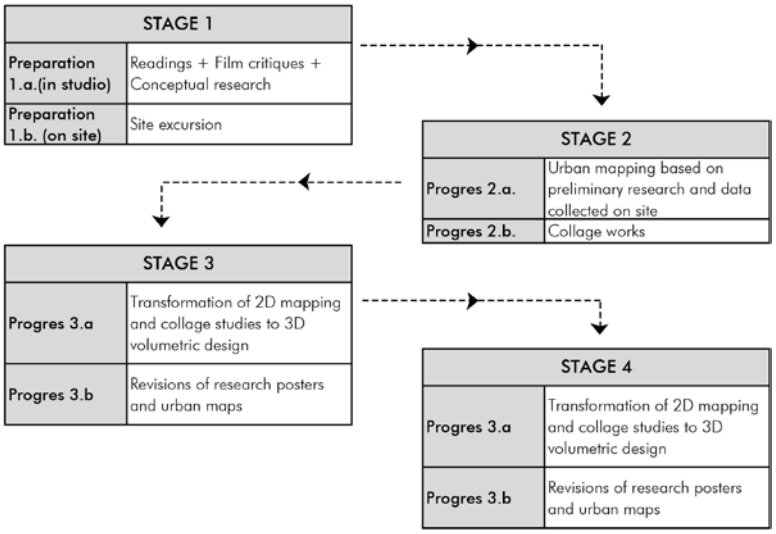
METHOD

The present study is based on a qualitative case study methodology (Bergin, 2018; Yin, 2018). The researcher's first-hand interaction with a phenomenon within its real-life context is essential in qualitative case study research that may cover interviews, observations, and reflections used to analyze a topic in design research (Jonson, 2005; Charlesworth, 2007; Groat & Wang, 2013). Qualitative case study methodology fits well with the objectives of the present study that aims at presenting and discussing a studio approach developed for the ARCH/MIM 101 Design studios taught in the first year of the bachelor's degree in Architecture and the bachelor's degree in Interior Architecture and Environmental Design in Özyeğin University. The study dwells on the final exercise of the basic design studio entitled "Urban Abstraction and Mapping," which aimed at introducing the students to context-based design knowledge through the embodied interaction of the body/subject with the physical space. This project is described and analyzed by the authors of the present study, who were the tutors of ARCH/MIM 101 studios while conducting the case study research. The authors

facilitated the design and implementation of the pedagogical approach as well as the chance to observe and interpret students' experiences and learning strategies in the context of the studio. Besides, over the years, the authors have been reflecting on the teaching methods used in ARCH/MIM 101 Design studios, trying to improve the content and procedures of studio pedagogy each academic year.

In the present study (1) first-hand observations and reflections as the studio tutors in the studio context and within site excursion, (2) reflections on studio tutor's work through weekly critiques, and a final jury evaluation and (3) projects designed by the first-year design students are used as data sources and data collection tools. A triangulation strategy based on multiple data analysis techniques is applied to compare the data sets and increase the validity and rigor of this qualitative study (Humble, 2009; Teddlie & Tashakkori, 2009) of the students participating in the ARCH/MIM 101 studios. "Urban Abstraction and Mapping" was designed as the final project of ARCH /MIM 101 Design course that covered four more projects on the following topics: Ex.1.0. Abstraction of natural objects and pattern design, Ex.1.2. Abstraction of photographic composition, Ex.2.0. Figure-ground composition based on Gestalt principles, Ex.3.0. Movement analysis and volumetric design and Ex.4.0. Transformation of form. The content and sequence of these short-term projects are structured in accordance with the main objectives of the course, which are introducing the first-year design students to the basic elements and principles of design, guiding them to develop 2D and 3D composition designs based on these design elements and principles and cultivating in their skills of thinking and making with a special emphasis on material-technical-structural issues and critical-creative representation tools. In the studio, *urban abstraction* and *urban mapping* are inquired and used as methodological tools. İstanbul, as a complex urban city, is experienced through bodily perceptions of the individual as a *flaneur*, walking on a pathway. The bodily experiences of the individual as *flaneur* constituted the basis firstly for conceptualizing the tangible and intangible features of urban city and secondly, transforming these features and layers into the volumetric design of the abstracted urban mappings.

Table 1. Educational phases of Urban Abstraction and Mapping project



The project duration was four weeks, and four main stages of learning are systematically implemented throughout the four-week schedule (Table 1). In Stage 1, students were expected to read chapters they have chosen from the book Invisible Cities by Italo Calvino (1997) and make group discussions on the concepts that can be derived from the readings. Students were also given further readings by de Certeau (1984), Baudelaire (2017) and Benjamin (1999) and extracts from the movies The Man with a Movie Camera (Vertov, 1929), Metropolis (Lang, 1927) and Qatsi Triology (Reggio, 1982, 1988, 2002) were shown and discussed in the studio. This was also supported by conceptual research as the group works with reference to keywords such as urban abstraction, urban mapping, mind-mapping, *flaneur*, urban experience, urban palimpsest, urban layering. The introductory stage also included a site excursion to selected locations in the Galata and Karaköy districts in the European side of Istanbul. Galata Tower Square was selected as the meeting point for studio tutors and students. 3 main paths (Galata Tower-Bankalar Avenue- Karaköy Ferry Station- Paket Post Office, Galataport)

were selected for the analysis of tangible and intangible features (visual/geometric elements, urban image, scale and monumentality, auditory experiences, transportation networks, user groups, daily practices, programmatic elements, etc.) of urban space. Students were asked to utilize site analysis tools such as sketching, mind-mapping, visual and auditory recordings during the site visit. The data collected during the site excursion was analyzed in Stage 2, in which students were expected to develop 2-dimensional urban mapping studies and collage works. These 2-dimensional studies were expected to reflect the designerly ways of thinking of each student about the tangible and intangible layers of urban space and how they can be abstracted using creative representation tools. All the inputs derived from the preliminary conceptual research, the site-excursion and analysis and mapping studies were expected to guide the first-year students in Stage 3 for a critical inquiry of the volumetric representation of urban layers in X-Y-Z dimensions. The 3D volumetric design of the abstracted urban mapping and collage studies were to experiment with the abstraction of urban layers, their possible intersection and/overlapping, and the potentials of the materials (color, texture, durability, etc.) for the representation of the visible and invisible elements of the urban layers. In Stage 3, students were asked to design 2 posters for the representation of both the process and the products of the project: a research poster exposing the findings of all preliminary conceptual and environmental analysis, and a design poster portraying all the design processes, including the 2-dimensional studies of mind-mapping, abstracted urban mapping and urban collage as well as the 3-dimensional volumetric design, both the prototypes and the final model. Stage 4 included Revisions of 3D model through desk critiques and Final Jury presentations and evaluations.

FINDINGS

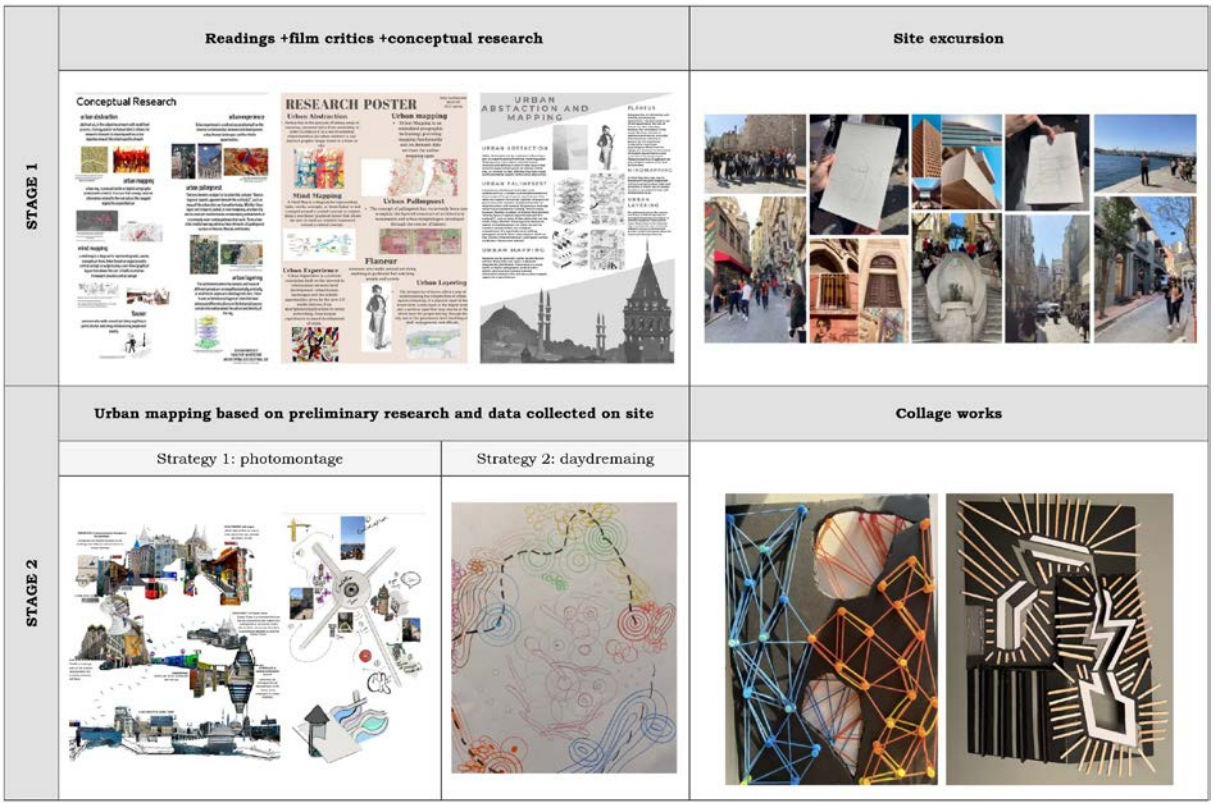
The results are based on the analysis of the generative capacity of mapping to integrate experiential and conceptual knowledge and evoke inputs for 3D volumetric design at the introductory design process in ARCH/MIM 101 studios, by focusing on the structure implementation, and products of the studio approach. Evaluation and the interpretations enriched the discussion part of the manuscript, and the discussion is based on (1) educational goals, (2) educational achievements, and (3) limitations and constraints encountered by first-semester design students in each phase of “Urban Abstraction and Mapping” project as part of the design process in ARCH/MIM 101 studios (Table 2).

Table 2. Educational objectives, achievements and limitations/difficulties encountered in each phase of “Urban Abstraction and Mapping” project

			Educational objectives	Educational achievements	Limitations and difficulties
STAGE 1	Preparation 1.a (in studio)	Readings + Film critiques + Conceptual research	to structure the conceptual framework of the project through different mediums	raising awareness of design as a research process; developing critical thinking skills and knowledge base about designing.	dominance of visual literacy skills over reading
	Preparation 1.b (on site)	Site excursion	to observe and analyze urban space through bodily perceptions and sensory experience as an individual; to expand research and learning practices beyond the boundaries of the studio	increasing the students' awareness of the city they live in by exploring the heterogeneous and layered structure of urban space; learning to experience their environment as active participants	difficulties in describing and analyzing their experiences through concepts
STAGE 2	Progres 2.a	Urban mapping based on preliminary research and data collected on site	to activate students’ critical-creative thinking skills; to abstract the tangible and intangible layers of urban space by using creative representation tools	transfering the findings of conceptual research and on-site observations to the design process by revealing and reconstructing the relationships between them, synthesizing conceptual and perceptual knowledge through a critical-creative-subjective filters	low levels of abstraction in mapping; difficulties in activating the intuitive reasoning skills
	Progres 2.b	Collage works	to transform perceptual and sensory experiences into authentic frame of references for abstraction and design	developing volumetric design and exploring the nature and potentials of model-making materials	dominance of aesthetic concerns in composition design

STAGE 3	Progres 3.a	Transformation of 2D mapping and collage studies to 3D volumetric design	to inquire volumetric representation of urban abstractions in X-Y-Z dimensions by experimenting the transfer of conceptual and abstracted knowledge to volumetric design	discovering the circular nature of design process by inquiring the tangible and experiential counterparts of the concepts in mapping studies; developing 2 different mapping strategies called as "photomontage" and "daydreaming"	difficulties in understanding that the process of transformation from abstract to concrete and from concrete to abstract continues at every stage of the design process
	Progres 3.b	Revisions of research& design posters and urban maps	to showcase the conceptual research outputs and studio discussions as the introductory stage of the design process	re-constructing different forms of knowledge by taking into consideration principles of compositon design	low level of creative visualization of different knowledge forms; lack of engagement with composition design principles in poster design
STAGE 4	Finalization 4.a	Revisions of 3D model through desk critiques (prototype development)	to iteratively develop 3D volumetric representations of urban abstractions	testing material potentials in accordance with the conceptual references of mapping	low level of abstraction in some volumetric design experiments ex., tendency to represent some landmarks in the route as they are
	Finalization 4.b	Final Jury presentations and evaluations	to explain the process and the outcomes of design designs; to respond to questions raised by the tutor-jurors	developing skills of self-expression, openness to criticism and time management; raising awareness about the wholeness of the design process	difficulties in explaining mapping strategies; difficulties in explaining the transition between different stages of the design process

The project is structured on four stages (Figure 2). STAGE 1 included preparation in the studio based on Readings + Film critiques + Conceptual research. Educational goals envisioned for this stage were questioning the concepts that inform the conceptual framework of the project through different media and, thus, helping students get familiar with foundation concepts. This stage of the project not only raised students' awareness of design as a research process but also contributed to developing their critical and creative thinking skills and knowledge base about design. On the other hand, there were also some constraints at this stage of the studio. Because first-year design students are mostly equipped with visual literacy more than text literacy, they are not familiar with reading articles or book chapters.



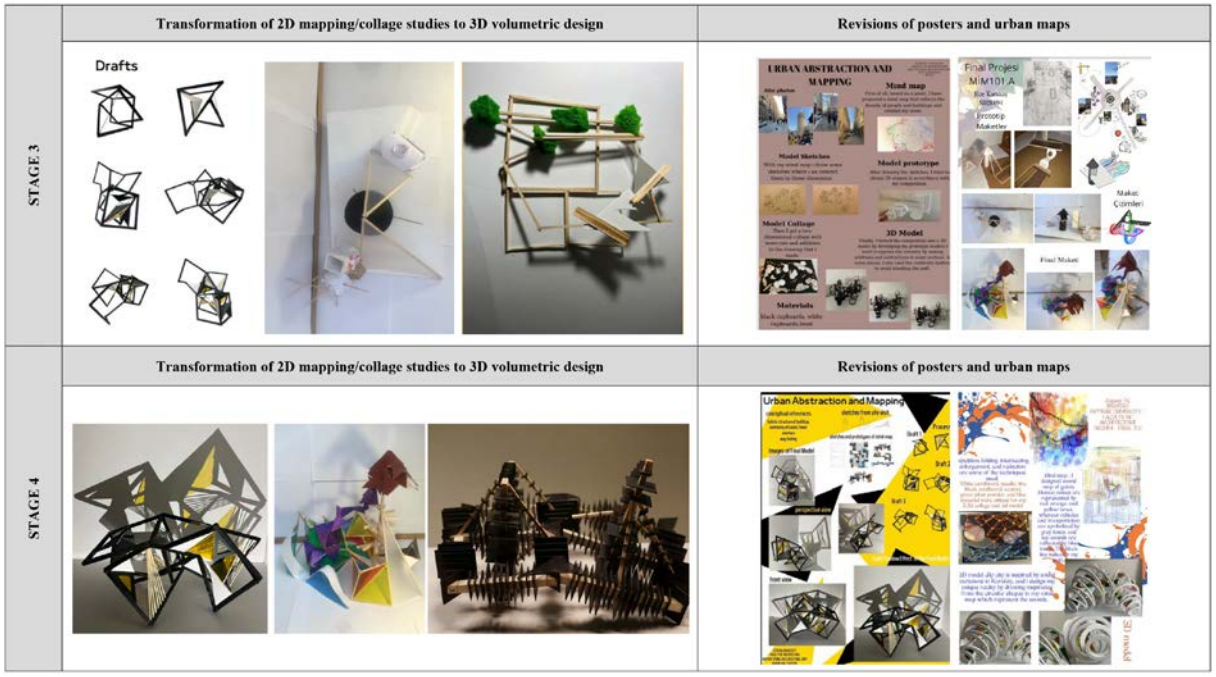


Figure 2. Four subsequent stages of "Urban Abstraction and Mapping" project

Yet, the state of having more active visual perceptions turned into an advantage for the studio exercise of watching excerpts from movies and discussing certain concepts in relation to the project brief. These discussions provided a ground for critically evaluating the tangible and intangible elements of urban space through daily practices, the interaction between the observational reality and the subjective and imaginative perceptions of the observer. This, in turn, prepared the students for the site excursion they participated in the next stage of the project. The reason for choosing documentary films was to draw attention to the fictional dimension of urban/spatial experiences of observers, to the fact that we all experience the world through our own lens. These two exercises were followed by literature research about the main concepts given in the design brief and the preparation of a presentation. The students, who gained a certain awareness of the readings and movie critics in the studio, discovered the definitions of the related concepts and started relating these concepts with visual examples. Preparation on site was based on site excursion. The educational objectives of this stage were observing and analyzing urban space through bodily perceptions and sensory experience, promoting personal perspectives in observing, perceiving, conceiving, and visualizing space. The pedagogical goals were to expand research and learning practices outside the studio, to increase students' awareness of the city they live in, and to encourage them to explore the heterogeneous and layered structure of urban space, especially within the framework of the chosen route. Students were encouraged to learn to experience their environment as active observers and participants, one of the key features of being a designer. Bodily movement through walking was the primary notion that supported the active engagement of students to space; observations and experiences on the go were effective in enabling students to look at the space through multiple perception channels. However, the students who had difficulties bringing their conceptual awareness to a certain level in the studio research exercise needed help describing their experiences through concepts. This difficulty was also evident when analyzing the data collected after returning to the studio from the site excursion: some students needed help finding conceptual references for their data analysis.

STAGE 2 started with practices of urban mapping based on preliminary research and perceptual-sensory data (in different media such as photographs, sketches, video recordings, sound recordings, etc.) collected on site. The objectives were to activate students' critical-creative thinking skills and to abstract the tangible and intangible layers of urban space using creative representation tools. Bodily perceptions and sensory experiences were expected to be re-evaluated as a spatiotemporal frame of reference for abstraction. The mind-map method was determined as the appropriate method to achieve this. Because mind-map has the potential to provide an opportunity for each student to represent the spatial experience they have acquired from their

own point of view by synthesizing the concrete-abstract, objective-subjective elements together; thus, this method contributes to encouraging the students to develop their own design strategies. Mind-map helped students to transfer the findings of conceptual research and on-site observations to the design process by revealing and reconstructing the relationships between them, synthesizing conceptual and perceptual knowledge through a critical-creative-subjective filter and, eventually, representing this synthesis through different forms of knowledge (visual, textural, etc.). Some successful examples of expressing experience with concepts were: the use of "interface" concept with reference to "interior/exterior of the buildings (facades and interior practices)" and "underground/above ground combining the underground and aboveground of the city by using underpass"; the inquiry of "sound" with reference to diverse sound qualities such as "deliveries and miscellaneous; transportation; street sound; traffic, harbor and building operation"; "palimpsest" concept related with diversities between and co-existence of "layers of human density, human orientations, building heights." Conceptualizing the experience, in other words, trying to express the prominent elements of the students' subjective experience in the route, constituted the first stage of the mapping exercise.

The concepts were reconstructed by students using different visual and written knowledge forms. Two different approaches were observed among students. Some students tended to bring together the photographs they took during site excursions and or the images found on the web to reconstruct the route in a certain flow. While doing this, they cropped the images, distorted them by altering their scales, overlapped, or changed the positive-negative space setup by making the ground line upside-down. So, this group of students created their own route compositions. While creating their compositions, some students maintained the route's flow and sequence of elements in this flow, while others first disassembled and recombined the route in a new setup in accordance with their own imaginative and intuitive filters. This visual flow is also supported by short explanations and concepts. The first strategy of urban mapping used by students in the first semester design studio can be defined as the "photomontage strategy" and the second as the "daydreaming strategy." The second group of students exposed a more abstract approach, coming closer to the subjective notion of mind-mapping strategy. For instance, some students focused on the sound variations experienced during site excursion, such as human sounds represented as red, orange, and yellow, vehicular sounds represented as tones of gray, and the sound of sea represented as blue. Another student focused on varying densities of people and buildings, represented through diverse geometric shapes and colors. An interesting approach to mind-mapping was based on a cartographic composition made of horizontal lines as modular groups, representing the interpretation of concepts such as "field of view", "crowd", "light", "width of route" and "height of route." Mapping as a strategy to synthesize conceptual and perceptual notions of urban space also had its challenges for first-year design students, who were expected to discover mapping methods for the first time. In some mapping studies, the level of abstraction remained low. Studio tutors had difficulties in activating the imaginative and intuitive reasoning skills of students, as they were inclined to represent concrete features of their site observations. Stage 2 also included collage works that aimed to guide students in their attempt to transform daily experiences into an authentic frame of reference for abstraction and design. Most of the students seem to achieve an introduction to volumetric design and working with materials in design. Yet, the problems in this stage were low levels of abstraction and emphasis on creating aesthetic compositions. Besides, successful collage works were sensitive to composition design principles (proportions, equilibrium, continuity, contrast, etc.) and tested the potentials of different materials as preparation for 3-dimensional volume design.

STAGE 3 included experimentations for the transformation of 2D mapping and collage studies to 3D volumetric design. The main objective of this stage was to inquire volumetric representation of urban abstractions in X-Y-Z dimensions by experimenting with the transfer of conceptual and abstracted knowledge to volumetric design. As the students tried to conceptualize their bodily perceptions and sensory experiences at Stage 2, this time, they questioned the tangible and experiential counterparts of the concepts on which they based their mapping studies. As indicated at Figure 1, they once again discovered the circular nature of the design process. It is revealed that the two different mapping strategies discussed above had two different reflections in the 3-dimensional design process. For the students utilizing "daydreaming as mapping strategy" there was a formal and compositional continuity between their mind-map collage studies and the 3-dimensional models: a more explicit relationship between the successive stages of the design process was observed. The figural formations in mind-map and collage studies and the principles of combining these shapes (in X and Y dimensions) become more robust by gaining depth with the Z dimension. The students were directed to

spatialize the 3D volume so that it could be perceived from 6 different perspectives, as was emphasized throughout the semester in the first-year studio. The relationship between 2-dimensional mapping studies and 3-dimensional models for the students exposed to “photomontage as a mapping strategy” in stage 2, was more implicit. Observing a formal and compositional continuity between the two stages of the design process was harder. The mapping studies based on “photomontage” strategy exposed a composition of images and concepts with no definite geometrical language; thus, defining the frame of references for 3-dimensional volumetric design was a challenge for students proceeding from stage 2 to stage 3 (Figure 5). The challenge was defining the strategies to guide this transition in terms of the integrity of the design process and to reflect the subjective conceptual and perceptual filters for each student. For example, the student focusing on the concept of “interface” with reference to the dualities of “interior/exterior” and “underground/above the ground”, tried to transform this concept into a fluid space by replacing solid and permeable surface elements in X-Y-Z dimensions in her volumetric experimentation. The mapping that was created by overturning different urban layers, were transformed into a volumetric design in which when turned upside down, the model was based on a similar stratification (layering) strategy. The volume designed by expressing the different sounds perceived in the urban space with different material textures can be given as another example that follows the “photomontage” strategy.

Stage 3 also aimed at guiding the first-semester design students to test the potentials of materials (transparency, durability, flexibility, etc.) for representing abstracted urban references in a volumetric way. Students were encouraged to choose materials according to their relevance for their individual design strategies and to test different treatments for transforming the material (creating texture or voids on material surfaces, cutting, folding, stretching, etc.). They used linear and planar elements based on principles such as repetition, continuity, balance, contrast, and techniques such as folding, intersecting, overlapping, scaling, addition/subtraction, which were emphasized throughout the ARCH/MIM 101 Design courses. The challenges for stage 3 mostly derived from the difficulties in understanding that the process of transformation from abstract to concrete and from concrete to abstract continues at every stage of the design process, and that the 3D volumetric design is more than gaining depth of a 2D design. Studio tutors underlined the importance of experiencing a circular process in which the students should continue to achieve progress by generating, critically evaluating, and developing alternative design solutions.

Stage 3 continued with Revisions of research and design posters and urban maps to showcase the conceptual research outputs (based on the keywords such as urban abstraction, urban mapping, mind-mapping, flaneur, urban experience, urban palimpsest, urban layering) as the introductory stage of the design process. Students had made progress in terms of developing skills for re-constructing different modes of knowledge by taking into consideration principles of composition design. Some posters can be regarded as experiments to creatively visualize different forms of knowledge, which were designed as compositions by taking into consideration the compositional principles in poster design. In some posters, the potential for creative visualization of different knowledge forms needed to be more robust: the lower competence in using digital tools and their tendency not to treat the poster as a composition design can be the underlying reasons.

STAGE 4 included revisions of 3D models through desk critiques (prototype development) with the aim of guiding students in the iterative development of 3 dimensional representations of urban abstractions. Students developed prototypes of their 3D volumetric design by taking desk critiques for 3 times before the final evaluation. This helped them test the material potentials/constraints (such as durability, elasticity, permeability, solidity, etc.) in accordance with the conceptual references of their mapping studies and their volumetric design strategies. The final part of Stage 4 and the project process was the execution of a final jury. Final jury aimed at encouraging students to explain the process and the outcomes of their designs and respond to questions raised by the tutor-jurors, which would help them develop skills of self-expression, openness to criticism, process/time management and increase their awareness about the wholeness of the design process. In the final jury, the 2D mapping, collage studies and 3D models acted as tools for communication between the students and tutors. Some students made presentations by explaining the transitions between the conceptual research-site excursion-volumetric design stages of the design process; while in some presentations, it was observed that how each design stage constituted an input to the next was not clearly understood and well-explained by the students.

CONCLUSION

Focusing on the structure, process, and products of an introductory design studio approach conducted at the Department of Architecture of Özyeğin University, this study examined how the analysis and abstraction of the tangible and intangible elements of the physical environment can be utilized as a tool for synthesizing perception-experience-conceptualization as three essential components of design. The main questions addressed in this study were how an inclusive introductory design studio model could be developed for stimulating a better understanding of the balance between and a dynamic commingling of visual reasoning/critical conceptualization and sensory experiences/bodily perceptions in the design process and the ways experiencing physical space through walking as a performative act can contribute to achieving such a balance and commingling in basic design education.

The study findings showed that urban abstraction and mapping strategies developed through the first-year design students' bodily perceptions and sensory experiences in urban context helped raise awareness of the heterogeneous and multi-layered structure of urban space, but also of design as a generative and iterative research process. Furthermore, students managed to transfer the findings of conceptual research and on-site observations to the design process by revealing and reconstructing their relationships, synthesizing conceptual and perceptual knowledge through a critical-creative-subjective filter. Thus, the studio approach opened new perspectives for beginning design students to go beyond the abstract geometric language of composition development, but rather to integrate experiential and conceptual knowledge to generate new knowledge as a basis for 3D volumetric design. It is shown that urban abstraction and mapping strategies have been instrumental in increasing students' engagement in critical thinking and volumetric and material experimentations in the design process.

The results of the case study analysis of a pedagogical approach for the first-year design studio through a final project indicated two different urban abstraction and mapping strategies developed by the students- "photomontage" and "daydreaming" strategies. This pointed to the potential of mapping for the development of diverse critical-creative and intuitive approaches to re-construct different forms of knowledge through the filter of each student's subjective, conceptual, and perceptual approaches to the act of designing. It is revealed that the students who were able to operate the transition from perceptual-experiential realms to the realm of abstraction and conceptualization through a cyclical process managed to better utilize from urban abstraction and mapping as a research and design strategy and achieved distinctive heuristic approaches to 2D and 3D design learning. On the other hand, those students who had difficulties in transferring one form of knowledge to another tended to approach 3D volumetric design as gaining the depth of a 2D design. Consequently, this research can help discuss the contribution of mapping methodology to the development of basic design pedagogy and of the basic design education to the transition phase to architectural design. The findings of this study may contribute to the development of new teaching and learning strategies based on the physical environment as a reference to abstraction to be implemented for the introductory design education, in a way to support the abstract design approaches that are widely covered in basic design courses.

There were several limitations to this study. The current study is based on a four-week project at ARCH/MIM 101 Design studios at Department of Architecture of Özyeğin University. Although the study combines students' projects of three studio sections in Spring 2022 semester providing opportunities to analyze the potential and constraints of urban abstraction and mapping strategy for introductory design education, a longitudinal study is needed by increasing the number of participants and repeating this approach. For future studies, it would be supported to investigate the potentials of this strategy with a larger sample size in subsequent introductory design studios. Another issue to be raised could be examining the reflections of the learning goals achieved in this studio on the subsequent studio levels. These will help test the pedagogical contributions of urban abstraction and mapping strategy for the development of first year design students' critical-creative-intuitive thinking and making skills as part of basic design education. The findings of this study also provide a ground for further discussions on the contribution of basic design education to form a more engaged learning process for foundation-level design students and support the transition to architectural design. Finally, the results are relevant for and accessible by other design researchers and tutors who are interested in analyzing and evaluating the effectiveness of teaching/learning methods applied in the basic design studio at the introductory level of design education.

Authors' Contributions

The 1st author contributed 50%, the second author contributed% 30 and the third author contributed % 20 to the study.

Acknowledgements

This study was based on ARCH 101 and MIM 101 Design Studios that were conducted in 2021-22 Spring Term at Özyeğin University Faculty of Architecture and Design. Special thanks to the students of the Department of Architecture and the Department of Interior Architecture and Environmental Design for their contribution to the study, especially to the students Alisa Kaptan, Berçin Şen, Burak Songun, Buse Özdemir, Cansel Toplu, Ece Karakaş, Lara Güner, Selin Kurbanzede, Yağmur Ergezen, Tunahan Kaya, Zehra Keskin and Zeynep Uç whose work is demonstrated in the article. We also thank Gizem Efendioğlu for her valuable contributions to ARCH/MIM101 studios as research assistant.

Competing Interests

There is no potential conflict of interest.

Ethics Committee Declaration

Ethics committee approval is not required.

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