

# Nanos Gigantum Humeris Insidentes: The New Challenges For Future

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In one of his personal letters, Isaac Newton says “*If I have seen further, it is by standing on the shoulders of giants.*” That acquainted aphorism of him does actually derive from a Latin expression, which takes place in the title of this short paper. In the meaning of *‘discovering truth by building on previous discoveries’*<sup>23</sup> (Wikipedia, 2016), the expression has a real relevance with the issue of foundation and prospective (trans)formation of institutions.

Having been established with a very ambitious start-up project in 1996, METU Master of Urban Design (MUD) Program is at the 20<sup>th</sup> anniversary. Since then, the program has not given a break in studio education and research. For the institutionalization of an organization, in the way of embedding a norm or a particular mode of behaviour as a whole, this is a long period. It is long enough to put a self-reflective perspective revealing what has been achieved and what has to be done on the basis of that meticulously constructed tradition, as well.

In the context of this paper, the authors who are also the ‘products’ of this tradition suggest the headlines of a projective trajectory for METU MUD based on the accumulated experience reflected within this Catalogue.

## Urban Design: (In)Between Architecture and Planning

Fifteen years ago, in the sixth year of the establishment of METU MSc Urban Design under the Department of City and Regional Planning, the first author of this article was one of the students within the program, and he organized a panel discussion at the Faculty of Architecture. Having invited four academics from both Architecture and Planning departments, he kindly asked the participants to make their own definitions of urban design from their professional perspectives in order to trigger a



Figure 1. The medieval manuscript and allegorical drawing depicting the Greek mythology of Cadalion acting on the shoulder of the giant. -Library of Congress, Rosenwald 4, Bl. Süd-Deutschland, ca. 1410- (Source: <https://commons.wikimedia.org>)

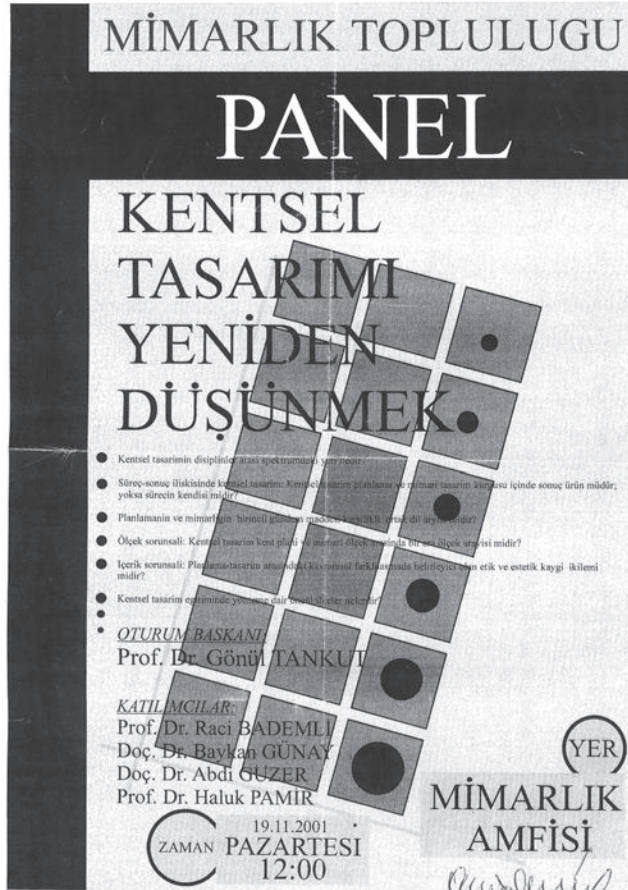


Figure 2. Poster of the panel discussion organized at METU Faculty of Architecture in 2001: **Re-considering Urban Design** (Source: Personal archive of Olgu Çalıřkan)

fruitful intellectual debate on the issue. At the very hot moment of the discussion, one of the panellists argued that there should have been no term like 'urban design' because every design act is essentially 'urban' due to its intentional and operative context.

Apart from the fact that 'urban' plus 'design' does not necessarily equate to 'urban design' or the relevance on-

logical question whether the act of design should be categorically considered 'urban' or not; even within that panel discussion, it was revealed that there was apparently no consensus on neither urban design nor design among architects and planners.

Yet the question of the disciplinary position of urban design as the field between architecture and planning<sup>4</sup> has remained relevant considering the expected quality of urban design education, which is the main concern of this paper.

Long after this panel dated in 2001, the authors have recognized that the question had not been resolved even at the 60<sup>th</sup> anniversary of the first Urban Design Conference at Harvard where Josep Lluís Sert opened up the discussion for a common disciplinary definition of the emerging field in 1956. Within the enduring-debate, the first argumentation is that urban design is a subset of planning. The champions of this opinion support that idea with the claim that in the context of global/neoliberal economies, planning's intrinsic attainment of public good, social justice and sustainable ecology and its built-capacity for social science research necessitate urban design to be retained within city planning and planning education (Stenberg, 2000; Gunder, 2011; Talen, 2009, 2011). The counterview against this perspective points out the naivety and romanticism inherent within the argument which in fact disregards the actual involvement of planners in commodification of urban land through the formation of gated communities, closed complexes or privatized public spaces financed by the global capital (Banerjee, 2011). The ones seeing the futility of grounding the discussion on a normative basis offer a more substantial framework. Accordingly, the first view suggests that urban design tends to be an independent school of design professions and disciplines (Childs, 2010). This perspective implicitly excludes planning. Another position emphasizes the 'interdisciplinary' nature of the theory and practice involving architecture, planning and landscape architecture<sup>5</sup> (Lang, 1994/2007; Forsyth, 2007). The more flexible view, in this context, suggest even a broader disciplinary framework that includes all the disciplines interested in the planned production of space -i.e. civil engineering, real estates, law and social sciences- (Schurch, 1999). Questioning the ontology of

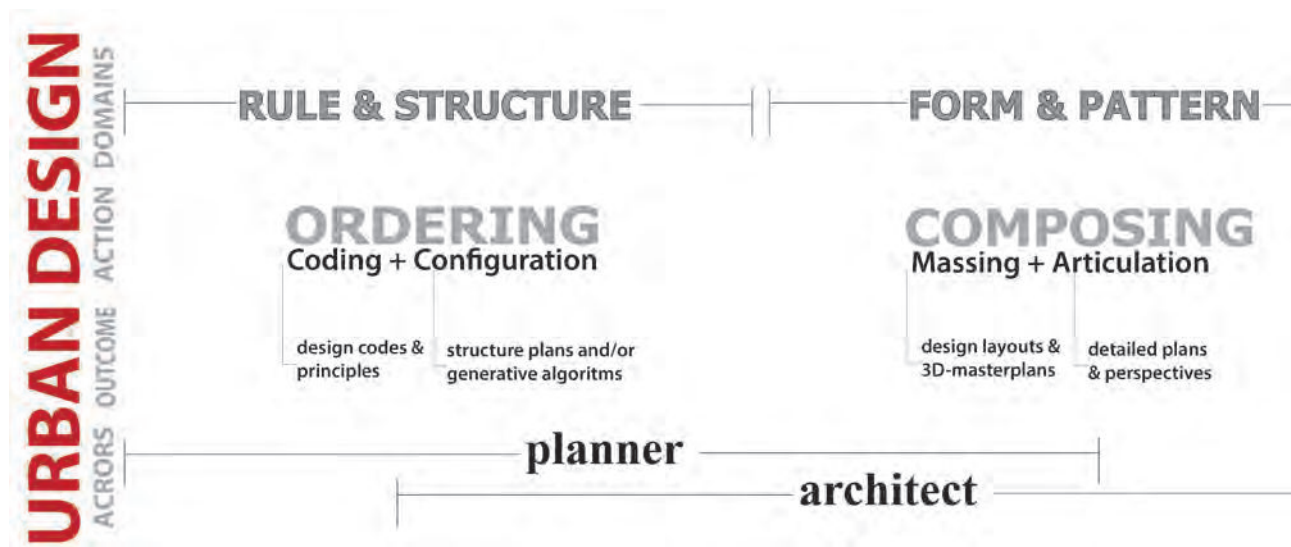


Figure 3. A domain-specific definition of urban design: the necessary position of architecture and planning as the parent disciplines of urban design.

(urban) design practice and thinking in relation to art, Marshall (2015) argues the most overarching framework positioning urban design between the 'disciplinary territory' of fine-arts, infrastructure/product design and planning. Constructing the cognitive relation between design and art, this point of view is severely rejected by the perspective which is sceptical—about the personal creativity intrinsic in (urban) design within the broader socio political context of urbanism<sup>6</sup> (Cuthbert, 2016). The point that the 'big debate' achieves does actually originate from the early discussion of Kevin Lynch one of the founding figures of the field. Regarding its both sensory/aesthetical dimension and its procedural insight (dealing with plurality, continuous change, and conflict), Lynch (1984) sets 'city design' on the skills of both planning and architecture against the background knowledge of politics, sociology and economy.

Based on this perspective and bearing the very basic conception of the field as *the organization of space and its integral definition with form and function* (Madanipour, 2006), the authors believe that reclaiming the multi-

trans-, cross- or inter-disciplinary nature of urban design does not suggest an added-value on the discussion of urban design education. No counter argument excluding any parent discipline is convincing anymore with regards to the field that was originally established by the protagonists who were prominently architect<sup>7</sup>, as well as the contemporary practice that occurs in the overarching framework of planning today. More substantially, the main spatial domain on which urban design acts does necessarily involve the practice of both planners and architects through integrative coordination (see: Figure 3).

As seen in Figure 3, urban design process can be conceptualized in two domains: *rule and structure, and form and pattern* having their own morpho-logics to operate with<sup>8</sup>. These two domains ask for both the guiding and regulatory role of planning<sup>9</sup> and the compositional skills and cognition of architecture<sup>10</sup>. Without one or another, the field does not perform properly. Therefore the main question to be discussed for the prospective future of urban design education here mainly concentrates on the

	Country	Institution	Programs
North America	US	Berkeley University College of Environmental Design	Master of Urban Design
		Georgia Institute of Technology School of Architecture	Master of Science in Urban Design
		Harvard University Graduate School of Design	Master of Architecture in Urban Design
		Columbia University	Master of Urban Design
		Ball State University	Master of Urban Design
		Savannah College of Art and Design	Master of Urban Design
		Carnegie Mellon University	Master of Urban Design
		Arizona State University	Master of Urban Design
		The University of Texas in Austin School of Architecture	Master of Science in Urban Design
		University of North Carolina at Charlotte	Masters of Urban Design
		University of Miami School of Architecture	Masters of Urban Design
	University of Colorado Denver Collage of Architecture and Planning	Master of Urban Design	
	Canada	University of Toronto John H. Daniels Faculty of Architecture, Landscape and Design	Master of Urban Design
		The University of Melbourne Melbourne School of Design	Master of Urban Design
University of Toronto John H. Daniels Faculty of Architecture, Landscape and Design		Master of Urban Design	
Europe	United Kingdom	University of Nottingham Architecture and Built Environment	Master of Architecture and Urban Design
		University of Westminster Architecture and the Built Environment	Master of Arts in Urban Design
		Oxford Brookes University School of the Built Environment	Master of Arts in Urban Design
	Germany	University College London School of Planning	Master of Research in Interdisciplinary Urban Design
		TU Berlin Department of Urban and Regional Planning	Master of Urban Design
	The Netherlands	University of Stuttgart	Master of Science in Integrated Urbanism and Sustainable Design
		Hafencity University of Hamburg Urban Design Program	Master of Urban Design
Belgium	TU Delft Faculty of Architecture and Built Environment	Master of Science Architecture, Urbanism and Building Sciences	
Sweden	KU Leuven Faculty of Architecture	Master of Urbanism and Spatial Planning	
		Lund University Faculty of Architecture	Master of Sustainable Urban Design

Eurasia	Israel	Bezalel Academy of Arts and Design Jerusalem Tel Aviv University Department of Geography and Human Environment.	The Urban Design Master's Degree Program  Laboratory for Contemporary Urban Design
	Turkey	Middle East Technical University Faculty of Architecture	Master of Urban Design
	Lebanon	American University of Beirut	Master of Urban Design
Australia	Australia	University of New South Wales Built Environment	Master of Urban Development and Design
		The University of Sydney Faculty of Design and Planning	Master of Urban Design
Asia Pacific	Singapore	National University of Singapore Department of Architecture	Master of Art (Urban Design)
	China	The Chinese University of Hong Kong School of Architecture	Master of Science in Urban Design
	Hong Kong	The University of Hong Kong Faculty of Architecture	Master of Urban Design
	Japan	The University of Tokyo Department of Architecture	Master of Architecture and Urban Design

Table 1. Selected graduate programmes in urban design.

content (epistemology and methodology) rather than the claimed (disciplinary) structure of the program.

### Towards a dynamic programming: an international perspective

Following the overall outlook briefly presented above, the current state-of-art in urban design education through surveying the leading programs in different regions of the World is evaluated. This is basically to provide some critical indications for the strategic transformation of urban design education either at METU or those searching for a projective perspective for future.

The survey takes only the graduate programs thought in English into consideration. The data is mainly collected by the web-survey on the basis of the index made by *Plan-etizen*, the independent resource on planning.<sup>11</sup> Nevertheless, the index has been updated by a number of programs not included in the list. Eventually, 34 gradu-

ate programmes in urban design from 15 countries have been investigated (see: Table 1).

The main selection criteria in selecting the programmes and forming the dataset are the active and accessible presence of the educational programme and the availability of their curricula. Accordingly, 288 courses of the urban design graduate programme from six different geographical regions in the World have been examined. The course titles are divided into their main contents in order to gather the essence and the main topic (i.e. *The Theory and History of Urbanism* course is used as two different contents as theory and history). Having gathered all the main concepts included in the course titles from all programmes, the frequency of mention of the contents is visualized through a *World Cloud* program. The main intention with this analysis is to see the most commonly focused urban design issues and topics easily.

This analysis is conducted not only to show the most frequently mentioned contents as it is usually done, but also



Figure 4. World Cloud Including main contents gathered from all of the course titles from all programmes (frequency of mention ranging between 1 and 15)



Figure 5. World Cloud Including main contents gathered from all of the course titles from all programmes (frequency of mention ranging between 2 and 5)



Figure 6. World Cloud Including main contents gathered from all of the course titles from all programmes (frequency of mention ranging between 1 and 3)

<p><b>TOPICS ON URBAN DESIGN</b></p> <ul style="list-style-type: none"> <li>Urban Design Elements</li> <li>Urban Design Issues</li> <li>Urban Design Communications</li> <li>Urban Design Colloquia</li> <li>Fabrics and Typologies</li> <li>Elements of Urban Design</li> <li>Interdisciplinary Art and Design Practices</li> <li>Public Space</li> <li>Urban Dynamics - Theories and Tendencies</li> <li>Urban morphology</li> <li>Place-making</li> <li>Urban coding</li> <li>Place identity</li> <li>Principles of Analytical Design</li> <li>Spatial Cultures</li> <li>Urban Design: Layout, Density and Typology</li> <li>Urban Design: Guidance, Incentive and Control</li> <li>Communication in Urban Design</li> <li>Strategic Design</li> </ul>	<p><b>RESEARCH &amp; METHOD</b></p> <ul style="list-style-type: none"> <li>Reflective Synthesis</li> <li>Research Method</li> <li>Analytic Methods of Urban Planning: Quantitative</li> <li>Analytic Methods: Qualitative</li> <li>Urban Design Methods and Tools</li> <li>Principles of Analytical Design</li> <li>Spatial Cultures</li> </ul> <p><b>ECONOMICS</b></p> <ul style="list-style-type: none"> <li>Real Estate Design and Development</li> <li>Real Estate Regulation and Finance</li> <li>Economics of Urban and Regional Development</li> <li>Real Estate Finance and Development</li> <li>The Economies of Cities and Regions</li> </ul>	<p><b>HISTORY</b></p> <ul style="list-style-type: none"> <li>Urban History Lab</li> <li>History of UD</li> <li>Urban Form through History</li> <li>History of Urban Form</li> <li>19th- and 20th Century Urban History</li> <li>History of Urban Development</li> </ul>
<p><b>POLICY</b></p> <ul style="list-style-type: none"> <li>Planning Law</li> <li>Policy Making in Urban Settings</li> <li>Community Participation</li> <li>Policy and implementation</li> <li>Planning Process: Quantitative and Policy Dimensions</li> </ul>	<p><b>ENVIRONMENT</b></p> <ul style="list-style-type: none"> <li>Sustainability of the Built Environment</li> <li>Climate Smart Architecture and Urban Design</li> <li>Sustainable Urban Landscape</li> <li>Climate and Design</li> <li>Sustainable Urban Design Approaches</li> </ul>	<p><b>THEORY</b></p> <ul style="list-style-type: none"> <li>Urban Design Methods and Theory</li> <li>Design Theory Modules</li> <li>Theory of Urbanism</li> <li>History and Theory of Planning and Design</li> <li>Theory and Elements of Urban Design</li> <li>Theory of Urban Development</li> </ul> <p><b>HERITAGE</b></p> <ul style="list-style-type: none"> <li>Cultural Landscape</li> <li>Preservation Through Public Policy</li> <li>Rights of Monuments</li> <li>Urban Preservation</li> <li>Urban Renewal</li> <li>Architectural heritage</li> <li>Urban regeneration</li> </ul>

Figure 7. The courses offered at the graduate urban design programmes and the major thematic clusters in which they position.

to express the mid-size and low-size mentions. Meaning that, not only the main tendency in the overall course scheme is unveiled but also the structuring and specifying body of courses are exposed. The final verbal-maps present the most frequent concepts relatively larger in size than the other ones involved in analysis aiming for specifying the most common and marginal use of the shared concepts. (see: Figure 4, 5, 6)

No need to mention that the broader the range, the wider the common use of term among various programmes indicating high level of relevance. In this context, it is seen that the generic concepts such as **sustainability, real estate, theory** or **form** are indicated as the most frequent notions defining the curricula. (see: Figure 7). Apparently, they are the very basic concepts that would characterise the curriculum of any urban planning department. Yet the point is that all those generic concepts are taught by the courses of urban design programmes within the specific framework of physical planning and design<sup>12</sup>. In this sense, though they may seem too generic, they are specifically re-framed in urban design. (i.e. The concept of sustainability embody the course **Sustainable Approaches in Urban Design**, see: Figure 7) In the second range, more specific concepts like **housing, environment, economics, community building** and **GIS** come to foreground. The diversity within this group basically indicates the topics which are subject to be given as thematic concentrations, which are ideally provided for operative specialisation within urban design. The third and the narrowest range of frequency cluster, gives an overview on the topics that differentiate any programme with a particular concentration on a specific theme (i.e. **regeneration, public participation, informal urbanism**) or a certain methodical/technical topic (i.e. typology, visualisation and drawing).

We may argue that the quality of an urban design program can be examined with the extent to which it effectively covers the wide conceptual area of urban(ist) issues presented. The more diversity within the first and second type of thematic universe, the higher the competence the program suggests for the fundamentals and specialisation within the field respectively. Whereas if a programme aims for specification (in addition to spe-

cialisation) on certain topic, it has to invest on certain methodology (i.e. mapping, analytics, digital design) or up-to-date themes (i.e. media, mobility, informality) by supported course works.

On the basis of the survey, a clustering is made to classify all the examined course titles in principal themes is suggested as well. (see: Figure 7) The catalogue provides a basis to define an ideal framework for the curriculum of a grad-level urban design programme.

Looking at Figure 7, one can easily recognise that the topics (i.e. **place-making, morphology, typology and control**) which directly touch upon the design issues take the broadest coverage and the foremost position in the programmes. Nevertheless those topics, in all the programmes, are strongly supported by the design courses on urban policy, economics, environment, heritage, history, methodology and theory. This seems quite a condition of a full-fledged urban design education. The authors argue that to be genuinely called 'programme' in the international context today, this condition should be met within certain optimality. Besides, for coherency in educational scheme, an umbrella course framework covering the basic topics of urban planning and design should be supported by a strong body of specialized, well-focused and maintained urban design topics.

#### **METU MUD: From 'urban design studio + research' to 'advanced urban design research programme'**

Since Ecole des Beaux Arts in the 19<sup>th</sup> century France, 'atelier' system, studios are the central platforms of design education. Studios are basically the places where creativity is thought and theory is tested by simulated practice (Long, 2012: 445). Yet design studios are not the places where only the practical apprenticeship is conveyed. Bearing the fact that design is an intellectual operation by which objective knowledge on the studied phenomenon is driven, design studios can be considered the core area of knowledge production as well (Dutton, 1987: 17). Taken in that way, a design studio could act as a research platform where research is done by design. Meaning critical inquiry and heuristic investigation through exploration of possible futures (Steenbergen et. al., 2003: 24), **research-by-design** is already an es-



established notion which is yet to receive enough interest from the planning schools. When we look at the major urban design programmes, we see that there is a real tendency for defining design studios as the main stage of research-by-design projects. Increased number of urban design labs or studios are entitled in alternative names like '**community based design**', '**Urban Places**', '**Future Cities**', '**Projective Cities**' or '**The Why Factory**'. This also indicates the current tendency to shift from the settled conception of urban design studio relying on 'project making' in conventional sense.

The enduring experience of METU MUD, in this regard, suggests a real opportunity to adopt the model of **advanced design research program**. Since the programme has directed students to conduct their thesis studies in continuation with the studio project of the year, there has been a working link consciously constructed between studio course and the thesis studies. (see: Acar, 2016 at this volume). Yet the point is that design and research, in that context, has remained discrete even in a consecutive manner. Though there have been lots of design analyses conducted on the main topics of the projects during the first twenty-year period of the studio, it is hard to claim that the design process itself has been conducted as the core mean and phase of research itself<sup>13</sup>. To transform the studio course into a creative research domain, the design methods and concepts should be regarded as the target rather than the particular design solutions suggested by the projects<sup>14</sup>. The universality of the method (tools and techniques) and the generosity of the concept (vocabulary), in this sense, are seen as the fundamentals of design knowledge to be utilized in practice.

To launch that tradition, METU MUD Studio has introduced an intensive programme (more concentrated than before) involving a series of workshops, lectures and seminars in the process for the last two years. While seminars worked for elaborating the subject matter by individual researches and collective discussions, design workshops focused on developing a holistic perspective via short and finite exercises built on one another. For further improvement of this approach, first the conventional notion of **design project** solving the particular problem(s) of a specific context has been transformed

into that of **design research project** aiming the development of either a reproductive methodology or a new conceptualisation in/for design. To that aim, the conventional (linear) relationship between analysis and design has been deconstructed, and the two phases have been integrated into each other in accordance with the actual nature of (urban) design thinking (Çalışkan, 2012). To improve that approach, rigorous (integral) analysis should be balanced with personal impressions and insight as intrinsic within the qualitative nature of design (Schröder, 2016).

Another step to the formation of 'design research programme' would be in the way of reformulating the settled conception of writing a MSc dissertation which mostly falls insufficient to involve design thinking in research. Due to the so-called concern of 'scientification', the graduate researches from many design schools in Turkey do exclude design issues from the scope of the studies. This mainly results from the fact that there is little perception regarding design as an instrument for research. To overcome the problem, we should integrate design into hardcode research within masters' dissertations. Rather than conducting a review and adding a 'case-study' after that (mostly in the way of **verification**), the research issues should be derived from the in-depth design (re)search. By this way, delving into the subject matter by directly handling the phenomenon by design, the student could come up with actual problematic issues and relevant (design) hypotheses which could, in turn, be tested (again by design) in a genuinely scientific way (of **falsification**<sup>15</sup>).

Starting up the process at the design studio under the initial supervision of the tutors would essentially enhance the **design-led research** method. Such a student-led/design-oriented research method can definitely enable the alternative pedagogical models -i.e. **information processing, situated learning** or **activity model**- (Long, 2012: 441-44) to be experimented in the studio as alternative to the conventional behaviourist approach by which learning goals are prescribed at the outset, as well.

The ontology of research by design needs more elaboration if it is to be settled properly. It should be, therefore, noted that design, which would lead research, should

reflect either strategic or speculative (even fantastical) direction to broaden the scope of the research questions on the actual limitation and potentiality factors of the possible future. In this regard, **form-exploration, conceptualization, design speculation** and **systematization** are the fundamental performances to be addressed in design research. Simulation of the doomsday scenarios should be part of the design research as well. This is especially critical to direct the researches on risk management. In this sense, Instead of depicting the fixed and desired end-state (blueprint), the techniques of scenario planning and systems thinking should be activated within design research. Such a dynamic perspective is mainly needed to open up the path for actor-based researches in urbanism.

Considering the survey given above, the core of the program should be devoted to the courses of the major design disciplines. Though this does not mean the exclusion of the theory and research of social, political and natural sciences, urban design education requires a its own methodology due to the particular cognition of design and design thinking in urbanism (Schön, 1983/1991; Rowe, 1987; Lawson, 1980/2010, Çalışkan, 2011, 2015).

By MUD programmes, professional competency of urban designers are settled and improved following the undergrad educations. This is quite the question of skilling. Bringing different professions and creating a common skill-factor for all is the major pedagogic challenge of any UD programme. In this context, not only the technical expertise –i.e. graphic communication and visual representation- (Lang, 1994/2007: 469), but also the cognitive ones (i.e. three-dimensional/visual, relational and strategic thinking) should be given for the desired '**mind-set**' of urban design (Kreiger, 2006: 28).

Design studios are getting more international due to the increased student and staff mobility at global scale (Palazzo, 2011: 44). Accordingly, the local design contexts are diversified through their socio-cultural and political dynamics (Cuthbert, 2001). For any programme acting the competitive condition of global education, the range of the project locations and the themes selected for the contextual design research projects get more important

for international success. To that aim, locational specificity of Turkey as a Eurasian country should be taken as an advantage. The Balkans, Eastern Mediterranean, Middle East and Asia should be the primary locations to interact and collaborate at all level. This is principally compatible with the original (and somehow forgotten) mission of Middle East Technical University as well.

Introduction of new technologies are one of the most vital topic for the contemporary urban design education due to the real potentiality of transforming practice and pedagogy of the field radically in future (Palazzo, 2011: 48). In this regard, emerging design support systems like Geodesign or parametric design models are worth to be integrated within design research programmes. At that point, while METU MUD Program made a serious progress with the later for the last few years<sup>16</sup>, an effective integration of GIS into design decision processes is yet to be done.

Involvement of the outside professionals and academics from different disciplines (i.e. sociology, politics, environmental science) in studio and juries should be pedagogically encouraged (Colman, 1988: 109). The open juries are the platforms to ensure rich intellectual debates supported by different perspectives, and to open up new discussion topics in professional domain.

Participation in national and international design competitions should be encouraged not only for its pedagogical merits, but also to test the current level of competence of the programme within the broader context of the contemporary design community<sup>17</sup>.

Last but not least, in order to establish a unified programme interrelating design studies of the MSc studio, master's level researches and PhD studies, a **Design Research Unit of FORM+SPACE** should be founded in the body of the programme within a multi-disciplinary framework. Consisting of both the researches on urban space and morphology, the unit can conduct project-based investigations incorporating the research students and fellows from different design disciplines and from different levels with a series of publications presented to the national international societies.

## Conclusion

The long-lasting discussions about the significance of urban design will continue, considering the fact that the significance of the urban has become the key reality in the world for all aspects due to the socio-political conditions. This, in turn, will affect and transform urban design education as well. Furthermore, increasing interest to urban design both at the level of local and government(s) in Turkey along with an enduring search for formulating legal instruments for practice calls for a systemic and updated knowledge-basis on the field. This addresses a skilled research program on innovative urban design vocabulary and toolkit serving for an effective design practice as experienced in many countries for the last few decades<sup>18</sup>. Such a duty that could be accomplished by advanced design research, first and foremost, belongs to academia. The ones (re)formatting their programme will lead that prospective process successfully. Targeting the top ranks in the international league in near future, for sure, METU Master of Urban Design is expected to be one of them in Turkey.

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  3. This expression is also titled by Stephen Hawking in one of his books, 'On the Shoulders of Giants' (2002, Running Press: Philadelphia) in which the author compiles the seminal texts of the five physicists as the pioneers of modern science.
  4. This was actually at the outset agenda when the programme was being established at METU Faculty of Architecture in the mid-1990s. For more information, see:, Acar, Y. *The Omnipresent Urban Atlas: An Inquiry into Intersubjective Knowledge of Urban Environments*, unpublished PhD thesis, METU Graduate School of Natural and Applied Sciences, Ankara, forthcoming.
  5. Also see: Akkar Ercan and Barlas (2016) at this volume.
  6. This view essentially argues the insufficiency of classical urban design theory and calls for a radical reconstruction of it based on the substantial theory of spatial political economy (Cuthbert, 2001, 2007).
  7. J. L. Sert, E. Bacon, K. Lynch, C. Alexander, P. D. Spreiregen, N. J. Habraken, J. Barnett, J. Lang, D. G. Shane and B. Hillier can be considered the prominent ones in that genre.
  8. For the systemic relation between urban morphology and design: see: Marshall and Çalıskan, 2011; Çalıskan, 2013.
  9. The term 'ordering' is originally coined by Marshall (2009) and used it with the meaning of rule making and structuration of the broad spatial context in which various singular design operations take place.
  10. The term 'architecture' connotes a general notion which encompasses landscape architecture as one of the primary discipline in urban design theory and practice as well.
  11. See: [http://www.planetizen.com/search-schools/?f\[0\]=sm\\_field\\_prog\\_degree%3AGraduate&f\[1\]=sm\\_field\\_prog\\_discipline%3AUrban%20Design](http://www.planetizen.com/search-schools/?f[0]=sm_field_prog_degree%3AGraduate&f[1]=sm_field_prog_discipline%3AUrban%20Design), accessed in August 2016.

12. It is critical to state that the courses involved in analysis are the ones specifically opened by the graduate programmes in urban design rather than the elective courses given by external departments (i.e. planning and architecture departments) in cooperation with the programmes.

13. Being conducting the whole year project without any specific context (i.e. city, precinct etc.), the project, 'Ruling the City': Parametric Urban Design Coding in 2014-2015 academic year represents the first attempt for this approach at METU MUD.

14. The project, 'Parametric Design Coding' experimented in 2014-2015 at METU MUD (see: page 176-183 at this volume), in this regard, can be considered a successful attempt on this way.

15. For more information on 'falsification' as the criterion of scientific inquiry, see: Popper, K.R. (1963) 'Science as Falsification' in Conjectures and Refutations, <http://staff.washington.edu/lynnhank/Popper-1.pdf>, accessed in August 2016

16. The elective course, **UD755 Parametric Urban Design** given by O. Caliskan and Y. B. Barut (with G. Ongun in 2015) at METU Faculty of Architecture aims to support the search for alternative methodologies in urban design research.

17. The tradition of participating in design competitions which was rather valid in the first ten years of METU MUD Studio was re-activated in the last year with two international competitions: **Mars City Design International Design Competition** and **The International Architectural Competition for Science City 2016** see: <http://www.marscitydesign.com>, accessed in August 2016 and <http://bibalex.org/sciencecity/> accessed in August 2016.

18. The works for an effective design control and guidance suggested by Urban Task Force in the UK and those by the New Urbanist groups in the States in close coordination with the public authorities do actually represent success-stories within their particular contexts.

