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# Can creativity be institutionalized?

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**Abstract:**
The aim of this paper is to provide a debate on attaining a creative environment for learning architectural design through a multi-dimensional tool based strategy. The underlying hypothesis is that a dynamic model for teaching architecture could only be possible through a *loosely structured open network of tools allowing customizable design strategie***s**. It is also argued that such a dynamic network could be determined through a thorough analysis of the state-of-the-art of the architectural discipline. In order to justify the acceptability of an architectural design education paradigm based on an open network of tools, the impacts of individuality of the actors, ambiguity of the design problem, boundaries of the discipline, *or the unbounded state of the art*, and the unpredictability of the outcome will be discussed in depth. The definition of creativity; as the ability to adapt knowledge, information and experiences from various areas of life and thought, interpret them in a new way and thus break away from existing patterns of structure and thought; determines the framework of the approach. In order to attain creativity, an institution should not use repetitive procedures based on precedent experiences reproducing the past, but apply open network structures easy to change and adapt to current issues and problems.

***Keywords:*** *Design tools, design education, creativity, dynamic network*

**Intro**

The aim of this paper is to provide a debate on attaining a creative environment for learning architectural design through a multi-dimensional tool based strategy. The underlying hypothesis is that a dynamic model for teaching architectural design could only be possible through a loosely structured open network of tools allowing customizable design strategies. In this model that may be loosely categorized under the active learning strategies, teaching is transformed into guidance and the responsibility of learning focused on learners. Active learning models, designed generally for primary education, propose interaction with course materials and environment and encourage personalized construction of knowledge through discovery, experiments and discussions (Bonwell & Eison 1991). In the dynamic tool network learners are also responsible for the design of a personal curriculum. They are guided through the process of choosing courses or pieces of courses they are interested in during their design

assessment. It is observed seeking for knowledge and the need to use it practically creates an environment where probability of learning and understanding is higher (Subotincic 2007, Aydınlı 2007). It is not a pure discovery but a guided discovery into the realm of design and designing knowledge. It's been argued that a guided discovery is more efficient than a pure one (Mayer 2004). The tutor and the design problem itself guides the learner, focuses his/her interests, translates their needs into existing packages of knowledge, courses in this case, that they can have access to design tools such as precedents, methods, techniques, and thinking tools.

The individual is at the center of the model. The participation of the learner to the curriculum design is largely achieved with credit-based systems as an extension of active learning strategies. In order to provide a creativity inducing environment institutions play a key role. It is argued that by providing such a loosely structured dynamic curriculum, a creative institution is possible. Institutional creativity is attained and strengthened by active participation of individuals to design of the curriculum.

It is also argued that such a dynamic network could be determined through a thorough analysis of the state-of-the-art of the architectural discipline and sound future projections. In order to justify the acceptability of an architectural design education paradigm based on an open network of tools, the impacts of individuality of the actors, ambiguity of the design problem, boundaries of the discipline, *or the dynamic and unbounded state of the art*, and the unpredictability of the outcome will be discussed in depth in the following chapter named 'the setting of design'. The chapter is organized around the assumption that designing is the expansion of conventionally accepted limits into the unpredictable zone of future probabilities by constructive discoveries of an individual operating in the rather ambiguous possibilities defined by design problem. Individual as the source of originality, ambiguity as clouds of probability, limits as the boundary between invention and convention and unpredictability as the uncertain ways of things to come, is discussed in an axiom-postulate-proposition structure.

The notion of creativity; as the ability to adapt knowledge, information and experiences from various areas of life and thought, interpret them in a new way and thus break away from existing patterns of structure and thought; defines the framework of the approach (Klanten, 2007). Thus, the approach will be discussed referring particularly to the medium and content of the architectural design studios where the works require a certain level of creativity.

## The setting of design

**Axiom 1: Individuality [in institutionalized education]**
All students of architecture are individuals with varying intellectual, cultural and social backgrounds and hence their ways of dealing with design issues and problems will also vary.

**Postulate 1: Institutions shaped by individuals**
A creative institution of design education focuses on the individuality of the candidate and potential profiles of the practicing architect.

**Proposition 1: Dealing with individuality**
Individuals are singular in their speed of learning, their background, and in the way they interpret reality. Their various experiences and the way they incorporate them to their selves are unique (Piaget, 2001). On the other hand actual form of everyday life is recreated momentarily by the interaction between individuals creating new problems waiting to be solved.

Institutions were devised to shape the individuals in the last couple of centuries in order to create and maintain a stable society. Current issues are forcing institutions to become more creative in finding ingenious ways to solve emerging problems. To provide a multitude of solution proposals to the present problems requires individuals with different point of views.

Promotion of individuality is a choice that an institution faces. It can suppress individuality and resist a society of change or promote individuality to obtain more profound solutions to the problems of culture of change. The decision depends on the answers these questions; is it possible to suppress change and is it possible to manage and maintain an institution continuously shaped by the individual actors?

An institution focused on the individuality creates a space for the candidate to roam, wander, explore and eventually -and hopefully- actualize him/herself. The studio masters; who once conveyed their knowledge and methods through studio work; become mentors guiding potential architectural candidates to their designer identities. The realization of the desired outcome of a freethinking individual can not be induced by the program. The task of the institution is to create and maintain a stimulating environment enriched by a multitude of patterns and tools. Here the term *tools* correspond to a multitude of means; including tools of conception, form generation, evaluation, transformation, representation, etc. Reflecting the vague state-of-art they can be historic, new, invented, cross-fertilized, burrowed or domain-specific with physical, digital or hybrid attributes. Intervening with the process of finding unique ways of tackling design is against individuality by definition. An educational method aiming to develop design ability may become very useless indeed when it does not apply to the candidates with different intellectual potentials. Pointing to a number of means at least will help the future architects to navigate their own ways during the process. Method is a design, a compilation of design tools and behaviors, after all. Institutions should allow space for of self-actualization and restrain from *imposing* designing methods and algorithms.

During the last couple of decades a number of *design methodologies, design theories* and *design strategies* were proposed as an answer to how architectural design could be taught (Bayazit 2004). Most of them have a mutual characteristic, disregarding the idea that design methodology is a design itself. It is a compilation of smaller experiences, thus applicable to certain circumstances. Every individual possibly will design his/her own methodology at the end of the day but to institutionalize a design methodology is obsolete.

If the methodologies are large compilations of smaller carriers of actions and thoughts that can be called ‘tools for thinking’, why shouldn’t we introduce ‘design tools’ so they can be available for the novice architects to be recompiled again for yet other strategies to design?

Focus on individuality shifts the attention from a sound design product to an individual with a profound *design-thinking mode*. The curriculum and the content of the program must address to the ability of designerly thinking and behavior. A repertoire of design tools and a collection of working patterns incorporated in studio culture will presumably instigate design thinking, which in turn will produce good designs previously unforeseen. A studio experience producing unpredictable outcomes is one of the indicators of a creative institution.

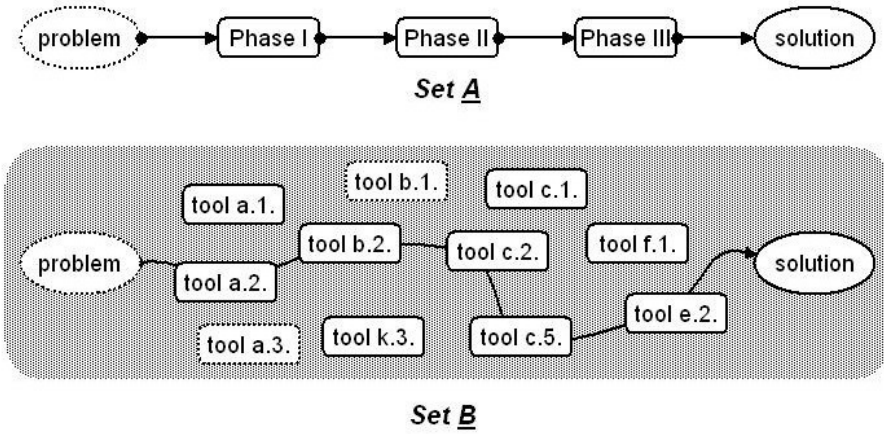


***Figure 1.*** *Comparison of Two Studio Models. Set A illustrates a generic studio structure based on phase-by-phase development. Set B exemplifies a studio structure defined by a network of tools thus allowing alternative paths. Note the passive participation of the unused tools.*

A program focused on individuality requires redesigns for each an every individual navigating their way around. Candidates will navigate in a predicted treelike path but will be allowed to network their ways around the design knowledge organized in modules. Mapping rather than profiling the progress of candidates will be important for consulting purposes rather than evaluating their performance. Institutional creativity may be possible with a non-linear organization of its components.

**Axiom 2: Ambiguity [in pre-solution organization-free state of designing]**
If architecture is an extended process of formation, then before ideas coalesce into a definitive form there must exist some undifferentiated state free of any organization (Aranda, 2006)**.**

**Postulate 2: Institutions shaped by ambiguous organizations**
This state is personal, and thus unique to every individual. A creative environment allows subjectivity through passage from this pre-material state into the realm of the material. It does not imply rules or methods of behavior and organization but provides tools open to customization and improvisation.

**Proposition 2: Dealing with ambiguity**
During the design process, extending the passage from highly ambiguous intellectual activity of problem definition to the end product with an explicit form creates potential unique ways of confronting the design problem. This intermediate zone, or better design space, between problem definition and

forming where almost anything is possible is the main arena where most creative ideas occur (Stouffs 2006, Heape 2007).

A situated problem defines a cloudlike problem-solution space. Redefinitions of the problem and all the possible solutions appropriated to the problem create a probability cloud. Designing becomes an exploration and discovery of all the possible variations of the solutions. This philogenetic state, not fixed but a series of changing, dynamic solution space and its complex relationship with also not well-defined and re-interpretable problem space is naturally ambivalent, ambiguous and wicked as Simon described (1968). Navigating through ambiguous design space and reconciling the problem and solution is the skilful act of a designerly thinking individual.

The design space covers so-called conceptual and professional thinking zones between problem>interpretation>solution model of Goldschmidt (1983, 2005). It may be argued that the transition zone closer to form making is composed of less ambiguous but more formal activity. But in increasing number of cases forming cannot be separated from interpretation of the problem; as in the fibrous structures of Hanif Kara, Serpentine Gallery of Toyo Ito, and Embryonic Houses of Greg Lynn. Major problem of this transition arena is that it may cause anxiety due to the lack of appropriate tools or actions. A designer driven by the look or feel of the end product, accompanied by a feeling of safety, will speed through the process ignoring potential ways leading to alternate and may be more appropriate solutions. Efficiency in such an uncomfortable ambiguous state of design process is possible through an environmentally extended mind described by Clark (1998), equipped with various and ever developing and varying design tools. Another benefit of tools is that they provide a mean to structure this ambiguous pre-solution state in design process.

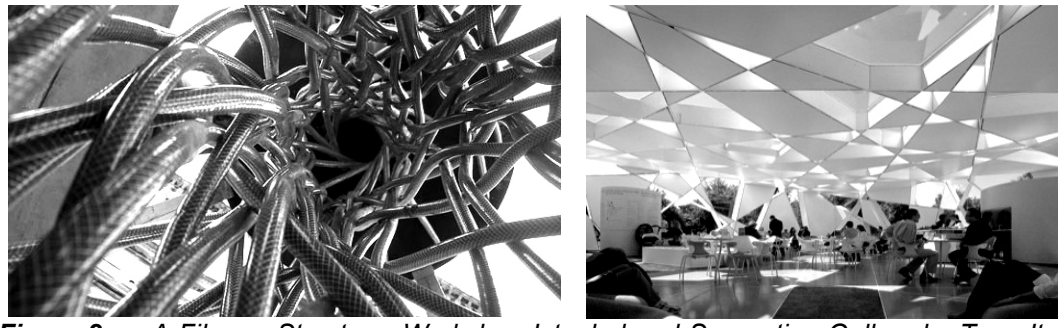

***Figure 2.*** *A Fibrous Structure, Workshop Istanbul and Serpentine Gallery by Toyo Ito & Cecile Balmond*

Design tools are cognitive in essence. As a matter of fact ergonomics scholar Baber (2003), while discussing physical tools, suggests that even a hammer may be a cognitive tool. The strong cognitive aspect of tool use is discussed extensively by Preston (1993) who proposes to redefine tools as equipments based on her readings of Heidegger demonstrates that equipment use is a cooperative venture of the organism and the environment, not just that an active user does to a passive environment. Furthermore Dennett (2000) and Clark (2002) argue that basic workings of our brain and the foundations of our intelligence are based on cognitive machinery which transforms things to others -thus doing things with things- that they choose to call tools for thinking. The collection of all these tools that we integrate during our lifetime forms our individuality (Dennett, 1992).

Analysis of the precedent design works may point to a variety of tools and their changing use patterns. At the end of many similar readings, a glossary of design tools will be available with potentials for consideration in the design studio. Candidates equipped with an architectural thinking mode can navigate through architecture culture without loosing their creative edge and choose and compile their own theory or set of actions from the design tools they have gathered.

**Axiom 3: The boundaries [of design discipline]**
The tools of a given age and practice are revealing indicators not only of that discipline's achievements but also of its aspirations and limitations (Piedmont-Palladino, 2007).

**Postulate 3: Institutions determine the limits [and determined by them in return]**
A creative teaching environment allows experimentation and creation of new tools of imagination, representation, conception, making, transformation…

**Proposition 3: Dealing with the limits**
There is a boundary, which every designerly thinking individual eventually confronts, between the limits of conventional practice and the insecure and expansive territory of innovation. It may be argued that design activity is a continuous act of debating and negotiating innovation with convention. Designing is a natural behavior of expanding conventional wisdom into innovative research, always dealing with the limits and boundaries of average knowledge of doing things.

Architectural design is a socio-cultural cognitive activity. It is part of a very unstable and ever changing context networked around history, economy, politics, ecology, esthetics etc. The design basically is a statement of the self as a product of its never-ending dialogue with this context or culture that is encircling it. Hence, design decisions are *historic* rather then *universal*. Trends and general design behaviors define the common ground. This situation is also reflected in the design tools. Most frequently used or neglected tools describe a general course of action in the praxis of design of a certain period. Following certain frequencies of tool use and repetition of certain forms of behavior may lead to a more plausible deduction in the hopes and blocks of designers. Tools are very transparent regarding the information encoded within. They can transform certain things by inbuilt algorithms but they are ineffective in others. Tools are honest in this sense. Bu they are also full of surprises, prone to innovative tweaks, modifications and 'misuse'. A tool is open to new ways of alternative use through improvisation or intentional redesigns. They provide a stepping-stone for a much more complex or simpler new tool.

With small transformations new tools may be generated unexpectedly. Almost every significant project introduces a new tool. In fact, it may be speculated that general positive response to a project is highly related with the introduction of a new tool to the realm of design.

The design studio is like a carpenter workshop; full of tools for making, form-giving, conceiving and representing. Tool use augments the faculties (Beck, 1980). With effective use of certain appropriated tools the capacity to understand, conceptualize, visualize and compute is augmented. New tools

push the boundaries and define new limits. An institution concentrated on tool use and tool development defines new limits instead of getting trapped by limits and impossibilities.

New tools are made by reconfiguration of the already existing or may be borrowed from other disciplines. Considering *circulation* as a separate and positive entity inside the body of a building date back to the encyclopedia age (Forty, 2004). The coin was imported from the respiratory system to design culture. Another example is using collage as a tool to compose masses and integrate buildings to their surroundings. It was borrowed from avant-garde movements from plastic arts at the start of 20th century.

Current use and innovation of design tools congregates around digital algorithms, computational procedures such as computer-aided manufacturing or computing programs such as generative components. Institutions investing in information technologies expand and define new limits in borderline areas and become leading forces in design community.

**Axiom 4: The Unpredictable [in the world of changes]**
Changes in products, media, systems and modes of everyday living require and define inter-disciplinary and trans-disciplinary collaborations.

**Postulate 4: Institutions shaped by the imminent**
A framework for design education incorporating principles and intrinsic knowledge of a multiple disciplines can not be determined by a generic model imported from only one of the disciplines. Relevant physical/ digital/ hybrid generic tools of collaborating disciplines; whether original, borrowed, mutated or transformed; with potentials for conceiving, thinking, making or representing [or creating new tools] dominate the design environment.

**Proposition 4: Dealing with the unpredictable**
*"True creation is when you can't tell what's ahead, you can't see until you get there (Toyo Ito, 2004)".*

The general trend in institutional organizations; which in the long run leads to their decline and demise; is the tendency to preserve the *status quo* by repeating the known solutions over and over while ignoring the fact that current issues evolve in praxis. The curriculum is planned five or six years ahead depending on the length of the studies, causing a time lag between present issues and the course material designed five years ago. Credits are distributed painstakingly between already existing courses making it very difficult to readjust to current issues.

A similar approach is followed within the courses. In order to teach design a design methodology is applied during the studio hours. As argued earlier, the problem with this method is that it is actually also a design based on previous experiences, thus working only under similar circumstances. With the introduction of a genuine problem they fail. The ultimate question with institutional design education lies here. The candidate who will confront the problems of the imminent is loaded with the methods of the previous. In such cases, being equipped with many tools is more advantageous to being competent with a specific method. Acquired methods act as raw materials and as carriers of compiled design tools that can be deconstructed and reconstructed when need arise. The architect dealing with the imminent reverse engineers existing methods to recompile new ones. With every new

problem new causal relationships is networked between tools. It may be argued that success depends on the repertoire of the tools available.

**Concluding remarks on a creative institution**

A creative institution is the product of its fellow individuals freely interacting in highly adaptable forms of organizations. There is a first condition of institutional creativity: an absolute primacy of persons over institutions, of all possible institutional forms, the least institutional one is preferred. (Schabert 1989). Creative institutions are not designed on a drawing board, but are the spontaneous responses to challenging situations (Streeten 1995). To build a creative institution based on the assumptions and solutions of the passed is quite obsolete. A dynamic and proactive organization and institutional structure will be necessary to cope with unknown problems of the future.

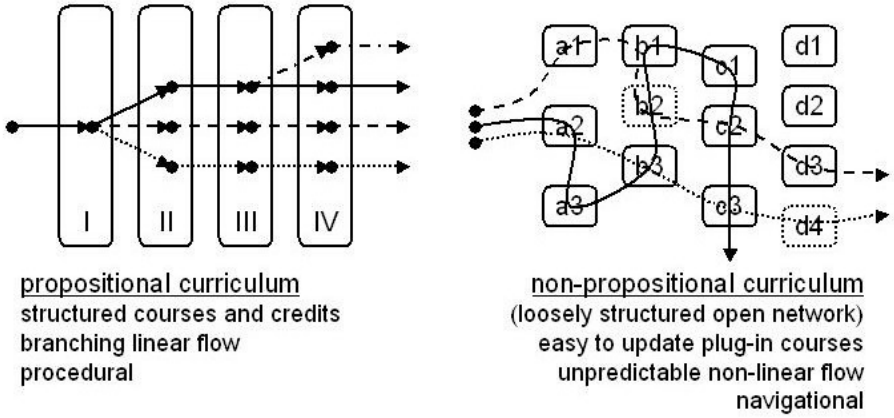


***Figure 3.*** *Comparison of Two Curriculum Models for a School of Architecture*

Creative Institution confronts the new and redefines the limits to reach its objective. It is not shaped by the passed and blinded by the known solution. It looks for the means to improve the value of the individual within the society, negotiates ambiguity, and confronts limits and the fear of the new. Otherwise the second scenario applies where the institutions resists to change. They resist to change and challenging situations by merely ignoring or misinterpreting the here and now; they attempt to control the future by the brute force of laws and attempts to regulate professional practice. Ironically creativity and a setting where creativity is possible by a degree -like freethinking and interacting individuals redefining the limits and dealing with the present without the constraints of the known solutions- is taken as a threat for the survival of institutions. The logical end of this line of thought leads to the assumption that uncontrolled free individual interactions or uncontrollable future variables and Change with a capital C can make a predefined algorithm of production –an institution per se- very unstable. On the other hand creativity is stemmed from change and reconfiguration among many things. Institutional creativity may be structured on non-propositional forms of organizations instead of predefined propositional forms.

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Makalenin hedefi mimari tasarım eğitimi için çok boyutlu tasarım araçlarına dayanan yaratıcı bir ortam sunmanın yollarını tartışmaktır. Metindeki temel varsayım, mimarlığı öğretebilmek için gerekenin ancak dinamik, kişiselleştirilebilir tasarım stratejilerine olanak veren, açık uçlu bir ağda çözük olarak düzenlenmiş tasarım araçlarından oluşan bir model olduğu önerisidir. B yaklaşım kabaca yetmişli yıllardan itibaren olgunlaşmaya başlayan *aktif öğrenme stratejileri* altında sınıflandırılabilir. Öğretenin bir kılavuza dönüştüğü ve sorumluluğun odağının öğretenden öğrenene doğru kaydığı aktif öğrenme anlayışı özellikle orta öğrenimde sınıf içinde dersle ilgili malzemeyle etkileşerek, tartışmalar ve keşifler yaparak öğrenenin bilgiyi kendi farklılıklarına ve ihtiyaçlarına göre kendi deneyimleri etrafında inşa ederek edindiği bir yaklaşımdır. Makalede önerilen *açık uçlu tasarım araçları ağı modeli* öğrenenin ilgilendiği tasarım projesi etrafında ders programını ve ders içeriğini bile yürütücülerin kılavuzluğunda kendi oluşturduğu kişiselleştirmeye açık bir modeldir. Modelin merkezinde birey yer almaktadır. Bireyin bir kılavuz eşliğinde keşfetmesine imkan tanıyan model, öğrenenin kendine göre derleyip üzerlerine kendi yordamını oluşturabileceği geçmiş deneyimler, temsil sistemleri, teknik bilgiler, yöntemlerden ve düşünme araçlarından meydana gelen tasarım araçlarını temel alır. Kurumlar aktarabilecekleri bilgiyi araç paketleri halinde dersler olarak düzenlediklerinde, öğrenen kendi ihtiyacına göre düzenlediği izlek hem öğrenen hem kurum için son derece yaratıcı bir ortam oluşmasına temel oluşturabilir.

Böylesi dinamik bir ağın ancak mimarlık disiplininin ayrıntılı olarak irdelenmesi ve zengin seçenekli ders içeriği oluşturulabilmesi sonucu kurulabileceği önerilmektedir. Bu modelin ilginç önermelerinden biri öğrenenin bizzat ders programına almadığı ama varlığını bildiği bilgi paketlerinden de pasif olarak etkileneceğini, öğrenimi için çizebileceği alternatif izleklere yönelik farkındalığının öğreniminin önemli bir parçası olacağıdır.

Açık uçlu araçlar şebekesine dayalı bir mimarlık eğitimi modeli için tasarımcı adaylarının bireysellikleri, tasarım probleminin muğlaklığı, mimarlık disiplinin sınırları ve tasarım ortamının öngörülemezliği belirleyici unsurlardır. Muğlaklığı yeniden yorumlanabilir problemin tarifinin değişebilirliği ya da aynı probleme verilebilecek uygun çözümlerin çokluğu olarak tarif etmek mümkündür. Muğlaklık olasık ve imkanların çokluğunun yarattığı bulutsu kümelerin doğal sonucudur. Metin içerisinde muğlaklık tasarım için ortadan kaldırılması değil beraber çalışılması gereken pozitif bir değer olarak ele alınmıştır. Mimarlık disiplini deneyci araştırmacı üretim ile konvansiyonel üretim arasında sürekli konvansiyonun lehine genişleyen sınırları zorlayan bir faaliyettir. Mimari tasarım ve genel olarak tasarım deneyci üretim ile gelenekselleşmiş üretim arasında köprüler kuran araştırmacı bir uğraştır. Yaratıcı kurumların bireye, muğlaklığa, tasarım alanın sınırlarına ve gelecekte ortaya çıkması söz konusu yeni problemlere karşı tavırları yaratıcılıklarını sürdürüp sürdüremeyeceklerini belirleyecektir. Metinde birey, muğlaklık, sınırlar ve öngörülemezlik maddeleri belit-koyut-öneri düzeninde tartışılarak incelenmiştir.

Bireysellik bölümünde, bireyin farklı öğrenme süreçlerine, bilgi edinme biçimlerine uyum sağlayabilecek, bireyin deneyip keşfetmesine imkan tanıyacak bir ortamın oluşturulmasında kurumun yeri tartışılmaktadır. Bireyin yönlendirildiği değil bireyin yönlendirdiği kurumsal bir organizasyon kurumsal yaratıcılık açısından önem arz etmektedir. Bunun için kurumlar bireyin kendini gerçekleştirebileceği bir alan yaratmalı yöntemler empoze etmekten kaçınmalıdır. Kurumlar, bu durumda üniversiteler, herhangi bir tasarım yöntemini kurumsallaştırmaktan sakınmalıdır.

Muğlaklık bölümünde mimari tasarıma özgü kesin tarif edilmemiş bir problemden mutlak olmayan bir çözüme doğru ilerleyen olasılıklarla dolu çok değişkenli ortama, ya da *tasarım uzayına* değinilmektedir. Çözümlerin çeşitlemelerle çoğaldığı doğru ve yanlış değil de uygun çözümün arandığı tasarım uğraşının olasılıklar uzayında bir seyrüsefer becerisi gerektirdiği, böyle bir ortamda önceden belirlenmiş algoritmalarla

hareket edildiğinde tasarım uzayının olasılıklara gebe yaratıcı ortamından tam olarak yararlanamayacağı tartışılmaktadır.

Sınırlar bölümünde konvansiyon ve yeni arasındaki sınırın genişlemesinde tasarım araçlarının rolü tartışılmaktadır. Tasarım araçları yeni durumlara uygun yeni tasarım araçları oluştururken bir başlangıç bir basamak oluştururlar ve önceden yazılmış programlarının dışına taşarak onlar için öngörülmemiş işler için modifiye edilip geliştirilerek ya da sadeleştirilerek konvansiyonun yani herkes tarafından kullanılabilecek yapma bilgisinin gelişmesine katkıda bulunurlar.

Öngörülemezlik bölümünde geçmişten gelen tecrübelere dayalı bir programla geleceğin sorunlarına çözüm üretilemeyeceği, kurumların içinde bulundukları duruma göre uyum sağlayabilecekleri dinamik bir organizasyonla şekillenmeleri gerektiği tartışılmaktadır.

Yaratıcılığın, hayatın ve düşüncenin farklı alanlarından derlenmiş bilgi, veri ve deneyimleri uyarlayıp alışıldık yapıları aşmak ve onları farklı bir biçimde yorumlamak şeklindeki tarifi yaklaşımın çerçevesini oluşturur. Kurumların geçmiş tecrübelere dayalı dolayısıyla geçmişi yeniden üreten çok önceden belirlenmiş prosedürlerle değil, güncelle birlikte dönüşebilen, kolay değişen program ve içerik zenginliği ile yaratıcı olabilecekleri önerilmektedir.

Sonuç bölümünde kurumsal yaratıcılık için bireylerin kurumlar önünde mutlak önceliği, en yaratıcı kurumun en az kurumsal olan olduğu tartışılmakta, kurumsal yapılanmanın önceki tecrübelere göre şekillenmiş ön tanımlı algoritmalara göre değil, güncel koşullara göre dönüşebilen esnek ve yaratıcı bireylere alan yaratan bir karakteri olması gerektiği önerilmektedir. Öğrenen bireyin kendi alanın yaratabilmesi için de *açık uçlu tasarım araçları ağı modeli* önerilmektedir.