Al-Azhar 7th Engineering International Conference
AEIC 2003

Culturation of Future Architects: A knowledge-Base for Future Practice

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The permanent challenge of *cultruation* of the architect is regarded as a postulated effort for continuous investigation of analogies between the profession (practice) and established areas of learning (architectural education), with continuous penetration and conceptualization of the nature of architectural products and of the production activities and processes of those products. Based on this retrospection, architecture is, and continues to be, a result of dialogical, comparative, multidisciplinary activities. Its task is to create meaningful environments supportive of their inhabitants by organizing spaces and places accommodating human purposes. Therefore, its knowledge base must span to touch everything of human value.

In undergraduate architectural education leading to professional practice, a collection of courses is assumed to formulate this knowledge base. This collection encompasses a set of History/Theory courses spanned throughout the total period required to implement the academic program. Recent literature, however, reveals that there is a growing dissatisfaction within the university (or academic) community regarding the academic content, structure, and teaching methodology of these courses. Arguably, the case does not differ much in Egypt. Many academics voice the opinion that these courses are taught as "ready-made interpretations" and in "as-is" formats, rather than in a "method-oriented", "experiential" manner. This dilemma results in a failure of such courses to formulate the students' knowledge-base and there by the mal-culturation of future architects.

This paper aims at introducing new conceptions and modes of teaching that help transform the knowledge content of History/Theory courses from abstract to concrete. To achieve this aim, the paper proposes the term "culturation" as the "comprehensiveness of knowledge content" required for the theorization of future architects. The paper then highlights the role of History/Theory courses in the cognitive development of students that is anticipated to "put integration into practice" upon their graduation. Then, it moves to analyzing the instructional and learning objectives of History/Theory courses, basing its argument on a case-study of teaching methodologies of two particular courses taught in two different architectural schools in Egypt. Through the case-study, a preliminary assessment of the two courses takes place, in which their objectives, content, resources, procedures and evaluation are focused on.

Finally, an applicable model for teaching H/T courses is then proposed, by introducing a set of recommendations that are anticipated to help students discover and develop their inherent skills required for future architects to take responsibilities of serving their society in the coming future.

Keywords:

Culturation of the architects – knowledge-base formation – concept formulation – cognitive development - instructional objectives – teaching practices – method-oriented teaching

Culturation Of Future Architects: A Knowledge Base For Future Practice

"Him I call an architect who by sure and wonderful art and method is able both with thought and invention to devise, and with execution to complete, all those works… which can with the greatest beauty, be adapted to the uses of mankind".

Alberti, Italy, 15th Century

Introduction:

Architects are the professional keepers of the knowledge and skills that render the built environment. Theirs is the historic charge to conceive and re-conceive design. Presumably, they learn somewhere how people do or want to live (Russel Ellis and Dana Cuff, 1989).

Before 1 BC, Vitruvius proposed that an architect ought to be an "educated" man, so as to leave a more lasting remembrance in his treatises. In this respect, architecture is the one discipline that deals with social and behavioral as well as aesthetic and pragmatic issues (Vitruvius, 1 B.C. in Russel Ellis and Dana Cuff, 1989).

According to Nasser Rabbat, architecture is a semi-independent cognitive field, as it has its own theoretical and methodological domains that is linked somehow with the methodological domains of its parallel cultural activities of literature, art, engineering, poetry, music, but it does not counterpart with any of them completely with respect to analysis, studies, etc (Rabbat, 2002).

Rabbat further stresses that architecture also has its own culture that is part of the general culture and that is a corner stone of its foundation, as it is the case with other varied cultural elements. Culture as referred to here, in its anthropological and historical meaning of the world, is the set of intellect and emotional concepts, traditions, customs, situations, cognitive structures and expressions, social composition, history, collective memory that architects and students of architecture unite with the historians determining architecture and defining it within the cultural frame to where it belongs. As well as determining it within its cognitive and professional frame

that crosses the limits and boundaries of culture, to include all architectural human traditions in a continuous historic system (Rabbat, 2002).

Since the early shelters till the most recent constructions, architecture also had its own history, independent of the other cultural and artistic areas. In the same time, architecture overlaps and intersects with them in the same time, as a result of architecture's fundamental belonging to the culture that produced it from one side, and to the World history of architecture that is –multi-cultured- from the other side. This dual belonging, in which architecture is linked with all other creative human activities, is the main problematic in the curricula of studying architecture as history and theory.

Culturation:

How history and theory can be properly, correctly analyzed and understood between their own cultural belonging that is determined spatially and timely and between their global professional and intellectual belonging with their varied dimensions and attitudes but contextually determined? Each of the two belongings of architecture is workable and effective in imagination, creation, and design of architecture before being built, during its implementation, seeing, using, interacting and judging it after its usage. How can the understanding of architecture, its symbolization and loading with meaning, remembrance and comparison with other architecture as part of the culture that produced it, or part of the global/world architectural heritage be addressed throughout education?

This is what is meant by *culturation* in this paper, or should it be referred to as the "***comprehensiveness of knowledge content***". Here, I would like to revert to Michael Astroh's claiming that; like philosophy, architecture is what might be called a comprehensive discipline, where architects' task is to organize whole sets of appearances and activities and so its Knowledge-base must touch on nearly everything of human importance (Micheal Astroh, 1977 in David Vanderburgh, 1998).

Knowledge Base Formation:

The knowledge base of the architect, therefore, must be justified by arguments, reasons that show why a certain statement is true or a certain action is sensible and in which context it is valid. Reasons give the bases for knowing and acting, as well as putting action in a context, to understand why the person who acts behaves in a particular way (Lundequist, 1998).

Prior to the formation of the so-proposed "knowledge base", it is necessary to revert to the "acquisition of knowledge", a process that *Piaget* considers as developmental. He asserts that while acquiring knowledge, the mind works from an already existing repertoire of mental schemata, and programs of conception and/or action. In this respect, *Piaget* asserts that knowledge should be provided while the student is applying his/her own in a particular situation, where he/she starts learning with an extensive repertoire of mental concepts that are already established and which act as an essential starting point for knowledge development in new areas (Salama, 1995).

Reading through *Piaget*'s **Interactional Model of Knowledge Transfer**, it can be concluded that knowledge should be matched with the ability to assimilate it as may be explained in the following diagram:

According to this model, the process of knowledge acquisition involves a sequence of testing, adjusting and retesting until the student is able to develop a "problem solution", which will be automatically accommodated within the acquisition of new knowledge. The repetition of such process is thus the means of a related-coherent knowledge-base.

History And Theory (H/T) Courses And Architectural Practice:

History and theory are two domains drawn into architecture's claim of comprehensiveness. Spanned throughout the total period required for accomplishment of architectural education, they are expected to formulate a bulk of the so proposed knowledge base. The content of such courses is regarded as the most likely body of knowledge that would have the potential to inform and organize whole of the "culturation" of the students. Since those courses have mainly to do with the "concept formulation" that puts "integration into practice", they can be referred to – according to Dicartes and Marx – as "images of architecture as thought made matters" or the "impossible realization of the ideal" (Lacour, 1996).

Despite the fact that the shelves are buckling under the weight of books on history and theory, and that every school of teaches some form of history and theory, yet, there is still little evidence to suggest that these books or courses are significantly and creatively informing either the design teaching or the overall education of the students (Teymur, 1992). The issue of the need to change teaching H/T courses from a subject oriented teaching to method oriented has ultimately become a debateful issue in most architectural education literature and symposia, to the extent that it is approached in on-line discussion forums. All frustrations reveal that most schools of architecture still adhere to the descriptive and non-interpretive approaches in teaching theoretical courses, and that it is left to individual attempts of instructors to stray out of that way. Debates also reflect that most instructors are still heavily relying on emphasizing formal aspects with little attention paid to exploring new avenues of interpretation. This aspect totally isolates the courses, and accordingly the students from the larger context in which architectural artecrafts have been developed.

Reading through the results of students' evaluation of courses with respect to objectives, teaching methodologies and learning outcomes, students agreed that H/T courses are considered as basic part of their architectural education and that such courses are the base on which their architectural consciousness is built. "*Knowledge introduced in such courses enables us design, theorize, criticize and conduct research, thus, setting us on the right track to design*" (Sherif Fadl, junior student, Misr International University, Fall 02). Negative comments and depreciated scores were maximized in courses that were packed with information and very little to relate to. Instructors commenting on slides and focusing on details with very little or no attention paid to embedded theories. As for maximum scores, they were given to the courses that were more interactive, with little in-class "information" delivery and greater amount of "knowledge" obtained through field trips and assigned research papers. "*Research papers were beneficial because we had to do an effort in acquiring knowledge, rather than the spoon-fed information*" (Amr El-Bahrawy, junior student, Misr International University, Fall 02)[v].

As for teaching methodologies of history courses on the one side, students stressed that the most beneficiary and interesting courses were those taught with emphasis on the theories behind architecture, which made them better understand all related building types, construction methods, building materials, etc. Further comments affirmed that field trips offered physical contact, true settings, getting to know different variables helped better understanding of historical issues and impacts, gave the material credibility and thus it was easier for them understand and comprehend.

On the other side, and as for teaching methodologies of theory courses, students asserted that all those courses -even the early ones, provided a better understanding of several design related issues, such as the effect of culture, creative thinking, design approaches, procedures and principles, systematic design, design tools, critical skills of judgment and objective criticism, etc. All topics were directly influential on the enhancement of their design capabilities and

accordingly the quality of their design product that is; possessing a theory and knowing the causes.

H/T Courses And The Concept Formulation:

According to Rosing, *concepts* are tools of thinking (Rosing, 84 in Jerker Lundequist's, 1998). Words and terms –and concomitantly drawings- are expressions of the concepts and can be combined to express thought. The architect thinks when he works, and thus uses concepts. Therefore the main object for the theorization of the architect ought to be the clarification and development of the conceptual tools that are being used by practitioners. The architect then clarifies the situation both for himself and for others. He draws his knowledge of a specific case by seeing it as one of the cases as he stored in his repertoire. To be able to view something as something else, which has certain similarities with and certain differences from the current state is presumably a central ingredient in an architect's competence (Lundequist, 1998).

Concept formulation, therefore, is an outcome of a set of mental activities whose validity is tested in a physical/doable activity. As for the mental process of concept formulation, it is regarded as paramount to review *David Kolb*'s model of the **Learning Cycle**, in which he proposes the concept formulation process as a rational model, and that can be explained in the following diagram:

H/T courses, therefore, should go beyond being seen merely as sophisticated statement of presumed truths, conditions of truths or as pragmatic tools. For students to understand and to act as the world of architecture, they must understand the *world*. Hence, we –instructors- must aim to expand the bodies of knowledge relevant to architecture beyond the range of objects and concerns defined by existing (Teymur, 1992). H/T courses, therefore, should be no longer reduced to statements by famous architects, celebrities or geographical innovations parading as experimental architecture, but testable, arguable, comparable, refutable, reproducible and analyzable tools. In more precise words; a mode of thinking for both reasoning and designing (Teymur, 1992).

Accordingly, objectives of such courses should not be simply to transmit information but to promote the ability to conceptualize and thus theorize. They should not aim to simplify, but to complexify information and to elucidate its inherent complexity and interconnections. The objectives of those courses as such are to make the non-discursive discursive, capturing the rational nature of space or form in buildings in some consistent systems of concepts and terms, linked by some kind of logic. To transcribe into verbal, from the sense of conceptual organization that seems to inhere in built forms and to express the "inexpressible" as concepts about those forms and their effects (Hillier, 1998).

In light of the above, it is imperative that we –instructors- are entitled to convey knowledge and not merely information, to tell enlightening and edifying stories that help the future architects to develop a critical and ethical stance, and to shift our relevant memories from irrelevant "data" (Alberto Perez-Gomez, 1998).

We can then reformulate the objectives of H/T courses consequently as follows*:*

History: Technical construction and productive organization – History of the typology of the built amplitude that should be understood as an empirical base of scientific foundations in order to enfold ritualized activities - Consideration of the social organization (its origins and justifications).

Theory: Encountering various and descriptive impediments - Describing and conceptualizing architecture - Enclosing theories of action, arranging and categorizing the causes, layouts of investigation, images, schemes of actions operations of tentative configurations, forming of criteria of attention.

H/T Courses And The Students' Cognitive Development:

History, or the capacity of the architect to understand the work at hand in relation to the precedents articulated through story-telling, in pre-modern times also identified with mythical precedents. And even when it came to the crucial aspect of proportion, the epitome of regularity that served as an ontological bridge between the works of man and observable cosmos, the practicing architect always had to "adjust" the dimensions of the work to the site and purpose of specific task in the "thick present" of execution, rather than subject his practice to the dictates of historical theories (Alberto Perez-Gomez, 1998).

As for Theory, or the unavoidable capacity concerning the relationship between non-instrumental language and making, the process and products that issue from human action, the story of a thinking self and the architect's acts and deeds. And despite the uncertainties that accompany the work of architecture as it is cast into the world and becomes to occupy a place in the public realm and despite the fact that we can never truly and accurately predict a building's social meaning and perceived value, yet the word "discourse" must serve to articulate our intention of meaning. To act properly means to think properly - an obvious requirement to teach and practice architecture. The fragmentation and instrumentality that is simply taken for granted in the discipline must be subjected to critical scrutiny (Alberto Perez-Gomez, 1998).

Based on the above, we can thus capsulate the definition of History and Theory into "Ideas we link with" and "Ideas we think with"(Hillier, 1998).

History and theory, as regarded in this paper, are involved with the recall of both specifics as well as universals, the recall of a pattern, structure or setting. For measurement purposes, the recall situation involves little more than bringing to mind the appropriate material. A process of relating is also involved in that a knowledge-test-situation requires the organization and reorganization of a problem such that it will furnish the appropriate signals and cues for the knowledge the individual possesses, that is – to use an analogy (Teymur, 1992).

The first step is to propose some definition of the concept. *The second step* is to comprehend how it was developed through history. *The third step* is to do the case studies that are needed to show how the concept can be used in a meaningful way in different situations, and to describe the rules which govern the way people act in these situations. *The fourth step* is to compare the case studies, looking for the family resemblance at hand (Lundequist, 1998).

This brings us to the question of what it means to understand and to explain something. Understanding, seen as primary, is a pre-requisite for explanation. An explanation not only shows the nature of something, but also why it is as it is. Interpretation and understanding of what is investigated is a precondition for every explanation. According to Nordenstam, what is important, is the meaning that the phenomenon had at the time and in the context in which it arose and, the meaning that the phenomenon has at the time and in the context in which the interpretation is being done (Nordenstram, 1980).

Instructional Objectives And Their Corresponding Learning Outcomes:

Before moving on to the review of instructional objectives and their learning outcomes of H/T courses, we are obliged to describe the major categories in the cognitive domain that help develop those objectives for speculated/anticipated learning outcomes. According to Bloom, those

categories are: Knowledge, Comprehension, Application, Analysis, Synthesis and Evaluation (Bloom, 1956)[f].

Based on the preceding categorization, instructional objectives and their corresponding learning outcomes can be prescribed in the following table:

Instructional Objectives	**Particular Learning Outcomes**
With respect to Knowledge: Instruction should target the memorization of common terms, specific facts, methods and procedures, basic concepts, principles.	The outcome of such objectives, is such that students can define, describe, identify, match, outline, state, …
With respect to Comprehension: Instruction should target the understanding of facts and principles, the interpretation and/or translation of verbal and visual material, the estimation of consequences implied in data, the justification of methods and procedures.	The outcome of such objectives, is such that students can convert, defend, distinguish, estimate, explain, generalize, give example(s), predict, summarize, …
With respect to Application: Instruction should target the employment of principles to new situations, the usage of theories to practical situations, the solving of problems, the construction and demonstration of correct usage of material.	The outcome of such objectives, is such that students can demonstrate, modify, relate, solve, discover, produce, use, change, …, etc.
With respect to Analysis: Instruction should target the recognition of unstated assumptions, the recognition of logical fallacies in reasoning, between facts and inferences, the evaluation of the relevancy of data, the investigation/examination of the organizational structure of a work.	The outcome of such objectives, is such that students can breakdown, diagram, differentiate, discriminate, distinguish, identify, illustrate, infer, outline, point out, relate, select, separate,
With respect to Synthesis: Instruction should target the production/combination/making/creation of a well organized theme, to propose a plan for an experiment, to integrate from different areas into a plan for solving a problem, to formulate a new scheme for classification.	The outcome of such objectives, is such that students can categorize, combine, compile, compose, create, devise, design, explain, generate, organize, reconstruct, rearrange, …
With respect to Evaluation: Instruction should target the judgment of the consistency/adequacy with which conclusions are supported by data, the judgment the value of a work by use of internal criteria, or by the use of external standards.	The outcome of such objectives, is such that students can appraise, compare, conclude, contrast, criticize, describe, discriminate, justify, interpret, support, …

Instructional Theories:

For an integration of the previous objectives in an applicable teaching model, it is imperative to review two of the instructional theories that are believed to best relate the cognitive side of the knowledge base with the teaching practices together with their learning objectives. These theories are Bruner's and Gagne′'s.

> ***Bruner*'s theory: Cognitive theory adopted under four categories, these are;** predispositions, structure and form of knowledge-base, sequence, and finally, the form and pacing of reinforcement.

Firstly, ***predispositions***; or determining and conditions necessary for learning, depends on the cultural, motivational and personal conditions. It is important to benefit from the curiosity through activation and stimulation, preservation and directing. Putting into consideration that learning to solve problems depends on exploring alternatives. Secondly, ***structure and form of knowledge***; meaning that knowledge should be put into the forms that may be learned easily considering the learner's age, ability and experience. This involves *Bruner*'s view that any idea or problem or structure of knowledge might be displayed in a simple form to the extent/degree that any learner can understand clearly [1]. Thirdly, ***sequence***; or the relation with the stages of the cognitive growth. It is worth mentioning that the nature of the cognitive sequence varies between the different cognitive domains. And finally ***form and pace of reinforcement***, as *Bruner* stresses on the importance of self-support so that the success of achieving a certain goal (solving a problem for example) and the importance of offering/introducing the appropriate corrections at the right time and the right way.

> ***Gagne′*'s theory: learning processes and the external events that influence on the different facets of learning phases:**

With the conditions necessary to achieve certain types of learning objectives (include the verbal data, mental skills, cognitive strategies and trends and the mobility skills), *Gagne'* includes the learning facets clarifying how and where can the instructor affect the learning process; motivation, perception, gaining, memorizing, recall, generalization, performance, feedback. This involves certain learning processes that consequently are; anticipation, alerting, selective perception, symbolization (storage approach) storage/recall, converting, response and reinforcement. *Gagne'* also explains his view about the instructor's performance regarding the instructional events when following certain methods in learning, group learning, tutorial learning, and individual learning.

From the preceding, it can be concluded that while *Bruner*'s basic concern is the curriculum structure,

*Gagne''*s is the outcomes of teaching of particular curriculum and the ways for achieving them. As for learning outcome, both *Bruner* and *Gagne'* agree with *Piaget*'s previously discussed model of the Knowledge transfer, as well as *Kolb*'s model of the learning cycle. Learning outcome, therefore it is achieved when there is a relation between the previous learning and the new situations that are faced. This relation is based on the existence of elements or factors or stimulators or resemblances as the new situations require skills, or trends/attitudes or knowledge or conception of what is learned from previous situations.

Both theories also agree that learning outcome is affected by several denominators, which can be simplified and summarized in the following points:

The trial of directing teaching such that it leads to the achievement of the desired learning outcomes. It needs processes of analysis and comparison so that the learner perceives the relationships between different situations. For that, the instructor should try to clarify the generalities and the concepts and the regulations/laws so that the learner is able to completely perceive it and use it in new situations.

Actual resemblance between previous and new situation; for as much as there is resemblance, the possibility of achieving the transfer of the learning outcome is higher. This means that learning a situation helps in the quick learning of a coming situation.

The ability of the learner, as the transfer of the learning outcome depends on the ability of the learner to perceive between the contrasting or at least varied relationships between different situations.

Individual Attempts: A Method-Oriented Teaching Practices;

According to Michael Malecha, teaching is a combination of the conveyance of knowledge, caretaking legacy and traditions, skills preparation and individual guidance (Marvin Malecha, 1998). With respect of H/T courses, some serious attempts are observed aiming at the development of teaching practices from a subject-oriented tutoring to method-oriented guidance. Out of numerous attempts, two particular ones are chosen for reviewing; these are: ***History of Architecture*** and ***Design Methods and Theories***. Both courses are offered to junior students in two different schools of architecture in two different Egyptian universities as a-one semester course[1]. The methodology of the two courses is summarized in the following table, with respect to *objectives, content, resources, procedures* and finally *evaluation*:

	History of Architecture	**Design Methods and Theories**
Objectives	The objectives of the course are to enhance students' critical abilities with respect to identification of styles, comprehension of factors dictating/influencing architectural typologies and styles features. The course also aims at developing students' evaluation and assessment skills of architectural qualities with respect to spatial principles and formal relationships that are of benefit to their design education.	This course aims at making the design process more understandable and transparent to students of architecture, and thus more responsive to design uses. Upon the successful completion of the course, students should be able to infer the nature of design as a mental activity, conclude and interpret beyond the information given for designing, have control over their own creative behavior and manipulate the mental process involved, explain, justify and criticize their own design ideas and alternative solutions, in a cultural-sensitive manner.
Content	This course summarizes the cultural context that influenced architecture from the Early Christian to the Renaissance Eras with impacts expressed in terms of building types and in terms of specific architectural concepts, features and elements, and with repercussions on the contemporaneous.	The course reviews and clarifies essential methods and styles of inquiry encompassed by design thinking, evoking and projecting on what is design, design process, methods and models of design decision making, programming and post occupancy evaluation tools.
Resources	Variety of Sources in different domains, with emphasis on history literature; books, maps, research, articles. And images. In-class resources slides and overhead-projectors for presentations, geographical maps, images and images.	Variety of sources in different domains with emphasis on architectural literature; books, research, magazines, articles and images. In-class resources are the data show for presentation, board and markers for explanation and interpretation and pre- formatted sheets for conducting the in-class exercise.
Procedures	The course starts with a tutoring introductory lecture about the historical background of all the circumstances of the time-to study. A geo-political, cultural, socio-economic contextual review is considered as a brain storming and a warming-up session that prepares the students to what they are to study throughout the semester. The coming lectures are delivered as group discussions, where a map of each to-be-studied country is hang up. Reading through the map, expectation and speculation about	The course starts with a brain storming session that explains the difference between the main topics to be studied along the semester; design thinking styles, the design process and design methods and tools, which are the three main divisions of the course. A warming-up assignment is given, in which students individually or in groups of twos are asked to select one topic of the syllabus, and write an academic paper about. The results of the search of books, reports, articles, and websites are gathered, organized

	origin and historic development, geographical influences; climatic conditions, topography, natural resources, available building materials and thus, building techniques. Neighboring influences, imports and exports, political/social/economic/religious and overall cultural determinants are made clear. Afterwards, building types that might exist to serve such circumstances are being predicted and listed, architectural drawings and images are then reviewed. An exploration takes place with emphasis on functional concepts and formal composition. Visual aesthetics are also investigated, as well as all architectural features that would in the end constitute a definite style – derived as an end-product of certain ideological apparatus. Parallel assignments are devised such that students in groups are trained to predict and analyze functional programs of activities, spaces adjacency, zoning, massing, solid to void relationships …etc. Then, when the course reaches Coptic architecture in Egypt, students are obliged to go in field-trips where they can apply on real examples. Assignments are pinned-up, discussed and assessed in class, allowing all students to share thoughts and develop conceptual consensus.	and offered as a collective handout. Throughout the lectures, students are asked to present their findings which are –moderated by the instructor- discussed in class in a previously prepared scenario that is disguised to be delivered in an extemporization manner. Examples and projections are from real life, parallel design studios, name architects' works and theorists' writings. The longer and denser classes are those of the design process, programming and post occupancy evaluation. Parallel assignments are designed such that students –in groups- are asked to either reflect on their own design studio(s), or predict and analyze the design process and the functional programs of famous buildings or projects for name architects. As for post occupancy evaluation, the fundamental assignment is proposing independent evaluation criteria to be applied on already existing buildings in Egypt (the choice of buildings always tends to be selective for debateful buildings). Information is gathered pertaining to objectives, location, client's program, building materials, targeted users, designer's view point ...etc. Followed the set-up/design of the evaluation tool(s), preparing the students to go on structured field trips to their buildings, conduct the evaluation and write a comprehensive report on each building. Other frequent in-class assignments are conducted as group games, touching topics such as; devising a program for a building, design decision choice for a project, evaluation, participatory design, … etc, with emphasis on the individual role playing from one side and the participatory consensus from the other, a prologue for the end topic of the course that is; participatory

		design objectives, benefits and techniques.
Evaluation	As for exams, they are delivered as open-book ones. Concept formulation is tested in questions in which the concept is already given and students are asked to reflect on architectural expression or presentation of a building type or a building style. Other questions are designed such that students are to follow the articulation or the evolution of a concept or an architectural element throughout history, to give examples on implications of adaptive reuses/alterations of a particular building type into another …etc. More questions touching contemporaneous viewpoints such as globalization, or cross cultural issues and their reflections on architecture, through historical examples are also assigned. Questions in which students are asked to follow the evolution of the role of the architect throughout history giving reasons and analyzing examples are also introduced.	The exams are delivered –like the History of Architecture- in an open book manner. Questions that test memorization ask about something mentioned or commented on in class. The rest of the questions are to elaborate, discuss, analyze, devise, and criticize a related issue/situation or an architectural product. Having their collective handout with them, students fell confident in working their minds and test their learned concepts.

Those two courses –***History of Architecture*** and ***Design Methods and Theories***- and despite the differences between the two universities, students numbers and available facilities, yet, the feedbacks are clearly witnessed in the students' reflections in the design studios. Further positive feedbacks are documented in the students' evaluation of courses and of instructors. Here, I'd like to suggest a deeper evaluation of such courses to be conducted by educational professionals to validate the learning outcomes and verify the students' evaluation.

Assessment Of The Preceding Applied Teaching Practices From The Instructors' Points Of Views:

The benefits as expressed by instructors have mainly to do with the overall cognitive development that encompasses all categories of knowledge, comprehension, application, analysis, synthesis, and evaluation on the one hand, and that are related to their overall "*culturation"*. On the other hand, benefits have also to do with some particular gained skills (graphic, intellectual

and self-criticism), whose results can be easily and directly witnessed and measured in the design studio.

First, with respect to the overall cognitive development of students:

Information delivered in class are assimilated –according to *Piaget*- by students' cognitive schemata, and are later accommodated as basic experiences, through the process of testing, adjusting and retesting through the parallel in-class quizzes and take-home assignments which are similar –or at least relevant- situations. Then, these basic experiences are – according to *Kolb*- demonstrated by observation of pertinent cases, forming assimilated concepts that are tested in new situations – field exercises and applications, thus, closing the cycle by the formulation of well established concepts. Concepts formulated are then regarded as a natural outcome of personal powers of perception of the why, what and how of architectural thinking (*process*) and its resultant buildings (*product*), not as stressed upon through the explanations offered by instructors or books.

Second, with respect to other particular gained graphic, intellectual, and self-criticism skills:

As for other skills gained by this teaching methodology and that may be expressed as psycho-mobility skills, which are directly witnessed in the design studio. As a result of the students' exposure to involuntary visual abstraction, proportioning and measurement, their pen-manipulation skills as well their graphic skills are automatically enhanced. These skills also include line diagramming and sketching capabilities as well as photography and in some cases, model making (Salama, 1998). And because they are intrigued to better identify and co-relate the physical elements constituting buildings, they are able to better develop their own creative thinking away from the dogmatic line, tolerate eccentric designs and accept the culture of the other as expressed in design products, without falling in the pit of fashion or obsession. This is defined as the ability to think clearly about problems and methods for solving those problems, and which is achieved through determining/defining situation, collecting facts and analyzing the information and thus understanding the causes behind the existing solution. Students can then organize their cognitive findings and expressing skills in a logical co-relation, an order that does

not differ much from the design process. This self experience also enhances the students' essence of objective criticism, or the ability to pass a critical judgment, description of ideas in several ways, to continue ask questions at various stages of the design, which leads to a conscious improvement and manipulation of their own design thinking.

Putting It All Together: Towards A Conceptual Model For Teaching H/T Courses:

At this point, we can comfortably move on to conceptualizing a model for the so-proposed "culturation" of future architects, a conceptual model that is anticipated to formulate the knowledge base for future architectural practice. The methodology of the model is based on reviewing literature on curriculum development, teaching skills, multiple intelligences learning theory, the problem solving activities theories, classroom management theories, and testing and evaluation models. The conceptualization of such model aims at transforming theoretical knowledge from abstract to concrete. Introducing knowledge through this model should not only address the different ways of learning of students, but also should depend on individual triggering, followed by observation, then assimilation, then concept formation, which is finally tested in similar or relevant situations. The model is structured with respect to; ***objectives, content, resources, procedures*** and finally ***evaluation***.

The ***objectives*** should be made clear to students, and to explicitly target to direct their awareness of their learning behavior means (inference and theory making), and to get to change their array of expectations and skills they are brought to by experience (modify their theory in use). Objectives, therefore, should be described as the learning outcomes anticipated for parallel planned instructional objectives that start by knowledge, and proceed with comprehension, application, analysis, synthesis and end by evaluation.

Content of such courses is to include integrated bodies of knowledge that convey all aspects pertaining to the built environment. The topics introduced should be selected as means of developing the students' abilities of exploration and understanding the interrelationships between

the different variables and their implications. Introduction of quantitative and qualitative standards of the built environment as well as aesthetic considerations, with emphasis on the human factors, involved as consequences of political, socio-economic and overall cultural attributes. This serves as reference for comparative analysis of how a particular cultural setting affects design thinking of a particular building type, with respect to function, form and inclusive architectural articulations. Such content should also focus on the introduction of case studies that simulates and demonstrates political, socio-economic, behavioral and cultural dimensions, with a close examination of real contextual problems and solutions that are manifested through numerous site visits and walk-through exercises.

The ***resources*** of the taught material should encompass all means and tools that address the development of the undergraduates' thinking modes. The class as an apparatus for such resources should be a happy and purposeful atmosphere where a humanized, democratic climate should be felt. The arrangement of its layout might also be modified to encourage communication, challenge students' anxiety and enthusiasm, and change their attitudes from merely receivers to actual encounters, thus flourishing their sense of responsibility as well as their creative thinking abilities (Inas Kotby, 2001). Lectures might also include group discussions with different educators as well as real key-role players of designers, and public representatives.

According to David Lazear, there are 8 ways of knowing, these are: Logical-Mathematical, Verbal-Linguistic, Visual-Spatial, Musical-Rhythmic, Intrapersonal, Interpersonal, Bodily-Kinesthetic and Naturalist)Lazear, 1991). Teaching ***procedures***, therefore should be varied to employ most intelligences, making sure to address all ways of knowing for all students and also to breaks the monotony of the long class durations and to prevents the students from being bored. Effectiveness of individual lectures is to be instantly examined such that students are assigned similar, alike take-home assignments in which they apply what was taught in-class in an actual built environment. This process makes the taught material more relevant to real life situations and encourages students' reflection of opinions.

Teaching procedures – also - should successively address *attention, interest, understanding, guided practices,* and *independent practices.* A regular class, therefore, should always start by a ***warming up***, which is a quick revision for the last lesson, checking the consistency of the course, and getting the students in the mood. Then a ***brain storming***, or refreshing students' knowledge about the terminology and topics of the lesson to be taught, and involving them in the learning procedure. Then, moving to ***presenting the material***, reflecting on the surrounding built environment, involving students in questions and answers, moderated in a process-oriented manner, rather than in a subject-oriented one. Ending the class is a ***summing-up***, deducing students' conclusions, by asking opinion questions (Laila Galal, 2001).

Field-trips should occupy a longer span, as they introduce a true application of the remote theories and concepts taught in class. By then, students will learn and understand theories and concepts by experiencing them in their true settings with emphasis on the regular assignment of the comprehension, analysis and evaluation field-research.

As for ***evaluation***; students should always know in advance the objective of each exercise, so that they -with real desire and motivation seek means and ways by which they train themselves, out of class times/schedules. Testing and evaluation literature stresses that the easier way to achieve is through practicality and application, in which a distributed exercise is more beneficial than the continued exercise. It is obvious that there can not be a rule for this distribution because of several other factors, as the age of the learner, the strength of the motivation, nature, etc. Moreover, connecting of the parts to the whole to which they belong, as a student is completely trained on the whole before he is trained on the parts, and in live situations, instead of being based on memorizing the terms and the compositions. Finally, the nature of the student, his cognitive growth and learning, live context, the curriculum should be appropriate with his real needs, motivations and aspirations and his cognitive growth. As for exams; the hierarchy of the questions should be clear starting by knowledge and ending by evaluation, in which the type of

items are to be varied between True/False, Multiple Choice, short answers, matching, Restricted essay, and extended essay questions. The design of exam should encompass covering the majority of the course, delivered in a direct, straight forward manner, leaving no chance for guessing the meaning embedded behind the questions, or memorizing or copying as is.

Basic considerations of the proposed model may be summarized in the following table:

Objectives	*Content*	*Resources*	*Procedures*	*Evaluation*
- Objectives of the course should be made clear to students, direct their awareness to their learning behavior means. - Instructional objectives should promote the ability to conceptualize and thus, theorize. - Learning outcome should be prescribed as: 1. Identification of terms and concepts pertaining to the - - 2. Deduction of the nature of design as a mental activity resultant of interdisciplinary variable and influences. 3. Conclusion and interpretation of the "beyond the information" taught. 4. Manipulation and controlling over one's own cognitive development and associated graphic, intellectual and self-criticism skills. 5. Explanation, justification and evaluation of architectural endeavors.	- An integration of knowledge should relate between process and product. - Content should highlight the difference between learning from and learning about, ideas we think with and ideas we link with. - Content should emphasize human factors involved in architectural products studied as consequences of political, socio-economic and overall cultural attributes. - Practical interpretation and comparative analysis should be addressed through analysis and evaluation of live case-studies. - Close examination of contextual variables and dimensions should be demonstrated through guided site visits and walk-through exercises.	- All means and tools that match the eight ways of knowing. More simulation tools like media, video, computer modeling, and other visual simulation techniques that address all receiving and thinking modes.	- The overall course procedures should start by proposing definitions of studies issues , moving to comprehension how those issues were developed as a result of accumulation of human thought. Then, conduction of case-studies show how can concepts be applied meaningfully in different situations, where an exploration of the challenges that govern their manifestation takes place. And finally, comparing the case studies, deducing opinions, reflections and interpretations. - Throughout such procedures, attention, interest, understanding, guided practice and finally independent practice are carefully addressed. - Throughout the course, group discussions, debates, group-learning, learning by doing, and self and peer evaluation should take place, in a humanized, democratic	- Evaluation should challenge students' motivation through the declaration of the objectives of the exercises. - Exercises should be distributed and their scope should be widened, covering wider range of topics in the single-elongated exercise. - Testing should be delivered in a direct, straight-forward manner, structured in a hierarchy that starts by testing knowledge, comprehension, application, analysis, synthesis and evaluation.

			atmosphere. Moreover, field-trips should be emphasized on, so that the concepts are demonstrated tested in their true settings.	

Discussion:

This proposed model highlights the importance of drawing the instructional objectives in light of their expected learning outcomes, stresses on the comprehensiveness and contextualization of the knowledge content and resources for teaching theoretical courses either in-class or off-campus, places emphasis on the urge to develop the teaching practices, and draws attention to testing dynamics.

The employment of this model is expected to address the integration between the two modes of thinking of the students; the analytical, linear, sequential skills from one side and the synthetic, patternisitic, relationship-cognitive, intuitive and imaginative skills from the other side. This may be achieved through implementing more interactive models of teaching in which instructors act as facilitators, guide students on how to understand architecture with architecture, differentiate from learning about and learning from architectural exemplars. Instructors should always shed lights on the diverse cultural considerations that constitute the impacts on architectural products, help the students conceptualize needs and trends within an overall cultural context, train them enhance their own critical thinking, creative and judging abilities. In concluding words, help them discover and develop their own essential skills required for future architects that will take the responsibility of serving their society in the coming future.

Even though this model does not guarantee good design, but the appropriate knowledge base formulation -or what can be described as "theoretically informed design education"- makes students –future architects- more conscious of the impediments to it. Theorizing as a designerly

habit would generate as awareness of the role of concepts, thinking patterns, media and ideological fixes, and would enable us to appreciate and understand the complexity of the built form.

A Final Word:

I confidently claim that good theoretical informed education – *culturation* as proposed in this paper- would at least create a discourse that would in turn enable future architects to make the most of a largely mediocre world.

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[f] Those quotations are selected from a preliminary evaluation of H/T courses, conducted by the author of the paper among junior students of architecture, faculty of Engineering Science, Misr International University (MIU).

According to Benjamin Bloom, 1956 in: Taxonomy of Educational Objectives: Book1#1: the Cognitive Domain, definitions of those categories can be pointed out as follows:

- *Knowledge;* defined as the remembering of previously learned material. It presents the lowest level of learning outcomes in the cognitive domain.
- *Comprehension;* defined as the ability to grasp the meaning of material. A learning outcome that goes one step beyond the simple remembering of material, and represent the lowest level of understanding.
- *Application;* or the ability to use learned material in new and concrete situations. Learning outcome in this area require a higher level of understanding than that under comprehension.
- *Analysis;* or the ability to break down material into its component parts so that its organizational structure may be understood. Learning outcomes here represent a higher intellectual level than comprehension and application because they require an understanding of both the content and the structural form of the material.
- *Synthesis;* or to the ability to put parts together to form a new whole. Learning outcomes in this area stress creative behaviors with major emphasis on the formulation of new patterns or structures.
- *Evaluation;* concerned with the ability to judge the value of material for a given purpose. Learning outcomes in this area are highest in the cognitive hierarchy because they contain elements of all of the other categories, plus value judgments based on clearly defined criteria.

[f] According to Bruner, the structure of any cognitive domain is characterized by three inter-related factors; the way it is introduced, briefing or summarizing, its strength or –inter-connection-.

- History of Architecture is taught by Dr. Iman El-Nachar, department of architecture, faculty of Fine Arts, Cairo. Number of students of the class is almost 200 students.
- Design Methods and Theories is taught by the author of the paper, department of architecture, faculty of Engineering Science, Misr International University (MIU). Number of students in class is less than 30 students.

[f] According to David Lazear in: Seven Ways of Knowing: Teaching for Multiple Intelligences, 1991, and Multiple Intelligence Approaches to Assessment, 99, "knowledge transfer and accommodation" related to each intelligence can be summarized in the following brief:

1. *Logical-Mathematical*: The process of seeking and discovering patterns and through problem solving. It uses such tools as calculation, thinking skills, numbers, scientific reasoning, logic, abstraction, and pattern recognition.
2. *Verbal-Linguistic*: The written, spoken, and read aspects of language as a formal system. It uses such tools as essays, debates, public speech, poetry, formal and informal conversation, creative writing and linguistic-based humor (riddles, puns, jokes, etc)

Visual-Spatial: Seeing both externally (with the physical eyes) and internally (with the mind's eye). It uses such tools as drawing, painting, sculpture, collage, montage, visualization, imagination, pretending and creating mental images.

Musical Rhythmic: Hearing, sound, vibrational patterns, rhythm, and tonal patterns, including the full range of potential sounds. It utilizes such tools as singing, musical instruments, environmental sounds, tonal associations, and the endless possibilities of life.

Intrapersonal Intelligence: Introspection, meta-cognition, (thinking about thinking), self reflection, and "cosmic questioning" (What is the meaning of life?). It uses such tools as affective processing, journals, thinking logs, teaching for transfer, higher order thinking, and self-esteem practices.

Intrapersonal Intelligence: Person-to-person relating, communication, teamwork, and collaboration. It employs such

tools as co-operative learning, empathy, social skills, team competitions, and group projects that foster positive interdependence.
Bodily-Kinesthetic: Physical movement and performance. It employs such tools as dance, drama, physical games, mime, role-play, body language, physical exercise and inventing.
Naturalist: Encountering with the natural world. It uses such tools as hands-on labs, field trips, sensory stimulation, and attempts to classify and comprehend natural patterns.

This model is a recurring cycle within which the learner tests new concepts and modifies them as a result of reflection and conceptualization.

from which implications for action are deduced

of Abstract Concepts and Generalizations

which are assimilated into

which lead to

Testing Implicatios of Concepts in New Situations

Observation and Reflection

is the basis for

are followed by

Concrete Experience

immediate

This model assures that knowledge should be provided while the student is applying his/her own in a particular situation. In other words, knowledge should be matched with the ability to assimilate it.

Accommodation of the Problem by Acquiring New Types of Knowledge

testing, adjusting and testing

Search for a Schemata Closest to the Action

Assimilation of the Problem by the Cognitive Schemata

not solved

solved

New Situation