History, Theory and Criticism in Technical Courses of Architectural Engineering Technology: A Necessary and Didactic Relationship

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Abstract

Traditionally technical courses in architecture focused on the then current methodologies, standards and procedures and did not consider the evolution of thought which brought us to a particular point in time. Theories considering the advancement of the science of architecture are more often introduced to students through lecture, lab work and site visits but the historical basis of these theories is lacking. The *context* of technical course material and labs is not set in time. It is too often static.

As an extension of history and theory, criticism provides a constructive role on two fronts: 1) as a means to constructively evaluate the past and present and 2) a dialectical method for student evaluation and assessment. Typically, criticism, in technical courses, has been limited to the professor's evaluation of the student's work. I seek to broaden the criticism to include peer review and outside professionals. With the inclusion of history and a spread of the theory base, criticism can become a tool to further enhance the educational experience of the student, peers and professors. The tripartite relationship of History, Theory and Criticism then becomes a didactic relationship bringing a clearer understanding of technical issues and problems.

The didactic role that history, theory and criticism can play in a symbiotic relationship with technical courses can lead to a more complete understanding of the total role of the architect – a professional who combines design skills with technical knowledge. This combination, largely in effect prior to the middle of this century, can lead to a better built environment.

What is History, Theory and Criticism?

Before considering this paradigm to include History, Theory and Criticism in technical courses we must first define what History, Theory and Criticism are in this relationship. In their simplest manifestations, the American Heritage Dictionary provides a reasonable starting point. It defines them as follows:

- History: "The branch of knowledge that *records* and *analyzes* past events";
- Theory: "A set of rules or *principles* designed for the *study or practice* of an art or discipline";
- Criticism: "The act of making judgements and *evaluations*"

The italics are mine and are used to emphasize the key attribute of each subject as related to the use of the word in this context.

The history of technical items must duly record the use of the item and must, to be effective as a learning tool, go beyond the mere recording to include the analysis of the record. Without analysis, there can be no learning, no understanding, no re-application of the historic precedence for contemporary use.

Although the dictionary definitions provide a base for the understanding of the relationship of history, theory and criticism, a broader and more inclusive collection of definitions and comments is necessary to fully engage the importance and meaning of this connection. Here I rely on the words of select individuals, come historic in their own right and others more modestly contemporary.

On History:

> Witold Rybczyski writes:
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> "A building succeeds – or fails – on many different levels: as a practical object as well as a beautiful one, as a work of art, but also as a setting for life. To complicate matters further, there are many vantage points from which to pass judgement on a building."
> "In the past, is was assumed that a new building would withstand the wear and tear of use and climate in a predictable way. All buildings aged, of course, but time only enhanced their original charms. However, as architects have set aside tried and true techniques of construction and have experimented with new materials and innovative forms, it can no longer be taken for granted that

> buildings will last. What appears to be an admirable and provocative architectural statement today may be shown with the passage of time to have been a misguided and flimsy attempt at novelty. Oddly, architecture criticism is unaffected by such considerations."
> "The importance of buildings, it seemed to me, was not what they said about the vision of individual architects, but how they reflected the values of the society of which they were a part."
> "But appearances (of recreation of Victorian and other historical styles), like fiberglass columns and polyurethane moldings, can be deceiving. When we look at these comfortable and handsome houses, we see the surface of history – the footprint, not the foot – and it is easy to forget how much separates us from the past."[9]

Understanding the social climate of the times puts the design, detailing and materials in proper perspective. The Victorian age had large homes with many rooms since the home was the source of family but, beyond this, it was the base for life. "This was a world without public entertainment, without professional sports and, of course, without movies."[9] This understanding of why architects designed homes with varied spaces, decorated walls and embellishment and why certain materials were chosen is critical in understanding the use of these materials and embellishments today. This understanding expands to the machines of the home as well. Plumbing fixtures were relatively new inventions and most still required the manual act of replenishing water in water closets and bathtubs.

Robert Venturi, Denise Scott Brown and Steven Izenour, in their seminal book *Learning From Las Vegas*, brought the profession to it's collective knees when they declared, in 1972, that the architectural symbolism, heretofore considered associated with the classical, grand or modern styles, was equally valid when coming from the strip. They stated that they saw the usefulness of "commercial vernacular architecture as a vivid source of symbols-in-space"[10] and that the "historical precedent for symbolism exists, and the complexities of iconography have continued to be a major part of the discipline of art history."[10] The importance of recognizing and understanding historic symbols is evident. Architects must know the cultural implications on symbols and, with this knowledge, be able to provide the technical resources to make the symbols manifest.

On Theory:

> "What is presented as the basis for architecture generally and designing in particular usually lacks the rigor, testability, reaction to failure (not fitting the facts) and accountability that hypothesis demands. This is the crux. Most of what

> is called theory in architecture is either hypothesis incapable of being tested, or is a model of such simplicity that it lacks explanatory power." [5]

Theory in architecture, as related to technical issues, must be testable. It must stand the rigors of the application and extended use. It must react to failure to improve itself.

> "…unless that tradition is tested, unless its vitality is affirmed again and again by the most dedicated scrutiny each generation can bring to bear, it will certainly atrophy." [5]

The relationship of history and theory brings an inspired connection between the idea and the time in which it was born, thus forming a greater understanding of the *why* something was done as well as *what* it was and *who* developed it. This is particularly true for technical issues such as materials, details and assemblies since the technology must be understood in its time and place.

> "Where history and theory begin to merge is at the level of interpretation; sources; intentions; meanings, and influences are teased out of what exists or out of newly discovered connections, and attempts are made to integrate the pragmatics into some thematic schema." [5]

The "interpretation", "intentions" and "meanings" can only be expunged from the knowledge base and reformulated "to integrate the pragmatics" by the use of *criticism*. Criticism provides the intellectual rigor to sift out that which can be reinterpreted for contemporary means. Criticism can be the mental crucible to first mix the ingredients of new ideas. Criticism mixed with design (for technical details and procedures must be designed at least as much as the building mass) results in new ideas. The process of questioning is inherent in design. For design is "full of 'what-ifs', open, exploratory, seeking what things might mean, could mean, may mean, to others – attempting to find structural relations to other places or things…"[6]

Context of Technical Courses

The technical course descriptions include Working Drawings I, Working Drawings II and, due to the primacy of electronic development and documentation, Introduction to Architectural CAD. The Working Drawings courses are first and second semester of sophomore year respectively while the CAD course is second semester of freshman year. The initial emphasis has been on the Working Drawing courses since they combine CAD, specifications and the multitude of contract documents used to communicate design intent for construction.

However, expansion of this course base is certainly possible, especially when considering the rapid growth of technology in technical courses. Peter McCleary, a professor at the University of Pennsylvania, has written that "(T)he significance of technology has returned to the discourse on the purpose and meaning of architecture."[7] Also,

> "…a new concept of technology has arisen, one that does not limit itself to building materials and processes, but defines technology more broadly as the understanding (skills and knowledge) of the didactical relationship between humans and their environments (natural and built) in the production of a new superimposed built environment.
> Neither the pre-modern architect as master-builder, nor the Modernist coordinator of production, nor the fragmented perception of the Post-Modernist, have yielded a concept of technology useful in both designing and building."[7]

The scope of technical courses and technical issues is sure to expand as technology encompasses more of the process of building documentation.

Student Exercises

Student assignment and lab exercises have been redesigned over the previous year to bring in more instances of historic precedence and design and material theory. Student evaluations of historic and current architecture as well as evaluations of peer work is expanding as this integration of history, theory and criticism expands.
The integration falls into three divisions of technical courses: Construction Materials, Construction Techniques/Methods and Document Production. Each division has its own lab work and outside assignments in three areas: Research, Analysis and Evaluation. The application matrix is as follows:

Construction Materials		
Division	**Aspect**	**Overview of exercise/lab work**
Research	"History"	Applications of materials through historic buildings.
Analysis	"Theory"	Document the reasons why the material was used as shown.
Evaluation	"Criticism"	Given knowledge base, how could it have been better?

Construction Techniques/Methods		
Division	**Aspect**	**Overview of exercise/lab work**
Research	"History"	Methods of construction and materials.
Analysis	"Theory"	Document the reason why the assembly functioned.
Evaluation	"Criticism"	Given knowledge base, how could it have been better?

Document Production ("Contract Documents")		
Division	**Aspect**	**Overview of exercise/lab work**
Research	"History"	The communication methods for building construction…
Analysis	"Theory"	Document the reasons behind the communication methods.
Evaluation	"Criticism"	Given knowledge base, was it effective given the period?

A specific example of an assignment is:

1. Present, in lecture format with slide, video and CAD media presentation as appropriate, contemporary use of a particular material such as masonry. The lecture includes the material characteristics, construction uses, detailing and construction documentation. Included in the lecture is the analysis of and *theory* behind the material applications, not simply the facts.
2. Present *historical* examples of the use of masonry.
3. All students are then required to research the historical documentation and construction communication methods. Individual students are assigned, or may choose, different time periods to research. The research must also include *evaluation (criticism)* of how the material was used, the appropriateness and the effectiveness of the communication of the material detailing and construction.

Materials are reflective of the times and construction techniques available. Egyptian, Roman and Greek reliance on masonry construction with some venture into reinforced concrete by late Roman Empire. Masonry's dominance on the material and method of necessity continued through the Romanesque, Gothic, Renaissance and Beaux Arts periods. The technical knowledge of masonry can be clearly and explicitly illustrated by studying examples from these time periods. What does this provide? It gives students a simple, straightforward understanding of the *nature* of these materials and a base of knowledge for them to use in their own designs and documentation. This is not to say that the student needs to be limited by such a

straightforward application of materials, but knowing this allows the student to then stretch the use and applications. We see this throughout history as craftspeople handed down knowledge to the next generation and this next generation attempted to exploit the materials. The prime example, of course, is the development of the ever grander, ever taller Gothic Cathedral.

Conclusion

Common practice in architecture programs is to focus the presentation of history and theory and the development of the critical mind in design studios. This results in students who have the necessary understanding of the precedence and context of architectural design and the evaluative skills to not only improve on the past but to engage in constructive dialogue. We need to spread this pedagogical method to the technical courses so that students develop the same context and critical thinking in these courses. By engaging a new paradigm focused on how technical courses are *learned* rather than *taught* we can bring out these skills in future architects (and other industry participants) and, equally important, bridge the gap most students feel between design and technical areas of architecture.

Bridging this gap is essential if our students will be leaders in the profession of architecture in the future. The profession is changing as economies, technology and society changes. Judith R. Blau, a Professor of Sociology at the University of North Carolina, recognized the current roles architects must play when she wrote:

> "Unlike the other major professions, architecture must operate in ways that require architects to constantly respond to contradictory design theories, construction processes, and client demands. The architect must be able to play a host of roles to succeed in practice, including that of the artist, business expert, bureaucrat, social reformer, user advocate, and technician."[1]

These roles are expanding and growing and our graduates must have the knowledge base and skills to respond to the rapidly changing professional environment. They must do this while not loosing the sense of history, the intellect of theory and the learning power of criticism.

> "The essential purpose of architecture education, then, is not only the basic training of beginning practitioners, but also the initiation of students into this common legacy of knowledge, skills and language, while instilling a sense of

connectedness to the human needs that architecture, as a profession, must continually address."[2]

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Biography

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James E. Fuller, AIA is Assistant Professor of Architecture at the Ward College of Technology of the University of Hartford in West Hartford, Connecticut. He is a licensed architect and has been since 1984. He is an active member of the American Institute of Architects and is on the national Architects and Education Committee. He is certified by the National Architectural

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He was President of the Connecticut Chapter of the American Institute of Architects in 1994, Vice-President in 1993, Commissioner of Design for 1991 and 1992 and was on their Board of Directors from 1991-1995.

He currently serves on the Executive Committee and Program Committee of the Construction Institute. He also is a member of the New Hartford (CT) Board of Education Technology Committee and the Curriculum Sub-Committee.

He has lectured around the country on the use of computers in architecture including speaking engagements in Boston, St. Louis and Carmel Valley, CA.