Creative Inquiry: A Case for Specialized Research as Foundation of the Undergraduate Architecture Curriculum

This paper examines some of the common shortfalls of Research University education particular to architecture schools and proposes a model for an architecture curriculum based on creative inquiry and specialization. Architecture's future, as a theoretical discourse and professional practice, is dependent on the incorporation of computational thinking, diversity of practice, and specialized education for it to remain relevant in social perception as well as to its peer disciplines. These three areas can all be integrated in an undergraduate curriculum, however, careful planning of the curriculum is necessary to avoid the tendency to insert additional requirements and simply produce extraneous material.

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It would seem we have been at a similar crossroads before. The 1967 writing of 'A Study of Education for Environmental Design', sponsored by the American Institute of Architects and later dubbed 'The Princeton Report', opens with a sense of urgency apparently a result of the complexities encountered when operating at increasingly larger scales and simultaneously operating with advancements in technology:

> *'In recent times, the shaping of the environment has become such a large and complex process, and the goals of society have become so diverse and dynamic, that there is a recognized need for specially trained professionals to carry the main burden of this task. It is no longer possible, as it was in Thomas Jefferson's day, for a well-educated layman to command the knowledge, skills and time needed to produce a fitting environment …*[1]

It is a sentiment that recognizes the increasing need for specialization within our discipline.

Architecture has always been chasing cultural shifts and technological advances. The inherent, necessary property of architecture as being both responsive to and a product of its cultural contemporary has always antiquated it. Once a work of architecture is built, if we are already narrowing architecture's meaningful contribution to the constructed environment, it is already yesterday's style and technology. One can only hope that its function will endure. The age of information marked the point where architecture as a practice could no longer play "catch up." Practice has always been doomed by the sheer amount of coordination and physical resources it takes to produce a work of architecture. In academics, creative solutions aimed at addressing this problem are always shortsighted in that they fail to recognize it. Such attempts are inevitably going to look to fix a symptom rather than the disease. Examples of symptoms, as noted in the Boyer report, may be a lack of inquiry, research-based learning, or interdisciplinary learning.[2] In education, treating the disease means investigating an entire curriculum, the strengths of a faculty, the brand and motivation of an institution, and necessarily requires a system wide overhaul. This requires a closer look at the typical system—and curricular map—to identify possible solutions.

AN EDUCATION EVOLUTION

> *'(Architecture) combines technics and aesthetics, sciences and humanities. Schools are called on to impart highly disparate types of knowledge, negotiating the architect's multiple identities as craftsman, technician, and creative artist; professional and intellectual; public servant and businessman. These identities have not just coexisted, but sometimes conflicted. Architecture's hybridity implicitly challenges the very definition of the discipline.'*[3]

We graduate students with a variety of degrees in architecture, but a relatively low percentage go on to practice architecture and fewer still actually become licensed architects. This is a trend that has been noticed for some time now. Architecture graduates are highly creative and intelligent minds that have developed excellent problem solving skills and many move on to other successful careers. Were they misplaced in architecture programs only to find a new career path after graduation? Or did an architecture degree begin to prepare them for a more diverse palette of career options? Questions of the clarity, focus, and even efficiency of our schools' curricula rise from these statistics.

One must also question whether there is too much redundancy in schools' degree offerings and, at the same time, equity in education duration commensurate with the product being offered. Architecture programs are among the most competitive programs upon entry at their institutions and they attract some of the most intellectually sound students. The transcript of a typical incoming freshman is no longer a blank sheet. It is becoming more common for high school graduates to have earned, through high school Advanced Placement exams or exemption, a full semester's worth of general education credits prior to even setting foot on campus. This trend creates a problem in the conventional architecture undergraduate curriculum that dedicates a fair amount of credit hours to general education coursework. How can the first two years of an undergraduate education—the typical general education standard—be better suited to "in-major" needs?

The time it takes to earn a professional degree in architecture is arguably commensurate with the experience needed to practice architecture in its antiquated form. However, many students are being forced to follow this path with their institutions well aware of the low rates of degree transfer to licensure. Should curricula be reevaluated to address this? On the other hand, a professional architecture degree takes longer to earn relative to most other disciplines with a simultaneous problem of the dilution of program standards toward a more comprehensive, diverse, technology sensitive program which usually means some sort of curricular 'band-aid' has been applied rather than a revision of a curriculum..

The Boyer Report contends that *a symbiotic relationship between all participants in university learning will provide a new kind of undergraduate experience,* for only then would universities be able to offer their best possible undergraduate experience without privileging their research interests.[4]

There has also, for some time, been an increasing pressure on faculty to produce research and scholarship. Faculty members are evaluated disproportionally by their research activities, leaving quality undergraduate education at risk because this teaching becomes undervalued to those seeking tenure and promotion.[5] This [research activities] can be leveraged in favor of teaching by promoting research activity in an undergraduate setting.

In developing *'Ten Ways To Change Undergraduate Education',* the Boyer Report wastes no time in identifying—first on its list—research-based learning as necessary standard for universities.[6] The question, then, is how to do so in an effective manner. The reality is that research and scholarship responsibilities of faculty are typically paramount with teaching effectiveness a distant third. Further, faculty that are invested in research—and drawing funding to their universities—are rarely placed in situations where they are teaching undergraduates, especially those in the first few semesters of their education, which the Boyer Report argues is critical for students' success.[7] In recent years there have been signs of change where universities have begun programs that place undergraduates in a research role, one of creative inquiry that does not necessarily bear the same expectations as graduate and post-graduate research does, but with a similar framework.

CREATIVE INQUIRY AS RESPONSIBILITY

Creative inquiry offers undergraduates the possibility of approaching a depth of study not otherwise attainable in an undergraduate curriculum dominated by low-level memorization of information. It is a practice of research-based learning at an undergraduate level and involves many of the typical practices of graduate and doctoral research such as the identification of gaps in knowledge, product or process creation and refinement, critical thinking, and imaginative solutions. It is a method of learning that came into popularity as a result of the Boyer Report and has been adopted by many undergraduate programs.

In schools that have creative inquiry programs, the preferred method of implementation has been through an elective process on the part of the student. Students choose a faculty mentor who has initiated a project through the university and enroll in an elective course particular to the creative inquiry course and not necessarily a required curriculum. At the same time faculty who initiate and sponsor these programs are not required to do so. Reasons for doing so are varied, but are most commonly to find ways of advancing research topics through non-traditional means.[8]

With the contemporary and future architect needing to operate in a networked environment, as one of many members of a larger team to produce complex works—and incapable of operating across multiple fields as the 'master builder' was able to, why not address this situation by introducing required specialized areas of education?

A NEW DESIGN THINKING

How can creative inquiry be a forward-thinking endeavor? The Boyer Report suggests that it is critical that faculty encourage students to use technology creatively, but falls short of identifying how this can be done. Instead, a rather low level approach of computerization is implied by giving examples of known application at research institutions such as: video conferencing, multimedia software, and online instruction services.[9] Understanding that all of these tools have been quickly absorbed into our everyday, given the pace of technological development in the nearly two decades since the publishing of the Boyer Report, it would seem the education of a student at that time would have been rendered obsolete in a short time period. The key component missing here is a basic understanding of how various new technologies function and how they may be used intelligently and creatively within an emerging information society. Curiously, three decades prior to the Boyer Commission, a precedent was set for such a shift in *thinking* about technology and the way we teach design with the Princeton Report:

> The growth of population and technology, for example, are seen as the products of and not the causes of the expansion of knowledge.[10]

The Princeton Report goes on to suggest that architects ought to consider the importance of systems thinking in how we design and how we educate:

> Rather it is our increasing understanding of relationships, the relationships between the actions and events in all realms of life, that has had the greatest effect on how we comprehend and deal with our problems. We can understand today how the changing of any part of our physical environment affects and interacts with every other aspect of that environment.[11]

Systems thinking is not new territory in education as an approach to problem solving. However, it does not specifically speak to the types of problems that are being presented with technological advancement, specifically when taking into consideration that computing is at its core. There is another important—current—shift in education, one that concerns computational thinking. Computational thinking is the thought processes involved in formulating problems and their solutions so that the solutions are represented in a form that can be effectively carried out by an information-processing agent.[12]

It's described by Jeanette Wing as conceptualizing rather than programming as a problem solving solution, fundamental rather than rote skills, humanizing problems rather than computerizing problems, and complementing and combining mathematical and engineering thinking.[13]

Her last definition of computational thinking, of complementing and combining disciplinary traits, is a powerful suggestion that reaches beyond the mere use of technology as a problem-solving tool to a fundamental question of learning how the tools function. It clearly asserts that computational thinking and systems thinking need to be networked, that these together will make the future creative problem solver.

Current and future generations of students are immersed in a culture that privileges information and information processes as an investigative method of operation. If we understand computational thinking as being compulsory to the various disciplines that employ information processing, it is critical that architecture schools adopt an attitude that computational thinking be compulsory to the education of the architect.[14]

EDUCATING WHAT PRACTITIONER?

One question educators need to continually be asking concerns the value of the product they are offering. On one hand, educators must evaluate their curriculum, specifically through its content, to determine whether it satisfies a certain comprehensive introduction to architecture. There are many variations possible, but all based on a core premise that a student of architecture should be introduced to the practice of architecture with an end goal of eventually entering professional practice as a licensed architect. The National Architectural Accrediting Board (NAAB), as the agency created to facilitate this evaluation, has set specific criteria that architecture programs use to measure their program.[15] This accreditation, of course, directly serves the National Council of Architectural Registration Boards (NCARB) as the entity responsible for administering Architecture Registration Examinations, and subsequently licensure. As a result, the curricula of architecture schools are tied to a view that all students are on track to become licensed architects.

However, another parallel question regarding the value of architecture schools' products that must be answered speaks to the application of a student's education once they enter the job market. Are students being taught the correct skill set? Is architectural registration an appropriate 'final goal' in defining an academic curriculum for an architectural education? The very system in place would suggest otherwise. Students, of course, must complete a lengthy Internship Development Program (IDP) that, through scrutiny in recent years has seen several revisions of its own to appeal to a new generation.

Suggesting a change in NAAB criteria that might imply students are not necessarily following a path to licensure certainly wouldn't align with their mission statement and would challenge the value of architecture education, rather than strengthen what is perhaps the most solid argument schools have to prospective students: That the academic education of an architect prepares an individual to be a creative problem solver in the widest range of applications, both directly in the field of architecture as well as elsewhere. On the other hand, retooling architecture schools' curricula to reflect a change in cultural thinking and operation could make the argument for architecture as a degree path even more viable.

NCARB offers one, very distinct path: architectural registration. Another question that must be asked, however, is exactly what professions students are engaging in after graduation. Many graduates are able to find very successful careers in other fields of varying affinity to architecture by utilizing their design education, specifically that of creative thinking and problem-solving. If we assume design-related and allied professions are their primary destination, is it possible to consider an education in these a priority for architecture students as well? Wildman argues for the "Future Architect as Entrepreneur." Citing several cases where architects have created their own jobs by creatively extending a unique knowledgebase to a marketplace in an alternative manner.[16]

DIVERSITY OF PRACTICE

> In practice, we have learned to assemble teams of many different environmental disciplines in response to complex design problems…But it is only rarely that the education of the team members has prepared them to make the fullest contribution they might in such a setting.[17]

This quote, from the *Princeton Report*, outlines a problem in architecture of complexity and specialization. Robert Gutman observed the growing separation between theory and practice of architecture and suggested the then-shifting role of an architect as 'constructor to a designer'[18] was far more than a label. As architects contract services from others more and more, the *"autonomy of the design discourse"* is reinforced.[19] This outlines his argument for a practice grounded in research.

The new architect is less likely to design buildings. As architects and designers this is likely to be evident and in plain sight, however we need to expand the definition of an architect—in its socially accepted perception—if our practice is to include what we are best trained for. 'Buildings' are not a priority and do not constitute architecture merely by their existence.

Dana Cuff argues for the production of places as a social process and that architects should therefore be competent designers in a "social sense."[20] This critique reflects the tone of the Princeton Report's discussion on the growth of knowledge of social, economic, and environmental relationships:

> We are beginning to understand today, as we seldom have in the past, the way that changes in the physical environment are inextricably linked to changes in the social, economic, and political environment.[21]

Three goals outlined in the *Princeton Report* for education were: being able to work effectively in the real world; ability to comprehend and adapt to cultural changes; and the ability to foresee change in a way that students might be able to actively shape the future of their environment.[22] These goals are somewhat broad, yet they underscore the necessity for a solid foundation in the understanding of one's contemporary context and its trajectory.

Schon, in his discussion on the epistemology of practice, follows the model of Technical Rationality which declares that "professional activity consists of instrumental problem solving made rigorous by application of scientific theory and technique."[23] This suggests a relevance to research-based inquiry in education, as opposed to skill-building. He goes on to describe the importance and necessity of specialization in the professional world, leading to three components of professional knowledge: basic science, applied science, and applied knowledge.[24]

SPECIALIZATION

Indeed, the typical undergraduate architectural curriculum is divided into these three components. There are "general education," "discipline specific," and "professional" elements to any accredited architecture degree. In the case of a graduate, first professional degree, the "general education" category is assumed to have been completed prior to acceptance in the degree program.

But if Schon's specialized profession is integrated into a curriculum—along with a research-based, computational, and systems-driven approach to learning—what would it offer for the future architect? In other words, can creative inquiry be a driver for the specialization of the discipline, and therefore allow students to take their education further?

The new architect will be HIGHLY specialized and need to work with other architects as well as individuals from multiple other disciplines. One can do something well, but a complete product of a more complex sort will take collaboration—even before the engineers and contractors get involved. Specialization in a curriculum points to a need for depth of study in a specific topic or area of investigation. What might a specialized curriculum include? How might such a curriculum perform?

CURRICULUM REVISION

Interestingly, the adoption of a creative inquiry program would not necessarily need to change the curriculum map at all. The important change that can occur, however, is that—if utilized as a key element in a design curriculum throughout all coursework—critical inquiry may become the dominant language that describes the path a student takes. In this way, students would potentially be able to craft their own curriculum so long as it also satisfies other professional criteria (such as

NAAB guidelines).

On the other hand, it is also possible (and perhaps more tangible a transition from the current standard) for distinct "tracks" to be identified within a degree program that become specializations students may select from upon entering the program, similar to the declaration of a minor. An advantage of this method would be to predefine certain areas that students, who might not yet have developed the maturity, sensibility, or direction within their discipline, may learn more about before selecting. Such a model would have an easy shortlist of categories such as: *Professional Practice, Construction Management, Community Design/Build, Historic Preservation, Urban Design, Structures, Visualization, Computation, Architectural History + Theory, Sustainability, and others*. One could look at this as an organizing of specialized degrees at the undergraduate level around what are often designated "selected topics" courses in current programs. This would guarantee a sufficient introduction to subject matter and level of investigation required on the part of the student. This is particularly manageable for institutions not already engaged in undergraduate, first professional degree programs.

If a creative inquiry program were initiated as a required part of an existing program, it could be tied to specialized degree programs that would better prepare students for specific design-related fields and, more importantly, an evolving architecture practice that is increasingly relying on a distributed network of associates to design and produce rather than the classical 'Master Architect' who would handle all facets of a project.

FURTHER QUESTIONS

This also raises the question of where the traditional professional education falls within such a system. If specialized tracks are organized in such a way that NCARB recognized coursework is offered in a "professional degree" track within normal course of study the introduction of specialized degrees would only increase the diversity of offerings, rather than eliminate professional degrees or disenfranchise students and faculty.

While the usefulness of specialization in terms of depth of knowledge retention and acquired technical skills is directly applicable to an emerging practice with specialized needs, there also exists a parallel dilemma of how to make a specialized undergraduate degree valuable to a professional or post-professional education. The question of value is relevant to both the student and the university, and for opposing reasons. To the student it is about more than the learned experience and quality. One must also recognize the economic impact. A student seeking a professional degree in architecture must currently study from anywhere between 5-7 years before graduation, with an IDP timeline adding approximately 2.5 years of regular, full time work.[25] For the university, a decreased timeline should also equal more productivity—and funding.

Having a specialized curriculum that focuses on research-driven work and a model of investigative and problem solving thinking that is useful in an information-driven society would better prepare students for practice—in whatever capacity that means. It would likewise benefit educators in their ability to effectively carry out research activities and teach material that is directly relevant to their own interests.

ENDNOTES

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