

A DESIGN FOUNDATION FOR INFORMATION ARCHITECTURE

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Abstract

Information architecture is currently emerging as a discipline that concerns itself with the development of systematic approaches to the organization and presentation of online information. It has emerged rapidly as a developing professional practice – more rapidly than university curricula have been able, for the most part, to develop coherent approaches to the theory and practice of IA and to the professional needs of practitioners. An ‘architecture’ analogy is appropriate for information architecture since it provides methods and models for education and professional development.

Introduction

Information architecture is currently emerging as a discipline that concerns itself with the development of systematic approaches to the organization and presentation of online information. It has emerged rapidly as a developing professional practice – more rapidly than university curricula have been able, for the most part, to develop coherent approaches to the theory and practice of IA and to the professional needs of practitioners. The field is adapting ad hoc methods from various sources, and there seem to be relatively rich ways to formalize adaptations of methods and models from other design professions. A design studio approach to teaching IA would help to situate the discipline among the design professions, would provide models for IA pedagogy, and would also provide a path and model both for the professional development of individual practitioners and for the profession as a whole

In defining the field as information architecture, there are probably productive analogies to other professions that are being ignored - ‘information engineering’, or ‘information therapy’, for example. Although it

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may be too soon to eliminate the possibilities that other professional analogies might present to the profession, the fit of 'architecture' among the various possible professional analogies seems to have a lot of resonance among its practitioners.¹ The 'architecture' analogy may be very appropriate: areas that could be developed include the architect's role as the designer and coordinator of a process that leads to the product, deliverable, or structure, as well as the 'creative' tasks of design per se. Design and planning education have developed explicit methods for design and implementation processes, as well as pedagogical methods for professional role development, such as manager, designer, evaluator, mediator, advocate, teacher, facilitator, technical expert, etc. The orientation in design training and education emphasizes studio/lab/project learning, critiques of works-in-progress, as well as theory, which provide a useful model for educators in information architecture. The paper outlines the history of design pedagogy from the perspective of the Harvard School of Design 1955-1975 and posits its appropriateness for the development of pedagogical methods and models for information architecture. The paper concludes by noting where the processes and methods of traditional design disciplines may be most appropriate to information architecture, and where they may be less so, and outlines a possible undergraduate curriculum for IA based on areas of convergence.

But is it Architecture?

In what sense is 'information architecture' *architecture*? Is it related to the profession of architecture by metaphor and analogy, or is there some basis for seeing IA and 'A' as components of some broader domain of theory and practice? Wordnet² gives four senses for 'architecture':

1. **architecture** -- (an architectural product or work)

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2. **architecture** -- (the discipline dealing with the principles of design and construction and ornamentation of fine buildings; *“architecture and eloquence are mixed arts whose end is sometimes beauty and sometimes use”*)

3. **architecture** -- (the profession of designing buildings and environments with consideration for their esthetic effect)

4. structure, **architecture** -- (the manner of construction of something and the disposition of its parts; *“artists must study the structure of the human body”; “the architecture of a computer's system software”*)

Current usage of the term ‘architecture’ in computer and information science is limited to the fourth sense above related to structure.³ The current usage of the term IA seems broader than simply an adaptation of a generic meaning of structure and relations; it also connotes the traditional professional usages referring to the architectural design process and the architect/designer as person. If we accept the word ‘architecture’ in IA as an accurate descriptor rather than a metaphor, what implications does that have for the theory, practice, and professional development of IA?

A Design Approach to IA

Norman Newton), who presented the approach of the Harvard School of Design in his *An Approach to Design*, notes that architecture is a process, not an instance or manifestation its results (1951, 75). For those familiar with the design approach of the School in the 1950s and 1960s, it might be fair to modify the third sense of ‘architecture’ given above to “the *process* of designing buildings and environments with consideration for their esthetic effect.” The educational approach of the School during this period was to teach an interdisciplinary general program of design to first-year students in architecture, landscape architecture, and city planning. The goal of this approach was to develop within the student an orientation “toward the

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unified field of design that would serve him as a broad and soundly flexible basis for creative work in the context of his own future (Newton 1951, vii). This sense of the creative usefulness of a general design education, augmented by the professional attitude and skills necessary to a particular field, has much to offer information architecture as a field .

Although this integrated interdisciplinary approach has since been discontinued at Harvard, it has had tremendous influence in design education in the U.S. These early attempts to formalize a general approach to design seem rather soft when compared with today's more procedural methods, perhaps the best known of which in this context is Christopher Alexander's work.⁴ However, the approach developed by the School pre-sages current thinking about the need for universal approaches to design education. Proponents of the emerging field of design research make persuasive arguments for a general design education even at the doctoral level (Durling and Friedman, *passim*). Friedman (2000, 12) also presents a conceptual model for aligning design professions dealing with the "material" with those concerned with the "immaterial" as a necessary component of design in a knowledge economy.

The method that the Harvard School of Design promulgated in the 1950s and 1960s consisted of a three-phased approach to design:

1. *Programming*, "a phase of recognizing and delimiting the basic problem in terms of human need, and of deciding in a general way what sort of action or provision is most likely to effect a solution."
2. *Analysis*, "in which the designer analyzes carefully the relationships among the various activities involved in the problem and, by means

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of a persona, visual, imaginative synthesis, evolves the specific structure – the specific form and arrangement –of the concrete physical solution that will accommodate that complex of activities.”

3. *Representation and implementation*, “in order that this creature of his imagination may be brought to full actuality, the designer prepares working drawings and other contract documents and furnishes supervision, all as directives to the men whose combined efforts will result in construction of the finished product, the work of design (Newton 1951, 5-6).

These three phases themselves were broken down into various component processes. The emphasis of most design education and of most designers has been on the “creative” middle phase. Over time, all aspects of this process have been subject to more rigorous procedural development in the design professions, but one may still recognize these basic processes in most of them.⁵ This process is also implicit in the more design-oriented of the commercial information architecture firms, such as Sapient’s ‘Discover – Define – Concept – Design – Implement’ process (Svec, 2). It may be worth quoting from Newton’s instructions to beginning designers for the middle phase to see how relevant this approach may be for information architects today:

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As a procedure, therefore, I suggest that you try, as the first step in the middle creative phase of your designing, to draw a *structural diagram* (some prefer to call it a relational diagram or a functional analysis) of the *activities* to be provided for in the solution of your problem. The aim of such a diagram is to enable you to visualize and to relate to each other the kinds or phases of activity, to come to a tentative conclusion as to which of these are in their nature closely connected (as, say, cooking and eating), which ones less closely (as, say, playing ball and sleeping), and so on toward the establishment of a workable *structure* - an optimal set of relations and order - of the various *activities* concerned) (Newton 1951, 138-9).

Newton also advises against prematurely forming a structure before all the analytic and synthetic processes are complete:

In setting up this structural diagram of activities . . . you will avoid as completely as possible any premature visualization of the specific spatial form or forms in which the activities are to go on. . . [Newton then goes on to give specific recommendations for the kinds of symbols to be used].

* * *

All of these factors, and any others appropriate to the individual case, will help you to visualize the entire complex of activities as something occupying roughly determinable plastic spaces related to each other in many dimensions. But keep your attention continually on the activities, seeing them occur freely in space without physical restriction, and hold off as long as you can your finally visualized realization of specific form.

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From this point on there are no doubt many sound ways of going forward with the problem of creating the spatial complex that your analysis has indicated as desirable. You will surely need to ask yourself early how the spaces thus far determined can be built with construction methods and materials available to you – or capable of invention – and how these would best be used to accomplish their space-forming purpose with sensible economy of means. . . . Little by little, swiftly or slowly, depending on how fast the light of your vision enables you to go, you will be bringing into form a tentative graphic statement in plans, elevations, and sections – and you will be well under way in the creative middle phase of the process of design (Newton 1979, 131-3).

This design approach for developing relationships of functions, activities, and structure in spatial design maps very well as an overview of the information architecture process as well. That it maps so well supports Newton's (and later Friedman's) arguments about the value of a general design education for the design professions.

The Harvard School's early formalization of the design process may be viewed as an expression of what Friedman (1997) sees as the transition from design as "craft" to design as a "knowledge profession" comprising "a knowledge-intensive process that involves selecting goals, then developing and executing strategies to meet those goals." This is also part of the process that Simon (112) presents as the transformation, in order to gain academic respectability, of "the intellectually soft, intuitive, informal, and cook-booky" approach to design into "subject matter that is intellectually tough, analytic, formalizable, and teachable."

Rowe (1987, 46-50) describes this transition in focus and methods as one from a "behaviorist" method that saw design in terms of a series of overt

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stages of the activities of “analysis, synthesis, evaluation, and so on,” to an “information processing model” that sees the design process as a frame for problem-solving behavior with “three subclasses of activity:”

1. The “problem representation problem;”
2. The “solution generation problem”; and
3. The “solution evaluation problem.”

These lead to a view of design as “problem-space planning” wherein the types of decision-making that are appropriate to particular design problems become the subject of design. This information processing is shown in the early work of Alexander where the design approach is an algorithmic one based on decision trees.⁶ The reaction to the more deterministic and procedural of these information processing models, which seemed to diminish the role of the traditional, intuitive, creative part of the design process, led to the perception “that design, like other disciplines, involves a kind of procedural knowledge – that is, both tactical understanding and know-how – and a kind of substantive knowledge outside the procedures themselves” (Rowe, 112). Taken as a whole, the evolution of design theory and design education provides useful hints and explicit pedagogical models for the development of information architecture educational practice.

An Educational Architecture

This tension between the procedural aspects of design and the knowledge of the creative substance of design outside those procedures has affected, I would argue, the development of pedagogy in the design professions. Most design education has its share of traditional classroom lecture-style learning

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where one gets to know the nuts and bolts of history, construction materials, theory, etc. But there is also the studio environment where the budding design professional develops her own “substantive knowledge” of a way of working that is necessarily a personal synthesis and application of all the other components. This is the crux of professional development where theory, content, and procedure are integrated in a continual refinement of both a product (as an instance) and a personal synthesis of the design process. This results, ideally, not only in the designer’s ability to approach a given design context in a creative and productive manner, but also in the realization that each design “episode” may call for variations in technique and method in the process itself. As Rowe (1987, 34-5) observes, “We might say that the organizing principles involved in each episode take on a life of their own, as the designer becomes absorbed in the possibilities that they promise. Here a ‘dialogue’ between the designer and the situation is evident.”

To enable this dialogue for future design professionals in IA, it may be helpful for IA education to model the studio orientation of the other design professions. If educators are serious about providing educational pathways for IA professionals, the give-and-take of the studio “crit” that gives rise to both the ability to develop and deliver a solution in context, and to the development of the designer, may be an essential part of the educational process. This ability to integrate the performative, “problem-solving, know-how”, and what Peter Rowe (1996, 243) calls the “tectonic imagination” into an ideal “design thinking” should be the goal of a professional design education. According to Rowe, “Moreover, this thinking is probably epistemologically unique, and therefore warrants continued institutional recognition and support” (1996, 243).

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In this respect, the emerging profession of IA may be (oxymoronically) a new archetype for the professional information scientist, since many practicing information architects are already at the point Marcia Bates (1045) describes as an essential transformation for an information professional:

Most people outside our field do not realize that there is a content to the study of form and organization. . . .

...

People who come into this field, whether formally educated in it or who drift in through a job, sooner or later go through a transformation, wherein they shift their primary focus of attention from the information content to the information form, organization, and structure.

This focusing of attention on the “form, organization, and structure” of information is what information architects do. As an emerging sub-discipline of information science, one educational goal of information architecture should be to emphasize and reinforce this focus on form and structure as a core component of the field.

Herbert Simon lamented (113) the “loss of design” in professional curricula that occurred when the professions were striving for more academic legitimacy by transforming trade schools to schools of applied science. He noted that “The older kind of professional school did not know how to educate for professional design at an intellectual level appropriate to a university; the newer kind of school nearly abdicated responsibility for training in the core professional skill.”

The development of a design-oriented approach to information architecture adds a new core discipline to Information Science as a whole – one that would explicitly fill the need for Bates’ idea of “a content to the study of

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form and organization” of information. Information science as a field has tended to take a passive approach to information structure, studying information form and structure as given or as developed in other fields. As the knowledge economy expands, a more active approach is needed. Information architecture as a design profession would radically expand Bates’ notion by not only studying the form and organization of information as it already exists, but to further develop principles of information architecture and design for the proactive structuring of information. The educational structure supporting such activity would include not only the general problem-solving skills provided by a design education, but also the specific development of design skills for information architecture. The challenge is to develop interdisciplinary languages and skills for design practice while also developing the methods and skills specifically appropriate to information architecture. As Rowe (1996:245) notes:

Undoubtedly there will always be a certain artificial compartmentalization of design knowledge and understanding for effective didactic purposes. There are, however, pressing needs in educational circles for decent role models and for case studies of good practice. There is also a need for reasonable amounts of integration and inclusiveness, without inundating design studios with constraints and responsibilities that cannot possibly be addressed. The choice of subject matter is certainly important and should reflect important facets of the surrounding social and technical context. Nevertheless, design is a way of thinking about and of knowing the world, and it has its own considerations and practices that require mastery.

In addition to mastering design practices in general and skills appropriate to one’s field, another principle of professional activity is that it exists for the overall public good. Newton (1979, 91) describes “the common goal” of the design professions is to study “*people in their environments*, and . . . we

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evaluate our work in terms of its positive contribution to the longer, healthier, happier survival of humans.” Although the fields of human computer interaction and usability design share this orientation, the development of a professional structure and ethical basis for research, design, and implementation is still in its infancy.

Development of An Emerging Profession

[P]rofessions are occupations with special power and prestige. Society grants these rewards because professions have special competence in esoteric bodies of knowledge linked to central needs and values of the social system, and because professions are devoted to the service of the public, above and beyond material incentives (Larson, x).

According to a recent survey (ACIA, 2001a), 51% of respondents to a survey of those who call themselves information architects “seek certification or some other type of professional recognition.” In a separate survey (ACIA, 2001b), 228 respondents who identified themselves as Information Architects had no less than 116 distinct job titles. In yet another survey (ACIA 2000), respondents indicated that while 37% currently have no formal educational credentials in IA, the respondents expect this number to drop to 10% by 2005, with 47% expecting that the increase in formal credentials will come from graduate courses in IA or related fields. Dodging for the moment the question of whether the educational system is prepared to meet these expectations, it seems apparent that there does exist a more-or-less self-organizing professional movement in IA. Reciprocal to the need in the field of information science for active designers and architects for information structures, there is a need for professional recognition and social recognition of the importance of this activity in the emerging knowledge economy for its practitioners. At the nexus of these two reciprocal needs is the social value of giving incentives to a profession to make the kinds of positive contributions

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to the social fabric that have historically been expected of professional activity.

The recent evolution of information architecture seems to have more parallels to guild formation than to the formation of a profession:

The craft guilds, which were organized everywhere by the thirteenth century, were . . . devices for establishing social credit in a phase of rapid development of small commodity production. . . . The assembling of producers along craft lines was encouraged by the public authorities as a means of regulating the new urban markets (Larson, 15).

To participants of the ASIS-sponsored listserv on information architecture, the craft-supporting nature of the self-organization of information architects is apparent – much of the list discussion is about technique, relations with others in production, process standards, and markets. There is also a good deal of discussion about the need for more formal training for and recognition of IA skills.⁷ These kinds of discussion, together with the needs expressed in the surveys discussed above, reinforce the perspective that IA is an emerging profession that may benefit from the “social credit” and recognition that formalizing the educational process may provide. Such a process would also provide a mechanism for social input regarding what the social expectations for such a profession would be.

If information architecture as a profession develops along the lines of other traditional professions, one would expect education to support what Larson describes as three “dimensions” of professional attributes - the cognitive, the normative, and the evaluative:

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The cognitive dimension is centered on the body of knowledge and techniques which the professionals apply in their work, and on the training necessary to master such knowledge and skills; the normative dimension covers the service orientation of professionals and their distinctive ethics, which justify the privilege of self-regulation granted them by society; the evaluative dimension implicitly compares professions to other occupations, underscoring the professions' singular characteristics of autonomy and prestige.

...

These communities are concretely identified by typical organizations and institutional patterns: professional associations, professional schools, and self-administered codes of ethics (Larson, x).

These three dimensions correspond closely with architect Peter Rowe's description of the threefold relationship of a design school to professional practice:

First, there is the direct education of would-be professionals. Second, there is a critical appraisal and reappraisal of architecture, including the circumstances and agents that brought it into being, as well as its practices. Third, there is public education about architecture, how it is produced and what might be expected of it (Rowe 1996, 242).

Rowe cautions against thinking "the educational mission of most architecture schools and the well-rounded development of practicing professionals" to be "fully coincidental or isomorphic." "As much as anything," Rowe continues, "this education concerns a way of thinking about the world and about architecture in an intellectual as well as a practical sense" (Rowe 1996, 242).

Conclusion

As educators and professional designers, we are already, as Phil Agre notes, "latecomers to the scene of the accident. The real design has been done by poets, and intellectuals, and propagandists. . . . The designer becomes a

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representative for all of the people whose attentions are still elsewhere, who don't know the stakes in a design process whose results will become irreversible by the time they ever hear about it.” Information architecture already is a vibrant field of practice. Some of its practitioners might take umbrage at being included in the realm of “poets, and intellectuals, and propagandists,” but I think more would identify with the edgy, counter-cultural aspects of their design practice. As a discipline it finds itself in a mediating space between the artistic aspects of design practice as cultural production and the economic field of production of most of their clients and employers. The professional practices of information architecture are being developed by a cohesive group of committed individuals. Its core practices of analyzing, designing, and building information structures are not only central to the present and future needs and concerns of the information sciences as a whole, but also central to the needs and concerns of society in an information economy. Newton’s (1979, ii) goal “of design as an integral part of modern life and as an approach to positive creative action” can be seen as a manifesto for the professionalization of information architecture, which would be enabled through the development of a design-oriented profession and accompanying professional standards, educational practices, and professional mission and ethics. The professional goals of information architects are parallel to those that Rowe (1996, 243) posits for architecture: to “have the understanding and the wherewithal to deal effectively with the institutional setting in which their professional actions take place,” and above all to “get the job done properly, responsibly, and beautifully.”

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¹ These thoughts were initiated by Lou Rosenfeld's (somewhat tongue-in-cheek) comments at the ASIS IA session on the possibilities that might be afforded by looking at ourselves as "Information Therapists" in addition to Information Architects.

² (<http://www.cogsci.princeton.edu/cgi-bin/webwn/?stage=1&word=architecture>)

³ The ACM thesaurus has many uses of architecture: Modeling of computer architecture; System architectures; processor architectures; Network Architecture and Design; Software Architectures; Hypertext/Hypermedia architectures; hardware architectures. The ASIS thesaurus refers only to architecture as a profession and "computer architecture. ACM Classification system: <http://www.acm.org/class/1998/ccs98.html>; ASIS Thesaurus <http://www.asis.org/Publications/Thesaurus/tntime.htm>

⁴ Alexander wrote his *Notes on the Synthesis of Form* while at the school. His later *A Pattern Language* was written partly as a re-thinking of what he came to see as an overly algorithmic approach to design.

⁵ See Rowe (1987) for an excellent discussion of this evolution.

⁶ Alexander, *Notes on the Synthesis of Form*. In the preface to the 1971 second edition of this influential work, Alexander laments the attention given to the heuristic process he outlines rather than their formal utility and beauty, noting the traditional designer's need to develop a process out of one; sown sensibility and training rather than mimicry.

⁷ The sigia-l archives can be found at <http://www.listquest.com/lq/search.html?ln=sigia>.