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Design and Curriculum Design
An architectonic view

There are those who might jib at thinking of a curriculum as a work of art as well as a lot of work. Yet the same people might very well have always accepted the dictum that teaching is as much an art as a craft. Chalmers draws some striking analogies between the undertakings of architecture and the building of curricula, and deliberately exploits the existence of a variety of ideas and practices in the former highly sophisticated field of activity in order to suggest developments that could be fruitful in the practice of curriculum design - a field that surely ought to aspire to an equal sophistication and productivity. Is it strange that in an article on curriculum planning, words like "imagination", "flair", and "aesthetic" should keep cropping up? One would hope that they did, really. It ought to be surprising that they surprise us.

In this paper I introduce a number of approaches to designing, implementing, and evaluating that are commonly used by designers working outside the curriculum field, and suggest that these approaches have value for curriculum workers. I am an art educator with a particular interest in the built environment, and teach an introductory course in curriculum studies. I present these views not in an attempt to be clever, smart, or trendy with metaphor, but rather because I am convinced that art and design as found in architecture can offer the curriculum field insights and directions that are relatively unexplored, and that are perhaps more reasonable than Eisner's models of connoisseurship and educational criticism. Therefore I present in this paper an architectonic view of curriculum, and attempt to show how curriculum relates to and accords particularly well with the principles of architecture.

Architecture is the art and science of building and designing structures - especially habitable ones. It is both an

art and a science. As science, architecture may produce buildings that are strong and practical. As art it may produce structures that are aesthetically pleasing. To suggest that the development, implementation, and evaluation of curriculum is both art and science certainly accords with much current thinking in the curriculum field.

Curriculum must be well built

By way of introduction let us consider three quotations on architecture in which I have replaced the words "building" and "architecture" with the word "curriculum":

"A (curriculum) must meet the following standards to qualify as (good curriculum): it must conveniently serve the purpose for which it was built; it must be structurally sound; and it must be beautiful."

Marcus Vitruvius Pollio

"A (curriculum) serves three purposes: to meet the social and economic needs of living, to delight the senses, and, last but not least, to symbolize all that men aspire to hold and to command."

George Howe

"Good (curriculum) is always a perfect expression of the time in which it is built, not only of that time's artistic skill but also, if it is interpreted correctly, of its religion, its government, even of its economic and political theories."

Talbot Faulkner Hamlin

A recent key work on the elements and principles of architecture from which these quotations are drawn (Information Design Inc., 1982) suggests that the practice of architecture "includes defining problems, evaluating alternatives, and implementing solutions". (p.2) The same source lists other key points that architecture shares with curriculum:

"It involves forging effective compromises between divergent demands, and it means setting priorities by determining relevancy."

"It requires a fusion of interconnected and interrelated areas. When one area is affected, all others are likewise affected."

"It takes on different forms, depending on its physical, historical and cultural environment. The purpose of architecture is to produce an aesthetically pleasing structure within functional restraints."

"It is built on a historical framework which has been evolving

from the beginning of civilization."

"It evolves as mankind's cultural expectations and technological innovations evolve."

"It must be experienced to be valid; each person reacts to a particular design in a unique way."

"It is a human activity that must make humane decisions."

"It is used by living human beings, with all their needs, wants, habits, frailties and inconsistencies. The success of an architect's work can be judged only within the human context."

"An architect's goal is the synthesis of a multitude of diverse elements into a cohesive, structural whole. He or she takes abstract ideas and helps turn them into real form. An architect solves problems". (pp.2-3)

An architect must work under environmental and human constraints to create a building in its total context. This might mean working under imposed financial limits, but still finding optimal building solutions. An architect, like a curriculum worker, needs to be farsighted: his or her structure will continue for many years into the future. Similarly an architect works with and is often the team leader of many others. An architect, like a curriculum worker, must have a wide range of abilities, including (metaphorically) drawing and sketching, visualization, understanding of the building process, knowledge of materials and their forms and functions, as well as a good head for details and a sense of appropriateness; persistence; ability to work under pressure, to get along with people, to supervise others; and flair and imagination.

What is design? Common elements

The Concise Oxford Dictionary defines "design" as a noun in many ways; as a verb the dictionary definition is also diverse, but not ambiguous. "To design" can embrace the activity and products of the architect, the engineer, the craftsperson, the decorator, and the artist. A machine, a system, a publication, a sculpture, an electrical circuit, an experiment, and a curriculum can all be designed. "A design" implies some form, structure, pattern, or arrangement for a proposed thing, system, event, or method. It is a product of judgment and invention as well as of knowledge and skill. Penny Gouldstone, a University of British Columbia colleague who teaches design courses, distributes the following sheet (original source unknown) to her students. It might also be distributed to and discussed by students in curriculum development and evaluation classes:

Figure 1

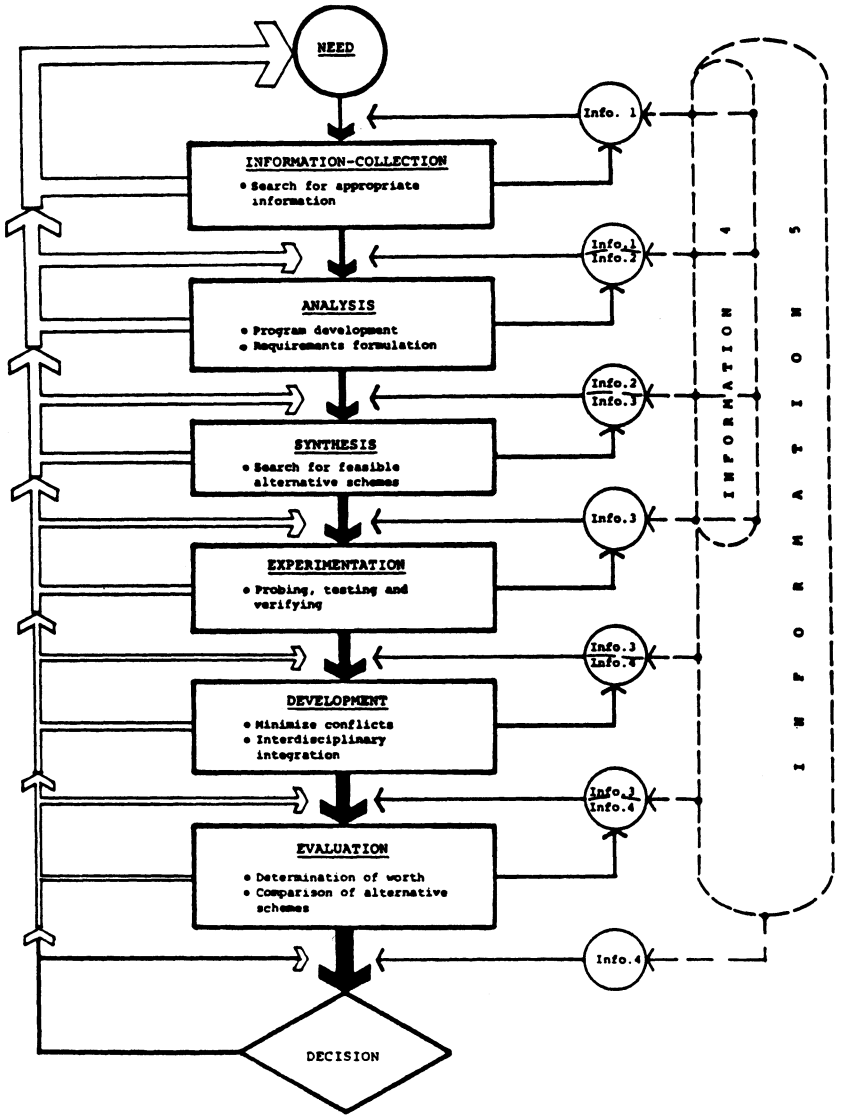
DESIGN
initially depends on
LOOKING
training the eye to
SEE
to absorb appearances
to be alert and sensitive in
RECOGNISING
the elements of design
CONTRAST - HARMONY
RHYTHM - BALANCE
in
LINE - SHAPE - PATTERN
in order to
CHOOSE
and
ORGANISE
for a purpose

In the curriculum field we already have workers (primarily Eisner's students) who have tried to see and to evaluate curriculum, instruction, and curriculum materials from the point of view of the elements and principles of design. Curriculum developers should have little difficulty with a definition of designing proposed by a working party of the British Design Council in 1980. Designing is seen by this group as "the process of seeking a match between a set of requirements and a way of meeting them, or finding an acceptable compromise". (Keith-Lucas, 1980, p.4) The continuation of the definition should be of particular interest:

"Often the process involves working from both ends, that is betweeen requirements and possible solutions, with as much effort being devoted to the constructive reinterpretation of the design requirements as to the creative development of a solution to them". (p.4)

Just as some scholars in the curriculum field may criticize and wrestle with approaches to curriculum that are seen as too artistic, so too may architects and planners. Recently a special issue of a journal devoted to exploring the relationship between science and architecture dealt with what is called "fuzzy sets" in architecture and building. In a somewhat parallel fashion to curricularists' arguments for "expressive" or "type three" objectives, the authors of the five papers in the Architectural Science Review admit that a degree of "fuzziness" accompanies complex architectural problems, and they try to show how it is feasible to develop "objective" mathematical models which

Figure 3

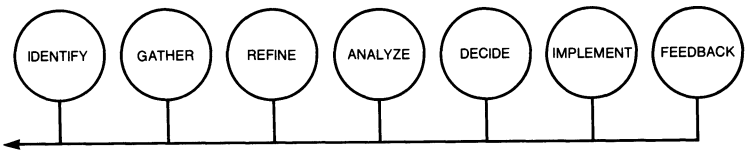

NEED
INFORMATION-COLLECTION
• Search for appropriate information
ANALYSIS
• Program development
• Requirements formulation
SYNTHESIS
• Search for feasible alternative schemes
EXPERIMENTATION
• Probing, testing and verifying
DEVELOPMENT
• Minimize conflicts
• Interdisciplinary integration
EVALUATION
• Determination of worth
• Comparison of alternative schemes
DECISION
Info. 1
Info. 1 / Info. 2
Info. 2 / Info. 3
Info. 3
Info. 3 / Info. 4
Info. 1 / Info. 4
Info. 4
INFORMATION 4
INFORMATION 5

include subjectivity, through the use of fuzzy sets. They touch on mathematical procedures, and seem, according to their authors, "to show promise of bridging a gap between quantitative and qualitative statements and reasoning". (Brown & Yao, 1982, p.70)

Four approaches to design process

Curriculum workers can find many implications for their own work in the models of the design process presented by architects, industrial designers, and planners. There follow four such approaches to design. The first (Figure 2) is presented by a team of architects with more than fifty years of combined professional work in architecture:

Figure 2



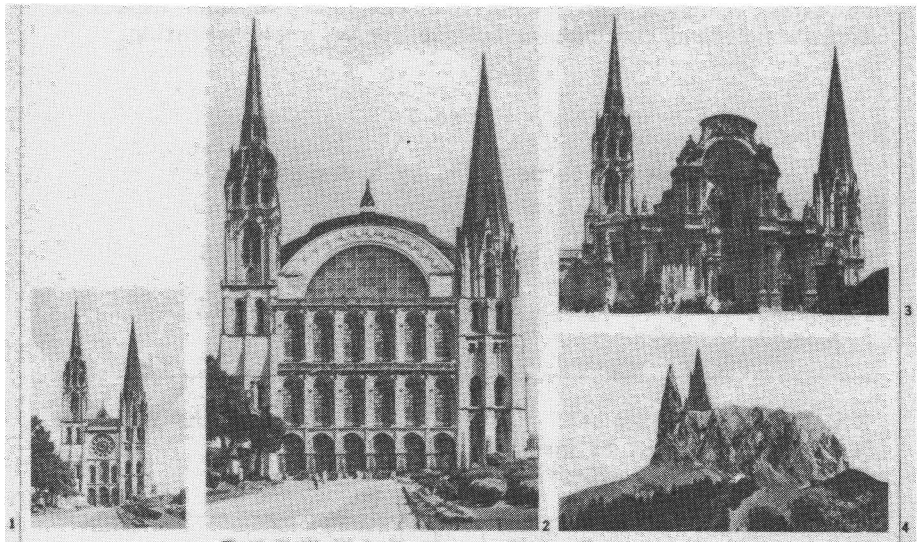
The second (Figure 3) is presented by a professor of architectural engineering.

A third approach is represented in their book Idea as Model (1981) by Pommer and Hubert, who state that

"Design is reading. Design is rewriting existing architecture. Design is transforming existent types ... Design implies a dialectic between the new in relation to the **memory** of the old. But design is also a **production** of meaning, the transformation of the old into the new; the mutation of the known into the unknown."

In addition to designing new buildings and environments, architects renovate, refurbish, rehabilitate, convert, improve, and repair. It seems that this is what often happens to curriculum prepared at the provincial level, when it is being implemented at the district or local level. It is amusing to compare curriculum with these illustrations, showing what might happen to Chartres Cathedral in different hands.

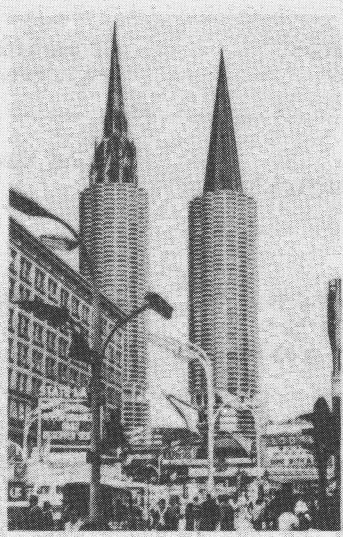
Figure 4

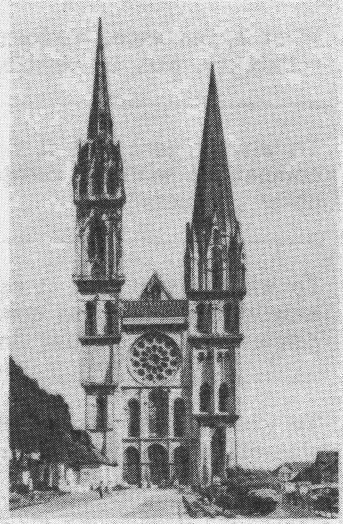


CHANGE AT CHARTRES

The tourist view of Chartres is transformed beyond recognition by Alain Barandard in his book *La Cathédrale de Chartres dans tous ces états.** After rehearsing several responses, starting with arrival on the 13.52 train primed with information gleaned from a guidebook, he asks, 'Why remain trapped with sagging jaw and glazed eyes?'. He then sets about the metamorphosis of the cathedral in 62 annotated photomontages in various categories (symmetrical, economical, analogical, homogeneous, repetitive, utilitarian, ecological) and a historical fantasy which should make even the most brazen authors of glossy brochures blush.

1 Chartres Cathedral.
2 'Palais des expositions'.
3 'Adaptation baroque'.
4 The erosion after the Ice Age etched enigmatic forms of great precision. . . .
5 (facing page) 'Carlton-Hilton'.
6 It was not until the Restoration that the cathedral was rebuilt in a more stripped down and resolutely modern style.
7 Corbelled cathedral.





*Published on French by Editions Denoel, Paris. ISBN 2 207 22793 6.

The fourth approach is a set of questions, formulated by an industrial designer, which lead us directly into another aspect of architecture and curriculum: buildability or implementation.

Figure 5

Questions to be asked by a design team

QUESTIONS ABOUT PRODUCT	SOURCES OF ANSWERS
Will the sponsor like it? Is it in his interest to invest in it? Will it be put into effect?	Sponsor and financier.
Does it make the best use of available materials and components?	Suppliers.
Can it be made cheaply enough with available resources?	Producers.
Can it be distributed through available channels?	Distributors.
What appearance, performance, reliability, etc. is required?	Consumers and sales organizations.
To what extent will it be compatible with, or competitive with, other products?	Other sponsors.
To what extent will it restructure the existing situations to create new demands, opportunities and problems?	Large scale system operators.
To what extent are its effects, and side-effects, acceptable to all concerned?	Political institutions and pressure groups.

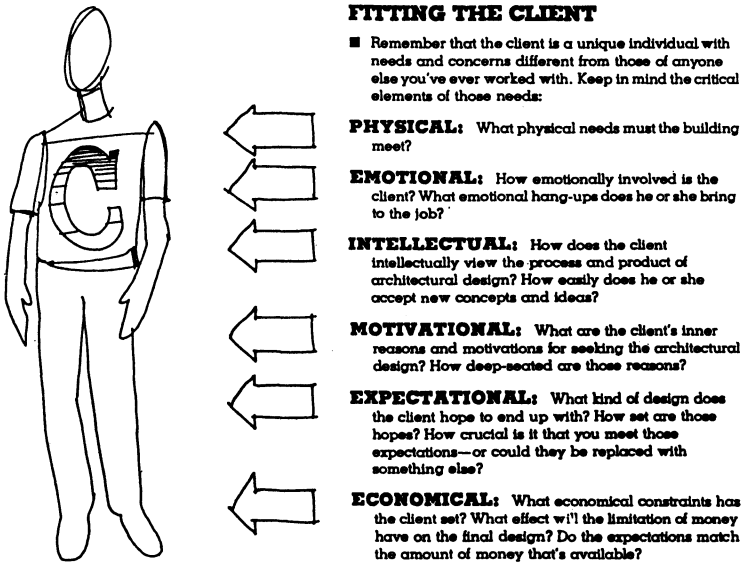
(Jones, 1970, p.8)

In a recent issue of the Architects' Journal we find this:

"...If architects made their designs more 'buildable' they would get more jobs, the environment would benefit, clients would be happier and the old confrontation between architect and contractor which is still with us might be replaced by a common determination to build better". (Allsopp, 1983, p.29)

Figure 6, prepared for students of architecture, would seem to have equal relevance for those concerned with curriculum.

Figure 6



It seems reasonable that architects and curriculum workers both need considerable contact with their clients, and need to establish rapport and credibility to convince the client that they can fulfill expectations with understanding and commitment. They need feedback.

Another "buildability" implication for curriculum may be found in the types of construction communication used by architects: detailed floorplans, schedules, site plans, diagrams for foundations and footings, framing instructions for the horizontal assemblies, sections to help visualize spatial relationships, elevations, utility plans, details, and specifications as given to the construction workers who will transform the idea into actuality. For example, rough sketches, quick models, renderings, presentation models, and slide presentations are all

techniques used by architects and planners to "flesh out" floor plans and schematics.

Evaluation by aesthetics, logic, meaning - and postoccupancy

Traditional architectural criticism has had as its main focus aesthetics. But in architecture, as well as in those scholarly criticisms of the work of some of Eisner's students, the aesthetic is being increasingly seen as only one of many design elements affecting users of buildings. For example, if we return to the Chartres Cathedral image, an article in Scientific American alerts us to the fact that although it is Chartres that has been traditionally extolled as the better piece of architecture, Bourges is the better piece of engineering (Mark, 1975).

In our field there are those who approach curriculum theory through philosophy, and in planning and design theory the use of formal logic is receiving increased attention. In The Educational Imagination (1979) Eisner suggests that the legal advocate might be a model for the curriculum worker, but he does not develop this idea, preferring instead to focus on the critic and the connoisseur. To get some idea of how formal logic could be used in planning I looked at a study that submitted the concept of desirability to logical reconstruction (Baljon, 1982). This study gives examples, particularly in the area of goal statements, of how a lack of formal logic in planning theory can be found in the way in which all kinds of irrationality or incomplete rationality emerge from "common-sense" notions of planning. Baljon talks about both linear and non-linear planning processes, and could, in fact, be addressing curriculum developers, implementers, and evaluators rather than planners.

Sir Christopher Wren wrote:

"Architecture has its political use, public buildings being the ornament of a country; it establishes a nation, draws people and commerce, makes people love their native country."

The study of meaning (semiotic inquiry) has potential for both curriculum and architecture, as we seek to determine the meaning of those things that we have built and the structures (curricula) that we are presently building. That semiotic inquiry in architecture is becoming more important is indicated by the cartoon in Figure 7.

Of particular interest to curriculum workers in the architectural notion of postoccupancy evaluation. To date, postoccupancy evaluations have focussed primarily on the impact of designs on users. Zimring and Reizenstein (1981) suggest that postoccupancy evaluations can be more clearly understood if they are compared to familiar notions of architectural criticism. A critic may visit the site, examine photographs, or

Figure 7

"What does it mean?, I don't recall your asking what the Empire State Building meant."

look at other buildings by the same architect; but the methods depend on the individual approach of the critic. By contrast, postoccupancy evaluations use systematic, often quantitative, as well as qualitative methods of investigation to gain a valid picture of the users' views of the building. Evaluation methods are described fully in Inquiry by Design (Zeisel, 1981) and in Environmental Design Evaluation (Friedmann, Zimring, and Zube, 1978). Of particular interest for curriculum evaluation are Friedmann, Zimring, and Zube's views that a postoccupancy evaluation has five elements: the users, the building itself, the socio-historical context, the design process, and the neighbourhood. They stress that "users" don't just live or work in the building - they may simply be passersby. The building is described in terms of size, cost, and materials, but also in terms of other qualities important to users like noise and visual privacy. The socio-historical context describes the broad forces that influenced the building's design, such as social pressures for energy efficiency. Postoccupancy evaluations generally describe who made the decisions and help us to understand various people's roles in determining the final "shape" of the building. Finally the neighbourhood is considered. How does the building "fit"? Aesthetically? Socially? How does the building affect neighbourhood pride and self image?

Conclusion

Of necessity this paper is very general, and I have only touched on a few of the many architectural implications for curriculum studies. It is tempting, for example, to seek to find metaphorical relationships with curriculum in such common building systems as the flat truss, tensile, frame, post and beam, and vaulted systems.

At the end of my curriculum class I show Figure 8 to small groups of students. This is a costume for a nineteenth century architect. The students' task is to provide a costume for a contemporary curriculum worker. The result invariably has several hats, and fingers in many pies. It may be a marionette, with stakeholders pulling strings. Sometimes the character is skating on thin ice. But setting aside the humour, there is a graphic concern with demonstrating how functional, economic, aesthetic, social, and ethical considerations are interrelated, and important.

If the architect can teach us anything, he or she can lead us to a better understanding of the broad parameters of design; can help us appreciate the challenge of using both art and science to build habitable curriculum; and can help us realize the importance of visual, verbal, and three-dimensional communication in the design of curricula and curriculum materials, in their implementation, and in their evaluation.

Figure 8

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Figures

Figures 2 and 6
Information Design Inc. Notes on Architecture. Los Altos: William Kaufmann Inc., 1982.

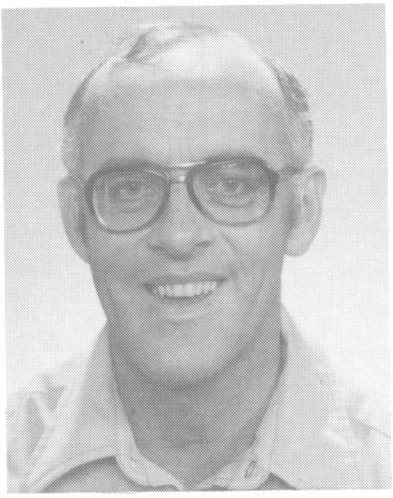
Figure 3
S.J.Y. Tang. "Tanguage and architecture." Design Methods and Theories, 1982, 16(3).

Figure 4
"Change at Chartres." The Architects' Journal, 1983, 177(2).

Figure 5
J.C. Jones. Design Methods: Seeds of human futures. London: Wiley Interscience, 1970. Reprinted by permission of John Wiley and Sons. Ltd.

Figure 7
Architectural Record. 1983, January. Reprinted by permission of Charles Saxon. Copyright 1984.

Figure 8
D.G. Emmerich. Course in Constructive Geometric Morphology. Seattle: Department of Architecture, University of Washington, 1970.



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