If I were to write a sequel to *Thirty-three Educational Design Principles for Schools and Community Learning (National Clearinghouse for Educational Facilities, 2003)*, THIS would be it, both in process and content. True to the mission of DesignShare, this book is also a sharing of ideas, and is explicitly open-ended, inviting dialogue from all who read it.

"...It is possible that each person may once again embark on the construction and development of his own language—perhaps taking the language printed in this book, as a point of departure" (Christopher Alexander, *A Pattern Language*, p.xvii). I think the same could be said for this book.

Jeffery A. Lackney
Madison, WI
March 15, 2005

Introduction

Inspired by Alexander

When Christopher Alexander wrote *A Pattern Language* more than 25 years ago, he approached architecture from a unique perspective. He looked at the real world of people plus the buildings and spaces they inhabited in order to understand the connections between the built environment and the human psyche. Focusing on architectural and landscape attributes that worked, on places that felt pleasant or were spiritually uplifting and to which people were attracted rather than turned off, Alexander was able to identify many spatial "patterns" that nourish the human communities they support.

Interestingly, the larger body of architectural work, in the period immediately following the publication of Alexander's ground-breaking book, does not appear to have affected the way we build our homes, our towns and cities. However, over time, Alexander's work has gained credibility as the ideas he presented have begun to enter the scientific realm of complexity theory, fractals and neural networks—disciplines on the cutting edge of science. The "connections" between the built environment and healthy communities that Alexander was pointing out are now more readily apparent. Today, we know that human brains are actually hard-wired to understand and respond to patterns in all spheres of our life and, particularly, to those that exist within our built environments.

Our book, *The Language of School Design,* does not claim to be scientifically based. The book draws upon our own experience as school planners and the best practice of school design from over 20 countries, represented by hundreds of innovative school designs that we have published at DesignShare.com.

Why a Pattern Language for Schools?

We felt the need to develop a pattern language for schools for the simple reason that while Alexander's book is now beginning to influence the planning and design of healthy communities, transformation is painstakingly slow in the world of school design. Despite the fact that the educational establishment itself has embraced a number of innovative approaches over the years, architects often hear educators speak with a vocabulary reminiscent of their own

childhood experiences in school buildings designed for a different time.

Why do schools look the way they do? Why is there a chasm between widely acknowledged best practice principles and the actual design of a majority of school facilities? Why has the connection between learning research and educational structures been so difficult to repair? These are the questions that we have been grappling with over the past decade as school planners.

A Common Design Vocabulary

From our own experience and from the research, we have begun to understand that one of the biggest roadblocks to innovation is the lack of a common design vocabulary that all school stakeholders can share. In other words, there is no quick and elegant fashion in which design ideas can be developed and tested in a way that truly involves all stakeholders.

Most of the larger school systems (and many of the smaller ones as well) rely on their own internal "quality control" methods to develop schools. But the inadvertent result of all this quality control is a lot of sameness and little innovation.

The climate in which schools are developed today, with heavy reliance on educational specifications, design guidelines, exemplars and prototypes, leaves little room for real creativity and innovation. Educational specifications create a school before it is created—design guidelines are too prescriptive (so that architects are often relegated to the role of assembling pieces instead of doing real design). Exemplars look good on paper or may have worked in certain specific circumstances, but have little to do with the needs of particular communities; and most prototypes are about cookie-cutter schools that don't even pretend to be community specific. We firmly believe that schools need to grow from a shared vision. But we know that much can be lost in the translation of a written vision into built form. And so, we need a graphic pattern language to supplement the written words—a pattern language that is so simple that every participant in the planning process can not only understand it, but actually create their own patterns or easily amend ones developed by their design professionals. In this sense, our pattern language differs from Alexander's in that we wanted to create an actual, usable design vocabulary for schools as a living, changing thing—similar to the spoken and written language that changes as cultures grow and change—but one that everybody can use.

25 Patterns Are Only A Beginning

We want to emphasize that we are not presenting these design patterns as a comprehensive vocabulary for school design. The 25 patterns contained here only *begin* to define the graphic language for the design of healthy and functional learning environments. To the extent possible, we have selected patterns that represent certain universal principles, though they are not to be used as a template or prototype of how any given element in a particular school should be designed.

School designers should look at these patterns as a starting point for developing their own patterns or modifying the ones provided here. Of course, in certain circumstances, some of these patterns will be usable without modification.

Some Pattern Ideas That Need to Be Further Developed

The professionals who reviewed this book submitted many useful suggestions that have already been incorporated into this first edition. Some of these ideas need to be explored further, and to do this we are recruiting the book's future "authors"—the readers—to create new patterns that best represent these ideas. Here is a small sampling of the areas that will be developed in the next edition of *The Language of School Design:*

- To what extent do state standards and required curriculums dictate the manner in which school buildings are planned and designed?
- Do the facilities created as a result of such external educational forces help or hurt learning goals?
- How does the physical design of a school affect the social dynamics of the school community?

The last issue has been partially addressed via the various patterns in this book that encourage social learning. Some of the areas need to be looked at further, such as the way in which toilets can be designed and located to mitigate the problem of bullying. Other issues deal with the conditions that seem to attract particular groups of students to "territorialize" parts of the school campus and how these areas move back and forth between various age groups as they progress through school.

Diagrammatic and Illustrative Patterns

Each of the 25 patterns (and their sub-patterns) in this book can be categorized as either diagrammatic or illustrative.

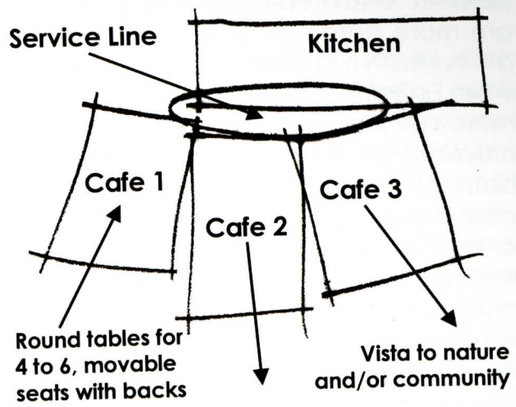

Figure I-1. Diagrammatic pattern for cafés at Goa International School, India. Planner: Fielding Nair International (FNI); Architect: FNI with Dennis Coelho and Suhasini Ayer.

Diagrammatic Patterns: A diagrammatic pattern is a rough sketch of a "big idea." In this sense, a diagrammatic pattern is somewhat generic and universal in scope. That doesn't mean a diagrammatic pattern will represent a spatial relationship that works in all cases, but it is intended to represent a particular philosophy of planning and design, more than the actual design of a particular school. See Figure I-1.

Diagrammatic patterns are useful early in the planning process as a graphic sounding board to gauge a client's general educational philosophy and design preferences. A diagrammatic pattern can also be created very quickly and "on-the-fly" to capture specific ideas during planning and community meetings. These kinds of early sketches often influence the final design.

Illustrative Patterns: Illustrative patterns are different from diagrammatic pat-

terns in one important respect—they are more detailed. It is not unusual for an illustrative pattern to also be somewhat universal in scope. In general, the more detailed the illustration is, the less universal its scope. If this is so, why bother with an illustrative pattern and can it even qualify as a pattern? The answer is yes. We believe that any illustration can be a "pattern" as long as it documents spatial relationships in a way that communicates the big idea. That is why diagrammatic patterns intended to first introduce a big idea often turn into illustrative patterns to flesh out that big idea. In Figure I-2 the illustrative pattern shows how the design pattern fits into the overall design process.

How to Use the Pattern Language Method

Let us take a moment to introduce how exactly our Pattern Language Method can help in the design process by looking at a specific example of its use. Figure I-2 shows the stages in the development of a cafeteria design for a school that was aided by the use of design patterns. This client originally started with the idea of building a typical large school "cafeteria." During the course of the discussion utilizing the Pattern Language Method, we were able to understand how the cafeteria should not only reinforce the school's desire to create "community," but also give a special identity to each of its Small Learning Communities. We understood that this could not be done without somehow breaking down the scale of the large cafeteria into smaller cafés. However, because of financial constraints, we needed to service all the cafés utilizing one central kitchen.

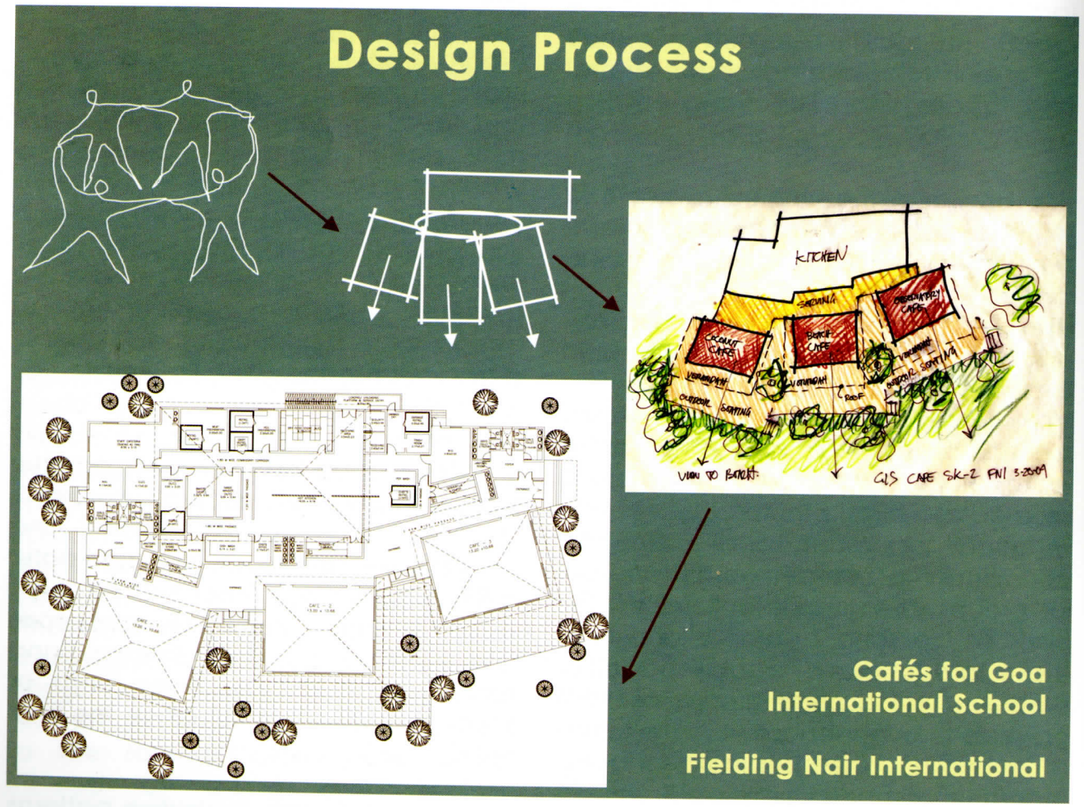

Figure I-2. Illustrative pattern for Goa International School shows how the Design Pattern fits into the overall design process.

These discussions led to a very rough penciled pattern showing how three separate cafés might be developed that could be serviced by one central kitchen (Figure I-1). Once the team agreed with this direction, a more illustrative pattern was developed by the planning team that allowed the architects to produce a scaled schematic design drawing (Figure I-2). Utilizing this system, we can break down the communication barriers to good design that often beset school architecture.

In Pattern #25: *Bringing It All Together* (Figures 25-1, 25-2, and 25-3), we look at another example—this time for a whole school. This is to demonstrate how the Pattern Language Method we are proposing is not only about the elements that make up a school, but also about effectively setting up the design for a whole campus.

Knowing its value as an important aid in the school planner's toolbox, we are interested in continuously expanding our graphic "vocabulary" and sharing the information with all those involved in the creation of schools and school facilities. We have created a special online interface at our website (http://designshare.com/patterns)to collect more graphic patterns from the school planning community based on their own experiences. Periodically, we will review and edit the patterns submitted and reissue this book in electronic and print form.

The Numbering System for Design Patterns

Our *Language of School Design* starts with a look at 25 distinct "patterns," each representing a distinct area of school planning and design. The patterns are numbered from 1 to 25. Within each identified area, there are potentially many different patterns or sub-patterns. These become associated with the original pattern. For example, we have many patterns under the primary learning area umbrella, the classroom in its many iterations, which is Pattern #1.

As we move forward and new patterns are added, we will determine first if the pattern belongs in one of the original 25 "categories" already established. If it does, we will add it to that category and give it its appropriate number from 1 to 25 plus an alphabetical suffix *a, b, c,* etc. On the other hand, if the pattern brings a new idea to the table, it will get its own number such as 26, 27 and so on.

The advantage to this system is that Pattern #1 will always be the place to go to for information about the primary learning area: classrooms, studios, Advisories and the like. Similarly, entrance features will always be part of Pattern #2, so people can quickly refer to Pattern #2 for information about entrances, or for example, to Pattern #22 for sustainable design, no matter which edition of the book they have.

With far less investment of money and effort than the traditional system, where designers and school stakeholders do not share a common language of school design, the Pattern Language Method can help build consensus quickly, and create superior designs.

Introduction

Enriching the Four Realms of Human Experience

It is clear that most school architecture tends to look at spaces in a linear way—that means we first decide what a space would be used for and then we design the space for that activity. This kind of thinking ignores the complexity and research about the human brain and human experience, resulting in the design of static spaces that inhibit learning.

The reality is that the design of learning environments is a complex assignment. While the solutions may be simple or elegant, they can almost never be "simplistic." We need to understand the complexity of the human experience as noted above in order to understand what "learning" is about. We also need to recognize that it is almost impossible to solve a design problem unidimensionally. Everything we do as designers impacts the users of the space at many different levels.

What exactly in the whole range of human experiences does The Pattern Language Method encompass? In response, we can say that it deals with four major and simultaneous realms of human experience—spatial, psychological, physiological and behavioral. Each of these realms is characterized by multiple "attributes." See Table I-1.

What is fascinating about this list is the obvious interconnectedness of the attributes across the four realms and the fact that the interconnectedness is non-linear. That means it is nearly impossible to identify simple cause-and-effect relationships between specific attributes that would hold true always. These relationships are always contextual, but they are far from being outside our ability to control. For example, research tells us that as humans our sense of sight (physiological realm) is a major emotional (psychological realm) trigger. We also know that our emotions can elicit a physical response (behavioral realm) such as laughter when we are happy, facilitated to a lesser or greater degree by the environment (spatial realm).

Let us look, for example, at "Light on Two Sides" in the original *A Pattern Language* by Christopher Alexander, which advocates having daylight penetrate a room from more than one direction. The purpose is to reduce stark contrasts that characterize rooms with only one window. Of course, if the problem were simply one of lighting a given space, it

Table I-1. The four realms of human experience and their corresponding attributes.

Realms of Human Experience Within the Purview of School Planning and Design	Attributes
Spatial	Intimate, Open, Bright, Closed, Active, Quiet, Connected to Nature, Monumental, Technological
Psychological	Soothing, Safe, Awe-Inspiring, Joyful, Playful, Stimulating, Creative, Encouraging Reflection, Spiritually Uplifting, Creating a Sense of Community
Physiological	Warm, Cool, Cozy, Breezy, Healthy, Aromatic, Textured, Visually Pleasing
Behavioral	Independent Study, Collaborative Work, Team Work, Physical Fitness Activity, Research, Writing, Reading, Computer Work, Singing, Dancing, Performing, Presenting, Computer Work, Large Group Work, Communing With Nature, Designing, Building, Teaching, Relaxing, Reflecting, Playing

could be accomplished with one window or even with adequate artificial light but that would miss Alexander's point, which goes to the heart of how we as humans experience our environment.

Going beyond individual patterns and focusing on how they work together, Alexander likes to refer to a building's functional complexity using such words as "dense" and "profound." He compares a well-designed building to poetry as opposed to prose, because the former can be understood at many different levels that go beyond the meaning of the individual words. In the same way, a good building can either "string together patterns" without any real coherence or assemble them to create poetry in design form.

This is the fundamental thesis behind the Pattern Language Method advocated by Alexander and by us in this book; that there are certain recognizable "patterns" that define healthy spatial relationships both at a micro and macro level. Unlike Alexander's ambitious work which encompasses human environments at every scale, we have limited our focus to the design of learning environments. However, we acknowledge that the learning environment is actually nothing more than one piece of a larger pattern and that good planning requires that each piece be respectful of the overall patterns for communities and towns that the original *A Pattern Language* identifies. In this sense at least, it is really impossible to ignore the larger context in which a learning community is situated. We have addressed this in a limited way in Pattern #24, Connected to the Community, but we strongly urge our readers to read Alexander's *A Pattern Language* for a treatise on the larger spatial patterns in our communities, towns and cities.

To pass the test and qualify as a "pattern," there has to be a certain universality to its application. A good example is Pattern #23, *Local Signature*, which cites three extremely diverse examples from Perth, Western Australia, from Goa, India and from Bridgehampton New York. Even though the examples themselves would seem to have nothing in common, the common human experience they seek to evoke ties them together within one "pattern."

The Pattern Language Method is a sensible way to provide room for these various facets of our essential natures to be stimulated, while at the same time allowing for the wide range of human interests and behavioral tendencies to co-exist peacefully. An example of how the four realms can be made to work in practice is the placement of an art room with natural lighting and a landscape view (physiological and spatial realms) intended to evoke a desired creative response (behavioral realm) by ensuring a suitable peaceful and reflective frame of mind (psychological realm). The ability to rearrange the room so that different persons can organize themselves at different times of the day for different artistic activities makes the design more robust. Our desire for flexibility must not supercede our primary intent, which is to positively manage the complex relationship within the four realms in order to create an environment conducive to artistic endeavors.

It is also clear from the above discussion that there is a certain synergy within the patterns themselves—a point we touched upon earlier. The above example for the design of an art room borrows ideas from various patterns in the book entitled: *Daylighting*, *Indoor–Outdoor Connection*, *Student Display Space*, *Indoor–Outdoor Vistas* and *Art, Music and Performance*.

A school, or any learning environment for that matter, in its totality, represents a very complex organization, but one that can usually also be represented in the form of a "pattern." An example of this is the "*Bringing It All Together*" Pattern #25. The larger pattern will only make sense, however, when its sub-groupings are also recognized as complete "systems," themselves deserving to be represented as patterns.

While we are only listing the positive attributes of the four major realms of human experience, many attributes have a paired negative attribute as well, that we as school designers don't want to trigger via the design we create. Examples of negative attributes would be claustrophobic, stale, gloomy, drafty, dysfunctional, depressing, scary, inflexible, uncomfortable, banal, and so on.

Obviously, the permutations and combinations by which the various positive attributes can come together are almost infinite and that is why healthy "patterns" are important to identify. The patterns included in this book have been developed over time and are based upon our experience with spatial relationships that are functional at a very fundamental human level. These patterns respect the great complexity of human needs that vary not only with time and the context in which people operate, but also from person to person.

Beyond the curriculums and tests that define so much of what school is all about, it is ultimately our ability to enrich the four realms of human experience noted above that will determine how well we have done our work as school planners, designers and as members of a learning community.

Introduction

The 25 Patterns

We have selected the following 25 school design patterns because they represent a fairly complete range of the various design principles that define best practice. It is important to stress that dozens of variations of each diagram we have provided are possible. The number of diagrams that can be done is only limited by the school planning team's imagination. And yet, each diagram included in this book embodies certain universal principles—and the principles themselves are less likely to change from site to site.

1. Classrooms, Learning Studios, Advisories and Small Learning Communities
2. Welcoming Entry
3. Student Display Space
4. Home Base and Individual Storage
5. Science Labs, Arts Labs and Life Skills Areas
6. Art, Music and Performance
7. Physical Fitness
8. Casual Eating Areas
9. Transparency
10. Interior and Exterior Vistas
11. Dispersed Technology
12. Indoor–Outdoor Connection
13. Soft Seating
14. Flexible Spaces
15. Campfire Space
16. Watering Hole Space
17. Cave Space
18. Design for Multiple Intelligences
19. Daylighting
20. Natural Ventilation
21. Full Spectrum Lighting
22. Sustainable Elements and School as 3D Textbook
23. Local Signature
24. Connected to the Community
25. Bringing It All Together

Introduction

The Pattern Language Method

The 25 "starter" patterns in this book have been ordered into six categories as follows:

1. Parts of the Whole
2. Spatial Quality
3. Brain-Based
4. High Performance
5. Community Connected
6. Higher Order

We talked earlier about interconnectedness of the four realms of human experience that healthy patterns try to balance. A great deal of interconnectedness of patterns also occurs across the six areas listed above as shown in Table I-2.

Individual patterns may themselves have qualities that qualify them for consideration under more than one category; however, we have tried to identify each pattern under the one category that describes its purpose most clearly. In only two cases have we placed a pattern under more than one category; and in these cases, we have identified the primary category under which each one belongs. (Pattern #1, dealing with classrooms and Small Learning Communities, is primarily classified as category one, Parts of the Whole, but also fits the description of category six, Higher Order. Pattern #2, Welcoming Entry, is primarily classified as category one, Parts of the Whole, but also fits the description of category # 5, Community Connected.)

We expect that all future patterns will fall into one of the above six categories though we are open to considering the inclusion of additional categories should we discover a school design pattern that does not fit the description of the above categories as follows:

Parts of the Whole: These are patterns that describe specific functional areas of a school. The first 8 patterns presented in this book starting with classrooms and Learning Studios and ending with Casual Eating Areas look individually at several key parts of the whole school—thus the term "parts of the whole." However, not every school will contain all the parts we have discussed under Pattern Numbers 1 through 8. By the same token, it is possible that we have not listed every functional area that a school might contain. Many specialty academies contain highly customized spaces designed to meet particular functional needs. For example, the Center for Advanced Research and Technology (CART) in

Clovis, California contains a Forensics Lab whose requirements may only be partially captured by the patterns in this book.

Spatial Quality: These are patterns that describe the quality of a given space or spaces and cut across functional areas. Transparency and flexibility, for example, are spatial qualities that apply to several of the other patterns.

Brain-Based: The primary facet of a brain-based pattern is that it responds to some particular aspect of brain-based research. Patterns in this category deal with the design of spaces that stimulate the brain in ways that are beneficial to learning and overall human development. The four patterns listed under this category are important to consider in the design of any and all parts of the school and relate again to the concept of interconnectedness.

High Performance: High Performance is a term that applies to the efficient operation of the building, as well as the way in which it is designed to get the best "performance" from its occupants by providing a healthy, safe and cheerful environment. These are patterns that highlight a building's connection with nature, its sustainable qualities, and the opportunities that are available to translate the way it is put together into self-evident learning tools—thus the term, "3D textbook."

Community Connected: There is ample evidence that schools that are integral parts of their communities work better. Not only are students of community schools more likely to get a better education, but community schools also serve to strengthen social ties and build economic value for the neighborhood as a whole. But Community Connections as a pattern goes beyond making schools into community icons; it involves locating the school in a place that allows the students to get at least a part of their education by participating in activities within the community and outside the school building. A school can thus be "connected" to the community by having students take part in community service assignments, by working at local businesses, corporations and institutions, and by utilizing the resources of existing community facilities such as the local YMCA or library.

Higher Order: We define a Higher Order pattern as one which encompasses other patterns within it. The most obvious example is Pattern #25—Bringing It All Together. This is a pattern that shows how an entire school might be arranged and, therefore, includes various components that can themselves be represented as patterns. At a smaller scale, Pattern #1 also qualifies as a Higher Order Pattern because its subpatterns are actually combinations of simpler concepts that are put together using stand-alone elements like the Learning Studio and the Advisory.

Table I-2. Classification of patterns.

Pattern #	Description	Pattern Type					
		Parts of the Whole	Spatial Quality	Brain-Based	High Performance	Community Connected	Higher Order
1	Classrooms, Learning Studios, Advisories and Small Learning Communities	**X**					X
2	Welcoming Entry	**X**				X	
3	Student Display Space	**X**					
4	Home Base and Individual Storage	**X**					
5	Science Labs, Arts Labs and Life Skills Areas	**X**					
6	Art, Music and Performance	**X**					
7	Physical Fitness	**X**					
8	Casual Eating Areas	**X**					
9	Transparency		**X**				
10	Interior and Exterior Vistas		**X**				
11	Dispersed Technology		**X**				
12	Indoor/Outdoor Connection		**X**				
13	Soft Seating		**X**				
14	Flexible Spaces		**X**				
15	Campfire Space			**X**			
16	Watering Hole Space			**X**			
17	Cave Space			**X**			
18	Design for Multiple Intelligences			**X**			
19	Daylighting				**X**		
20	Natural Ventilation				**X**		
21	Full Spectrum Lighting				**X**		
22	Sustainable Elements and School as 3D Textbook				**X**		
23	Local Signature					**X**	
24	Connected to the Community					**X**	
25	Bringing It All Together						**X**

* Where a Pattern is listed under more than one category, then the bold-faced "X" indicates that pattern's primary classification.