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Learning environments : redefining the discourse on school architecture

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ABSTRACT

LEARNING ENVIRONMENTS: REDEFINING THE DISCOURSE ON SCHOOL ARCHITECTURE

by
Alessandro De Gregori

The thesis maintains that the physical environment of the school is only one component, although an important one, of learning environments suitable for learner-centered, *constructivist* approaches to learning. Accordingly, school architecture should relate to both, the *physical* as well as the *social* environmental contexts. This perspective could invite educators and architects to participate in a collaborative discourse for realizing most effective and sustainable learning environments, one school at a time.

In search of *learning factors*, factors that could influence learning and engage educators and architects in a collaborative discourse, the study addresses the following:

- a) A review of literature related to education, school architecture, and environmental psychology;
- b) Interviews with school architects and educators;
- c) Case studies of schools that exemplify distinctive approaches to the design of learning environments.

Among the findings, the thesis identifies three learning factors: *classroom organization*, *learning technologies*, and *school climate*, as components of a conceptual framework that could advance a common language between educators and architects. Overall, the thesis confirms the importance of an *environmental approach*, and moves to *redefine the discourse on school architecture*, by suggesting interdisciplinary research related to the findings, as a strategy to advance knowledge and shared understanding of effective learning environments.

**LEARNING ENVIRONMENTS:
REDEFINING THE DISCOURSE ON SCHOOL ARCHITECTURE**

by

Alessandro DeGregori

**A Thesis
Submitted to the Faculty of
New Jersey Institute of Technology
In Partial Fulfillment of the Requirements for the Degree of
Master of Science in Architecture**

New Jersey School of Architecture

May 2007

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APPROVAL PAGE

**LEARNING ENVIRONMENTS:
REDEFINING THE DISCOURSE ON SCHOOL ARCHITECTURE**

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To the Student
and
my family, my mentors,
and the Architect Mario Bellini, who fostered my interest
in the design discipline.
I keep learning from all of them.

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CHAPTER 1

INTRODUCTION

1.1 Overview

This study originates from the assumption that designing and building new schools from such perspectives as building performance, or meeting the capacity demand for a growing student population, are not necessarily a sufficient or adequate approach to building effective *learning environments*¹.

In order to understand how an effective learning environment works, such as for meeting sustainable conditions of *constructivist*² approaches to learning, it is necessary to explore multiple factors related to learning, as well as the interactive process for planning and building such environments.

Therefore, the thesis maintains that the physical environment of the school is only one component, although an important one, of an effective learning environment. Furthermore, school design should be addressed from an interdisciplinary environmental perspective in order to overcome unresolved issues and thus redefine a sustainable approach to research and planning of learning environments. Most importantly, the thesis attempts to overcome cultural and language barriers that prevent common understanding

¹ A learning environment represents the physical, social, and cultural context in which learning occurs (Duke, 1988, p. 6).

² Several approaches to the current evolving discourse in education commonly relate to the term *constructivism*, which acknowledges the active role of the learner in the interpretation of reality, and ongoing construction of knowledge (Gulati, 2004). The related pedagogy emphasizes the importance of helping people take control of their own learning (Bransford, Brown, and Cocking, Eds., 2000, 12). Accordingly, the discourse in education addresses the design of constructivist learning environments (Jonassen and Land, Eds., 2000, 2). In advancing such a discourse, the thesis advocates the importance of integrating interdisciplinary contexts, those of the architectural and environmental disciplines in particular.

of issues related to learning as well as the development of a *collaborative discourse*³ for optimizing solutions for learning environments. For example, contrary to the meaning of the expression “learning environments” cited in Footnote 1, the evidence is that the expression has different meanings depending on the discipline where it is used. For a case in point, in architectural language the word environment tends to be related to space; and *learning environment* is generally understood as the physical space where learning occurs, typically a school. Conversely, in educational literature *learning environment* relates to the pedagogical landscape (i.e., student-centered teaching and learning), which has its foundation on a particular philosophy of education.⁴

However, the integration of linguistic boundaries is important, as it fosters common understanding and purpose in the discourse among different disciplines. Planning the physical space of schools as part of a comprehensive concept of learning environments is a measure of how important the development of a common purpose is for investing resources in effective learning environments. In other words, the postulate that the physical environment of the school can effectively support learning is contingent upon the collaborative discourse among the shareholders of the learning environment’s planning process.

To prepare for the practice of this interdisciplinary process, the study explores architectural, educational, and environmental psychology perspectives on learning environments. For example, the study examines the contribution that physical features

³ Collaborative discourse: the process of interdisciplinary communications and shared meanings among the school planning shareholders, in particular, architects and educators.

⁴ For an example of literature demonstrating a one-sided view of *learning environment*, see *Theoretical Foundations of Learning Environments* (Jonassen and Land, Eds. 2000), where the discourse on *learning environments* is not related to the physical space in which learning occurs.

may have on the *learning climate*⁵ of the school environment, students' learning engagement, and educational outcomes. By following this approach, numerous literature sources from the above disciplines reveal the attention researchers have dedicated to questions related to pedagogy, learning, and the relationships among learners, teachers and their environment. The latter type of question highlights the growing importance of issues related to the school climate as a factor of effective learning environments.

In general, research on learning environments covers all school ages, from kindergarten to institutions of higher education. Although some findings of this study are applicable to any level of learning, such as in relation to cognitive processes, and diverse forms of learning, this study reviews findings that could inform a collaborative discourse for planning and designing middle/junior and high schools. An interpretation of the findings points at main factors of effective learning environments that represent important issues of common interest to educators and architects. Such factors as *classroom organization*, *learning technologies*, and *school climate*, are intended as a strategic approach for advancing a collaborative discourse in school planning and, especially, in the development of interdisciplinary research on learning environments.

1.2 Significance of the Study

This study is critical at a moment in which the United States is engaged in school renovations and new construction to replace old and inefficient school buildings. The assumption of the study is that new schools need to meet the challenges of new directions

⁵ According to reviewed literature, the learning climate results from three important factors: (a) The educational philosophy informing the core of pedagogical values of the curriculum; (b) the quality of interactions among the people living in the school environment, students, teachers, and school management; and (c) important physical features of the school environment.

in education that address learner-centered, constructivist approaches to learning. Students living in a learning environment need to perceive that the space in which they spend several hours of their days, and important years of their life is a meaningful, inspiring space that conveys a *sense of place* and contributes to the *school climate*.⁶ Hence, new schools are to be envisioned as effective learning environments that support students' learning engagement and academic achievement.⁷

The importance of this study also stems from the context and far-reaching impact of current socio-economic trends. The global economy requires new skills, especially in high-technology sectors, and the development of innovative solutions for products and services.

We, China, India, and Europe can all flourish. But the ones who flourish most will be those who develop the best broad-based education system, to have the most people doing and designing the most things we can't even imagine today. (Friedman, 2006)

The above-mentioned trends that, according to Friedman, necessitate a "broad-based education system", introduce a new sense of urgency about the importance of learning creative and competitive skills. Such effort is inseparable from, and should be integrated in, the context of redefining the discourse on school architecture. Furthermore, the United States and other nations are preparing for the largest-ever influx of elementary, secondary, and college students. The increased global students' demographics are creating new demands on the design of schools, in terms of both capacity and geographical distribution.

⁶ In *italic* is a preview of terms found and explained as they occur in the context of the literature review of this study.

⁷ The average high school graduate has spent about 13,000 hours within the walls of a public school building...potentially the most impressionable and valuable hours of his life...Through this environment, the whole costly process of education may be encouraged or nullified (Carr, 1935).

Finally, the significance of the study stems from the history of school design in the United States, an unfolding process in which the social and physical environments have been planned in response to the needs of each other (Lippman, 2003b). However, a constant in the resulting structures reflects places in which the goal is spatial control (Kennedy and Moore, 1996).

To elaborate, square classrooms have traditionally been designed and built according to a pattern of units adjacent to each other and organized in rectilinear rows on one or both sides of narrow traffic corridors. This pattern could be justified as being cost-effective in construction. However, it may not be effective in relation to students' perception of the place, as it could be associated with the oppressive image of institutions, and structures that are organized by the necessity to control the behavior of occupants. Yet, the pattern has been a pervasive phenomenon in school buildings in the United States and around the world. It has created a typology that is taken for granted and is embedded in the collective unconscious.

In essence, the acceptance of traditional organization of classrooms, as central expression of a learning environment, has delayed the capacity to sustain effective criticism in view of changes in education, thus perpetuating the power of such a typology. Its disciplinary character is present in scores of anachronistic school environments that survive education reforms. A 2005 publication of the UK Design Council states, "Learning in the UK schools is evolving fast, but the environments where the learning happens are essentially the same as they were 100 years ago" (*Learning Environment Campaign Prospectus*), exemplifying a multinational perspective of the permanence of traditional classrooms' typology.

There is, however, a social component that manifests the attitude of such permanence. As long as capacity needs for increased student population and building performance criteria are met, public school buildings document a frequently unchallenged endorsement of the traditional classroom typology.

Hence, the contradiction offered by the repetitive construction of classroom typology up to recent times reveals, save notable cases,⁸ a historical inertia for developing a common language and collaboration between educators and architects to concurrently implement approaches to both education reforms and school facilities that are focused on learning and the effectiveness of the learning environment.

1.3 Study Questions

The premise that the lack of common language impedes a collaborative discourse on the design of effective learning environments leads to the following interrelated questions:

Q.1: Which important factors related to learning could facilitate a collaborative discourse between educators and architects for planning an effective learning environment in every new school project?

Q.2: What strategy would sustain ongoing development of knowledge and discourse on the architecture of schools' learning environments?

1.4 Method of Study

The inquiry on learning environments is organized in three phases. The first phase develops a thorough literature search that informs the development of the thesis. The next phase consists of a number of interviews with educators and architects. Two interviews, the most important, became most useful open-ended conversations. The recording of

⁸ For example, see Crow Island School's case study, p. 53.

these two conversations were transcribed and major excerpts are placed in the Appendix, although the content of both excerpts is packed with pertinent information and should be read as integral to the text of the study. The third phase includes four cases of schools that illustrate different architectural approaches to the development of effective learning environment.

The literature review, focusing on multi-disciplinary research and theoretical works on the complex interaction of physical, pedagogical, and social environments of learning is in Chapter 2. Chapter 3 summarizes the various interviews. Chapter 4 introduces four case studies of architectural solutions. They are significant examples of the intentions in the approach to a learning environment and the type of discourse among the stakeholders, typically educators and architects, which structured the related solutions. Chapter 5 builds on the findings and analyses of previous chapters to discuss environmental factors related to learning, or *learning factors*, that could support a collaborative discourse among the stakeholders in the planning, design, and construction of schools. The final recommendation is for the promotion of multidisciplinary research on learning environments, a strategy for a sustainable development of the collaborative discourse, and the alignment of pedagogical practices with the organization of the learning environment of schools.

CHAPTER 2

LITERATURE REVIEW

2.1 A Conceptual Framework

Research literature used in this study comes from sources in the United States and the UK. From these sources is also possible to find studies and cases of effective learning environments originated in European and Asian countries.

Considering the disciplines of education, environmental behavior, and architecture (see Figure 2.1), the purpose of this review is to identify interacting factors related to learning effectiveness⁹ that could advance the discourse on school architecture between educators and architects. Factors that would attract high educational interest would become building blocks of a conceptual framework for the collaborative discourse and subsequent research on the architecture of schools as effective learning environments.

2.2 Selected Learner-Centered Educational Theories

By and large, the Progressives' reforms have not been implemented on a widespread basis. (Schank, 1995)

2.2.1 Pioneers of Educational Philosophy and Practice: Dewey and Washburne

Carleton Washburne was a charismatic superintendent of schools in Winnetka, Illinois, from 1919 to 1943.

⁹ Learning effectiveness relates to the learner's opportunity for reaching the level of *optimal experience*, which benefits from a pedagogy that aligns the learner's skill level to the challenge level he or she has to deal with.

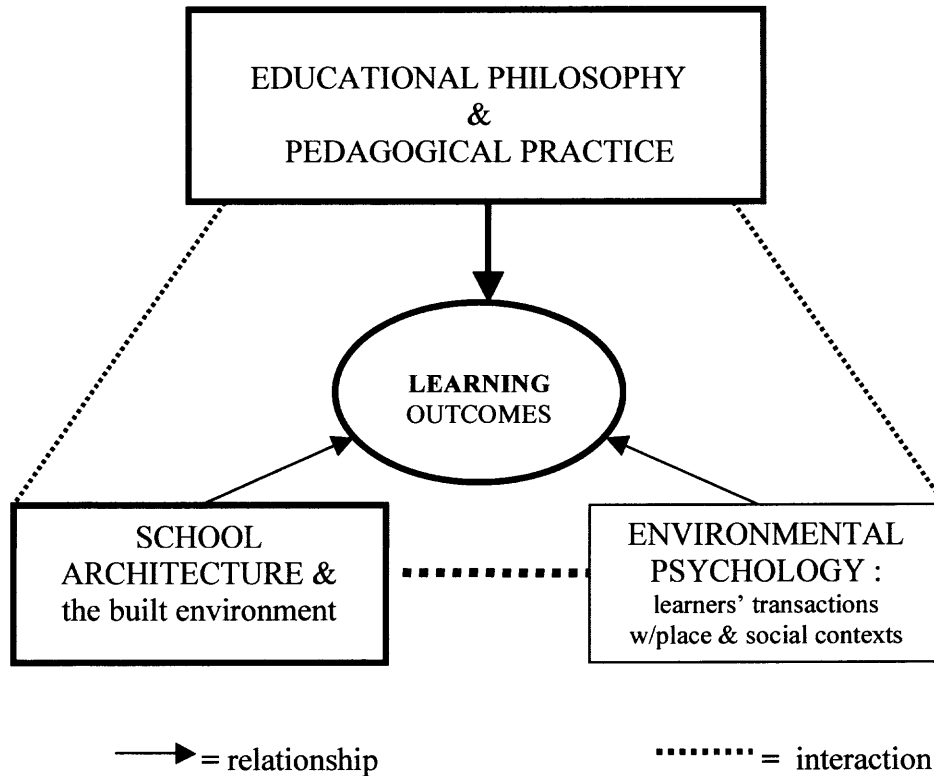


Figure 2.1 Conceptual framework of literature review related to the architecture of schools as learning environments.

Washburne applied and developed John Dewey's philosophy of progressive education to the Winnetka public school system. Of his books on education, one in particular, narrates the experience of developing his own interpretation of Dewey's educational philosophy (1997). His approach included a deep commitment to the importance of the school's physical environment for meeting pedagogical needs and supporting the school climate. The culmination of that commitment resulted in Crow Island School, a kindergarten to elementary school that became internationally famous, influenced school architects, and established the paradigm of a successful school planning process. Washburne had a direct impact on the general concept for Crow Island School and the classroom in particular, that he described in detail (1940; see also Figures 4.4 and 4.5, p. 55), a result of his development of a collaborative discourse with the

architects Eilil and Eero Saarinen, and Lawrence Perkins (Perkins, Wheeler and Will of Chicago). Crow Island School is discussed in Chapter 4 as a case study (p. 53).

2.2.2 Vygotsky's Zone of Proximal Development

Past and current pedagogical directions toward collaborative learning could be traced to Lev Vygotsky's (1978)¹⁰ concept of the *zone of proximal development* (ZPD), an aspect of Vygotsky's social development theory¹¹.

Accordingly, the "zone" measures the distance between learning in isolation and in relationship with others. For Vygotsky (1978), best advancement and appropriation of knowledge occurs in social transactions with other people and through use of tools for specific tasks.

2.2.3 Contemporary Theories of Learning Environments

The book *Theoretical Foundations of Learning Environments* (Jonassen and Land, Eds., 2000) presents a number of essays about interpretations and developments of cognitive theories since the 1990s that promoted an educational paradigm shift. A more social and constructivist view of student-centered learning is replacing past instructional views. In essence, the selected essays by Jonassen and Land sustain the argument that the shared meaning of "learning environment" is the operational framework of a student-centered pedagogy.

¹⁰ Lev Vygotski (1896-1934), Russian psychologist. His most productive years were at the Institute of Psychology in Moscow (1924–34), where he expanded his ideas on cognitive development, particularly the relationship between language and thinking. His writings emphasized the roles of historical, cultural, and social factors in cognition and argued that language was the most important symbolic tool provided by society.

¹¹ZPD: a level of development attained when children engage in social behavior. Full development of the ZPD depends upon full social interaction. The range of skill that can be developed with adult guidance or peer collaboration exceeds what can be attained alone. (<http://tip.psychology.org/vygotsky.html>)

In the essay *Student-Centered Learning Environments* (Land and Hannafin, 2000), the authors discuss five core foundations: *psychological*, *pedagogical*, *technological*, *cultural*, and *pragmatic*. What is avoided, however, is a discussion about the possible relation between pedagogy and the physical organization of space that facilitates rather than hinders pedagogy, from the overall concept of the school facility to the shape and organization of a classroom. The essay makes only an unspecified reference to the “context” in which learning occurs. The only reference to the physical organization of learning environments relates to the *technological* foundation. Here, technology, such as computerized applications for visualizing scientific investigations, is used to provide opportunities for learners to develop cognitive capabilities. Paraphrasing Vygotsky, technology tools are used to facilitate the learner in reaching his or her “zone of proximal development”.¹²

Land and Hannafin’s essay reviews multiple forms of learning and underscores a renewed interest in student-centered teaching and learning. According to the authors, the design of learning environments reflects the constructivist theory, which supports individual effort to construct meaning and engage in active learning. Examples of related instructional design are problem-based learning, project-based learning, constructivist learning environments, and open learning environments, all of which are based on the centrality of the learner in defining meaning (2000, p.12).

Another important essay in the book that relates to this thesis is by Young, Barab, and Garrett (2000, p. 147), about an ecological perspective on learning. The authors refer to Dewey and Vygotsky as the original promoters of active, individualized learning, the

¹² In debating this approach, the relationship between pedagogy and the physical organization of learning environments beyond the use of technology tools is a central argument of this thesis.

foundation of their research. They develop the argument that, in the perspective of ecological psychology, the unit of analysis is the interaction between the agent, the “intentionally driven” learner, and the environment. They conclude with the following recommendation to educators and curriculum designers.

“Think of instructional design (ID) as the process of creating environments that afford meaningful authentic activity. Consider that many students do not have goals for which instructional tools afford much action, so they must be led to adopt new goals (build a bridge, or help a character solve an everyday problem)... Those clever designers can also create learning environments that afford progress toward these new goals, environments that are so closely aligned with the goals that they encourage optimal performance” (Young et al., p.168).

By adopting the expression *optimal performance* the authors refer to the work of Csikszentmihalyi (1991) that is reviewed in Section 2.2.4.

Jonassen and Land’s review of new theoretical foundations is necessary because of their implications for the design of new pedagogy as well as schools facilities having the common purpose of optimizing the learning environment. Similar to Jonassen and Land’s approach, in an article published in *Change* magazine, Barr and Tagg (1995) discuss the urgent need to change the traditional “*instruction paradigm*” into a “*learning paradigm*” focused on the learner and the production of learning.

2.2.4 A Theory for the Optimal Experience of the Learner

Csikszentmihalyi’s (1991) “theory of flow” maintains that the key to having an *optimal experience* is for an individual to align the skill level to the challenge level they deal with. The right challenge level relates to the individual engagement to new challenge and skill development. In that condition a state of “flow” can occur, characterized by the loss of self-consciousness and where the individual’s activity is rewarded regardless of the

original goal. Too small a challenge level relates to the individual's boredom and disengagement. Too large a challenge level relates to the individual's frustration and disengagement.

Csikszentmihalyi's theory could apply to active learning through the interaction of the learner with challenges and problem solving, as a means to the optimal learning experience that would correlate to their potential level of developmental and academic achievement.

2.3 The Multidisciplinary Context of Learning Environments

2.3.1 Overview

New studies generated from the disciplines of education, environmental science, and architecture (Figure 2.1, p. 9) address issues that take into account the multidisciplinary context of learning environments. To begin, research interest on the impact of educational theories on school architecture has re-surfaced since the 1980s (e.g., Ageli, 1984; Nair, 2002; Washor, 2003). Among influential theories are re-interpretations of Dewey's progressive education¹³ (Semel, 2006), social constructivism¹⁴, learner-centered education, problem-based and cooperative learning.

¹³ Progressive education. The movement with which John Dewey has become associated, can best be understood... as part of a "broader program of social and political reform called the Progressive Movement" [Cremin, 1961]. ...What is important is to consider how Dewey proposed to meet these challenges (*due to social, demographic, and technological changes*) through education and how his ideas were interpreted by progressive disciples in such a way to alter the course of schooling in this country (Sadovnik, Cookson, and Semel, 2001, p.74).

¹⁴ Social constructivism in relation to learning. Meaningful learning occurs when individuals are engaged in social activities (Kim, 2001). www.coe.uga.edu/epltt/SocialConstructivism.htm Although beyond the scope of this writing, it is worth mentioning for future inquiry that different perspectives of social constructivism on learning should be considered. See also "social reconstructionism" (Semel and Sadovnik, 2006, pp.10-13, and 367)

Additionally, theories and research from different disciplines have developed interpretations of the physical and social attributes of the environment, its influence on the human perception of *place* and related behavior (e.g., Altman, 1992; Hall, 1966; Holl, 1993; Norberg-Schulz, 1984; Pallasmaa, 1996; Sommer, 1969).

Furthermore, as counterpoint to the concept of *learning environment* adopted by Jonassen and Land (2000) and others (see Section 2.2.3, p. 10), a book addressing new directions for teaching and learning assembles essays on the importance of physical space in creating supportive learning environments (Chism and Bickford, Eds., 2002). Here the expression *learning environments* overcomes confining semantic interpretations, such as in Jonassen and Land's book, as it adopts an integrated meaning that is conducive to more effective interdisciplinary work. The book primarily addresses theoretical arguments, research, and cases related to higher education's learning environments. Yet, the analysis of issues linking new directions in learning theory to the physical organization of learning environments has a wider application that could extend to schools in the K-12 range.

Ultimately, education and environmental science have fostered inquiry about the impact of social and physical characteristics of the learning environment on *school climate* (Sackney, 1988; Uline, 2006). In particular, research has been conducted on the impact of the classroom's environment and organization on students' learning styles, perceptions, and behavior (e.g., Anderson and Burns, 1989; Fraser and Walberg, 1998; Wolff, 2002).

Following, the review presents several relevant perspectives from different disciplines addressing the environmental context of learning.

2.3.2 *Place: a Theoretical Background*

2.3.2.1 The *Sense of Place*. The expression *sense of place* has several meanings. It is useful to clarify interpretations of the expression that in the literature apply to architecture and the subject of the thesis, the architecture of schools as learning environments. To begin, the word *place* has different meanings. *Place* may informally be used interchangeably with *space*, but in the context of this writing, *place* has a meaning of a different order. Consider the following related definitions:

Place...1b: physical environment: SPACE; **1c:** physical surroundings: ATMOSPHERE [the feeling for ~ was in him like feeling for a personality – R. L. Cook] (Webster's, 2002).

The dictionary definition already contains the meaning of the expression *sense of place* as it is intended in the development of the thesis. In fact, the quote refers to the perception of non-physical characteristics of *place*. In practice, the experience of space as physical environment, such as the school facility, could relate to both, the students' *acquaintance* with the entrance, the classrooms, the auditorium, etc., as well as to their perceived *sense* of the entire *place*.

Up to this point, I have considered dictionary derivations on the meanings of place or sense of place. Indeed, there is good evidence of the way in which *place* is seldom entirely neglected. Increasing multidisciplinary interest on human transactions with the physical environment has been nourishing the discourse about *place* and its implications related to the phenomenology¹⁵ of perception in architecture, environmental psychology, and social behavior. Writings on the subject of place by Norberg-Schulz (1984), Gallagher (1994), Meyerowitz (1985), and others prompt further review.

¹⁵ The use of the term here refers to the existential philosophical tendency of the multidisciplinary movement called phenomenology. <http://www.phenomenologycenter.org>

2.3.2.2 Phenomenology of Perception: The Architecture of *Place*. In this section, environmental concepts on *place* and the *sense of place* are re-presented in relation to specific architectural perspectives. In *Genius Loci: Towards a Phenomenology of Architecture* (1984), Christian Norberg-Schulz acknowledges the influence of the philosophy of Heidegger¹⁶ as the catalyst that determined the approach to his book. Heidegger's concept of the *existential foothold*, or *dwelling* gives purpose to architecture, beyond earlier concepts of functionalism in architecture. Man dwells when he can identify himself with an environment and experiences it as meaningful (p.5).

According to Norberg-Schulz, *place* is a goal of architectural investigation, where the "spirit of place", an expression that translates an ancient Roman concept, denotes the character of the place, its "*genius loci*". This timeless principle captures the essence of the sense of place as an existential phenomenon. (Norberg-Schulz, p.18). The author asserts the transformative quality of architecture, where people's experience of space makes it a living *place*. His intention is to convey an urgent message, after decades of "scientific" theory, for a return to a qualitative, phenomenological understanding of architecture.

Although Norberg-Schulz argues for a theory of place applicable to architecture, his writing falls short of developing a complete definition. His essay is among the best of a number of theoretical "contributions", to use his expression, by architectural writers. Besides, Norberg-Schulz admits that the discourse on a theory of place originates among philosophers' interpretations. He refers to Heidegger, but other philosophers have produced works of inspiring quality (e.g., Bachelard, 1994, Malpas, 1999).

¹⁶ Existential phenomenology is traced back to *Sein und Zeit* (1927, 'Being and Time'), the major work of Martin Heidegger (1889-1976). This work presents an examination of the distinctively human mode of existence characterized by participation and involvement in the world of objects. (Steiner, 1979).

To elaborate, Norberg-Schulz reviews and illustrates a great number of *places* from ancient history to the 20th century: natural, primitive, man-made places, cities as places, and places today, gradually enriching the notion of an architecture of place that unites modern architecture with the past. Furthermore, Norberg-Schulz mentions issues related to the demand for imagination in architecture that have been advocated by Sigfried Giedion¹⁷, and the need for an education through art, as the *place* which gives us our identity (1984).

The reader could extend Norberg-Schulz's theory to other types of places other than those he uses to illustrate his argument. In essence, architecture can convey a "sense of place", the perception of non-material characteristics to the physical space, such as a sense of belonging, meaning and purpose.

His argument has true merit and can be applied to an architecture of learning environments that is capable of contributing to a positive *sense of place* in support of learning. In the case of a school, where students' experience of a physical context may subtly encourage connections with the environment, and its occupants, the sense of place becomes a catalyst of the learning climate and the student learning engagement.

2.3.3 Contextual Views of *Place* vs. Learning

2.3.3.1 The Power of *Place*. In *The Power of Place* (1994), Winifred Gallagher reports that the psychologist Roger Barker is frequently cited for his 1960s research on situations

¹⁷ Swiss historian and critic of architecture, Giedion (1883–1968) was a key figure of the International Congress of Modern Architecture (see CIAM) from its inception (1928). He taught at Massachusetts Institute of Technology and Harvard.

- Giedion's lectures were collected in his books: *Space, Time, and Architecture* (1941), and *The Eternal Present* (1964). Retrieved from <http://www.infoplease.com/ce6/people/A0820784.html>
- Giedion's articles in *Architectural Records* (1954, 1956) about the **social and spatial demand for imagination in architecture** were collected in *Architecture You and Me* (1958, pp. 157-199).

that he named “behavior settings”, related to people interacting with social structures: people, things, and the physical places¹⁸. According to Gallagher:

He decided to chronicle entire days in the lives of children, recording their interactions...After examining his data, the psychologist came to a startling conclusion: their (the children’s) settings were more important determinants of his subjects’ behavior than their personalities. (1994)

The implication for the school environment is that everything in it encourages people to maintain the state of being and behaving by the *sense*, or power of *place*. People are no longer just individuals, but teachers and students.

As reported by Gallagher (1994, p. 131), Frank Putman, a research psychiatrist, says “We maintain the idea that we are the same person at home, in the office, in the car, but on some level we know there is a lot of discontinuity in our lives”. So, it seems that the place in which we first master information helps recreate the *state* necessary to retrieve it through feelings that are important influences on memory, a phenomenon called *state-dependent learning*. The basic principle that links our places and states is that the experience of good or bad environments promotes good or bad memories, which influence good or bad mood, and in turn, good or bad behavior.

In conclusion, by merging architectural and environmental research perspectives, reviewed in this and previous sections, the sense of place is the direct psychological human response that architecture can produce as a result of the symbolic transaction between people and the physical environment. This response influences behavior.

¹⁸ In an article retrieved from <http://garfield.library.upenn.edu/classics1980/A1980JW15800001.pdf> Roger Barker comments on his book *Ecological Psychology* (1968) which describes the theory of behavior settings: “The present book was published near the beginning of the widespread concern for the built environment and probably accounts for the extent of the citations, for it provided a toehold of methods and theory for architects, town planners, community experts, and so forth.”

Consequently, the sense of place is an important factor in the architecture of learning environments, as it could encourage the student to engage in learning behavior.

2.3.3.2 Technology and the Crisis of *Place*. Innovative views that debate or imply new concepts of *place* have evolved from the proliferation of communications and information technologies (i.e., Meyrovitz, 1985; Schneider, 1994; Schank, 1995).

Meyrovitz's book, *No Sense of Place*, is particularly relevant in contemporary interpretations of *place*, as he shows that our experiences and behavior are no longer shaped by where we are. He questions whether *place* is still a large determinant of behavior, vs. something else that has been traditionally tied to and confused with *place*. His question leads to the postulate that it is not the physical setting itself that determines the nature of the interaction, but the patterns of information flow (p. 36). This view, according to the author, has profound social implications on the structure of work and education.

According to Meyrovitz, in school education the age-grading system demands consistency between chronological age and mental and social development. Therefore, the information flow to children is carefully controlled through the curriculum. However, television bypasses this linear sequence because it is accessible to children in no particular order. In addition, children are exposed to facts and information that contradicts ideals even before they learn about them in school. As a result, the school system can probably never regain the near monopoly over information it once held. Meyerovitz recommends that for the school to survive it must maintain a "knowledge edge" by giving students the sense they are "in the know" because of the school (p. 255-257).

He suggests that focusing on methods of acquisition of knowledge and practice of social skills, such as effective verbal communication, is the strategy for the school to keep a competitive role in education. Expanding on McLuhan (1964, p. 305) on the notion of education as a counter-balance to the technological environment, the school environment offers opportunities for ways of thinking and knowing, and experiences that information technologies cannot teach. Indeed, the learning opportunities of a school environment include the development of the skills for interpreting and evaluating information by interacting with other people: speaking, listening, and discussing.

Recovering the value of *the sense of place*, which he dismissed as a central argument of his book, Meyrovitz suggests that the skills the school should foster could be best experienced in a classroom of mixed ages and backgrounds where students can learn and teach from each other (p. 258). His concept of the school learning environment is timeless. Implicitly, he recovers the educational values of the 19th century icon, the “one-room schoolhouse” and projects them to an insightful view of the ideal school *place*.

2.3.3.3 The Digital Environment: A Place of Cognitive Evolution. A final comment relates to the evolution of cognitive processes that are globally affecting culture and behavior of younger generations. Although this thesis is concerned with learning within a school system of education, it is important to observe evolving forms of learning that occur outside of schools’ education. In fact, cognitive processes that evolve as social phenomena of life experiences external to schooling deserve to be studied in relation to the development of pedagogical methods and the organization of learning environments. Following is a case in point.

According to advertising expert Lord Saatchi, in a BBC RadioWorld Service's interview of 22 June 2006, people over 25, which he calls "Digital Immigrants", are conditioned to more traditional sequential forms of learning. However, "the brains of young people, 25 or younger, are wired differently", Saatchi said. They are the "Digital Natives", who have developed the capacity for CPA, Continuous Partial Attention, enabling them to perform in multiple concurrent activities, a new environmental context for the achievement of the "optimal experience" status. Saatchi pointed out that the "commercials" in current TV advertising are obsolete, from the Digital Natives' perspective. The new challenge in advertising is capturing the understanding of an entire product concept and content in one word. Hence, the chase for words' branding is on. Apple, Xerox, and a few other words are the precursors of this challenge.

The Digital Natives could be hypothesized as a case of cognitive and behavioral evolution of the general population that has adapted to the conditioning effect of digital technology. New research may find that younger generations of students - perhaps even including some of the students that formerly would have been classified with attention and hyperactivity issues - are recognized as the emerging society, around which economy, politics, life styles, and education must pay attention.

The sensitivity to the Digital Natives' ability to perform in multiple concurrent activities offers the opportunity to study the application of this cognitive/behavioral mode to pedagogy and the related architecture of learning environments.

2.3.3.4 Towards an Architecture of Learning. At the time of his writing (1985), Meyrovitz was mostly critical of the impact of television and other patterns of information flow vs. human transaction with the physical environment as a major

influence on behavior. Ten years later, the full impact of computers connected by Internet had fully emerged beyond television as a global revolution in the way people interact, entertain, and learn. In the book *Engines for Education* (1995), Roger Schank, a cognitive scientist and director of Northwestern University Institute for Learning Sciences (ILS), explains his approach to education.

Our ideas are largely aligned with what the historians of educational reform call the Progressive Reform Movement... By and large, the Progressives' reforms have not been implemented on a widespread basis. One reason is that they have been hamstrung by economics. Progressive programs require that children get individual attention, and individual attention is at odds with student-teacher ratios of thirty-to-one. (Preface, p. x)

Schank repositions the Progressive reform movement in the context of the current social and technological environment, proposing a new paradigm for learning: “We should spend about: (A), 1/3 of our day at the computer, (B) 1/3 talking with others, and (C) 1/3 making something.”

Schank’s vision is inspiring. He reinterprets Progressive ideas of education, uses the potential of information technology, points to the freedom of individual construction of a *sense of place*, opening the door for the learner to venture in the emotionally charged exploration of the world.

2.3.4 A Transactional Perspective

Environmental psychology research applied to the learner’s transactions with the physical and social environments of the school is an important component of interdisciplinary research on learning environment.

A principle of this transactional perspective suggests that people and psychological processes are embedded in and inseparable from their physical and social contexts. This principle means that psychological phenomena experienced by a person,

such as the sense of place in a learning environment, are considered as holistic units rather than combinations of separate elements (Altman, 1992).

Altman's views are shared by other researchers. For example:

“Psychological phenomena are best understood as holistic events composed of inseparable and mutually defining psychological processes, physical environments, social environments, and temporal qualities.” (Werner & al.,1987)

Altman's environmental research interest considers two possible ways to relate the physical environment to social relationships and psychological processes: One, as an aspect of behavior, for example use of space, territorial behavior, etc.; Two, as a context or setting within which psychological processes, relationships, and behaviors are embedded, a view that is of particular relevance to the study of architecture of learning environments (Lippman, 2003b). In this case the environment is not seen as simply in its behavioral sense, but it also becomes part of a phenomenon contributing to its meaning, and highlighting the holistic quality of relationships (Altman, 1992).

In essence, transactional views could be managed according to the purpose of the researcher, while they alert the researcher that psychological phenomena must be considered as being integrated within the context in which they occur.

2.3.5 School Climate

Research shows that *school climate* is a complex variable relating to many areas and people, from interactions among students and teachers, to the structure of buildings, examples of a broad scope of factors. Therefore, school climate is a most important subject of research on learning environments, because its concept captures important attributes of the social context that contributes to the identity of each individual environment.

Interest in research about school climate originates from a more general question: how effective the school environment is in relation to student academic engagement and achievement? A large body of research dealt with the question by using the *school climate* construct, which derives from the study of “climate” in organizational research (Anderson, 1982), as cited by Sackney (1988) in his own review of school climate, which is further discussed in this section. Organizational climate has been given different names, such as “atmosphere”, “milieu”, or simply “culture”, but a more descriptive definition is using analogy: “Personality is to the individual what climate is to the organization” (Halpin and Croft, 1963).

Furthermore, Tagiuri (1968) defines climate by including all aspects of the environment: its *ecology*, the physical component; its *milieu*, the social component; and its *culture*, the beliefs, values and meanings of the organization. Elaborating on Tagiuri’s definition, Sackney’s adopts the following modified definition of school climate.

“We shall consider school climate to be a relatively enduring quality of the internal environment of the school that: (a) is experienced by the members (students, teachers, administrators, secretaries, etc.), (b) influences their behavior, and (c) can be described in terms of the values, norms, and beliefs of a particular set of attributes of the school.”

Sackney goes on to clarify that *school climate* may be divided into *academic* and *social* climate, sometimes referred to as “cultural dimension”. His major concern are those institutional patterns and behavioral practices that enhance or impede student achievement. Consequently, he addresses a number of school climate’s research issues. To elaborate on the findings Sackney provides a framework of positive attributes of school climate, which he divides into academic and social climate attributes (see Table 2.1, p. 25).

Table 2.1 School Climate Attributes

Positive Academic Climate	Positive Social Climate
Collaborative Processes	Administrative-Staff-Student
Leadership Skills	Peer Norms
Teacher Skills	Opportunity for Student Participation
Use of Rewards	School Facility Characteristics

In regard to the school facility characteristics, studies of secondary schools found that student behavior and academic achievement tended to be better when the school was clean, without graffiti, contained student work displays, and had good appearance features (Rutter et al., 1979). Several other studies link small school size to a positive school climate (see p 30), student performance, and safety (e.g., Cotton, 1996; Nathan and Febey, 2001; Freiberg, 1998). Some research evidence also indicates that landscaping school grounds results in better student behavior (Brynjegaard, 2001).

An aspect of research that is closely related to the scope of this thesis is the awareness among educational researchers about the impact of school facilities on school climate (Sackney, 1988). Since the 1980s, more research on school climate has enriched the literature by covering investigation on a wider range of positive and negative attributes of school climate. Among negative attributes, absenteeism and drop-out rate, student morale and violence, have been investigated. Scholars from different disciplines, including education, sociology, and architecture, have contributed to a body of relevant analysis of negative attributes of school climate in relation to the deteriorated conditions of school facilities (e.g., Anyon, 1997; Kozol, 1991; Noguera, 1996; Sanoff, 1996, Tanner, 2000).

In conclusion, research has found that school climate influences student morale and performance. Furthermore, school climate attributes need to be included in a model that can be used for climate improvement research and implementation. (Sackney, 1988).

2.4 The Architecture of Schools as Learning Environments

2.4.1 Antecedents: The Educational Facilities Laboratories (EFL)

The following review is based on several online references by the Ford Foundation and the National Clearing House of Educational Facilities (Marks, 2001). The study of learning environments had a particularly productive period (1958 -1986) that generated innovation in school architecture and had an impact on the construction of a high number of new schools across the United States and Canada. Studies were conducted or promoted by the Educational Facilities Laboratories (EFL) established by the Ford Foundation. The EFL charter, under the initial direction of Harold Gores, a renowned educator, was “to help schools and colleges maximize the quality and utility of their facilities, stimulate research, and disseminate information useful to those who select sites, plan, design, construct, modernize, equip and finance educational structures”.

During the earlier period of EFL, from its start in 1958 to 1975, the purpose of the organization was timely, related to the urgent need for new schools created by the “baby boom” of post-World War II. Furthermore, during the period of its existence, EFL awarded grants to school districts, colleges, and nonprofit organizations, held conferences, and distributed publications on research, trends, and profiles of significant schools, among other topics.

Prior to the formation of EFL, the Committee on School Building of the American Institute of Architects, and a similar working group from the Teachers College of Columbia University had submitted funds request to the Ford Foundation to study school facilities (Marks, 2001).

The approach of the Ford Foundation Fund for the Advancement of Education, according to a retrospective commentary (Armsey 1976), was to establish a single non-profit organization, which became EFL, encompassing a full range of concerns, rather than funding the concerns of different committees. Armsey commented that it was “a means of solidifying and institutionalizing ways of ridding the education establishment of its attachment to forms and methods that they (the Ford Foundation’s officers of the Fund for the Advancement of Education) believed were hamstringing the teaching-learning process... proposing that it was easier to change buildings and what went into them than to change people”.¹⁹

The history of EFL and Armsey’s commentary bring to evidence several points. One point implies that the Ford Foundation intended to exclude the position of the education establishment on its own area of competence. Another point reveals the policy intent of the Ford Foundation to promote change in the approach to planning, design, and construction of schools on a national level. A final point is that, through its own group of experts, educators, architects, and consultants, EFL exercised control over policy, research, promotion, and funding of activities that resulted in a paradigm shift in the architecture of learning environments.

¹⁹ Armsey highlights the difficulty of managing people in a planning process that fosters innovation. His comment is especially critical when participants come to the table from different disciplines. A related argument is by Schon (1971), who argues it is more important to manage ideas, rather than people or structures, because ideas are the rallying points of collective action. Schon’s argument reveals a strategic approach to managing a planning process.

According to architects, educators, and school administrators interviewed by Armsey, EFL's greatest contribution was to institutionalize the discourse on a school architecture based on progressive thought in school construction, which resulted in a greater impact on educational facilities than any other single force in the history of American education (Marks, 2001). A publication sponsored by EFL (1964) describes the process of planning and building the Middle School in Greeneville, Tennessee, in which the discourse between the local stakeholders and the EFL team is an example of the course taken by EFL to produce the above cited impact.

In retrospect, questions arise that will be addressed in Chapter 4 where the Greeneville school is further discussed. Has a collaborative discourse described in the EFL publication fulfilled the purpose of optimizing the environment for supporting learning and educational outcomes? Furthermore, has the "open plan" architecture resulted in the anticipated adaptability to changes in pedagogy, and sustainability to stand the test of time?

2.4.2 Current Architectural Issues

Hypotheses about the impact of the physical environment on people's attitudes and behavior are historical products of different cultures that have also captured the attention of researchers for the architecture of schools. For example, Anne Taylor, of the University of New Mexico, has been pioneering studies on the educational importance of the school's built environment. In an article published in 1988 (Taylor & Gousie, p.23), she is quoted saying: "The architectural settings can facilitate the transmission of cultural values, ... aid creativity or slow mental perception... There cannot be separation between the learning process and the physical environment, they are an integral part of each

other”. Dr. Taylor has been doing research on learning environments in cooperation with architect George Vlastos by studying the impact on students’ learning engagement of classroom and school settings that were planned with community and students involvement. She promoted this approach in several speeches and articles (e.g., Taylor, 2001).

A broader view related to the subject was reported by cultural anthropologist Edward T. Hall: “Man’s sense of space is closely related to his sense of self, which is an intimate transaction with his environment” (1966, p. 60). Hall’s statement is a conclusive argument extracted from the findings of his extensive research. Its importance should be considered in the context of a study on learning environments.

Furthermore, specific aspects of the physical environment have been extensively researched in order to evaluate their effect on learning and academic achievement. For example, indoor air quality, thermal comfort, lighting, and acoustics have been individually evaluated for the assessment of *high performance schools*²⁰ (Evans, 2005). Research findings highlight school performance characteristics as most important factors for supporting learning and student achievement (Schneider, 2002; Dyck, 2002; Earthman, 2004). In addition, a study summarizes findings on the *adverse* effects of poorly managed thermal and ventilation systems (HVAC) on student health, attendance, and academic performance (Mendell and Heath, 2004). What is questionable in that kind of research findings is the degree of contribution that isolated physical factors have on learning because, as this thesis uncovers, the effectiveness of a school learning environment is a function of several factors, among which socio-cultural factors, such as

²⁰ The term *High Performance Schools* relates to the efficiency of the school built environment in terms of energy, lighting, acoustics, ventilation and thermal comfort, factors that, in turn, have been measured in relation to learning and academic performance.

those expressed in the concept of *school climate*, are predominant and extensively investigated. The above type of research on physical factors, is being gradually complemented by the attempt to measure the effect of complex sets of interacting variables that introduce new approaches to research design. Concurrently, the findings resulting from previous research on thermal, lighting, and acoustic factors, are becoming established requirements of school construction programs. Two research topics related to the impact of physical features on learning have attracted educators' and architects' special attention: smaller school size, and classroom design and organization.

2.4.2.1 Small Schools. The term *small schools* may not have a concrete numerical value. Although several researchers argue that no school should be larger than 400 or 500 students (Cotton, 1996), on average, research shows that “an effective size for an elementary school is in the range of 300-400 students, and that 400-800 students is appropriate for a secondary school” (Williams, 1990). Studies suggest that smaller schools and classroom sizes from kindergarten to secondary schools help educators understand and work with their students (La Sage and Ye, 2000). Several experts have endorsed small schools as educationally effective, especially for minorities and poor communities' students (Howley, Strange, and Bickel, 2000). Based on case studies, smaller schools can provide a challenging school environment, higher academic achievement, and greater satisfaction for families, students, and teachers (Nathan and Febey, 2001). As research shows that bigger schools are not necessarily better, reconfiguring large urban schools into smaller schools is having a positive impact on student performance and *school climate* (Wasley, 2000; Cotton, 1996). Here school climate is highlighted because it represent a very important factor in shaping the quality

of a learning environment. Although small schools is an issue of current debate, and certainly addresses the impact size and place have on learning and the effectiveness of a learning environment, the next issue, classroom design and organization, meets universal educational interest as being recognized as a common factor of learning, regardless of school size.

2.4.2.2 Classroom Design and Organization. Since the beginning of school architecture, society has been accustomed to square or rectangular classrooms. Their presence, from the drawing board to the built environment, is pervasive even today. It used to be an unchallenged typology, until the renewed interest in the principles of progressive architecture and the relation of the physical environment and learning, made the classroom's design a subject of investigation.

In North America the 1960s and 1970s have been a period of educational reform that included the design of "open plan" learning spaces, instead of typical enclosed classrooms (EFL, 1970). From the late 1980s to date, the educational restructuring movement that has changed the relation of teachers and students to the physical context of learning environments has renewed research interest for the design of classrooms (Huse, 1995). One of the most studied typology of classrooms is the L-shaped classroom. A thorough review on the subject discusses various forms of teaching and learning that benefit from the L-shaped classroom and presents a series of related design, from elementary to high school, that have been realized in the US and Europe (Lippman, 2003a), including the pioneering design of 1940s Crow Island School (see case study, Chapter 3).

2.4.2.3 A Reference on International Comparisons. An international comparative study of pedagogical methods reveals how cultural differences inform the physical organization of schools and classrooms in France, Russia, India, United States and England (Alexander, 2000).

The important part of this reference is that in Alexander 's view, the organization of space is an important indicator of the pedagogy and cultural differences, as he states that “The classroom layout signal distinct views of the relationship between individuals, the group, the class and the teacher and the relationship between the learner and what is learned” (2000). For example, grouping in Michigan, England and France, or class layout in Russia, India, and France, reflect profound differences of values in respect of individualism, collaboration and collectivism.

2.4.3 Practice Theory: an Evolving Architectural Paradigm

Transactional Perspective and Lev Vygotsky's Zone of Proximal Development form the foundation of Practice Theory, which examines individuals' development of knowledge in social transactions within their settings (Lippman, 2003b). Investigation based on Practice Theory is necessary in order to re-align school design in the 21st century to the needs of contemporary directions in pedagogy. Hence, Practice Theory and understanding of pedagogy are means to enhance designers' approach to advanced learning environments concepts.

Indeed, traditional design of learning environments separates activity settings, due to an approach concerned largely with reproduction of knowledge by the individual's

experience. Instead, with emphasis on learner-centered and cooperative learning pedagogy school environments would be designed as integrated systems (2003).

Citing other authors (Fielding, 2002; Hertzberger, 1991; Moore and Lackney, 1995), Lippman highlights new types of classrooms that would be organized as clusters around a common area. Furthermore, these rooms would be understood as areas where individuals are encouraged to move from a position of peripheral participation to full participation.

Interpreting Lippman' vision, learning environments would include places for individuals to learn individually, and also share knowledge acquisition with others, while the whole area of the school facility, rooms, corridors, formal and informal gathering places, etc. would be designed as a seamless and adaptable social setting.

2.5 A Summary of the Literature Review

This section highlights findings of most relevant references to the thesis. The underlying issue was to identify factors related to learning that address the questions²¹ of the study and could advance a collaborative discourse for the design of effective learning environments.

Table 2.2 (p. 34) is a matrix of factors related to learning and effective learning environments, as discussed in different literature sources of the review. The different sources help understanding the complexity of forces influencing learning and the structure of effective learning environments.

²¹ Q.1: Which important factors related to learning could facilitate a collaborative discourse between educators and architects for planning an effective learning environment in every new school project?

Q.2: What strategy would sustain ongoing development of knowledge and discourse on the architecture of schools' learning environments?

Table 2.2 Factors Related to Learning and the Thesis, from the Literature Review
 ■ = Most Important Factor(s) by the author(s) of cited reference; □ = Related Factor(s)

REFERENCE	LEARNING FACTORS Learner-Centered Pedagogy + Learning → Tools & Technologies ²²	School Architecture Buildings, Classrooms & Other Spaces	Environmental Transactions	
			<u>Physical Context</u> ← Learner's Behavior in Relation to	<u>Social Context</u> Cooperative Learning; Student-Teacher; Other
Vygotsky <i>Zone of Proximal Development</i>	■	□		■
Dewey; Washburne <i>Progressive Education</i>	■	■	□	■
Barr&Tagg; Jonassen&Land; Sadovnik & al. Eds. <i>Theoretical Foundations</i>	■			■
Csikzentmihaly <i>Flow Theory of Optimal Experience</i>	■	□		
Chism & Bickford <i>Models of Learning Environments</i>	□	■	■	□
Anderson, Sackney <i>School Climate</i>	■	□	□	■
Altman <i>Transactional Perspective</i>		□	■	□
Norberg-Schulz, Heidegger <i>Sense of Place, Phenomenology of Perception</i>		■	■	
Gallagher <i>The Power of Place</i>		■	■	
Meyrowitz <i>The Crisis of Place</i>	■	□		■
Schank <i>Architecture of Learning</i>	■	□		□
EFL	■	■		
Taylor & Gousie <i>Ecology of Learning Environments</i>	□	■	■	□
Evans; et al. <i>High Performance Schools</i>		■	□	
Cotton; Williams; La Sage; et al. <i>Small Schools</i>	□	■	□	□
Saarinen; EFL; Huse; Lippman; <i>Classroom Design & Organization</i>	■	■	□	□
Lippman; et al. <i>Practice Theory</i>	■	■	□	□

²² Learning Tools & Technologies are intended as a bridge between Pedagogy and the Physical Context of Learning Environments

Although most of the references on pedagogy are from educational sources, the concurrent presence of an architectural source (Lippman) discussing the subject, provides an example of the potential for opening a collaborative discourse between the disciplines of education and architecture. Additionally, almost all of the cited sources make reference to the importance of learning *tools* (i.e., Dewey, 1997; Vygotsky, 1978) and learning *technologies*²³ (i.e., Meyrowitz, 1985; Sackney, 1988; Schank, 1995).

The second observation is that most of the sources selected for review make reference to learners' transactions with the physical and/or social contexts of the learning environment, hence confirming an interdisciplinary consensus about the thesis calling for an environmental approach to school architecture.

A final observation relates to the importance attributed today by the educational discipline to the school's physical context. While some sources in education tend to ignore or attribute a minor role to the physical context (i.e., Jonassen & Land, 2000), other contemporary sources seem to reopen the discourse on the subject, examining models of learning environments with attention to the classroom organization (i.e., Chism & Bickford, 2002; Taylor & Gousie, 1988).

For a retrospective on the subject of classrooms, it is useful to recognize that educators must be credited for initiating in the first part of the 20th century the discourse on the school physical context as a learning factor. In the US, Dewey set the philosophical and experimental framework of the discourse, as an integral part of the progressive education that influenced school administrators and practitioners.

²³The term "learning technologies" refers to emerging pedagogical practices integrating information technology (IT) methods that support learning, such as the use of computer systems and applications, internet, and distance learning networks.

"Learning technology alone does not necessarily advance learning; well integrated learning technologies and practices often do." Retrieved from www.educause.edu/learningtechnologies/5673

Washburne is a notable example for advancing the discourse to a collaborative approach with architects. Then again, the relationship between the school's physical context and learning was revived in the late 1950s by EFL, in the attempt to institutionalize the discourse and avoid to "Balkanize research activities according to the different concerns of different committees".²⁴ This was pursued in combination with the "open plan" architectural approach of learning spaces, before the discourse lost the original impetus, partly due to the difficult implementation of that approach.

2.5.1 Cross Reference Index and Notes

Although each unit of the literature review refers to its relationship to the thesis, a quick way to refer to these relationships is to regroup the units for a direct cross reference according to the following three categories: learning, environmental factors, and collaborative discourse on school architecture. Next to each indexed reference is the page number of the thesis where the reader can find the review.

A. Learning: philosophy, theory, approaches and views.

Dewey, Washburne, 10; Vygotsky, 11; Land & Hannafin, 12; Sadovnik, Semel, 15; Saatchi, 26.

B. Environmental Factors: subgroups related to learning.

B.1 Theory and applicable research: Vygotsky,10; Altman,19; Norberg-Schulz, Heidegger, 21; Gallagher, Barker, Putman, 23.

B.2 Physical Context: Dewey, Washburne, Saarinen, 11; Young et al., 13; Chism and Bickford, 15; Meyrowitz, 24-25; EFL, 28 and 33; Taylor and Gousie, 30; Evans. 31; Cotton, Williams, La Sage, 32; Huse, Lippman, 33.

²⁴ <http://www.edfacilities.org/pubs/efl2.pdf>

B.3 Social Context: Almost any unit of literature in the review addressed learners' environmental transactions with the social context. In Table 2.1, p. 36, the most relevant references are indicated with a black square, as follows: Dewey, 11; Vygotsky, 11; Anderson, Sackney, Halpin & Croft, Tagiuri, 16-18; Meyrowitz, 25; Lippman, 34.

C. Collaborative Discourse: between educators and architects.

The literature review includes a few relevant references that relate to the subject: Washburne, 11; Chism and Bickford, 15; EFL, 30. However, the most useful findings on the subject emerge from the interviews and case studies of the thesis (see Chapters 3 and 4.)

2.6 Conclusion

The literature review brings to evidence physical and social factors related to learning, such as classroom organization, learning technologies, and school climate. These are factors of high educational interest that are useful for advancing a common language between educators and architects toward a collaborative discourse on effective learning environments. Following are final comments for consideration in relation to the thesis.

*The sample of studies in environmental psychology included in this review illustrates the scientific methodology this kind of research has shown to adopt. In this regard, research methodology in environmental psychology deserves consideration for designing the structure of interdisciplinary research on learning environments (Lippman, 2003).

* The boundaries of knowledge, once propriety of separate disciplines, has given way to the understanding of transferability of findings. This is like to say that, given an

issue of inquiry, a finding could be used as a multiple entry by the different disciplines undertaking the inquiry. When such an approach is adopted it is reasonable to foresee the value and economy for developing a collaborative discourse, a common language where each discipline is part of the inquiry process. In parallel fashion to the above argument, education research has adopted cognitive research in order to better apply pedagogy to multiple forms of learning.

* Table 2.1 (p. 34) shows how some literature relates educational issues to learners' transactions with the school's physical and/or social environmental contexts. Concurrently, other literature from interdisciplinary sources, discusses environmental research and theoretical issues that support the thesis and research on learning environments.²⁵

* Environmental psychology²⁶ emerges as a catalyst of a new paradigm for research on planning and architecture of schools. Thus, it facilitates the discourse between education and architecture. Therefore, a new advance in planning and design of school facilities, as effective learning environments, would result from an interdisciplinary theoretical discourse, and research collaboration between education, environmental psychology, and architecture.

* On a separate point, it must be noted that the pervasive impact of digital technology on cognitive learning processes cannot be ignored in the development of pedagogical implications on school architecture.

²⁵ The thesis refers here to the works of Altman (environmental psychology), Norberg-Schulz (architecture), and Gallagher (the science of space).

²⁶ Also environmental ecology studies have addressed the investigation of learning environments.

* A most relevant aspect of the review is that current research is recovering the values of Dewey's Progressive Education, active and collaborative learning, and the centrality of the learner in the development of pedagogy. That being an important postulate for this thesis, planning and design of schools as learning environments, must consider the need to facilitate the optimal experience of the learner.

* The architectural implication of the theory of place and phenomenology of perception is that the exercise of architecture is the construction of a dialogue between form and meaning, between the physical language and mental languages in which perception and feelings are important forms of human understanding and identification²⁷. In an analogous way the exercise of school architecture could be the construction of a dialogue in which the physical environment of the school acts as a transactional model for the learner's psychological processes, such as the acquisition of a sense of place and identification.

* In brief, the research literature review brings forward the following additional points of consideration for the concluding arguments of the study (see Chapter 5, p. 66).

- The school's physical environment is an integral part of the school's learning environment and contributes to the school climate²⁸.
- Research and application of findings from environmental psychology and cognitive science that are related to behavioral and motivational responses to the physical environment, improve the methodological approach to planning and design of school learning environments.

²⁷ "Architecture is a phenomenon of emotion ... Construction is to keep in place; architecture is to move" (Le Corbusier, 1985 transl.)

²⁸ "The space makes the difference" J. Herney, talking about students' learning engagement when discussing study subjects around the Harkness Table.

CHAPTER 3

INTERVIEWS

This chapter is a commentary on relevant interviews and their relationship to the development of the thesis. The transcripts of the two following major interviews are in the Appendix.

3.1 Dr. Elizabeth Hebert on Crow Island School

My telephone interview with Dr. Hebert occurred on June 21, 2006. From 1984 to 2005, Dr. Hebert had been the Principal of Crow Island, a public elementary school built in 1940 in Winnetka, Illinois, an affluent suburb of Chicago. Elizabeth, “Beth” was referred to me by Penny Lanphier, the docent who hosted my visit to the school in the Spring of 2006. Heralded as the architectural expression of an educational philosophy, the school was of interest in relation to my study for its innovative architecture, and, importantly, as a prime example of an effective learning environment.

At the time of the interview, my thesis was still at an initial stage, yet already focused on the architecture of learning environments, investigating architectural patterns that facilitate learning engagement. Furthermore, I was interested to find how such engagement could be related to the quality of learners’ interactions with the physical as well as social contexts of this school. The conversation with Beth Hebert added a new dimension to my thesis, which helped shaping the thesis as it evolved in its finalized

argument. Topics that addressed opening questions²⁹, soon switched to the new dimension of my study.

In essence, what emerged from the conversation brings the scenario of the architecture of schools as learning environments to a key formula that can guarantee its success. Knowledge, from philosophy to science, could reach discernment about architectural and environmental solutions, but in order for them to effectively materialize, a unifying process of collaborative communication among the stakeholders, educators and architects in particular, must happen. This means that the fundamental part of the process is the development of a common language for a common purpose. It does not seem an impossible task when one learns from reading the interview on Crow Island School, reported in the Appendix. Yet the process is unusual in some ways because it requires a degree of integration among disciplines, and openness of attitudes toward this integration by human resources with different visions and cultural backgrounds.

From the conversation with Beth Hebert, Crow Island School emerges as the model of a process that requires a commitment to interdisciplinary collaboration and redefines the discourse on school architecture. The discourse developed between Carleton Washburne, the educator, and the architectural team headed by Eliel Saarinen has become the culture of this school community, and continues to date as testament to its sustainability. But the ability to reproduce this type of discourse on the vast scale of public education has remained a challenge that continues to be debated to this date. During our conversation, Beth Hebert referred to the awareness of this challenge, when,

²⁹ For examples of architectural solutions related to the questions of the interview, see Crow Island case study, p. 54.

on the occasion of the 50th anniversary of Crow Island School, she promoted a invitational conference of 50 architects and 50 educators.³⁰

The conversation with Beth also covered the relation between the physical environment of the school and learning. The classroom organization, a learning factor discussed in the thesis, was a point of discussion. The L-shaped classroom module with the small integral outdoor garden accessible from the classroom, the moveable tables, the large corner window wall, matched by the window seat bench, the well-furnished and intimate workroom's "quintessential space", overall details scaled to the size of children, are parts of a learning environment that allows to articulate different activities, by offering "...a menu of possibilities" (Hebert's interview, Appendix A, p. 84).

"Children need to experience place, they need to experience the coming together", Beth said, endorsing, in a brief statement, two issues the literature review brought to attention. One relates to the phenomenology of perception Norberg-Schulz discusses having implication with the sense of place, which, in this case, relates to the child's identification with the learning environment and supports learning engagement. The other issue is at the core of the discourse on school architecture that addresses issues related to the social environmental context.

3.2 Jack Herney at Phillips Exeter Academy on the Harkness Table

I conducted the interview with Jack Herney, history instructor, and former Dean of Faculty, at Phillips Exeter Academy, Exeter, New Hampshire, on 27 July 2006. Having

³⁰ "The polar relationship that educators and architects have enjoyed throughout the modern era is finally being called into question. This polarity has manifested itself in a collection of buildings that bear little relation to curriculum and a curriculum that has little to offer to architecture": excerpt from Steven Bingler's speech, reported in *Children, Learning, and School Design Conference*, by E. Hebert & A. Meek, Eds. (1992).

learned of the Harkness Table, also known as the Harkness Method practiced at Exeter Academy, it seemed fitting to the subject of my thesis to inquire on a successful pedagogy that fundamentally relied on the physical context of a conference table. I valued the idea that the opinion about interviewing a teacher would come from a learner's perspective. Jack Herney was referred to me by Jackson Salovaara, a student at Exeter Academy.

I discovered the importance of this interview through the ensuing conversation with Jack Herney. I learned of the special attitude and commitment a teacher has to have to the practice of a learner-centered educational philosophy, whose most important operational instrument is the physical environment made of one pattern, the table, around which a class of twelve learners occupies part of the school day in debating study subjects, every day of the school year.

There is a lesson to be learned in the apparent simplicity of this approach. As Jack Herney reminded me, the table around which the students sat, created an empowering environment liberating the students' self confidence and supporting them to freely share ideas. For the table to be the central component an effective environmental context for learning, it needs also to be the catalyst of learners' transactions with the social context of the environment, peers and teachers. It could be argued that it's easier for a table to have such an encompassing environmental impact than an entire campus could. However, the following comment revealed the essence of this model of learning environments: " ... the reason the table works is this: the teacher gives over to the students the class in a very real sense... and turns his ears into the primary tool of teaching as much as his voice."

In closing, Jack Herney's interview has brought a contribution to the thesis by presenting a trendsetting model of learning environment in which the physical context is reduced to one basic component, the table, for the classroom organization. In the range of learning factors that the study investigated, this component, has also a critical role in support of the school climate. In common with the Crow Island School, yet in a different context, the Harkness Table case is an example of an educational approach to learning embedded in the physical environment. The latter point also support the notion that relations to the architecture of schools as learning environments are specific.

Although the success of the "Harkness" model requires teaching excellence and, ideally, a reduced number of students per class in comparison to typical public high schools, its impact on public education is beginning to be felt.³¹

3.3 Other Interviews

During the course of the study I made other school visits and related interviews. In this chapter, I introduce a small selection of interviews that are more closely related to the thesis. The investigation of these learning environments confirms that schools' learning environments show commonalities, but also significant differences in the way specific learning factors characterize each environment, although all share a high degree of effectiveness in terms of educational outcomes. After all, environments mirror people, and vice-versa. With the premise that the examples I provide here deserve more focused analysis, they nevertheless confirm the importance of the discourse of school architecture as a multidisciplinary environmental discipline.

³¹See reference to Dr. John Kazmark, Superintendent of Mountain Lakes School District, Board of Education, and John Carton, AIA, designer of the High School renovation, Mountain Lakes, New Jersey (pp. 63-64).

A hypothesis about learning environments derived from interviews and site observations, would be that commonalities tend to relate to the necessity of the collaborative discourse. The discourse, when it happens, starts with the participation of architects and educators before the building is born. However, the effect of the original approach, extends, and thrives, and adapts in the practice of education, among teachers, students, administrators, and the community at large, with all of whom architects and educators learn the actual effectiveness of the living learning environment. I have seen it happen at Crow Island School, at Exeter Academy, at Lawrenceville School and at Discovery Charter School. There is enthusiasm in these places, energy, care, and there are smiles. So, I observed that the extended collaborative discourse moves usually in parallel with the school climate.

Following is a brief report on informal interviews conducted on the occasion of visits to two other schools.

Dr. Kelley Nicholson-Flynn, Chair, Science Department, The Lawrenceville School, Lawrenceville, NJ. Founded in 1810, The Lawrenceville School is located on 700 acres in the historic village of Lawrenceville, New Jersey, five miles southwest of Princeton. Today, the School offers a comprehensive, coeducational program for 800 boarding and day students from grades nine through post-graduate, who come from 34 states and 29 countries.

Dr. Nicholson-Flynn's (Kelley) large office on the second floor of the Science Building is also her classroom, which is contiguous, through a wall with a large glass window, to a well-equipped biology laboratory. In the center of the room I noticed the Harkness Table, around which twelve students seat for her classes. I expressed my

interest in the school's educational philosophy. Kelley explained that Lawrenceville School adopts a learner-centered, constructivist approach to pedagogy, and offered to give me a tour of the main buildings. In addition to observing the architectural features of the School's learning environment, I was able to meet other faculty and discuss with them how their offices and classrooms are organized, most of which use the Harkness Table. In addition to the Harkness classroom, faculty have introduced an array of *learning technologies*, from CD-ROM to PowerPoint presentations to Web page construction. In every case, however, classes remain small and intimate, and as one student put it, "Our teachers won't let us get away with saying 'like' and 'you know.' "We have to explain exactly what we mean and support our ideas with evidence."³²

Originally intended as an interview session with Dr. Nicholson-Flynn, a prominent faculty, the overall experience of the visit to Lawrenceville School enriched the perception of the *sense of place* and its importance in the construction of the *school climate* as a learning factor. The use of the Harkness Table, and the learner-centered pedagogy, could be considered points of similarity between Lawrenceville School and Phillips Exeter Academy's learning environments. However, there may also be differences. The way in which faculty at Lawrenceville School have customized their own approach to the common pedagogical foundation, through their classroom organization and adoption of learning technologies appeared to be a point of distinction.

Irene Hall, Co-Leader, Discovery Charter School, Newark, New Jersey. Dr. Hall explained that she had been interested in Dewey's philosophy of education based on experimentation and practice. Her dissertation was on the educational experience of Alice

³² <http://www.lawrenceville.org/about/tour/harkness.asp>

Dewey (John Dewey's wife) in running the experimental Laboratory School at the University of Chicago. Hall's interest and studies have influenced the concept of Discovery School, of which she is a co-founder and leader with Barbara Weiland. The physical environment of the school, past the entrance, is an open space for about 70 students, grades 4 to 8. This "great room" gives access to several smaller rooms for office, library, crafts, kitchen, music and dance. The school practices a progressive educational approach to teaching and learning. Student creativity is encouraged. Within the open space several teachers address different classes and different grades. Students seat at scaled-down tables reminiscent of the "kitchen table" at which many of them will do work at home. These tables are all of the same size, but are painted in different colors that are easy to move around for their arrangement in clusters or independent learning spaces. A number of more enclosed working stations are also arranged in the space, mainly along perimeter walls.

I did some observation during classes. The noise level is noticeable, and a student noticed that the noise could be distracting. However, all children appeared to be attentive to teachers, participating in group sessions, or concentrating on their individual activities. The environment, is that it gives a distinct sense of place empowering the occupants. The school performance, by educational outcomes, is rated good to excellent.

3.4 Interview Notes

A commonality observed through the interviews is that the *sense of place* tends to associate with the social environmental context, a major component of the *school climate*.

An intriguing hypothesis derived from the experience of interviews, and related observation of learning environments, is that the physical environment is definitely an important component of effective learning environments, but is not characterized by commonalities.

Indeed, the bigger differences I observed among the schools where I interviewed educators are in the physical context of effective learning environments. In four interviews, I experienced four learning environments, four architectures, four classroom organizations, and three different furniture typologies. Furthermore, a physical environment can support different forms of learning situations by adaptable classrooms' organization (i.e., Crow Island and Discovery Charter School).

These examples justify the hypothesis that commonality, or a set of standards, in the physical context of the environment is not a requirement to guarantee the effectiveness of the learning environment.

CHAPTER 4

ARCHITECTURAL CASES OF LEARNING ENVIRONMENTS

The following case studies are the third approach to the investigation of the thesis. The cases examine different contexts, exemplifying distinctive approaches to the architecture of learning environments. The selected case studies are important, not because they have demonstrated the effectiveness of their learning environments (although a couple of them do), but because they are significant examples of the intentions of the architectural approach and the type of discourse among the stakeholders, primarily educators and architects, that structured the related solutions. Those intentions have addressed the objective of creating effective learning environments in ways that could be related back to issues examined in the literature review.

Findings from the cases articulate solutions with different results. The first case for a school that at the time of its planning in the mid 1960s was described as “significant”, Greeneville Junior High School, did not establish a sustainable paradigm of learning environments. The second case, Tajimi Junior High School, is recent. Hence, the review does not suggest to validate the school as a sustainable learning environment, but rather because it realized innovative solutions that reflect a planning process centered on the learner’s experience. Finally, two cases in particular, “Crow Island School” and “The Harkness Table at Exeter Academy”, review effective solutions that have sustained the test of time.

What is useful about the cases, even in their small number, is that they help identifying: a) issues that are related to the literature, or b) limitations in the architectural

approach, and finally c) the framework of a comprehensive approach to school architecture. Furthermore, since the cases refer to different periods in which the solutions were devised, they allow to extend the perspective about the critical issue of planning for a local or contextual approach to the sustainable conditions of learning environments.

4.1 Greeneville Junior High School

In reading one report published by EFL on *Profiles of a Significant School*³³ regarding Greeneville Junior High School, Greenville, Tennessee, it is interesting to notice that a process of interactions among several stakeholders took place in planning the school. Educators, architects and citizens studied and worked together to plan a building that would be “flexible, one which would provide optimal working conditions through improved environment and through adequate provision for program change”. However, the plan for a new junior high school was decided primarily to accommodate up to 1,000 students, as a solution to eliminate crowded conditions at both junior and senior high school levels.

The process of interactions then proceeded among school administrators, school board members, teachers, architects, and staff of the School Planning Laboratory of the University of Tennessee, who worked as a team to determine the educational specifications that would inform the architectural design of the school facilities. The cited EFL report states the following (next page).

³³EFL and School Planning Laboratory, The University of Tennessee (1964). *Profile of a Significant School*. Knoxville, TN: School Planning Laboratory, The University of Tennessee and EFL. Retrieved from http://archone.tamu.edu/crs//archive_files/EFL/6000.0103.pdf

The design eliminated 18,000 square feet of corridor and other excess space and satisfied all the space requirements of the specifications, at an estimate savings of \$200,000. Most of the savings was secured through the use of the circular perimeter wall. This design provides minimum perimeter for maximum interior footage at an average savings of \$100 per lineal foot for a masonry wall with brick veneer...Further savings were accomplished by the minimum use of windows... (EFL and School Planning Laboratory, 1964).

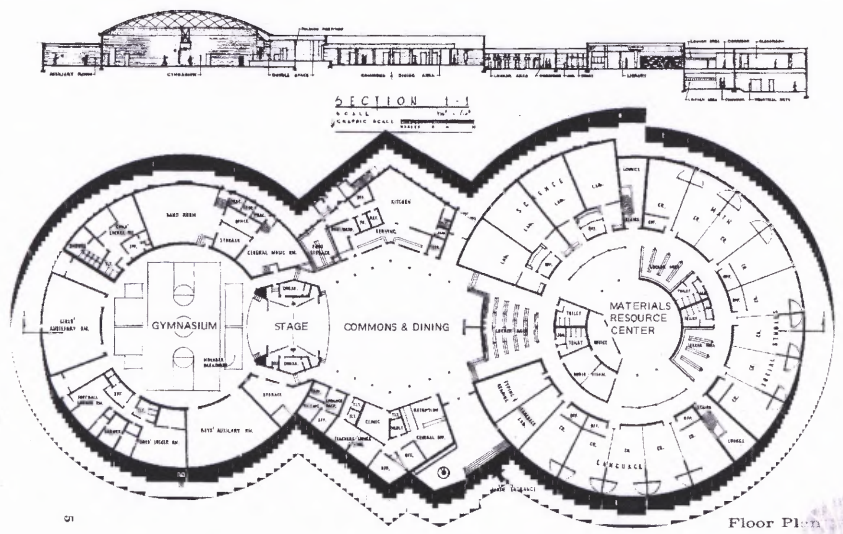


Figure 4.1 From top down, aerial view illustration, section, and floor plan, Greenville Jr. High School, Greenville, TN (original plan, 1964).

This report highlights the fact that while school design was conceptualized as part of a national effort by EFL to update the architecture of schools in order to meet educational performance with technological and pedagogical challenges, it resulted in being driven at the local level by the need to accommodate an increased student capacity and budgetary restraints.



Figure 4.2 View of Greenville Middle School (2006). New construction has been added to the original plan (left in the photo).

The issue presented here relates to the implementation of the collaborative discourse among the stakeholders, as advocated by the thesis. What appears to have happened in the planning stage, at least in this case, and presumably in other cases worth checking in EFL records, is that EFL, while intended to institutionalize an innovative discourse on school architecture that supported a progressive educational approach to learning, met a local community team of stakeholders with a less visionary concept of the discourse. As the report indicates, EFL and local planning committee representatives met and compromised to balance EFL's driven approach to effective learning environments with the local community's eminent goal to provide capacity for a growing student

population at a minimum cost per square foot, and, presumably, to avoid the risk of losing grant money.

What happened in this case is under scrutiny for a reason related to the thesis. One thing is writing convincingly or making policy about the importance of an interdisciplinary collaborative discourse; another, is the condition in which the discourse is practiced. To lead the discourse, the stakeholders, educators and architects in particular, need to share the direction of the educational mission, strive for a common language, act to understand the physical and social context of the project at hand, and master their own discipline. It is possible to envision, as EFL did, that such a complex set of professional, social, and human relations that need to thrive at the local level of a new school could be controlled from a centralized national level. However, the effectiveness of the learning environment, and/or the school climate may be compromised. A telephone conversation with Phil Graham, the long-time facility manager of the Greeneville schools district supported the assumption.

4.2 Crow Island School

Crow Island School, in Winnetka, Illinois, for nursery to intermediate students was built in 1939-40. Designed by the firms of Saarinen and Saarinen of Detroit, and Perkins, Weeler and Will of Chicago, its most important feature is that it is the architectural expression of Dewey's progressive educational philosophy based on the children's need of self expression, the development of their attitudes, and their emotional and social adjustment.

The architects were successful in interpreting the needs of the children and meet the educational objective of the school district. The floor plan shows the pattern of L-shaped modular classrooms (see Figure 4.3). These classrooms are at the core of the success of the school design that has been ranked 12th among all buildings and 1st among all schools in a 1956 *Architectural Record* poll naming the "most significant buildings built in America in the past 100 years." Among the school's many honors is a 1971 award from the AIA for design of enduring significance.

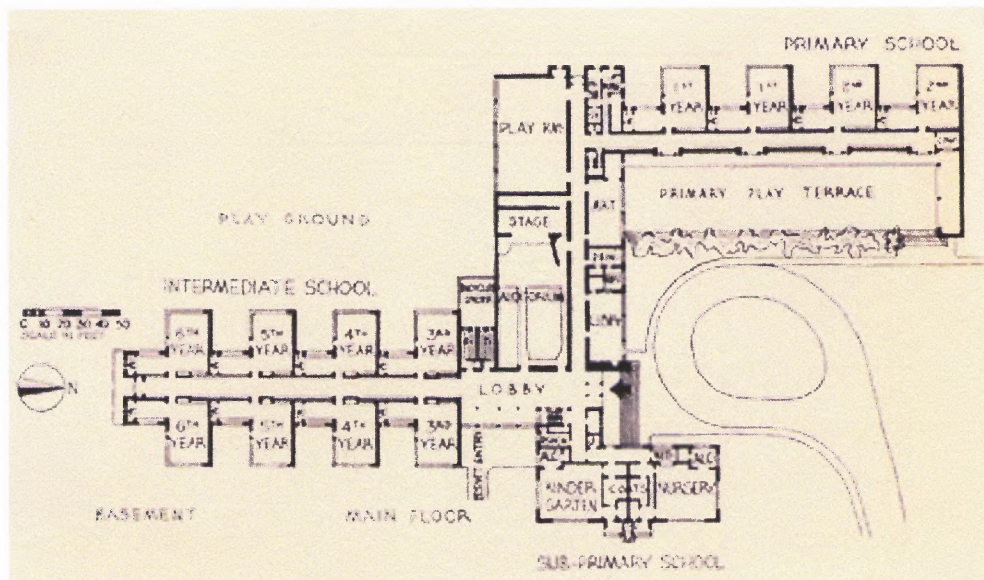


Figure 4.3 Crow Island School, Winnetka, Illinois. Floor Plan.

Each of the L-shaped classrooms is organized as a self contained schoolhouse, adaptable to multiple learning situations, suggesting a reinterpretation of principles that informed the one-room rural schoolhouses of the last part of the 19th and the first half of the 20th century. Each classroom contains large sections of glass windows and walls, in order to admit natural light into the room and the hallway. Each classroom has a semi-enclosed workroom that is equipped with sink, bench, tools, and includes the restrooms. Also, while small separate courtyards are accessible from each classroom, the articulation

of spaces and moveable furniture, enhance the perceived quality of the place contributing to the experience an inviting and spacious learning environment (see Figures 4.4, and 4.5). The architects studied every detail of the built environment to address its fitness to children's size, from the height of door handles, to custom made seating, and tables that could be rearranged for individual study or group learning activities. Washburne described architect Lawrence Perkins' search for the optimal design of the classrooms from the perspective of building a *collaborative discourse* as a means to build an effective learning environment.

Perkins visited classes, read our writings, talked with teachers, supervisors, principals, and school custodians. He made sketches and discussed them with all of us. Gradually the basic classroom units began to take shape. Then he made a table-size model of a classroom, with miniature furniture, and placed it in the corridor of the Horace Mann School for criticism and suggestions. There was no lack of these, and the model was altered accordingly. (1963, p.140)

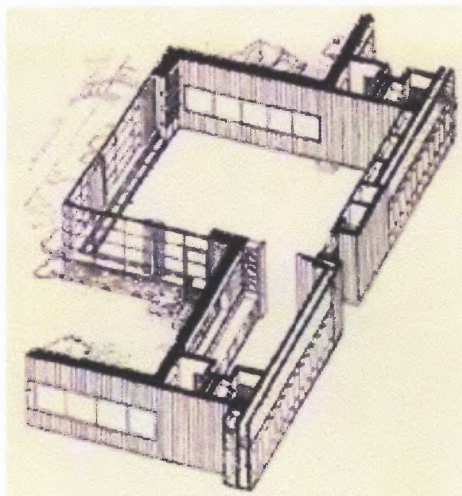


Figure 4.4 The classroom, Crow Island School, Winnetka, IL. Axonometric view.



Figure 4.5 The classroom, Crow Island School, Winnetka, IL. View of moveable furniture, and the outdoors through the large expanse of corner windows.

4.3 Tajimi Jr. High School, Japan

From Japan is a case of the evolving discourse on school architecture. Tajimi Jr. High School, located in the town of Tajimi-shi, Japan is the result of a concerted effort of the town community, the school district, and the architect to create an environment centered on the learners' experience. The school occupies 113,000 sq ft of floor space. The school that was designed by the architectural firm Atelier Zo, based in Tokyo, was completed in 2001.

Figure 4.6 illustrates the site of the school surrounded by plants and a public park with a large pond. Also noticeable is the area devoted to sports in the lower section of the plan, and the parking area, placed in the upper left corner of the plan. Within the green boundaries of the campus, the configuration of the campus gives the perception of a walking village.



Figure 4.6 Site Plan, Tajimi Jr. High School.

The core of the complex is made of two rows of three-floor buildings, separated by an extended courtyard with a space for new planting. The courtyard is an extension of the public park, which is accessible through the bridge on the little pond on the right of the plan. Covered walkways allow pedestrian circulation all around the complex.



Figure 4.7 Tajimi school courtyard's extension of the neighboring public park. View from South Garden, looking North into Courtyard (refer to plan, Figure 4.6, p.56).

According to the architect, the intention (resulting from the collaborative planning process) was to create an environment that would give students the opportunity of a multi-sensory experience of nature, materials, forms and scales, connection of inside and outside spaces. For example, the courtyard is to experience shades, the rain, winds, sounds and silence. The site and buildings, even the roofs, are covered with plants and gardens. All around there are benches, and small corners for people to seat and relax (Figure 4.7).

The place suggests observation, touch, and understanding of forms and scales. It inspires a feeling of freedom, as a counterpoint to traditional box-like classrooms in

which body and mind are confined. Learners will choose some favorite place that will become part of their school memories.³⁴

A major point of the building program is the adaptability to day-to-day changes of pedagogical objectives that is reflected in the design of the classrooms' module, or "house" as it is called (Figure 4.8).

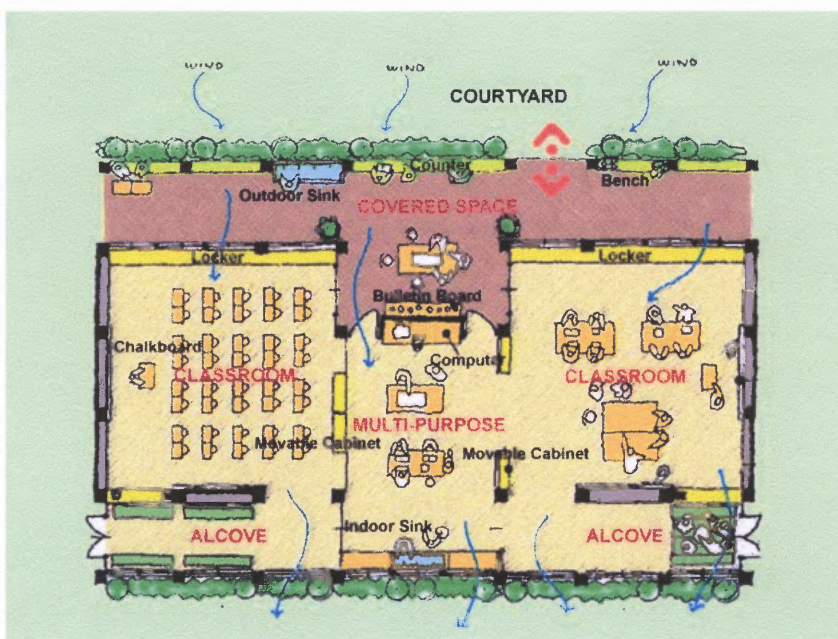


Figure 4.8 Classrooms' module: the "House".

The house contains two classrooms, a multipurpose space in between, and an extended space called the "alcove". For lectures, a classroom is used, and for group activities, which require more space, a classroom and a multi-purpose area are united. For art, science, and home economic classes, which usually require specialized rooms, a sink in the alcove provides possibilities for some light work. The "house" sustains activities

³⁴ www.designshare.com/index.php/projects/tajimi-junior-high

for different subjects and it is expected to be a center for extended research projects. Finally, the house gives access to an outdoor covered space with water and various furnishings.

In different ways, the Tajimi School combines established principles of an effective physical context of learning environments with an improved approach to multiple learning situations in a classroom space. The declared intention about the importance of students' integrated daily experience of *living* and learning in the school environment, such as the contact with nature, and the planned alternating use of indoors and outdoors, could be connected with principles expressed by the pioneering example of Crow Island School's environment.

Koji Ando, former principal of the school, did acknowledge that after the completion of the school "students have bright expressions on their faces... they are living in a nice atmosphere", and that students were involved in the planning. Again, Mr. Ando stated: "To realize requests of the students, some arrangement were made during planning. For example...to renew an image of school restrooms they were designed in a bright and new style."³⁵

Conversely, the concept of articulating various spaces in the paired classrooms' modules called "houses" was intended as an innovative improvement to multiuse classroom organization. This type of solution appears to offer a great deal of adaptability to active learning approaches and variable number of students in a class. Although there are no available data on its effectiveness, the solution could deserve a place in the discourse of school architecture for the study of new learning environments.

³⁵ In "Educator Narrative". Retrieved from www.designshare.com/index.php/projects/tajimi-junior-high

4.4 The Harkness Table at Phillips Exeter Academy

Phillips Exeter Academy is known as one of the oldest and leading boarding high schools in the United States. The Academy was established in 1781 by John Phillips, a successful merchant, and his wife Elizabeth. It provides an active learning environment where students can engage in a predominant mode of learning through questioning and discussion, and also through small-group work, research, labs, and creative projects.³⁶

Since a 1930 gift by the oil magnate and philanthropist Edward Harkness, the Academy's principal mode of instruction has been by discussion, "seminar style," around an oval table known as the **Harkness Table**. It has become the hallmark of the teaching method used at Phillips Exeter Academy. Edward Harkness described the idea for the use of the table that took his name as follows:

“What I have in mind is [a classroom] where [students] could sit around a table with a teacher who would talk with them and instruct them by a sort of tutorial or conference method, where [each student] would feel encouraged to speak up. This would be a real revolution in methods.”³⁷

The Harkness method has been maintained and gradually expanded to all curricular subjects up to this date. In 2004, Tyler Tingley, Thirteen Headmaster at Phillips Exeter Academy stated: “they are much more than a place to sit. At the Harkness Table classmates learn by discussing their thoughts and ideas rather than just by taking notes. Teachers are participants in the discussion, guiding students ... without lecturing.”³⁸

³⁶ http://en.wikipedia.org/wiki/Phillips_Exeter_Academy

³⁷ http://en.wikipedia.org/wiki/Harkness_table

³⁸ <http://explorersfoundation.org/glyphery/183.html>



Figure 4.9 Narrow oval Harkness Table in a rectangular classroom, Phillips Exeter Academy, Exeter, NH (seats 12 students and a teacher).

Every classroom is also the teacher's office. The Harkness table is usually placed at the center of the room and in a corner there is the teacher's desk. When I visited the Academy, I met with Mr. Jack Herney, who teaches Modern European History. I interviewed Mr. Herney about his ideas and experience of teaching with the Harkness Table's method. Excerpts of the interview with extensive explanation of the importance of the table in the practice of the 'learner-centered teaching method are reported in Appendix B.

All tables accommodate twelve students plus the teacher, but they are somewhat different in shape to fit best in the available classroom's shape. There are three types of tables. Two types are oval in shape. A small number of oval-type tables are narrower than the "standard" ones, to fit better in some narrow rectangular rooms. The table of the third type is a single exception at Exeter Academy. It is round to fit in a perfectly square room (see Figure 4.10, p. 62).



Figure 4.10 Round “Harkness Table”, in a large square classroom, Phillips Exeter Academy, Exeter, NH.

Every classroom I visited in the Academic building is provided with blackboards, bookshelves, and storage cabinets. In Figure 4.10 the teacher’s desk is visible in a corner of the room. In this building, the rooms are finished with wood millwork, and wainscoting, with large windows, overall providing a sense of tradition, dignity, and comfort.

The completion of the Phelps Science Center in 2001 meant that all science classes, previously the only ones taught in a more conventional layout, could also be conducted around the same oval tables. Classes are small to encourage all students to participate. These "Harkness" classes feature heavily in both the school's identity and its day-to-day life (see Figure 4.11, p. 63).³⁹

³⁹ "Students are coming to the Science Center to hang out. This is a complete change - 180 degrees from where we were last year. The students wanted to get out of Thompson as quickly as possible when class was over. Now we have students checking out of the dorm at night to go work in the science center lounge." *The Exeter Bulletin*, Winter 2002.



Figure 4.11 Oval Harkness Table in a laboratory/classroom, Phelps Science Center, Phillips Exeter Academy, Exeter, NH.⁴⁰

4.4.1 The Harkness Table at Other Schools – Final Comments

Several American independent schools have adopted the Harkness Table method. According to a feature article published in Wikipedia⁴¹, they include the following schools: Memphis Jewish High School, Horace Mann School, The Hotchkiss School, Palmer Trinity School, Phillips Academy, St. Paul School, Middlesex School, The Masters School, Whitby School, Germantown Academy, and The Lawrenceville School.

However, the Harkness Table method is becoming of interest to educators in the public schools system, at least from an experimental perspective. An example of use of the Harkness method is being considered at Mountain Lakes High School, Mountain Lakes, New Jersey, as I originally learned from John Carton, AIA, Partner, Parette Somjen Architects. During my interview of the architect I did see a prototype of a twelve seat oval table to be installed in the renovated facility of the school.⁴²

⁴⁰ Retrieved 1/18/2007 and cropped from <http://science.exeter.edu/jekstrom/SB1/ScienceB.html>

⁴¹ http://en.wikipedia.org/wiki/Harkness_table

⁴² Information obtained during the interview of John Carton, April 7, 2005.

The experimental application of the Harkness method in a public high school is of great potential impact on public education. I wanted to follow-up on the finding. In September 2006 I contacted again the architectural firm in charge of the renovation. I was then referred to the Superintendent of the Mountain Lakes School District, Dr. John Kazmark, with whom I had a telephone conversation on the subject, October 5, 2006.

Dr. Kazmark had promoted the project of experimenting with the Harkness method in connection with the overall renovation of the school and ordered a prototype of the table. The school renovation works were being completed in the fall of 2006 and the Harkness table has not yet been put in use at the time of the interview. However, Dr. Kazmark planned to place the table in the middle of the media center, a large space with easy access to computers, and experiment the application of the Harkness method in classes of ten to twelve Advanced Placement students. Before proceeding to this experiment with students, the table will be used for training teachers to the pedagogy required for a successful use of the method.⁴³

There is no information available supporting the evidence that the Harkness method has been largely adopted by other nations' school systems. One exceptional case, however, is from Melbourne Grammar School (MGS), Australia (Figure 4.12, p. 65). MGS has added to the method by incorporating wireless internet connections so that new information can be accessed and included immediately in the discussion⁴⁴. In addition, the larger than usual table adopted by MGS accommodates 20 people.

⁴³ For useful information on the Harkness method see Appendix B

⁴⁴ http://www.mgs.vic.edu.au/news/stories/mgs_news_harkness_april2005.php



Figure 4.12 Large oval modified “Harkness Table”, Melbourne Grammar School, Melbourne, Australia (seats 20 students and a teacher). Laptop computers are operated on batteries in a wireless environment.⁴⁵

A final comment is about the lesson derived from both, the literature and the interviews related to the Harkness “method” is that the table is the medium of a communal learning experience that promotes discovery through questioning and critical thinking. This experience in turn acts as the platform for supporting the individual student’s potential to acquire and use knowledge.

Furthermore, the effectiveness of the method associated with the Harkness table is dependent on two factors. As mentioned by Mr. Herney during our conversation, one factor is the teacher’s attitude toward Emerson’s educational philosophy of “respecting the pupil” and the approach of “giving the class to the student”.⁴⁶ The other factor is the student’s learning engagement and responsibility to the group for discussing the study material. There are ethics built in the method, and a behavioral training that informs the student’s conduct in life. It could be argued that this aspect of the Harkness method is the most socially valuable education of the entire student life of an individual.

⁴⁵ Retrieved 4/09/2005 from: www.mgs.vic.edu.au/news/stories/mgs_news_harkness_april2005.php

⁴⁶ From Appendix B: A Conversation with Jack Herney at Exeter Academy, p. 98, first paragraph.

Unanswered questions remain. Under which unexplored conditions would the Harkness table method be applicable? For instance, could it be transferred to a public education system? How successful could it be with a classroom of students whose learning abilities and attitudes are very different? What about experimenting the method on special setting of a public education system, such as college preparatory Academies or Advanced Placement classes?

Clearly, the method requires highly motivated teachers; teachers that subscribe to a learner-centered pedagogy and the importance of active learning through discussion on study material among students around a table. Is there a teacher-education system that prepares teachers according to this form of pedagogy?

Again, as per other case studies, all the points of merit and the counterpoints of questions contribute to the internal debate of issues related to the conclusive argument of the thesis.

CHAPTER 5

CONCLUDING ARGUMENTS

5.1 Changing Semantics

In the course of developing this thesis the expression *learning environments* has evolved from its original meaning related to the architectural language. Intended as an architecture of the school's physical environment for supporting a learner-centered pedagogy, the thesis has become a learning journey in itself across a widening linguistic landscape.

The concept of learning environments, when seen through multiple perspectives, such as those of education, cognitive science, architecture, and environmental psychology, loses sharpness and gains dimension. The deeper understanding of learning environments is beneficial to all interested parties, architecture, education, and the community of stakeholders. This understanding facilitates the discourse among the stakeholders, especially educators and architects, who are involved in the process of planning a facility, building it, and making it the sustainable instrument of an optimal learning experience.

As the concept of learning environments has widened, so is that of *architecture*. Schank (1995) using the term *architecture* as in "teaching and learning architectures" is a good example of linguistic appropriations that, as in the case of *learning environments*, hints of the trend toward mutual understanding and purpose between disciplines.

5.2 About Findings

Evidence from research literature, theoretical works, interviews, and exemplar case studies has revealed that the nature of the problem of finding a relation between schools, learning environment and students' learning engagement is a complex issue subject to several inter-dependent variables. What is needed is to assess and redefine the discourse on school architecture in relation to changing approaches to teaching and learning. In other word, it is necessary to address and understand the specific educational environment at both, the national and the local community levels, the structure of pedagogy, and the meaning of learning as perceivable by the learners today.

As the literature review shows, research in education and architecture debates arguments that support learner-centered, constructivist approaches to learning leading to reform. The general diffusion of such a reform in public school systems would have a huge social impact because the control of education would presumably be more decentralized in order to be effective. There are signs that this reform, in fact, is already slowly happening with growing advocacy by educators, parental involvement, and the demand for alternative learning environments, like charter schools, as an example.

As a new paradigm for learning environments is foreseeable, schools as *learning workplaces* will be designed by or with the involvement of students. Actually, this paradigm has already been tested (e.g., Anne Taylor. 2001).

Furthermore, the study has also identified the importance of the social environmental context in relation to learning, as confirmed by environmental psychology and research on *school climate*. Although the physical environment is a component, school climate relates in great part to the social environmental context. Ultimately,

findings confirm the importance of the thesis' postulate of an environmental approach to school architecture addressing both, the physical as well as the social contexts.

5.3 Questions Answered

The rationale leading to the questions of the study⁴⁷ derives from the thesis. The view that school architecture should address the physical and social contexts of the learning environment could invite educators and architects to participate in a collaborative discourse. The intention of the discourse would be to bridge interests for developing solutions to key factors, or patterns, of learning that encompass both environmental contexts. The thesis proposes a conceptual framework to advance the collaborative discourse, structured around the following key factors related to Question 1, and extracted from the study:

- Q.1a - Classroom Organization - learner's transactions with the physical context;
- Q.1b - Learning Tools and Technologies – learner's transactions with media;
- Q. 1c - School Climate – learner's transactions with the social context.

5.3.1 Q. 1a Classroom Organization

The underlying preoccupation in organizing classrooms is, as it has been in the past, their adaptability and sustainability for possible curricular changes and multiple learning situations. Learner-centered pedagogy heightens the need for multiple learning situations, such as lecture, seminar, group cooperative learning, or individual tasks and problem

⁴⁷ Q.1: Which important factors related to learning could facilitate a collaborative discourse between educators and architects for planning an effective learning environment in every new school project?

Q.2: What strategy would sustain ongoing development of knowledge and discourse on the architecture of schools' learning environments?

solving. This is achieved by giving teaching and learning assistant's roles to the space, the furniture, and the tools of the classroom.

For the classroom's space role, the L-shape has been successfully explored and established from elementary to secondary schools. Prime example is the classroom type of Crow Island School (p.58). It is a simple, but important and practical pattern. In alternative, the concept of space that could expand or contract with moveable partitions instead of walls has been systematically explored since the time of the EFL, with mixed results, that is to say this concept needs further study.

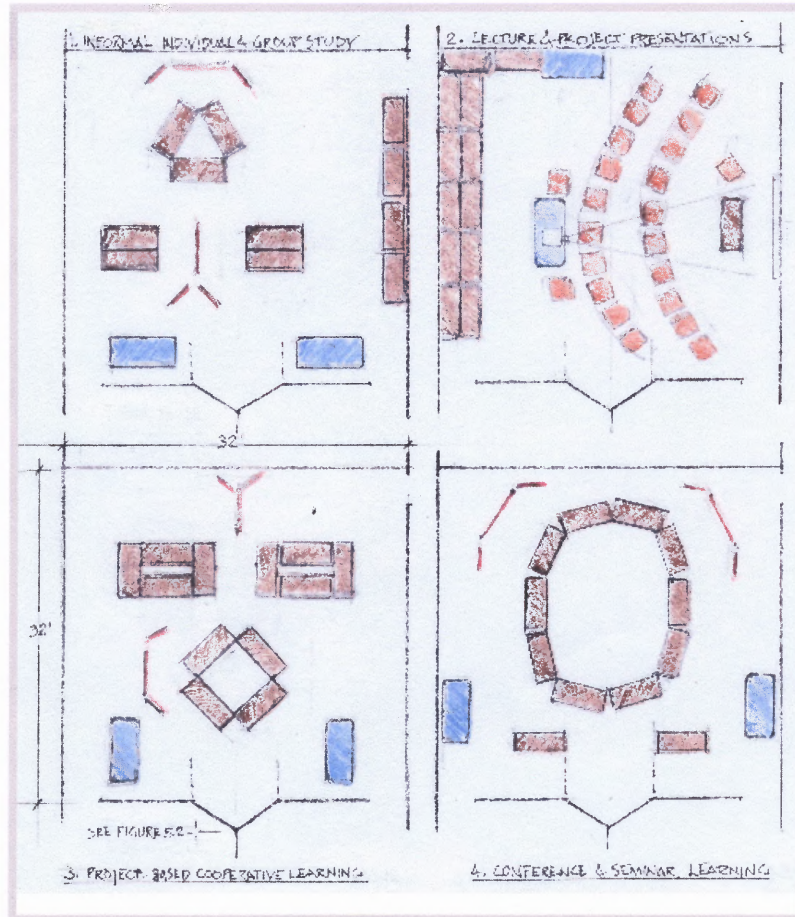


Figure 5.1 Sketch of a multipurpose classroom: four arrangements of moveable furniture on casters for the effectiveness of different learning situations.

The furniture role takes two directions. The first direction is to conceive modular and easily moveable furniture that could be rearranged for the different learning situations. The sketches in Figures 5.1 (p. 70), and 5.2 illustrate an approach to testing the validity of this furniture role in an experimental setting. However, solutions with moveable furniture need to address the specific context of learning situations.

Accommodating up to 24 students, Figure 5.1 exemplifies configurations of a multipurpose classroom of 1000 sq ft. Clockwise from top left: informal single and small group learning; lectures and student work presentations; conference and seminar learning; project-based cooperative learning. In brown are tables useable by one or two students. Workstations at adjustable standing height are in blue. Red lines represent a combination of blackboards, white boards, and easels.

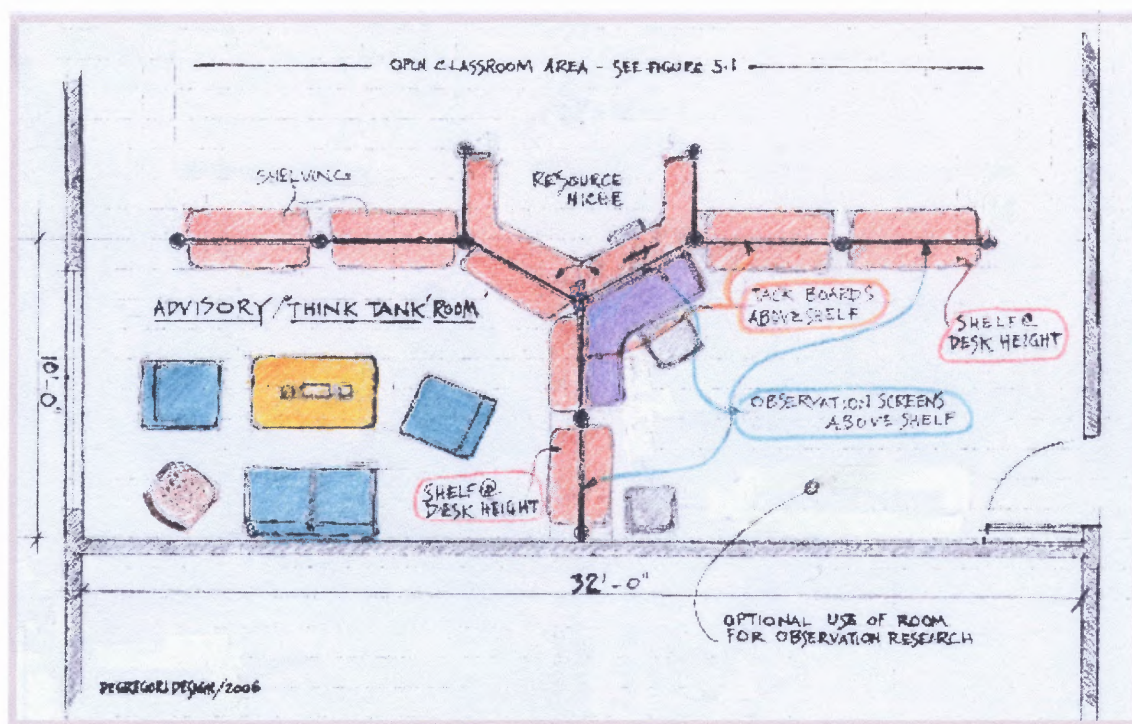


Figure 5.2 Development of a multipurpose classroom concept. Layout of two semi-private workroom extensions, useable by teachers and/or students.

The sketch in Figure 5.2 illustrates the possible use of a small “Advisory/Think Tank” place on the left, while the second place, on the right, could also be used for observation during a stage of research on the organization of the classroom.

The second furniture direction is the Harkness table. This pattern addresses one learning situation: the seminar, which empowers students to actively develop knowledge in a cooperative mode, through discussion on a subject around a solid conference table. It is another simple, yet important and practical pattern. However, for certain types of learning subjects, such as physics, chemistry, visual and performing arts, the Harkness table method is to be integrated in a laboratory type of space. Successful examples have been mentioned in this study (see Figure 4.11, p. 63).

In closing the argument about classrooms’ organization, the Tajimi School case study, discussed in section 4.3 (see Figure 4.8, p. 58) suggests a relevant model that combines the roles of space and furniture. As reviewed and worth repeating, the classrooms are combined in pairs to create a series of independent and adaptable living environments called “houses”. The articulation of the space is the most innovative feature of this model of classroom organization. Each house has indoor and outdoor spaces. The latter have benches and vegetation. The “house” has two large classroom areas where modular and movable desks, tables, and cabinets could be easily re-configured. Lockers are inside the classroom areas, which extend into semi-private alcoves. The two classroom areas of a house share a multipurpose buffer zone, with sinks, a conference table and a computer desk. Additionally, each house includes a small private study room and is accessible to the common courtyard.

The Tajimi model of classroom-as-schoolhouse organization reflects theories, concerns, and research finding on learning environments that emerged from the literature review of this study. It also is a reinterpretation of some of the features and the spirit of Crow Island School, such the moveable furniture, the workroom, and the direct transition between indoor and outdoor. Furthermore, the Tajimi house model reconnects culturally with the social and archetypal character of the American original schoolhouse. Finally, this model convincingly recaptures the essence of the learning environment as a *place* that has a friendly, active, adaptable, and livable social dimension, a dimension that moves to inspire exploration, involvement, and learning engagement.

5.3.2 Q. 1b Learning Tools and Technologies

The tools role is perhaps offering the richest of alternative approaches, both fixed and moveable, from the traditional blackboard type of interaction to the digital media: computers, and the internet. The subject of the classroom's learning tools pattern is vast, rapidly changing, and to some extent indeterminate. As per the moveable tools I am discounting the impact of traditional personal tools such as pencil, textbook, and notebook. They are archetypes and I assume they will always be around.

I am referring in particular to the personal computer that, in connection with the internet, has the ubiquitous quality of supporting the learning environment of the classroom in and out of the physical space of the classroom, which is to say that the personal computer with wireless connection has many of the attributes of the classroom environment, except the power of the existential and social dimension of the *place*. More discussion on this argument is a subject for a separate study.

The digital learning environment is the most active pattern in continuous state of improvement. Most of the assumptions on the subject are derived from evolving theoretical work that the literature review has examined. For example, Schank's work on teaching and learning architectures (p. 25) emerges as a brilliant approach to an unprecedented pattern of learning environments. Schank's architectures balance physical and virtual spaces that are grounded on a reinterpretation of learner-centered progressive education. His model bears some analogy to a pattern of learning environments that relates to *media revolutions*. Here I link both Thomas Kuhn's *Structure of Scientific Revolutions*, as well as Marshall McLuhan's *Understanding Media* whose seminal works were both originated in the early 1960s.

Kuhn's transferable notion of life-cycles of paradigms applies well to McLuhan explanation that the invention of a new media, after initial resistance, transforms into a tide of popular acceptance at the expense of the previous media consumption, such as in the case of print → radio → TV. McLuhan, in defense of previous media predicts that "education will become recognized as civil defense against new media fallout" (p. 305). At the time of his writing, McLuhan was concerned about the limited function of education for protecting previous media. He continued his remarks by saying "The only medium for which our education now offers *some* civil defense is the print medium. The educational establishment, founded on print, does not yet admit, other responsibilities" (p. 305). However, although education continues to defend the print medium, yet at the same time balances it with the digital age media as a learning technology of choice.

Schank's model of a *new architecture*, does exactly that in a creative, sensible way, while he ponders about the uncertain destiny of books (1995, pp.206-211). He

defines 21st Century learning labor by restructuring progressive pedagogy with a new pattern: the *digital learning environment*.

5.3.3 Q. 1c School Climate

Based on the finding of the study, a major object of research related to the Study Question 1 would be a comparison between the school climate in a traditional type of classroom organization and a classroom re-organized for the performance of multiple learning activity modes, as they would be structured by a learner-centered pedagogy.

Then, by integrating the complex character of learning environment into an interdisciplinary research model, the research should also ask: “How does the school climate support learning and academic performance?” In other words, in order to understand the chemistry of the impact of school climate on learning, research should attempt to analyze the components of the climate and their interdependence in the relationship to students’ learning engagement and *educational effectiveness*.

The educational effectiveness of learning environments would result from the measurement and evaluation of educational outcomes. A more elaborate discussion on evaluative practice is not a subject of this study. However, in accordance with Meyrovitz the thesis advocates the optimal experience of the learner as a major point of educational effectiveness.

Consequently, the educational outcomes would be the result not only of high test scores, as in current practice, but also of higher quality of educational experience as perceived by educational reformers, teachers and learners. For example, evaluations of perceived qualitative dimensions, such as sense of place, school climate, students’ academic engagement, and their involvement in the larger community environment (see

also next section 5.3.4, p. 73), would have the distinctive property to raise awareness on the quality of educational experience. Educators and communities would have the opportunity of a renewed perspective on the value of cooperation in research and planning of site-specific learning environments for enhancing the formative and innovative potential of education.

What is left to consider about the impact of the physical environment on learning is the lesson learned by the analysis of case studies and the conversations I had with educators, especially those about the architecture of Crow Island School and the Harkness Table method at Phillips Exeter Academy. And as per those and all the case studies, the evidence is that the adopted solution to the physical environment are distinctly different, yet they were all driven by one intent: to make places that best interpreted the educational philosophy and pedagogy of the time, for the optimal experience of teaching and learning.

This fact leads to the assumption that thinking in terms of architectural standards applicable to planning and designing learning environments has methodological limitations. This is not to question building requirements for *high performance schools*, effective criteria established by building science research. Instead, the task at hand is to contribute, one school at a time, to the creation of places where learning happens within the supportive living experience of an education reflected in the school climate.

5.3.4 Q. 1 A Note on School and Community: Connected Environments

Although the connection of school and community functions was not central in the literature review of factors related to learning, case studies and interviews revealed that learning environments are connected with the larger residents' community they serve,

making “school and community” an unavoidable issue of the collaborative discourse on school architecture. The emerging paradigm of public schools integrated with community functions could support learning and be included as an important factor in articulating the collaborative discourse on schools as learning environments.

Therefore this issue belongs to the concluding arguments of the thesis, and is open to several interpretations and new questions. To what extent would the public have access to the school functioning as a community center? What services would the center provide? What would the mutual benefits be to the residents and the learners’ communities? How would safety be addressed? It is possible to anticipate a multitude of different solutions to this issue, potentially replicating the multitude of solutions in which urban centers, even schools, could be given identity of place, which would make the discourse a lively opportunity to engage the public.

Although not literally a *center*, the community residents’ access to the courtyard of the Tajimi School from the adjacent pedestrian park is an elegant and fitting example of limited integration between the students and the residents’ communities (see Figure 4.7, p. 57).

At the other end of possibilities another interesting example has recently surfaced. Architect John Ronan of Chicago won in 2003 a competition by the city of Perth Amboy, New Jersey, for a high school/community center. The winning solution, to be constructed over a large available site, includes an extensible train of classroom modules and five multistory buildings for academic, retail and business use. The implication of this last and conclusive point of the study is that it adds a new dimension to the interdisciplinary discourse of school architecture.

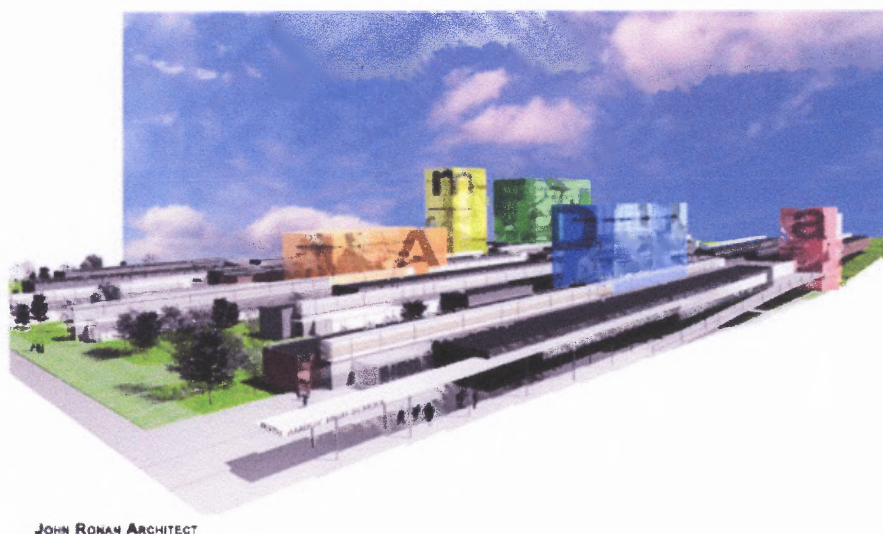


Figure 5.3 High School/Community Center, Perth Amboy, NJ. Illustration of the 2003 winning competition, John Ronan, Architect.⁴⁸

We are confronted with at least two alternatives. One is the traditional approach of planning and building schools by close teams in which the urban community is represented, yet educational objectives are intermixed with local interests and financial constraints affecting the planning agenda in which, for example, the selection of site may not be the best choice.

The other alternative is an innovative approach to planning the school that would better protect the integrity of the educational objective. The planning of schools integrated with community use, up to the full development of integrated community centers represents a promising and pragmatic alternative. Because the buildings or campus would incorporate cultural, recreational or business and other facilities, the entire urban community could use them. Therefore, the community could see the economic advantage of this alternative and be more supportive of the financial burden associated with the construction of the facilities. Also, from the point of view of urban planning, this

⁴⁸ Retrieved January 2006 from: www.lynnbecker.com/repeat/Ronan/ronan.htm

approach would have the advantage that the prospect of use by the entire community would favor the chance to locate the facilities in the best possible available site.

5.3.5 Q. 2 - A Strategy for the Development of a Sustainable Discourse on School Architecture: Interdisciplinary Research

In order to develop and implement a body of knowledge related to Question no. 1 of this study there is a need of investigating the complexity of learning environments by means of an interdisciplinary research methodology.

Question no. 2 of the study was prompted by literature reminding the reader that public schools continue to be built for urgent and understandable demands for increased capacity, equity within the school system, community use, or improved building performance. What is often assumed in the formulation of the program for a new facility is that it will be educationally effective, optimizing educational outcomes, meeting the needs of the adopted pedagogy and of the teaching and learning experience. This assumption is based on the knowledge and purpose of the people participating in the process of planning a new school facility, among which educators and architects' discourse should play a major role. How is it then that the praise new facilities receive for having met expectations for test-score related educational outcomes does not speak of the experience of the learner? Perhaps it is because there is no established measure for that.

Yet, this thesis maintains that the fundamental purpose of planning and building a new educational facility is that of creating an environment that supports learning for the optimal experience of the learner. The exemplar architectural cases and the conversations with educators reported in this study have sustained this point. Alumni testimonials and post-occupancy evaluations may include qualitative information about the student

experience of the learning environment. However, regardless on how useful the retrospective might be, it comes late to discover that something went wrong in the planning.

What was missing in the planning process, presumably, was the lack of a foundation on theory and practice of a collaborative discourse, and use of the knowledge accumulated in interdisciplinary research. To corroborate this view, former New Jersey Commissioner of Education William Librera denounced the problem that new research information needs to be integrated in the planning process of public schools. He concluded that the problem relates to a degree of disconnect between the education and academic systems, the latter being an issue for improving communications and policy.⁵⁵

A re-formulated fundamental question then should be: Which information, and values are important for guiding judgment in the discourse on school architecture for effective learning environments?

The study had the opportunity to examine two examples from the past about school planning processes and the collaborative discourse: Crow Island School and EFL. That is reference material that justifies the need for an extended comparative investigation, because it would bring understanding on successful approaches to the discourse.

To illustrate, the Crow Island case offers an example of a successful approach to the discourse, yet under a set of exceptionally favorable conditions: uncompromised educational objective priority, exceptional players, supportive community, and adequate funding. On the opposite end, in *Profile of a Significant School* about the Greeneville Jr.

⁵⁵ Information taken from handwritten notes by the author attending a speech delivered by William Librera in the Fall of 2005 to students and faculty of the Urban Systems PhD Program, at Rutgers University, Newark.

High School (EFL, 1964), a number of predictably common objectives prompted the need to plan a new school. Upfront objectives were the need for additional capacity, old and inadequate buildings, and rigidly set class sizes that prevented the use of new teaching methods.

The team of planners included members of “a population used to community planning”, to which the satisfaction of criteria for a building “offering maximum utility within the confines of minimum cost... is the basis for the *significance* of this school” (EFL, 1964, p. 4). As previously reported in this study the EFL document also states that the planning team worked together to plan a building which would be *flexible*, “one which would provide optimal learning conditions through improved environment and through adequate provision for program change” (p. 6).

The set of the local community needs and planning criteria is most likely as typical of today as it was in 1960s around the nation. The intentions were good then and, according to the guidance of EFL, grounded on principles of progressive education. Why then, many of the schools built under the EFL program have been criticized, abandoned, or transformed? What was missed or went wrong? Did not the built environment meet teachers’ attitudes and practices? Or the built environment proved to be a factor in deteriorating the school climate? Was it because of inadequate design, or a misguided discourse on school architecture? These questions require an extensive investigation that is beyond the purpose of this study. However, they bring the study to a final issue. These are questions that justify research and development on the methodology and leadership of the discourse on school architecture.

5.4 Conclusion

The evidence for a new research approach to the design of learning environments emerges from this study. There are three important areas of needed new research.

1. The discourse. As discussed in the previous section the discourse on school architecture for effective learning environments is a critical step in the decision making process of building schools. This issue has surfaced as a subject of study that has its roots in organizational theory, multidisciplinary project management, and policymaking. The school planning process, at different levels of intervention, is a critical stage for the development of optimal solutions.
2. School climate. In order to understand the complexity of the school climate's impact on learning, research should attempt to analyze the components of the climate and their interdependence with the physical context in the relationship to students' learning engagement. This research will require actual field and comparative analysis of live learning environment.
3. Classroom organization. Classroom organization is the most direct manifestation of the effectiveness of the physical environment on learning, all other variables being equal or controlled. The thesis offers most references to this subject, from theoretical to practiced, showing that effective learning environments could afford different solutions to classroom organization.

Commonality, or a set of standards, in the physical context of the environment is not a requirement to guarantee the effectiveness of the learning environment, although diversity in the physical context is equally not a requirement. This is to say that the non-specificity of the physical context could be associated with a constructivist approach to

the design of a learning environment. In other words, the effectiveness of the physical context of a school is not related to predetermined solutions. Solutions must be constructed for sustainable conditions of pedagogy and the social environmental context of the school.

What emerged from the study is the necessity to connect the arguments on school climate, learning technologies, and classroom organization to the argument about redefining the collaborative discourse on school architecture. Hence, the research on the interactions among physical, social, and educational contexts would articulate a vocabulary of meanings and discernment capable to achieve fundamental understanding for the creation of effective learning environments. To achieve this kind of understanding, the work already done is encouraging. It inspires the renewal of the discourse on school architecture. Therefore, to the students of architecture and education, the practitioner, the scholar, and the urban planner, my hope is for this study to suggest that the work for the school of tomorrow has just begun.

APPENDIX A

“CHILDREN, LEARNING & SCHOOL DESIGN”⁵⁰ A CONVERSATION WITH ELIZABETH HEBERT ON CROW ISLAND SCHOOL, WINNETKA, ILLINOIS

Telephone interview conducted by Alessandro De Gregori on June 21, 2006

A. = Alessandro DeGregori B. = Elizabeth Hebert (Beth)

Excerpts

A. My study is about the architecture of learning environments... I am interested in the qualitative value of the relationship among learners, teachers and the space in which they interact. Ultimately, the study is about finding architectural patterns that facilitate learning engagement within the context of schools' educational philosophy.

B. I think your key word is “qualitative”, as it is most difficult to put this into numbers.

A. Yes, we are embedded in a culture that is oriented to quantitative measurements and numerical values. To be effective in convincing an interested audience, such a board of education, I would have to develop a strong and convincing argument even though it does not have numbers to prove it's valid.

B. Well, an argument that they find valuable. Have you visited the school?

A. Yes. Penny Lanphier gave me a full tour... I was amazed that a community could have resources of such dedication to the issue of education.

B. It has to do with stewardship. And before stewardship you have to have a great design, so that all of this can happen. But how can I be of help to you?

A. I know that you as the Principal of the school for many years have always been interested in the physical environment of the school and its architecture. So I have prepared some questions that reflect a way for you to advise me...

Would you describe in your own words the educational philosophy that informed the design of the curriculum of Crow Island School?

⁵⁰ Title of a monograph on the proceedings of a first national invitational conference for architects and educators: Hebert, E., & Meek, A. (Eds.). (1992).

B. I was principal for 21 years until last year. I became principal of Crow Island School in 1984...the Winnetka Public Schools is a very well known and prominent school district and Crow Island is one of the five schools within it that opened in 1940. Not long after I came, it seemed to me that it would be a good idea that we would celebrate the upcoming fiftieth anniversary of Crow Island, which was going to occur in 1990.

So I began to get some people together to chat about that and of course the usual kind of things you want to have, a little gathering, a homecoming for the alumni... so, we went beyond that and we brought in a committee to actually contact the alumni and ask them about thoughts about the building and we got responses from about 1500 people. Then we planned a conference, the first invitational conference between architects and educators and it was held in November of 1990. And Peter (*Papademetriou*) was part of that...we reached out to the national Endowment funding and the Graham Foundation ...quite a few people and organizations were behind us, in fact there was a monograph that was published. ... It was an event that was and still is talked about. It celebrated Crow Island and it celebrated the essential piece of what was behind the design, the important conversation between educator and architects.

A. It seems that what happened at the conference mimicked what happened at the time of the design of the school, the continuous interaction between the architects and Washburne's team. I also learned that Larry Perkins was sitting in the classroom of another school in the district to observe for hours at a time the interactions of students with teachers and the classroom environment. Ultimately, what happened then was the opening up of the dialogue between two different languages in search of mutual understanding. So, what happened in the 1990's conference was an expanded phenomenon of that discourse?

B. Exactly. We had 50 educators and 50 architects; and I remember that when we got down to the little details of things, we put just names in the name tags, so you wouldn't necessarily know who was an educator and who was an architect... Jim Banning, University of Colorado, Steven Bingler, he's in New Orleans, and that's how I know Peter. We reached out to a lot of people in all aspects of school design,

and we said: “What we want to celebrate here is the conversation between educators and architects, because it really was a tribute to Dr. Washburne (*then the Superintendent of the Winnetka Public Schools*). In his 20s when he came to Winnetka, this young man was extremely articulate about the pedagogy and the progressive philosophy of education, and then you had Larry Perkins with the Saarinenes. Of course the story of how Perkins and the Saarinenes got together is well documented. I think there was an interview done with Larry Perkins that you can probably get through the Art Institute. I think it’s on the web. ... Washburne wanted an architect with a big reputation. Now, the Saarinenes had been friends with the Perkins family. Larry, a huge man, told me the story many times, he told me “and I offered the biggest bluff of my career, I said “Dr. Washburne, I can deliver that, I can get the Saarinenes” and in fact he did get the Saarinenes. ... You walk in that auditorium... that is the Saarinenes. I visited their studio in Finland... the Saarinenes came to the United States to do Cranbrook outside of Detroit. That was just prior to Crow Island. That was what they were famous for, here, that was their first connection here in the United States.

- A. Very interesting story... So, to go back to my earlier question, the philosophy of the school that influenced the thinking of the designers was maintained throughout the years? And that was Dewey’s philosophy of progressive education?
- B. Yes. Project learning, hands on, and individual learner-centered; and that continues today.
- A. And there is a lot of enthusiasm. I’ve seen it in Penny Lanphier, the docent who gave me the tour, and in the new Principal, Deirdre Lyne, who was interested in my study and the book I was reading on the “sense of place”. Now, I really would like you to correct me on my hypothesis. I believe that the ultimate purpose (*here I meant the purpose of the school physical environment*) is to facilitate the learning climate and academic engagement.
- B. Yes, but Washburne had a bigger idea than just academic engagement; his educational purpose was life engagement...
- A. I understand the educational purpose where academic and life engagement are interconnected. My assumption is that what school architecture could ultimately do is

to create the “sense of place”, which is important because it is related to identification with the place and sense of belonging, and consequently is a factor of engagement. If you are in a place you can relate to and have the sense of the place, or in other words relate to what Norberg-Schulz calls the spirit of the place, its *genius loci*, then that is a most important agent for learning engagement that architecture can deliver. It is the ongoing transactions. For example, if you start with rows of classrooms that give students the sense of prison cells, that’s a design failure, but if the school environment connect the student with a sense of belonging than you have done something that supports the learning engagement.

- B. Yes I agree. That’s a wonderful topic and now I am making a note that I will send you a piece that I wrote for an educational journal⁵¹. What I did there was to summarize a little to do with what you are saying right now, that when we ask the alumns what is that you remember, it was the sense of place, it was “feet touching the ground”, it was the sense of the outside, it was the sense of comfort, and those things created an emotional balance...I will send that to you because it might help you. I will also have sent to you from the school the monograph from the 1990’s conference⁵².
- A. Thank you very much... Here is what makes my thesis different from traditional research on the design of school environments. That has to do with the fact there is a third dimension that needs to be considered in new research...Perhaps the dialogue between architects and educators has not been maintained consistently, but it is part of a known practice. What I found, by getting involved with the implications of the sense of place, is that a third factor of research methodology needs to be taken into account: environmental psychology and behavior. Research in environmental psychology brings about a clearer explanation of the impact the school physical environment may have on learning engagement. The dynamics of these interacting factors could be represented in a triangle of connections: architecture, educational philosophy informing pedagogy, and environmental psychology. There was already a body of literature in this discipline that needed to be discovered and applied to the

⁵¹ Hebert, E. A. (September 1998). Design Matters: How School Environment Affects Children. *Educational leadership*, 69-70.

⁵² Hebert, E., & Meek, A. (Eds.). (1992). *Children, learning and school design*.

context of my type of study. For example, a particularly useful theory, called Transactional Perspective applies to the study of human behavior in the transaction occurring between people and their physical environment.

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- A. I was intrigued with the shape of the classroom ...
- B. Yes, the L shape.
- A. It originated a lot of discussions... even today. But how it came to be in relation to Washburne's educational philosophy?
- B. As I imagine the conversations that went on... where the period of childhood is deeply understood as a time of exploration, observation, and needed guidance; and so, the design picked up on that theme... because in so many schools' design they say "oh well, their focus is on math", where you got the building telling the people what to do. That's not what Crow Island is about. Crow Island suggests, Crow Island invites, it's the spirit of possibilities, and exploration, and playfulness...
- A. Yes, these motifs are mostly manifested in the child when he does not know the world. So, the design is about putting it in bricks, facilitating those motifs to be experienced...hence the L shaped classroom that best organizes the spirit of possibilities and exploration...
- B. Yes... did they give you the article by Jane Clarke⁵³? It has the picture of a bent plywood chair in the front of it?
- A. Yes. By the way, in regard to that chair, it reminds me of Charlie Eames. Is that true that he was involved?
- B. Oh yeah. The Eames were involved in the design of the benches (*in the auditorium*) and the chair...
- A. I do not think that article mentions Eames. The author wrote that the chairs and the auditorium benches were designed by Eero Saarinen... perhaps it was a collaboration with Eames...
- B. Well...the whole Saarinen family was involved, you know. So, you had Eero, he was young but he was involved, and then you had his wife (*Lilly Swann*), who did the

⁵³ Clarke, J. (1989). Philosophy in brick. *Inland Architect*, Nov/Dec., pp.54-60.

ceramics, and Loja (*Eliel's wife, Eero's mother*) did the curtains, that was the textile work that they were doing up in Cranbrook, there were some original pieces there.

A. So, it was in Cranbrook that the connection with the Eames occurred?

B. Yes.

.....

A. In your experience, were there places in the entire school that the students preferred for chosen activities, chatting, and so on? ...I know there is no cafeteria in the school, and that is a typical place where students mingle.

B. I think that through all the conversations I had (with students and alumni) different parts of the building elicited different kind of feelings. I think that part of the beauty and the genius of Crow Island is that this is happening without much attention being called to it. It's part of their being integrated into their thinking almost without being conscious. So, now I'm having a memory of a second grade classroom, a child is putting up a little play, and one of the children says to the teacher: "Mrs. Smith we should do this in the auditorium". So it is the sense that what little Steven has done is of significant importance, and the place we would do it (*perform the play*) would be the auditorium...It's a "why don't we go THERE" kind of conversation...

A. It is like that the place has developed the sense of networking and meaning of spaces. The place is not just like, say, a house, but it is also a network, where immediately you have a mental picture of the connections with places you can relate to.

B. Right. It's like having a menu of possibilities. So, if I would have to mention a place, though, I would say it is the Workroom (*the smaller space which forms the foot of the L shape*), both because of its size, it is intimate, and it has everything you need. It has the bathroom, it has the sink, it is kind of a quintessential place. Everything is within reach, within possibilities. So that space becomes created and recreated, depending on the imagination of the teacher and the children. Of course it is available for the children to go to, but often times it takes on its own being, where it might be a museum, or it might be a display area for the large projects they are working on, so it does not intrude in the classroom space...Every one of the 22 classrooms has it.

A. There is a lot of work currently done about this idea of the L shaped classroom and there are many interpretations, though it seems to me that something of the spirit of

the place, the original intention, is somewhat missing.. It is like the reasoning goes: “well, we know that the L works, let’s make a design that follows the principle”.

- B. Yes, ... the outcome was more powerful.
- A. Let me ask you the last couple of questions... You certainly have thoughts about the use of digital technology in education. When the new technology allows more and more to gain academic achievement through distant learning, do you think that distant learning makes the very existence of schools to be drastically reconsidered?
- B. Well the ultimate far out question is then “will distance learning and technology replace?” (*schools*)...My experience is that children need to experience place, they need to experience the coming together, ... It’s like a vitamin, it is a requirement.
- A. You are talking about the physical place, excluding the virtual one?
- B. Right... the physical, being in a place. You don’t say to a teacher “let’s imagine that and put it on a laptop”... you know. The idea “let’s go to the auditorium” meant “let’s go there and experience the feeling of awe and importance that that room creates here, because our little friend Steven has created a play that is worthy of that feeling. We should support him and experience that together as part of our memory”
- A. Ultimately it is as the physical space is ...allow me this expression... “the other body”. I mean, I am a physical body and I need to relate to the environment as a physical body... Therefore there is no better substitute. Yes, the virtual space would allow me to imagine myself as a disembodied entity, but I am a body and I need to relate to the physical space in which I am, or occupy.
- B. Yes. That’s beautiful. Now, I’m going to respond to that. In the past three years, we had two blind children come to the school, and, although my expertise is in special education... I’ve worked with deaf children for many years, but I haven’t worked with blind children... to watch Charlie and Charlotte, navigate the building... he was so able to tell me how friendly the building was, that it felt good to him, and he said it wasn’t at all as hard as his last school. There is something about that response to a child without sight that they still have an experience in the building as comforting and as responding their needs...
- A. Yes, I think “responding” is a good word because it reinforces the idea of this relationship...

- B. I like your idea...it's the other person, it really is... So, about the technology... of course we have the technology, but it's kind of like ...people are thinking that that's it. Well, it has its distinct limitations and it simply does not provide the richness that a feeling of place can be.
- A. The last question. If you had the opportunity to contribute and talk with the architects of today for planning a new school facility, what features would you like to see being included? And what would be your general idea to inform the architect for planning the space?
- B. I would be cautious about talking of particular features, except, of course, I would be talking endlessly about the workroom. I think what happens even before the features is the conversation, and here is my lament. My colleagues, the educators, few of us, could be as eloquent as Dr. Washburne in communicating to the architects the nuances, and the specifics, and the feeling tone, and the pedagogy, so that if that were to happen. Then out of that conversation would come...the school. Of course, it would be hard for me to imagine that whatever that school would be wouldn't have some of the elements of design, the spirit (*of Crow Island School*). Because if you are looking at what was that so many schools were "technology" schools, or were "science" schools, or were "literacy" schools, or were "multiple intelligences" schools, or all of that. But what they did at Crow Island was focus on children; they didn't try to imagine what we will be studying in twenty years. They said: "you know what? This is about childhood. So, what is it about childhood? Children need joy, they need security, they need affirmation, they need a place to imagine...If you focus on childhood and a deep understanding of that, then you got a pretty good shot at a well-designed building.
- A. I think this is reinforcing what is happening in today's philosophy of education that is recovering the sense of the learner as central to the development of pedagogy and the learning environments...where the teacher is the facilitator. The fundamental issue here is the optimal experience of the learner. Would you agree with that?
- B. Yes. Absolutely.

- A. It has been quite a voyage for education since the beginning of the 20th century and even before until today to gradually, and through landmarks like Dewey and Washburne, getting away from the institutional approach and closer to... the truth.
- B. Yes, the truth. It is quite the case, not to have an institutional response but to have an individual response.
- A. Your insights have been precious and I would like to thank you so much. I wish we had the chance to meet in person.
- B. Well, we may do that at some point.

APPENDIX B

“THE HARKNESS TABLE: METAPHOR OF AN EDUCATIONAL PHILOSOPHY” A CONVERSATION WITH JACK HERNEY AT PHILLIPS EXETER ACADEMY, EXETER, NH

Interview conducted by Alessandro De Gregori on July 27, 2006.

A. = Alessandro De Gregori J. = Jack Herney

Excerpts

- A. My study is about the architecture of learning environments. The hypothesis is that the physical environment of the school relates to the school’s learning climate. I am doing a literature review from architecture, education, and environmental science sources that are linked to the subject. Then I follow-up the review with case studies of schools, which become material for discussion of findings in relation to the analysis of the literature. Conclusions may identify architectural patterns that facilitate learning engagement as well as raise questions on the educational role of school architecture for further investigation.
- J. How did you decide to study Exeter Academy?
- A. While in other cases I looked at the entire architecture of the school, in this case I see the classroom as more of the focal point where the physical environment is catalyst in the making of the learning environment, especially because of the Harkness method that is practiced here ... Ultimately, if we want to connect the physical environment to learning, my assumption is that what architecture can do is to create a “sense of place”, individually and socially for the entire class. What I mean is that the sense of place develops a sense of ownership and belonging, feelings appropriate to the space, hence a learning climate and learning engagement could be facilitated... but I would like to hear from your experience and I prepared some questions.
- J. Good.
- A. For how long have you been teaching at Exeter Academy?

- J. I started in 1968 and remained teacher until I resigned in 1976 and went to Washington working on Capitol Hill about three years, working for a US Senator, then I came back to the Academy, did a year of fund raising, then I was Director of Admissions for eight years, while I was doing some teaching; Chair of the Department; I also taught most of the time when I was chair; Dean of Faculty for five years; I still taught a course when I was Dean of faculty; and than back to the classroom after that.
- A. You are known as a best teacher...I read an article from the Internet that endorses this claim... What's your sense of the importance of the Harkness method? What's your point of view?
- J. Let me go back to the philosophical basis for the Harkness Table to begin with, and then I talk about my own experience with it. In the 1920s there was a philanthropist, Edward Harkness, who was a very good friend of the principal of the school of the time, Lawrence Perry. Mr. Harkness, whose father was partner in Rockefeller's Standard Oil, was responsible for giving away his father money, essentially managing the philanthropy. At the time, Exeter was a school like every other; 25 kids in a class, desks, teacher in the front, lecturing, kids reciting, that sort of things. Harkness, in one social occasion, said to Perry: "What would you do at Exeter if money was no object... I want you to think about this and come back with an idea". Perry met with some faculty and they came up with an idea that was not much different than the Harvard Tutorial Program where teachers work one on one, and he went back to Harkness. Harkness said: "You know, this is not anything revolutionary; that's what Harvard does. I have in mind something where the middling student - I was a middling student, Harkness said - the degree to which the middling student was understanding material would be obvious to the teacher. We have a system in America now where a very good student is served well; where the poor student is known and neither not (*served*) or... but the middling student is not even known. And I have this idea of a table where there would be a small group so the teacher would hear each student every day and understand from what he's hearing the degree to which the student understood the material." So Perry went back and got another group, and said to Harkness: "Ok, this is what we have as an

idea: we would have not eight but twelve students sitting around a table, and the teacher would be at the table, and they (*teachers*) would conduct the class, not as a lecture, but as a conversation, and each student would be expected to participate every day. Moreover, this idea would permeate the school and those teachers would be in dormitories. The students could come to the teachers at night to get extra help". So, Harkness said: " This is more what I had in mind. How much would it cost? Go back and tell me that". There is a letter in our archive in which Perry said: "Dear Mr. Harkness, you asked what the itemization would be. Here it is. We would have to double the size of the faculty, double the number of classrooms, the dormitories, and so on... it came to about six million dollars". That was 1930, and it was a lot of money in 1930. And Harkness said: "You go start building that school out, I'll write checks". That's how it got started, and that's how it got finished. The fact that they finished converting the school to that kind of model for less than six million dollars is because it was done during the Depression. ...Several buildings were built from that endowment. Several of the dormitories... Phillips Hall was built... gradually other endowments allowed the whole school to be converted to a system where every class has a Harkness table in it. For a long time until this building was decommissioned as the science building and the one across the way was built, science did not have oval tables, because they had labs. But the Science Department when they outgrew this building and wanted a new one, they said: "We want Harkness tables". So the new building has a lab and a Harkness table. So, there is a discussion in the science classes as well in the other classes.

- A. This is interesting, because this approach to a science building solution has been adopted by an architectural firm in New York, the Heller Group, for the new Science building of the Lawrenceville School. I interviewed the head faculty of the Science Department there: the faculty loves the way in which money was spent to create an environment based on the principle of having the lab with a large window on the oval table classroom and teacher office. It's amazing how enthusiastic they are about this solution.
- J. Yes. I'll tell you another interesting fact about this. I was Dean of Faculty when that building (*the new Phelps Science Center*) was built, so I was part of the selection of

the architect⁵⁴... It was very thoughtfully done...One summer, before they finished the design of that building, they took a room in the existing science building, the building in which we are, and completely gutted it and inside rebuilt a biology classroom according to what they thought would be the best, and put a Harkness table in it. And they taught in the Summer school for a summer and asked the teacher of that class: “What did you learn? Is this the right configuration of the classroom?” and so on.

The table was a modular table that could be taken apart, put it in a horseshoe, arrange it for four different groups, and so on. They asked the teacher to experiment. At the end of the summer when they had the debriefing and asked the teacher what he learned, the first thing he said was “Get rid of the module. I do not want a modular table. I want a solid oval table”.

- A. In my view, it seems a major finding.
- J. “The reason”, he said, “no matter how you do it, in any other way, you do not have the same student engagement as you have with an oval table”. The space makes the difference. The connection around the table makes the difference to the discussion. So, every table over there is a solid piece of wood.
- A. After I learned about the Harkness method I informally discussed it on a few occasions with educators involved in the public school system. Generally, I found resistance to the idea, because of the implications related to the limited number of students the method requires. However, in talking with a school architect⁵⁵, I found that for a newly built public high school, the faculty wanted something like that, so they had Harkness facsimile tables being built. I’ve seen a prototype. I don’t know specifically how they will end up using these tables with a typical 24 students’ class, but it’s something to follow up.⁵⁶
- J. I’ll tell you that Mortimer Adler, the philosopher, was on television in the 1980s teaching a small group the way we teach a group of students. As text, it was the preamble to the Constitution, if not it was the first paragraph of the Declaration of

⁵⁴ Centerbrook Architects and Planners, Centerbrook, CT.

⁵⁵ John Carton, AIA, Partner, Parette Somjen Architects, designer of the 2005 addition and renovation of Mountain Lakes High School, New Jersey (April 7, 2005 telephone interview).

⁵⁶ See summary of telephone conversation with Dr. John Kazmark, Superintendent of Mountain Lakes School District, p. 64.

Independence, one of those two documents. They spent an hour in talking about it in dialogue, conversation. At the end they interviewed him and he said: "This is how education ought to be done". And he said: "The only school that is doing it is a boys' school in New Hampshire called Exeter. They do it with 12 kids, but you can do it with more than 12 kids, though it's harder".

- A. I want to show you this. (*I am showing Mr. Herney the photo of a "Harkness" table for 20 occupants in a Melbourne school. The students are using laptop computers. The caption says they are operated on batteries in a wireless environment*). They made a table for 20 occupants and I thought that maybe the effectiveness of the Harkness method is in question, because what seems to be important in the Harkness table is its dimension, a size that allows for a direct, closer rapport among the participants. I suspect that the larger size for eight more people changes the group dynamics; it makes the rapport more formal, also in terms of the language...
- J. Yes. The size is a factor, certainly. I would however say that the Harkness model works because of the furniture, but more than that because of an attitude in a philosophy of teaching...
- A. In fact, isn't Harkness is known not only as a table, but also as a method?
- J. That's right, but I would say less than a method, because that implies that you could write it down and there is something scientific about it, that there is a formula. I think it's a set of attitudes, and most of the faculty here thinks it's a set of attitudes. Before you leave here you should go to the bookstore and get a book called *Respecting the Pupil*.⁵⁷ It's a book of essays written long time ago, in 1980 for the bicentennial. The reason it has that title it's because the editors asked a teacher in each discipline to write about the Harkness method. For the title they tried to find something that would capture what those essays all had in common. And what they came up with was a quotation from Emerson in which he says: "... the secret of Education lies in respecting the pupil"⁵⁸. There are two paragraphs there, which tell you the philosophy in the attitude. It's a wonderful little short definition. He describes it in three ways. Respecting the pupil means being a companion of his thought, a friend of his

⁵⁷ Cole, D. B. and Cornell, R. (Eds.). (2001). *Respecting the pupil: essays on teaching able students*. (4th Edition). Exeter, NH: Phillips Exeter Academy Press

⁵⁸ Ralph Waldo Emerson in "Education", 1883, as quoted in Cole and Cornell, Eds. (2001).

friendship, and a lover of his virtue. And then he goes on to say that you must also respect yourself enough to not to ...in other words you must respect your discipline enough to simply not to give way to the student. My point is that the reason the table works is this: the teacher gives over to the student the class in a very real sense, surrenders his voice, and turns his ears into the primary tool of teaching as much as his voice.

- A. That seems to be in line with, or a step forward, the learner-centered philosophy of Dewey and others, and I like to reflect on that when I'll review this conversation.
- J. Any time I give a talk about Exeter and Harkness' classroom teaching, which I do when the families come back on 'Acceptance Students' to decide whether they are going to come back next year...I always end with that quote and try to explain a little about it. What we are really talking about here is a mindset about what's important in the classroom.
- A. Let me quote from Philip Roth's *American Pastoral*. I was impressed about something he said ... He talks about a high school alumni's reunion and he says (*reading*) "...I tried to comprehend the union underlying the reunion, the common experience that had joined us as kids."⁵⁹ What is 'maintaining the union beyond the reunion' at Exeter? Does the method with the Harkness table do that?
- J. When you get any group of Exonians together after they left Exeter the thing they may talk about most is the experience in the classroom and the attitude of respect and listening. You'll be surprised how many say: "I incorporate Harkness into my profession", no matter what profession it is. I remember a conversation, when I was Director of Admissions, with an applicant's mother who said: "Let me tell you why we are here. You have an alumnus in your school, by the name of (*not clear*). I have been interviewing applicants for Morgan Stanley for thirty years, and I have interviewed this young man and I said 'What would you bring to Morgan Stanley?' and it was the most arresting answer I've had in thirty years. I said 'Where did you learned this?' and he said 'from my school. That's the way they teach at Exeter'", but what he had said was 'I want to make the experience of banking a cooperative venture in which the

⁵⁹ Roth, P. (1998). *American pastoral*. (p.44, 1st Edition). New York: Vintage International.

clients understands that I am only a handmaiden to their success.’ And she said: “I’ve never heard it expressed in such a communal way, in such a cooperative way”.

- A. Yes, *communal* is the key word. That is the way of learning he experienced here. Although it could be, that experience may not be replicable on a large scale today in a public school system. And the physical catalyst is the table.
- J. Exactly. It’s a metaphor of what is the philosophy, and as I already said it’s not only banking, it’s medicine, it’s law... You’d be surprised of how many of the corporate offices of Exonians have Harkness tables on them, because they said “that’s the way I run my business, the same way I learned here”.
- A. It’s incredible that of all the purposes of education, that of preparing people for real life jobs, here you have a perfect example of a transferable experience. This also supports the hypothesis of my thesis: there are ways in which the physical environment affects learning, and it doesn’t have to be the expensive façade of the school building. But returning to your personal experience, what happens during a class session?
- J. Lots of things, really. If it’s happening correctly, students when they walk in the door they know immediately that they must participate, they know that the responsibility for what happen in the next 50 minutes, if it is successful or not, rests partially with them⁶⁰. They are prepared and they have a responsibility to the group. Second, they know that their responsibility takes a variety of forms. It takes the form of saying what’s in your mind, it takes the form of being directly honest and disagreeing with somebody if you do, or supporting him, it takes the responsibility of listening carefully and not dominating the discussion, of looking for a better idea and championing that idea if you hear it. It includes asking questions more than giving answers, and saying what I don’t understand, as much as what I do understand. It’s surrendering the notion of being the expert and being the correct student, and accepting the notion of being the confused student or the incomplete student and saying ‘help me out here, I really do not understand this’.
- A. Also, it’s training in management, isn’t it?

⁶⁰ Students have reading or problem assignments at each class session and their responsibility is to be participating to the class discussion of every session.

- J. Sure. All that goes back to what I said before of why it's applicable everywhere else.
- A. In terms of intelligence and different students' ability to learn, do you have a more or less uniform student body?
- J. We do. That helps. In some way, I think you can do it in a more heterogeneous setting probably, but there is a homogeneity here which has to do with the sharpness of mind, and probably interest in learning and initiative, so we start with some 'good tools'. That is not to say that, absent those, this wouldn't be the best way of learning because I think it is. You don't need those (*'good tools'*), because anybody, any kid has an elemental level of curiosity, and has an elemental level of self respect, and that impels them to do what needs to be done around the Harkness table. So, I think you can work with any level.
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- A. The July issue of *Esquire* magazine published an article from a college professor⁶¹, entitled *The Problem with Boys*, citing statistics that, among other problems, point to an increasing attention deficit gap in men vs. women, and to 11 percent more women graduating than men. I wonder if there is a way that the Harkness method could contribute to solving these problems through interactions and discussions around the table.
- J. I'd like to try and answer but I won't, because I don't know enough about that article and the reasons behind the deficit, but I could guess and make some assumptions about why there is that difference. I think (*the article*) is based on a sample that is much more heterogeneous and includes a broad swathe of society. As I said, our kids all have, regardless of gender, certain qualities, they were good at the previous school, they're achievers, they are all pretty curious, and they are all highly motivated, and walk into the classroom prepared. What a gift for a teacher! You absolutely know that if you said nothing, the class will go ahead, and would do so productively. If you walk in late to a class it's already under way...
- A. Yes, it's quite a different picture than the one described in the article.
- J. I actually heard of this article and lots and lots of follow-up on this, lots of commentaries, whether there is a problem and if so, with whom and why...

⁶¹ Chiarella, T. (2006, July). The problem with boys. *Esquire* (vol. 146, 1).

- A. The worth to me would be to see whether, in light of pedagogy, the Harkness method could contribute to the solution of the problem ... Anyway, moving on to another subject, does this method apply to all curriculum subjects?
- J. Oh, sure. People say: "How can you do it in math?" When I was Dean, I sat in every math teacher's classes. They essentially ask similar questions that the historian does ... because math is taught differently here. For instance, they would say: "Here is the problem. How did you solve it?" And the kid would say: "I solved that way". And the next follow-up question is: "Did anybody do in a different way? Did you use the material in a different way?" Which essentially is the same question that a history teacher's asking when a kid says a generalization, he says: "Do you all agree with that generalization?"... "Did the details that you had to work with convince you that there was something else you could come up with?"... The questions are often the same... so, it's a sort of discovery learning, and it's asking kids to think about what it is, and it's the process of that critical thinking that is more important.
- A. What comes to mind, this process is more like what's happening in a seminar in higher education, it's similar to pedagogy in a University setting, not so much at the high school level... so, you are already upgrading the level of learning expectations, by the way of your pedagogy.
- J. I think our 9th graders come in from a huge variety of schools and are instantly put in this kind of environment. Our 9th grade history class asks the same questions that senior history classes do. It's a different level of abstraction, a different level of analysis, and we now have started in the summer school something that actually takes in 7th grade kids. Those kids are asked the same questions that 9th grade kids are. You can take this down. It's asking something different of a kid that it's asked in most educational settings. But you can start asking those questions of kids anytime. Although, at the lower level of our language courses, they don't look a whole lot different from the lower level language courses at a high school. There is a lot of memorization and so on until they get the language. Early on, however, they are reading a short story in a foreign language and then having a discussion about that, and that's when the Harkness methodology takes over. It's a lower level in a language course.

- A. So, if I have to derive a conclusion, a fundamental quality of this method is that it's sustainable for any curricular subject; it's sustainable even with changes in educational objectives and technology, because it is at the root of the learning process, really at its philosophical base.
- J. Yeah... (*in regard to technology*) that picture that you had (*I show again the large Harkness table for twenty occupants using laptops in an Australian high school*), we designed the classrooms in which computers would be key, and the math department has done the same thing (*refers to the laptops*), we wired the tables, so we can do this.
- A. Can I see one of these classrooms?
- J. No teacher does it. When the history department did it, they put the computer on the periphery, and the math teachers said the same thing. This interferes with the eye contact between here and here (*points to the picture*). You should not break the eyesight. Don't put anything in between if you can help it. That becomes an obstruction.
- A. Even if the laptop is not entirely a visual obstruction in this application, it is so for what it represents. It's the metaphor of interference... But how do you use the computer technology here?
- J. We use it to produce information and evidence that then can be used in a discussion... the library and every kid's dormitory have fabulous resources... it (*the technology*) produces more evidence. It's a research tool.
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- A. Overall, this method is a powerful addition to the body of knowledge about educational philosophy and pedagogy, but the question remains: what about its applicability to a public school system, in your view?
- J. It is costly and it's frankly inefficient in many ways. Some colleagues would say: "Its way of dispensing information is not very effective." If you want to teach an AP class in American history this isn't the best way to do it because you are teaching to a test with the AP, and it's based on content, and this (*method*) isn't so much about content, this is about thinking. So, it depends on what the educational objective is. Is it a test or is to understand something? ...For a public school is terribly costly if you are

going to keep to the 12 to 1 ratio. On the other hand, that's what a lot of public school are finding: that we are spending money and do anything to reduce the student/teacher ratio, and the more you put teachers in touch with students... it goes back to what Emerson said.

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- A. I am concerned with the way in which new public schools are currently being built across the country at enormous cost ...Yet, most new high school classrooms are organized as the old ones they replace and do not seem to reflect developments in education or meet pedagogical needs, besides the investments in computers and building performance ...You mentioned that you participated in talks with architects (*on occasions related to building on campus, as earlier reported*). If you were asked about your ideas for a new school, what would be your criteria, your advice?
- J. I wouldn't do much different of what we got here. It starts with adults and kids and finding the right environment to free a philosophy, or to animate a philosophy; how adults interrelate with those kids... it's based on those philosophical notions about how you respect kids...Everybody says, one of the great issues of American education, and always has been, is that we disrespect the pupils so much that we under-challenge them. We do not appreciate how much they are capable of, and consequently we pitch things too low. If you pitch high to kids, again, depending on their ability level, they will raise to that. So, my school would be constructed in such a way that it would facilitate the philosophy, and I think that the table and the right student-teacher relationship would be essential.
- A. I think that respecting the pupil is the bottom line for liberating the student to his exploratory potential... And finally, what question I did not ask?
- J. Oh... The one *we* do not ask ourselves often enough I suppose is "what?" We think we got a great thing but it can't be that great, "what's wrong with that?" "How would you prove it?" "What needs to be better?"... Nothing is perfect, but I am not sure how to make it better, except that...probably the worst thing about Exeter is that we are too close to having the ideal and we become complacent, because having what I described happening in the classroom is not easy to do. Teaching around the table is awfully difficult. It can be exceedingly inefficient, as I said before, because you are teaching to

every kid, and you want the kid that doesn't understand to understand it. Great for that kid that already understands it. What about him or her? Every time I get into a class or somebody else's I learn something about how to teach better. I think the challenge to us is to believe that we have not found the answer and to understand that we still have to be better at what we do.

- A. Then the next question would be: "How do we make a school for teachers to achieve that level of excellence?"
- J. How do we make this a school not only for the kids, but also for the teachers to become better teachers?

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