

The Physical Environment as a Context of Teachers' Work and School Reform

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Current educational reforms are restructuring many aspects of secondary schooling with the potential of changing teachers' work and use of space. Descriptions of effective schools and current reforms led to the expectation that within schools of a traditional architecture, teachers' physical arrangement and use of space had changed to better facilitate organizational changes and goals; and that schools recently designed to support reforms would be more efficacious. The findings indicate that architectural arrangement of space had considerable affect on the success of the schools' restructuring efforts, as well as other conditions of secondary schoolteachers' workplace that impact their daily work lives.

This paper reports on a study of how teachers' use of space and place has changed due to restructuring with the intent of learning how the school setting impacts teachers' work. The importance of the relationship between school design and teachers' work is intensified in light of current educational reforms that are changing the way time, students, and knowledge are organized. These reforms, while having the ability to transform students' educational experiences, also have the potential of changing teachers' patterns of activities and interaction, and consequently their use of space.

The Physical Setting as a Context of Teachers' Work

Research on effective schools (Purkey and Smith, 1985) and teachers' workplace conditions (Corcoran, 1990) indicate that the physical setting is an important context of teachers' work. However, the description is vague, explaining the problem as little more than a basic need for more space and a "decent" workplace. That the problem is defined as merely a need for more decent space helps in understanding why few researchers have probed further into the issue of teachers' physical workplace conditions. In addition to the need for more decent space, other issues have been uncovered that indicate larger problems exist. Specifically, the arrangement and provision of spaces frequently leave teachers without convenient and regular access to necessities such as personal workspace, restrooms, supplies, telephones, and equipment (Johnson, 1990;

Bruckerhoff, 1991).

Spatial arrangement is also important to teachers' work in less palpable ways. The traditional high school typically separates teachers organizationally and physically into subject departments located in separate wings or buildings. This separation of knowledge and space creates boundaries that affect teachers' professional and social relationships with colleagues, and consequently school culture.

The organization of teachers' work, which isolates teachers for most of the workday in individual classrooms, generates a need to search for others in the workplace with whom to share camaraderie and support. These relationships provide opportunities to share experiences about teaching and students (Hammersley, 1984), ease the frustration of working in a bureaucratic organization (Woods, 1984), and establish norms of practice and professional status (Siskin, 1994). Without these opportunities, teachers' isolation is increased leading to feelings of alienation, disillusion, frustration, and eventually burnout or hopelessness.

Who a teacher chooses to interact with and develop social and professional bonds is largely determined by proximity. Particularly in large schools, time and space limit a teacher's range of movement. Whether departments are located in wings or separate buildings, the "combined constraints of small segments of time and large distances to cover largely preclude or make a 'hassle' any interaction beyond departmental boundaries" (Siskin, 1995), with the consequence that collegial relationships are formed and bounded within the departmental structure limiting interaction across subject lines.

Departmental boundaries of subject knowledge, time, and space effectively create and reinforce subject subcultures. As interactions remain limited to colleagues within the same department, norms and values about teaching practices and the profession become insulated and idiosyncratic, sharing common ground with few other departments (Hargreaves, 1994; Siskin, 1994). However, subject subcultures can also be sources of cohesive professional communities that establish positive professional identities, consistent instructional practices, and norms of collaboration and collegiality (Siskin and Little, 1995; Siskin, 1994).

Further consequences of department boundaries are reflected in a school's culture, which can vary from positive and cohesive to fragmented and political (Hargreaves, et al, 1992) affecting many aspects of the school environment such as the development of shared educational purposes and goals, a schools' ability to adapt to change, and

teachers' access to resources. Departmental boundaries and subcultures frequently disrupt the flow of information through a school leaving teachers with limited, distorted, or even no knowledge of events and circumstances of other departments and teachers in the school. Without adequate access to information, departments form their own educational purposes and goals independent of other departments, creating a source of unrelenting conflict when teachers are asked to participate in and implement school reforms (Hargreaves, 1994; Hargreaves, et. al, 1992; Hargreaves and Macmillan, 1995; Talbert, 1995).

Without adequate knowledge of the circumstances and needs of other departments and teachers, attainment of human and material resources becomes a political struggle with some departments having greater access than others (Hargreaves and Macmillan, 1995; Johnson, 1990). Access to limited resources becomes tied to prestige, which is granted on the academic value of the subject discipline of the department. Core subjects such as science and math generally have more power and influence than elective or vocational subjects (Little, 1993).

To summarize, although rarely explicitly stated, school design is a significant context of teachers' work (Siskin, 1995), as well school culture and the ability of a school to make desired changes (Hargreaves, et. al., 1992). Spatial arrangement has immediate and far-reaching consequences for teachers' ability to effectively and efficiently accomplish daily activities, form collegial relationships, and share information and knowledge.

The Study

Data was collected in six large public high schools located in suburban Northern California communities. Several focal questions were utilized in organizing the study:

1. How are teachers organizationally and spatially arranged?
2. Where do teachers spend most of their work time when not involved in classroom instruction?
3. How have teachers modified their classrooms to fit new instructional goals and practices?
4. How have other spaces in the school been modified to support changing goals and practices?

This qualitative study employed a combination of teacher observations and interviews. The study was designed such that one student in each school enrolled in an interdisciplinary program was followed through a full day, providing an opportunity to observe a variety of teachers and classrooms associated with that program and to talk with these teachers about their experiences. In all, thirty-six

teachers were observed and 104 teachers interviewed.

Restructuring Secondary Schooling

The purposes of current reforms are varied and complex, but most are aimed at challenging the traditional organization of the high school (see Table 1). The intent of these efforts is improved educational outcomes by creating a positive whole school culture and eliminating student and teacher alienation and isolation through smaller, more personalized and individualized learning environments.

Elements of Schooling	Traditional Comprehensive High School (Sizer, 1984; Powell et. al., 1985; Cuban, 1993)	Restructured Comprehensive High School (Sizer, 1992; Fiske, 1992; Agee, 1992)
Students	<ul style="list-style-type: none"> Segregated into groups according to age and perceived academic ability 	<ul style="list-style-type: none"> Student cohorts of mixed ages and abilities who proceed through levels of increasingly difficult skills at individual learning pace
Time	<ul style="list-style-type: none"> Segmented (fifty minute periods) 	<ul style="list-style-type: none"> Classroom time is flexible and based on the needs of the curriculum and students rather than seat time
Knowledge	<ul style="list-style-type: none"> Fragmented and specialized Instruction is fact-based and dominated by teacher talk and worksheets. The textbook is the dominant resource 	<ul style="list-style-type: none"> Integrated across disciplines Instructional activities dominated by student-led discussion and individual and group projects and presentations. Resources are varied
Teachers & Teaching	<ul style="list-style-type: none"> "Balkanized" (Hargreaves, 1994) - organized structurally, physically, and socially by subject department Individualism and Isolation "Teaching as a collection of skills or the mastery of techniques" (Lieberman & Miller, 1999) 	<ul style="list-style-type: none"> "Moving Mosaic" (Hargreaves, 1994) - organized structurally and physically primarily into multidisciplinary teams with easy access to subject department resources Teachers as professionals through expanded roles (teacher leaders, teacher researchers) Teaching as "research, reflection, and systematic inquiry" (Lieberman & Miller, 1999)
Learning Groups	<ul style="list-style-type: none"> "Shopping Mall" (Powell et. al., 1985) Student/teacher ratio 150:1 	<ul style="list-style-type: none"> Small coherent learning groups Student/teacher ratio of 80:1
School Culture	<ul style="list-style-type: none"> Prison-like/fragmented/ negative 	<ul style="list-style-type: none"> Cohesive/positive A "thoughtful place" (Sizer, 1992) Communities of Practice (Wenger, 1998)
Student Assessment	<ul style="list-style-type: none"> Standardized tests 	<ul style="list-style-type: none"> Authentic methods such as portfolios, presentations, and projects
Decision Making Structure	<ul style="list-style-type: none"> Hierarchical/bureaucratic 	<ul style="list-style-type: none"> Committees of teachers, administrators, students, parents, and staff replace the school district as the primary decision makers regarding school governance curriculum and instruction, assessment, etc.

Table 1: Elements of Schooling in Traditional and Restructured High Schools

The six participant schools restructured at least five years previous to the study. For most of these schools, restructuring took the shape of block scheduling and/or some configuration of interdisciplinary organizational structure (academies, schools-within-schools, etc.), although many of the schools have a number of different structures operating simultaneously (see Table 2). For example, Lakeland has an academy, a school-within-a-school, a 9th grade house structure, and ten separate career clusters/majors in addition to the usual special education and gifted programs.

School	Block Schedule	Academies	Schools-within-a-School	Clusters/ Majors	Houses	Other
Creekside	X	Business		X	9th/10th	* Career Advisories * Divisions
Lakeland		Business	At-Risk	X	9th	Divisions
Sierra Range	X	* Business Tech. * Health Sciences				Divisions
Bayhill	X	* Business Tech. * Retail			9th	Divisions
Valley	X	* Business * Health Sciences * Tech. * Mass Media * Retail	At-Risk	X	9th/10th	Divisions
Riverdale	X				X	Divisions

Table 2: Restructuring Elements in the Six School Sites

Despite these reforms, the organization of students, time, and knowledge has not been profoundly altered. Although all of the schools were adamant about the abolition of tracking in their schools, honors, advanced placement, and remedial courses are still offered. Furthermore, many teachers feel that tracking is appropriate:

“Students come into my classroom and they don’t all have the same skills or abilities and I just can’t teach them all in the same room at the same time... tracking is inevitable in math...” (Math teacher, Creekside)

Block scheduling was similarly received with many teachers seeing it as a detriment considering they no longer see their students everyday. However, many other teachers feel that the longer periods allow them greater flexibility to pursue a wider range of activities. Regardless, time remains fragmented and centered on administrative requirements rather than the needs of students or curriculum.

And just as time has remained fragmented so has the organization of knowledge. Despite the formation of programs intended to foster interdisciplinary collaboration and curriculum development, subjects continue to be taught independent of other knowledge, and departments persist as the primary organizational structure and source of information, collegiality, and community. Teachers may be assigned to one of these programs, but they continue to work within the physical organization of subject departments.

Signs of Change

However, within some of these schools there are indications that restructuring is changing some teachers work experiences, and for Sierra Range the whole school. Divisions combining two or more subject disciplines is one form of restructuring implemented at all six sites. For three

of these schools - Bayhill, Lakeland, and Sierra Range - divisions appear to be a source of interdisciplinary collaboration and collegiality. At Bayhill and Lakeland, partnerships have developed between English and social studies teachers; at Sierra Range these partnerships extend to math/science and even science/physical education.

Within these partnerships, teachers’ work together to create and execute a cross-disciplinary curriculum, and at Lakeland and Sierra Range to co-teach. Co-teaching has not been a consideration for teachers at Bayhill as their two departments are located at opposite ends of the school. Finding time and space to meet is a struggle. Whereas, partnerships at Lakeland and Sierra Range have been enhanced by teachers’ assignment to adjacent classrooms separated by operable partitions creating opportunities for activities not possible otherwise.

Sierra Range extends these experiences across the whole school. Excluding physical education, agriculture, and music, teachers appear to be arranged haphazardly, when in fact room assignments are dependent upon a teacher’s connection to colleagues. In addition to partnerships, academies are the primary organizational factor determining classroom assignment. Interdisciplinary collaboration is significantly higher in this school than at any of the others observed. One of the few complaints heard in this school is that they have to make an effort to hold *departmental* meetings each week; whereas in the other schools few, if any, *team* meetings occur.

Architectural Differences

One fundamental difference between Sierra Range and the other sites is its classroom arrangement. Although the school opened in 1964, it has a much more innovative plan than any of the others, including Riverdale, which opened just three years previous to this study.

Sierra Range was designed such that each of the four grade levels would be located and fully supported in its own building, including two fully equipped science classrooms (see Figures 1 and 2). The arrangement was not particularly successful due to students from one grade level attending classes at another. Over time the school abandoned this approach and assigned classrooms randomly.

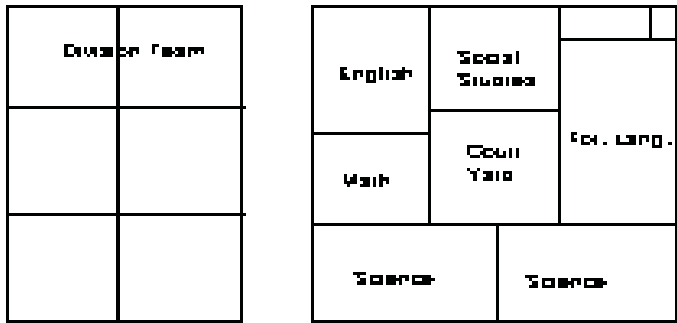
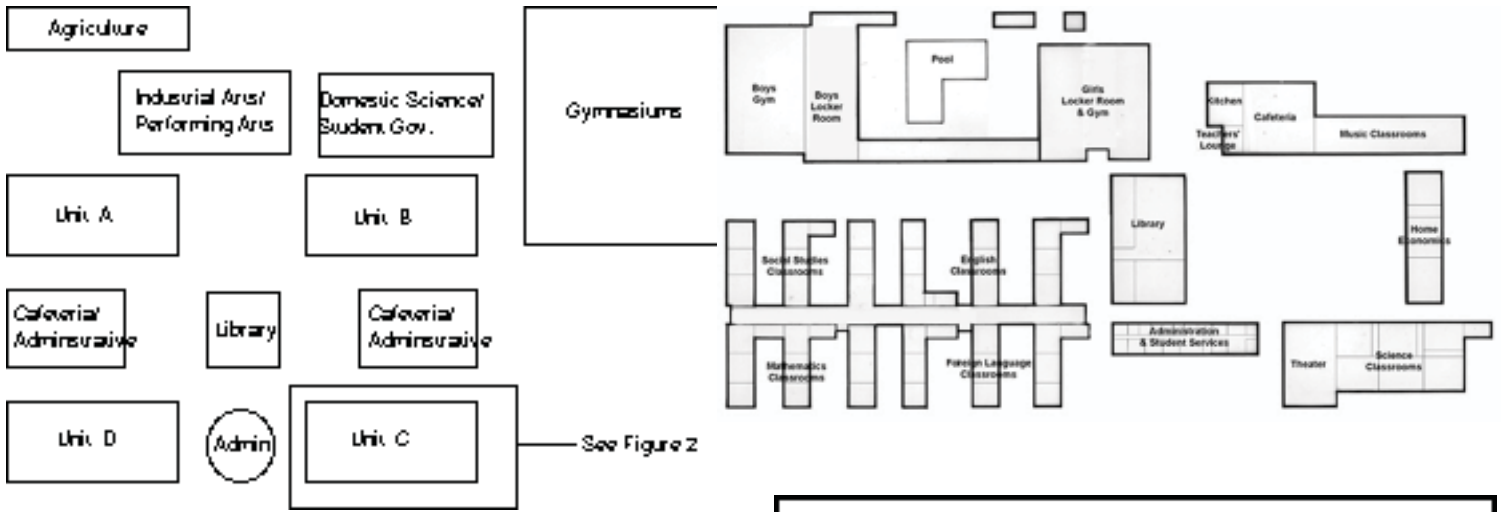


Figure 1: Sierra Range High School
 Figure 2: Sierra Range High School, Unit Layout

In complete contrast, the Creekside, Lakeland, Bayhill, and Valley facilities are traditional egg-crate, finger plan styles or campus plans (see Figures 3 and 4), with the subject departments clearly defined and separated. Riverdale is designed as houses except for the science classrooms, which remain segregated in a separate building, surrounded by the houses (see Figure 5).

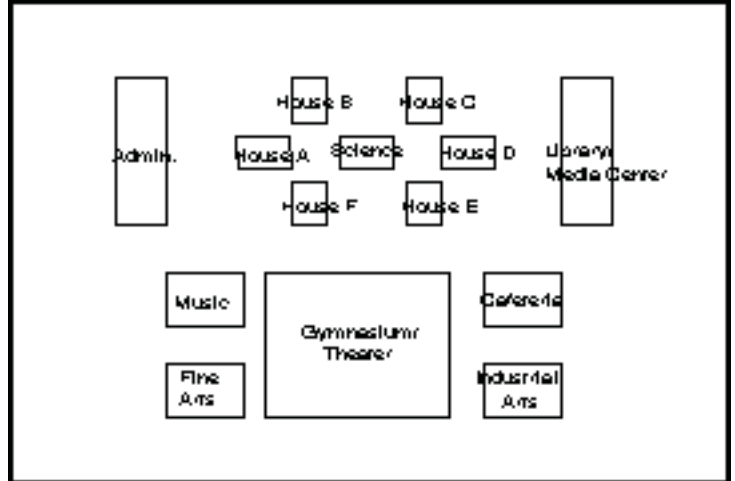


Figure 4: Valley High School, Finger/Campus plan
 Figure 5: Riverdale High School, House Plan

School Design as a Context of School Change

Although the data is insufficient to generalize about the impact of school design on restructuring, within this sample there is a clear distinction between the architectural plans of Sierra Range and the other schools. Sierra Range, which is designed in such a way that subject departments have not been able to form impenetrable boundaries, has made the most progress in changing teachers' and students' experiences and has the most positive whole school culture. On the other hand, the architectural designs of the other schools have worked as a mechanism strengthening departmental boundaries and weakening restructuring efforts (see Table 3).

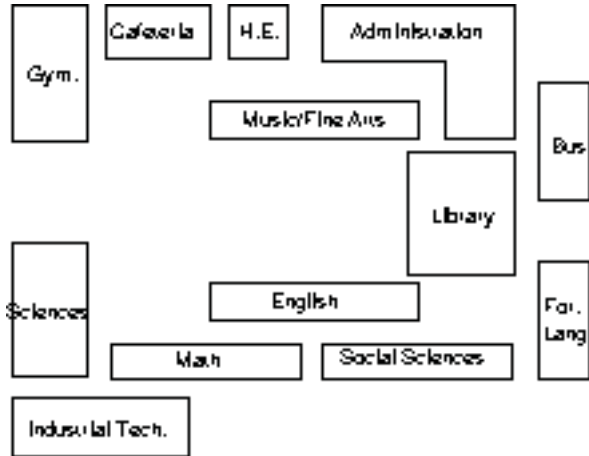


Figure 3: Lakeland High School, Campus Plan

School Site	Architect. Design	Subject Boundaries	Physical Organization	Available Workspaces	Mods to Physical Structure
Creekside	Finger	Well Defined	Subject Departments	Classrooms/ Conference Room	
Lakeland	Campus	Well Defined	Subject Departments with exceptions	Department workrooms	
Sierra Range	Integrated Campus	Weak	Integrated except non-core subjects	Classrooms	Added two operable partitions
Bayhill	Finger	Well Defined	Subject Departments	Classrooms/ Private Offices	
Yalley	Finger/Campus	Well Defined	Subject Departments	Department workrooms/ classrooms	Converted storage spaces to dept. workrooms
Riverdale	Campus	Subject Depts. are used to cover curriculum matters/ Team meetings are used to discuss discipline issues	Integrated except science and non-core subjects	Division Workrooms	

Table 3: Summary of Architectural and Organizational Structures and Teachers' Use of Space

Conditions of Teachers' Workplace

Although the purpose of this study was not to explore the conditions of teachers' workspaces, these are of such concern for teachers that they found them impossible not to mention. Many of their concerns have been identified in other studies (Johnson, 1990 and Bruckerhoff, 1991) but are discussed in more detail here.

Much of what was learned from these six schools is attributable to their size and overcrowding as to restructuring. Nevertheless, the issues raised by the teachers are critical to their experiences in their school and classrooms, and are universal among high schools, even new ones. The problems teachers describe greatly affect their ability to teach, to remain motivated, and to attain job satisfaction. Indeed, the administrative staff (including support staff) are generally provided facilities superior to those of teachers – and that is not saying much.

Spatial Problem	Creekside	Lakeland	Sierra Range	Bayhill	Yalley	Riverdale
Share a Classroom	2*	8	Problem in past but not since re-division of school district	6	5	
Lack of Storage Space	8	8	12	6	7	4
Lack of Personal Work Places	5	14	4	8	8	11
Lack of Privacy	5	7	6	6	4	12

*Number of times mentioned by teachers

Table 4: Spatial Problems Most Frequently Mentioned by Teachers

Not Enough Classrooms

A fundamental problem in five of the schools is the lack of classrooms. Most teachers no longer have their own. Depending on their seniority, teachers are expected to either share their classroom or move from classroom to classroom much as the students do. It is a common sight to see transient teachers toting shopping carts and suitcases as they travel from place to place (see Photo 1), teaching English in a classroom that smells of burnt cookies and sauerkraut one period and in a wood shop the next.

“[The smell] is really a distraction, particularly for the students who haven’t had lunch yet...not to mention that I never seem to have what I need with me. I often have forgotten something - student papers, handouts, marking pens, - and I just have to make do or wing it...” (English teacher, Lakeland)



Photo 1: Teacher Toting Suitcase to Her Next Class

Teachers who share classrooms, much less travel around, must be considerate of the other teachers in their use of space. Many transient teachers feel that they cannot use the classroom walls, or even arrange the furniture as they need. This issue is complicated by the fact that classrooms are much too small for any sort of creative arrangement, and often teachers who share a classroom are not from the same department much less the same academy or house - and as such are less likely to coordinate the use of wall space or classroom arrangement.

Teachers’ Workspace

Several additional problems are a result of this poverty of space. First, many teachers do not have places to work outside the classroom. Although a few new schools, and

some older schools, do provide teacher workrooms, these spaces are frequently co-opted for other purposes. And those that do remain offices are woefully inadequate, lacking sufficient space and privacy for the numbers of teachers expected to share the space. At Lakeland, the math office is truly a “nightmare.” Although the room is relatively neat, all available surfaces (including the floor) are covered with books and papers wedged between the several computers, and every drawer and cabinet has been claimed as territory by one teacher of the sixteen that share this space - roughly one drawer or shelf per teacher. At any one time, between six to eight people are eating lunch and trying to work in this room realistically suited to accommodate just three teachers.

Storage

Second, workspaces are not only inadequate, like classrooms they lack sufficient space to store the vast amounts of instructional materials teachers require to perform their job (see photo 2). Rather than storing “junk” as generally assumed, what teachers keep are important to their work and the school:

“These are teaching materials that I use almost daily, and over here in this pile of boxes are examples of student work that I keep for the school’s [WASC] accreditation review. Then, in these boxes are teaching materials from courses I have taught in the past and hope to teach again. The everyday stuff I keep stored in these two cupboards and the rest go into boxes. And this isn’t half of what I have, there’s more at home in my garage...” (English teacher, Sierra Range)



Photo 2: Science Classroom

Always an issue in any school, this problem was greatly exacerbated in those that were overcrowded. But for all of the schools, lack of storage was a real problem. Most of the teachers (85 of 104) interviewed stored materials at home.

Access to Space and Materials

Another aspect of space shortage is teachers' inability to have continual access to materials and supplies. If a teacher is assigned to one classroom, they typically store their "stuff" in that space. However, because they share the room with another teacher (usually, but not always, a rover), the primary teacher often has to find another place to work during their prep period. This requires hauling work around to wherever they manage to find a relatively quiet and unoccupied corner. Although, as one teacher explained, "there are no 'quiet, unoccupied corners'."

Privacy

And because there are no "quiet unoccupied corners", for teachers who feel a need to "take a moment to be alone" there is no relief other than

"...my car. I go out there almost every day during lunch or my prep period just to sit and think without interruption. Otherwise, there's no relief. You're completely surrounded every moment of every day by your students and your fellow teachers and everyone else. Sometimes my car is my favorite place." (Social Studies teacher, Lakeland)

Conclusion

Overall, this study makes few gains in terms of generating new knowledge about teachers use space and place in their schools. Its strength lies in its ability to provide empirical evidence that the physical design of a school is an important context of teachers' work and school reform. This study verifies that most school's physical design supports the traditional departmental structure and assists in establishing the boundaries of teachers' interactions.

Furthermore, this study verifies that schools as currently designed provide inadequate workspaces for teachers. Even in the best of circumstances, there is insufficient space, storage, and access to teaching materials and privacy. Teachers are expected to endure conditions that are unacceptable to other professionals. This is due in part to the workplace aspects of school design being ignored and given second shrift to the school as a learning environment, despite the fact that the two are intertwined and cannot be separated one from the other.

These issues require further rigorous study wherein they are more definitively connected to the what and how of teachers' work. Furthermore, there are many questions that remain to be examined. Such as, how do teachers use their classrooms as teaching tools? Where do teachers' social and professional interactions with colleagues and students occur? What spaces are being used in what ways? More specifically, are spaces being used as anticipated or differently? If spaces are being utilized as anticipated are more of these spaces needed, and if differently are anticipated activities and events being displaced or are they not occurring at all? In short, continued research is needed to fully understand the role of the built environment as a context of teachers' work.

References

- Agee, Janice Lowen (Ed.). 1992. *Second to None: A vision of the new California high school*. Sacramento: California Department of Education.
- Bruckerhoff, Charles. 1991. *Between Classes: Faculty life at Truman High*. New York: Teachers College Press.
- Corcoran, Thomas B. 1990. *Schoolwork: Perspectives on workplace reform in public schools*. In M.W. McLaughlin, J.E. Talbert, and N. Bascia (Eds.), *The Contexts of Teaching in Secondary Schools: Teachers' realities*. New York: Teachers College Press.
- Cuban, L. 1993. *How Teachers Taught: Constancy and change in American classrooms 1880-1990*. New York: Teachers College Press.
- Fiske, E. B. 1992. *Smart Schools, Smart Kids: Why do some schools work?* New York: Simon & Schuster.
- Hammersley, M. 1984. *Staffroom News*. In A. Hargreaves and P. Woods (Eds.), *Classrooms and Staffrooms: The sociology of teachers and teaching*. Milton Keynes: Open University Press.
- Hargreaves, A., and Macmillan, R.. 1995. *The Balkanization of Secondary School Teaching*. In L. S. Siskin and J. W. Little (Eds.), *The Subjects in Question: Departmental organization and the high school*. New York: Teachers College Press.
- Hargreaves, A., Davis, J., Fullan, M., Wignall, R., and Stager, M. 1992. *Secondary School Work Cultures and Educational Change*. Toronto: Ontario Institute for Studies in Education.

Hargreaves, Andy. 1994. *Changing Teachers, Changing Times: Teachers' work and culture in the postmodern age*. New York: Teachers College Press.

Johnson, Susan M. 1990. *The Politics of Space and Supplies*. In *Teachers at Work: Achieving success in our schools*. New York: Basic Books.

Little, Judith W. 1993. *Professional Community in Comprehensive High Schools: The two worlds of academic and vocational teachers*. In J. W. Little and M. W. McLaughlin (Eds.), *Teachers' Work: Individuals, Colleagues, and Contexts*. New York: Teachers College Press.

Powell, A. G., Farrar, E., and Cohen, D. K. 1985. *The Shopping Mall High School: Winners and losers in the educational marketplace*. Boston: Houghton Mifflin.

Purkey, S. C., and Smith, M. S. 1983. *Effective Schools: A review*. *The Elementary School Journal*, 83, 427-452.

Siskin, Leslie S. 1994. *Realms of Knowledge: Academic Departments in Secondary Schools*. Washington, D. C.: The Falmer Press.

Siskin, Leslie S. 1995. *Subject Divisions*. In L. S. Siskin and J. W. Little (Eds.), *The Subjects in Question: Departmental organization and the high school*. New York: Teachers College Press.

Siskin, Leslie S., and Little, Judith W. 1995. *The Subjects in Question: Departmental organization and the high school*. New York: Teachers College Press.

Sizer, T. 1984. *Horace's Compromise: The dilemma of the American high school*. Boston: Houghton Mifflin.

Sizer, T. 1992. *Horace's School: Redesigning the American high school*. Boston: Houghton Mifflin.

Talbert, J. 1995. *Boundaries of Teachers' Professional Communities in U.S. High Schools: Power and precariousness of the subject department*. In L. S. Siskin and J. W. Little (Eds.), *The Subjects in Question: Departmental organization and the high school*. New York: Teachers College Press.

Woods, P. 1984. *The Meaning of Staffroom Humour*. In A. Hargreaves and P. Woods (Eds.), *Classrooms and Staffrooms: The sociology of teachers and teaching*. Milton Keynes: Open