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Content as Context: The Role of School Subjects in Secondary School Teaching

PAMELA L. GROSSMAN SUSAN S. STODOLSKY

In this article we argue that understanding subject-matter differences among high school teachers is crucial for the analysis and reform of secondary schools. An emerging line of research suggests that high school teachers belong to distinctive subject subcultures; these subcultures are characterized by differing beliefs, norms, and practices. We report findings from surveys and interviews with high school teachers that illustrate salient aspects of subject subcultures. Shared beliefs about the possibilities and constraints posed by different school subjects may complicate efforts to restructure high schools or redesign curriculum.

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For too long, research and policy in the United States have treated teaching as a generic activity, and teachers as more or less interchangeable parts within a school system.¹ Seen through the lens of subject matter, high school teachers and the subject-specific contexts in which they work are far from interchangeable. If we are to be successful in restructuring high schools or reforming the nature of curriculum and instruction within secondary classrooms, we must sharpen our understanding of how the subject matters to secondary school teachers. Through undergraduate majors, subject-specific methods courses, and professional organizations, subject matter permeates the professional identity and much of the career-long professional development of high school teachers. Subject matter also undergirds the organizational structure of most American high schools in the form of academic departments. Though all of this may seem obvious to anyone connected with high schools, the most obvious features of schooling often have the most far-reaching consequences, as Jackson (1990) illustrated in his work on elementary school teaching.

Despite, or perhaps because of, the centrality of school subjects in high school teaching, subject matter has a taken-for-granted quality in much research on secondary teaching. Research on high schools has tended to look at features of the school as a whole (Boyer, 1983; Cusick, 1983; Lightfoot, 1983; Powell, Farrar, & Cohen, 1985) or aspects of teaching and learning within a particular subject matter. In this article we contend that taking a comparative approach toward understanding subject-matter differences among high school teachers is crucial for the analysis and reform of secondary school teaching. We argue that the nature of the parent discipline and features of the school subject, as well as teachers' beliefs regarding the subject, help create a conceptual context within which teachers work. Throughout this discussion of content as context, our central interest is in how subject-matter differences among secondary

school teachers help explain curricular and instructional patterns in high schools and responses to reform efforts. Shared beliefs about the possibilities and constraints offered by different school subjects help contribute to the "grammar of schooling" in high schools (Tyack & Tobin, 1994) and complicate efforts to restructure schools or redesign curriculum.

After first defining what we mean by context, we describe features of disciplines and school subjects that differentiate among subject matters and give rise to distinct subject subcultures. In arguing that these subcultures are characterized by differing beliefs, norms, and practices that affect teachers' work and responses to reform efforts, we present illustrative research findings from our own empirical research as well as that of other researchers. In conclusion, we discuss a variety of implications for research, policy, and high school reform efforts based on this understanding of subject-matter differences.

Definitions of Context

In this analysis, we focus on *school subjects* as specific contexts within which secondary teachers teach.² Throughout this discussion, we assume that contexts are socially constructed, located frequently but not necessarily within institutions, and individually interpreted. Lave (1988) makes a helpful distinction between arenas and settings in her description of context. She defines arenas as the larger institutions, which, though socially constructed, have a given set of features that both enable and constrain certain activities. A setting, in Lave's framework, is the individually constructed and represented version of the arena. The construct of setting helps us understand why individuals can experience the same arena so differently. In our framework, teachers of a specific school subject share a common arena for practice, though they may differ in their specific interpretations of the subject.

The organizational context of high schools also explicitly interacts with subject matter (Talbert & McLaughlin, 1993);

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most secondary schools reify subject-matter distinctions through the existence of subject-based departments. Departments can be a powerful feature of secondary teachers' lives, as the work of Ball (1981), Johnson (1990), Siskin (1991, 1994), Siskin and Little (in press), and Talbert (in press) demonstrates.

School subjects, as arenas for practice, possess different features, histories, and status that affect teachers' work (Goodson, 1985; Stodolsky, 1993). These features of school subjects pose implications for the nature of teaching within the subject and may mediate reform efforts. A comparative perspective focuses attention on the normative views of the subject shared by many teachers who teach it. These shared beliefs may help define the possibilities and constraints teachers perceive as they do their daily work and respond to innovations. The shared beliefs and norms of teachers who share a common school subject can usefully be characterized as a subject subculture (Ball, 1981; Ball & Lacey, 1984).

Content as Context: The Origin and Features of Subject Subcultures

The disciplinary socialization of prospective teachers contributes to the origin of subject subcultures. The parent disciplines from which many school subjects derive may exert an important, if often invisible, influence on secondary school curriculum and instruction. Academic disciplines differ in their histories, their epistemologies, and the degree of theoretical consensus existing within the field (e.g. Bernstein, 1971; Schwab, 1978). Bernstein (1971), for example, distinguishes between disciplines that form strong boundaries around their subject matter and offer fewer curricular electives and disciplines that blur the boundaries among subjects and offer students more choice. These features of the discipline affect high school teachers, particularly because secondary teachers receive a significant portion of their education within the discipline they will later teach. However, school subjects, the locus of secondary school teaching, differ in important ways from the traditional academic disciplines (Goodson, 1985).

We now turn to certain features of school subjects, such as status, perceived sequentiality, and scope, which help shape the subject-matter arena within which teachers work. School subjects differ in their degree of status within the school and larger community. Higher status subjects, such as math or science, may be able to claim greater resources and power within the school than lower status subjects, such as art or music (Ball, 1987; Ball & Lacey, 1984; Goodson, 1985). Higher status subjects are more likely to count for college entrance or to be considered part of the core curriculum. Subjects also differ with regard to their relationship to state and district assessment programs; while subjects such as math or English are regularly included in mandated testing programs, other subjects such as foreign language or art are not.

School subjects also differ with regard to the perceived or inherent sequentiality of the subject and curriculum (Stodolsky, 1993). A school subject such as foreign language has a fairly rigid sequential curriculum—French I, French II, French III, French IV, and AP French. Teachers of French II depend on their colleagues in French I to have taught particular grammar skills and vocabulary to their students. Without having mastered the content of French I,

students may find it difficult to move on to the next level. Social studies, as a school subject, would seem to possess less sequential dependency with regard to content. Students who were baffled by Ancient Civilization in the 9th grade go on to study American History in the 11th without noticeable consequence. Teachers' perceptions of the inherent hierarchy or sequentiality of a subject relate to their beliefs and actions regarding the importance of content coverage (Stodolsky & Grossman, 1995). Department policies regarding curriculum coordination may also reflect the degree of sequentiality related to the school subject.

School subjects also differ with regard to their scope and coherence. Some subjects, such as English or social studies, include a number of different disciplinary areas, resulting in a broad curricular scope with relatively less coherence than subjects such as math or chemistry. Social studies, for example, draws on the disciplines of history, anthropology, geography, political science, economics, psychology, and sociology. The extent to which departments are composed of teachers from diverse disciplines may contribute to the degree of cohesiveness of the department. Departments that draw together teachers from diverse disciplinary backgrounds, such as social studies, may find it more difficult to develop consensus about curriculum. Alternatively, struggles to develop consensus in social studies might be amplified by the differing perspectives, values, and theoretical orientations at issue in the school subject itself.

Because teachers work in subject-specific contexts and hold a number of subject-specific beliefs related to teaching and learning, the particular issues and policies that high school teachers view as problematic may vary. We argue that these conceptions of subject matter create a "conceptual context" that helps frame the work of high school teachers and mediates their responses to reform proposals. For example, teachers of broad, less well-defined subjects, such as English or social studies, may feel a greater sense of curricular autonomy than do teachers of more defined and more sequential school subjects. Because the subjects they teach are so broad, they may feel they need to make individual choices about what to include and what not to include (Grossman, 1993; Protherough & Atkinson, 1992; Stodolsky, 1988).³ Even a change in how the school day is structured might be perceived differently by teachers of different subjects. Teachers of subjects perceived as more sequential, such as foreign language or math, may worry over schedules that have them meet students only two or three times a week, whereas teachers of science or art might welcome such a schedule.

Research Findings

Before reporting findings from our own research, we review the few studies of secondary teaching that have taken a comparative subject-matter approach. These studies seem to confirm the existence of specific subject subcultures.⁴ For example, Siskin's (1994) study of math and English departments suggested that the departments were characterized by different cultures and norms, and that math departments at different schools shared more common features than the math and English departments at the same school. Ball's (1981) study of a British secondary school that was considering multi-ability grouping found that math and foreign language teachers were most resistant to such a change, in large part because of their beliefs

about the nature of their subject matter. These departments argued successfully for an exemption from the policy on multi-ability grouping on the grounds that their subject matter would not allow it. An earlier British study (Hayes, 1976) found similar differences between math and foreign language teachers, who supported tracking or streaming, and English teachers, who supported mixed-ability classes. Similar results are reported by Wheelock (1992), Gamoran and Weinstein (1995), and for middle-school teachers by Loveless (1994).

Other studies have tried to delineate differences in patterns of belief among teachers of different subjects. In a study of Dutch teachers, de Brabander (1993) found that teachers contrasted school subjects in relation to the nature of knowledge (hard versus soft) and on the emphasis on "work" or "play" in the subject matter. The teacher-generated contrasts were consistent with those postulated by Bernstein (1971). In a survey of Israeli teachers, Yaakobi and Sharan (1985) found that humanities teachers differed significantly from language teachers in their attitudes toward academic knowledge, with humanities teachers adopting a more "progressive" perspective on knowledge and teaching. A somewhat similar British study tried to distinguish between high school teachers who held transmission orientations toward writing and those who believed that writing involved interpretation (Barnes & Shemilt, 1974). Teachers of biology, physics, chemistry, and language agreed more often with the transmission perspective, whereas teachers of English and religion adhered to an interpretation perspective.

In our own comparative study of subject matter, we have relied upon a number of data sources to study the ways in which subject matter serves as a context for the work of high school teachers.⁵ Here, we briefly describe some ways in which teachers from different fields vary in their conceptions of subject matter, instructional beliefs, and curricular coordination and control.

Teachers seem to regard conceptions of school subjects as one of the commonplaces of their daily work lives. In interviews not specifically connected to subject matter conducted with teachers from 16 schools as part of a study on the contexts of secondary school teaching, teachers spontaneously spoke of what their subjects did and did not "permit" them to do. English teachers, for example, talked about the "permissive" nature of the subject matter,⁶ whereas math teachers spoke of what they perceived to be the constraints of the content. Math teachers commented frequently on the demands for coverage of a well-established curriculum, of having "to get to a certain point by a certain time," as one informant described. They also spoke of their sense of the sequential nature of the subject matter and the ways in which it affected their teaching. As one math teacher commented, "Math is the type of subject where [the students] just can't skip it. There's no point in saying 'You missed that, you get a zero.' They need it, they have to do it 'til they are ready to go on to the next section." Another math teacher echoed a belief in the linearity of learning. "The outline of the topics you can't change too much because so much of Algebra depends on what you do previously. You can't do a lot of problem solving until you've had positive and negative numbers. The same thing with factoring and things like that. You can't solve quadratics until after you've factored." In contrast, English

teachers described English as broad in scope; "English is the basis for all communication at the school." They also described the negotiability of the curriculum; as two teachers commented, not all students have to read the same text or even the same genre, as long as they are learning to read and to write. Said one teacher, "My goal is to have a student read. If they are going to read a fantasy book—and I don't like fantasy—that's o.k. They're reading." Finally, the permissive nature of English was mentioned by several teachers. A teacher who taught both German and English at a public school commented, "But I've always liked to do different things, and I can do that more in English than I can in German, of course." Another English teacher stated that the reason you might find cooperative learning in his department is that "our subject matter allows us to do that a lot." These comments suggest that high school teachers explain their work partly in relation to the constraints and possibilities they perceive as offered by specific school subjects.

These perceptions are confirmed by survey data from 399 teachers of 5 academic subjects (math, English, science, social studies, and foreign language) in these same 16 high schools (Stodolsky & Grossman, 1995). Teachers completed survey items having to do with perceptions of the subjects they taught, beliefs about the extent to which they were free to decide the content of their classes, and perceptions of the extent to which they coordinated the content of their courses with other colleagues. (See Appendix for survey items used to report findings in this section). Confirming the reports of the perceived importance of sequence in mathematics found in interview data, math teachers, along with colleagues in foreign language, scored significantly higher on the *sequentiality* scale than did teachers of science, English, or social studies ($F = 25.74, p < .0001$). Math and foreign language teachers rated their subjects as significantly more *defined* than did teachers of science, English, and social studies ($F = 7.96, p < .0001$). Math teachers also rated their subjects as considerably more *static* than did teachers of the other 4 academic subjects ($F = 31.65, p < .0001$), with English teachers most strongly rejecting the portrayal of their subject as static.

Along with different conceptions of their school subjects, teachers of the five academic subjects also reported varying levels of curricular autonomy and control. Elsewhere (Stodolsky & Grossman, 1995), we argue that these and other curricular consequences result from the degree of sequentiality and definition associated with each subject. While all teachers felt free to decide on the teaching techniques to use in their classes, math teachers felt significantly less freedom to decide on the content of their classes than did teachers of the other four academic subjects ($F = 9.77, p < .0001$). Math teachers also stood out from their colleagues in their reports of coordinating course content with other members of their departments, with math teachers reporting the most coordination and science and social studies reporting the least ($F = 6.90, p < .0001$). Similarly, math teachers were most likely to develop common exams with other department members, with English and social studies reporting the least likelihood ($F = 13.06, p < .0001$).

In addition to curricular coordination and control, instructional practices and policies may also be affected by subject subcultures. For example, tracking or student differentiation is a practice with important consequences for

students. Beliefs about tracking may be associated in part with conceptions of subject matter, particularly with the perceived importance of sequentiality. (Beliefs about the advantages and disadvantages of tracking may also represent value positions with respect to equity and the social distribution of opportunity.) As can be seen in Table 1, survey responses from teachers of five academic subjects showed significant group differences in beliefs about tracking. Math teachers believe most strongly that "instruction in my subject is most beneficial when students are grouped by prior academic achievement" while social studies teachers reject this statement most strongly ($F = 5.26, p < .0004$).⁷

Though far from complete, when taken together, our research and the research of other scholars suggest that subject subcultures may be characterized by both beliefs about the subject matter that bind teachers together and by norms regarding teaching practice, curricular autonomy, and coordination. These studies provide support for the idea that high school teachers work in somewhat separate arenas, defined by the subject matter they teach. The issues and concerns of the typical math teacher are not the same as those of the typical English or social studies teacher, nor do they work under the same constraints. While norms of specific departments, regardless of subject matter, can also affect the practices of an individual department, an important point made by Gutiérrez (1995), Talbert (in press), and Talbert and Perry (1994) in their analysis of departments, teachers of different subjects, in general, may hold quite different beliefs about the nature of the subject and the possibilities for curricular coordination. In the next section, we develop some of the implications for policy and directions for future research following from this perspective.

Toward Rethinking Research and Policy

We urge the research community to investigate the role of subject matter in secondary school teaching more systematically in analyses of teaching and to use a subject-matter lens in interpreting extant research. As we have already indicated, teachers of different subjects bring differing frames of reference to their teaching; these subject-matter frames, which inform teachers' thought and actions, must be better understood. Pooled analyses of high school teachers, for example, mask the real differences that may exist among teachers of different subjects. Claims regarding secondary school teaching in general may be more true for some subject matters than for others. For example, Cusick's (1983) study of high schools describes the curricular electives created by high school teachers in their efforts to attract students. However, many of the examples he cites in his work are from social studies and English, two subject areas of broad scope, in which the subject subcultures may permit more content negotiation by teachers; in contrast, relatively few quotations come from math teachers.

Researchers might also investigate the origin of beliefs about subject matter. How are beginning high school teachers socialized into subject subcultures? To what extent does the organization and representation of subject matter in universities prepare prospective teachers to hold particular beliefs about school subjects? Lacey (1977) commented on the strong role that subject-matter played in the socialization of prospective teachers in Britain.⁸ Researchers need to investigate the "hidden curriculum" of subject-matter majors within higher education to understand how prospective teachers come to hold certain beliefs. While gaining the subject-matter knowledge required for teaching, prospective secondary school teachers are

Table 1
Mean Responses to Selected Scales and Items for Teachers of Academic Subjects and ANOVA Results

Scale ^a	Math (n = 82)		Foreign Language (n = 42)		Science (n = 81)		English (n = 109)		Social Studies (n = 85)		Subject effect	
	M	SD	M	SD	M	SD	M	SD	M	SD	F	p <
Defined	4.92 ¹	0.73	4.89 ¹	0.75	4.57 ²	0.90	4.34 ²	0.82	4.36 ²	0.91	7.96	.0001
Sequential	4.92 ¹	0.73	4.96 ¹	0.95	3.99 ²	0.90	4.01 ²	1.15	3.68 ²	0.97	25.74	.0001
Static	3.35 ¹	0.88	2.93 ²	0.99	2.30 ³	0.82	2.01 ⁴	0.75	2.36 ³	0.99	31.65	.0001
Control teaching techniques	5.44	0.60	5.44	0.92	5.49	0.72	5.51	0.76	5.44	0.87	0.15	n.s.
Free to decide content	3.55 ²	1.51	4.42 ¹	1.47	4.62 ¹	1.30	4.42 ¹	1.30	4.67 ¹	1.27	9.77	.0001
Dept. policy: curricular autonomy [max 5]	3.11 ²	1.01	3.56 ¹	0.99	3.78 ¹	0.86	3.75 ¹	0.89	3.68 ¹	0.94	6.70	.0001
Coordinate course content with others	4.68 ¹	1.18	4.38 ^{1,2}	1.27	3.86 ³	1.54	4.07 ^{2,3}	1.17	3.73 ³	1.46	6.90	.0001
Develop common exams	3.58 ¹	1.90	3.16 ^{1,2}	1.76	2.93 ²	1.55	2.11 ³	1.27	2.40 ³	1.45	13.06	.0001
Student differentiation	4.52 ¹	0.98	4.02 ^{2,3}	1.20	4.32 ^{1,2}	1.04	3.99 ^{2,3}	1.16	3.78 ³	1.31	5.26	.0004

^aMaximum scale and item score is 6 unless otherwise noted. Numeric superscripts show results of Duncan's multiple range test. Each letter identifies members of a cluster significantly different from those with another level.

also being socialized into a particular view of the world, as seen through disciplinary lenses. In part, this socialization relates to disciplinary ways of thinking. However, students may also be absorbing beliefs about the subjects they will later teach from the ways in which majors are organized and the subject is institutionalized within higher education. For example, math and science courses designed to weed out all but the most serious students may teach those who remain that higher level math and science are not for everyone, a problematic lesson for prospective high school teachers if one wants to make higher level math available to a wide range of students. Similarly, academic departments that strongly differentiate the curriculum for majors and nonmajors are implicitly providing prospective teachers with a model of tracking.⁹ The number of prerequisites required for different courses within a major may also teach prospective teachers a lesson about the importance of sequence in learning a subject. Although research in higher education has documented the existence of strong subject subcultures within universities (Becher, 1989; Clark, 1987), relatively little research has investigated the effects of these subcultures on prospective teachers.

Research on teacher socialization has rarely investigated the high school department as a site for the socialization of new teachers. Studies of how departments socialize newcomers into their ranks might shed light on how beliefs about school subjects are maintained over time. Departments that deviate from normative views of the subject matter—for example, math departments that reject a view of mathematics as inherently sequential—provide a strategic research site for seeing how departmental culture can mediate subject subcultures (Gutiérrez, 1995). Given the differences that can exist among departmental cultures within a single school (McLaughlin & Talbert, 1993), this analysis suggests that secondary teacher education programs consider placing student teachers with partner departments rather than with partner schools. Although less common, nondepartmentalized high schools offer a strategic counter case deserving of study. Finally, the importance of department chairs should be more carefully studied. To what extent does departmental leadership contribute to the maintenance of a distinct subject subculture? If chairs participate in hiring decisions, to what extent do they use this role to maintain departmental norms and prevailing beliefs about the subject matter? Can strong department chairs overcome commonly held beliefs about the subject matter when these beliefs run counter to reform efforts?

Policy Implications

Clearer insights regarding subject matter differences in secondary school teaching must also inform the formulation and implementation of educational policy. For example, policy implementation is certain to be mediated by the different subject-matter arenas in which teachers teach. Teachers' perceptions of subject matter may also mediate their response to reform proposals. As mentioned earlier, teachers of broad, less well-defined subjects such as English or social studies may feel a greater sense of curricular autonomy than teachers of more defined subjects and make less of an effort to coordinate the overall curriculum within their subject. If they perceive and value greater autonomy over the content to be taught as an inherent feature of the subject they teach, teachers may resent reforms that

threaten to deprive them of this autonomy.¹⁰ At the same time, such policies may have the side-effect of encouraging more departmental coordination of curriculum, or at least discussion of what is being taught, than is likely to occur normally. For example, the English department at Esperanza High School, one of the schools we have studied over the past few years, responded to the California Assessment Program's new writing assessments by meeting to coordinate writing instruction across the curriculum. As a department, they divided up the writing prompts included in the CAP writing test by grade level, and committed to teaching students to respond to those prompts. The new assessment policy resulted in more curricular coordination within this particular department.

In contrast, teachers of well-defined, more sequential subjects such as math or foreign language may already make more of an effort to coordinate the vertical curriculum within their subject; however, they may respond cautiously to reforms that would affect the ways in which the curriculum is sequenced for learners. The math department at Rancho High School, another high school we have studied, believed strongly in the importance of sequence in math teaching and learning. When the state mandated that all students would study algebra and abolished many of the general math courses, the department responded by instituting a two-year sequence for students who were not seen as ready for the traditional Algebra 1 course—a year-long algebra course to cover the first half of the material in the standard Algebra 1 course and a second year-long algebra course to cover the remaining chapters of the course. In this manner, the Rancho faculty were able to hold on to their strong belief in student readiness, while conforming to the "letter of the law" mandating that all students study algebra.

According to this analysis, efforts to restructure high schools will bump into the subject subcultures that currently exist in secondary schools. Without a better understanding of the patterns of belief and practice held by teachers of different subject matters, proposals to decompose departments, to detrack the curriculum, or to create interdisciplinary curricula may falter. Our analysis suggests that efforts to restructure the high school curriculum will run into resistance from math and foreign language departments if issues of sequence are not addressed, a pattern that seems to be confirmed by current research on restructuring schools. In a study of restructuring schools, Gamoran and Weinstein (1995) found that efforts to eliminate tracking posed more problems for math teachers than for social studies teachers. Even in the schools that claimed to be eliminating homogeneous grouping as part of their restructuring effort, most of the high schools continued to rely on homogeneous groups for math instruction; "For the most part, especially in the middle and high schools, mathematics appears most resistant to the elimination of ability grouping" (p. 7).

In a study of departmental responses in high schools that are restructuring, Little (in press) found that math teachers at one school that had joined the Coalition of Essential Schools responded cautiously to the maxim "less is more." Little quotes one veteran math teacher who commented, "I think you can do 'less is more' in reading books; you can read three books instead of six books. But I don't think you can do 'less is more' in math." The chair of the

math department at this school reinforced this view; "You can't teach 'less is more' in math. There isn't anything you can throw out." At all three schools Little studied, teachers raised issues of subject integrity in questioning reform efforts.

Two kinds of difficulties have been detected in studies of schools trying to adopt the interdisciplinary approach of the Coalition of Essential Schools (Muncey & McQuillan, 1993). Members of core fields (English, social studies, math, and science) may have difficulty working out how to create an interdisciplinary program and still cover what they believe is essential to each area. In addition, teachers outside the core, such as teachers of foreign languages, express difficulty in trying to find both the means and justification for students to study their field.

The current interest in developing standards for classroom practice and student learning may also run into subject-matter differences. According to our analysis, teachers in subjects characterized by greater scope and greater theoretical dissension, such as English or social studies, will find it more difficult to reach consensus around specific standards than would teachers of mathematics or foreign language. The apparent success of the mathematics community in developing (if not necessarily in implementing) a set of curriculum and evaluation standards (NCTM, 1991) may have lulled policymakers into thinking that other subjects would, or could, easily follow the lead of mathematics. The current controversies over the history and English standards reflect, in part, the greater theoretical divisions that exist in these disciplines.

Policymakers also need to understand that instructional policy will always be mediated through individual teachers' own conceptions of subject matter (Cohen, 1990; Cohen & Ball, 1990)—the specific subject-matter "settings" in which they work. For example, math teachers who value problem solving and discourse within their subject are probably more likely to embrace current reform efforts of the NCTM or those introduced through the Urban Math Collaborative (Romberg & Middleton, 1994) than are those teachers who strongly believe in a more sequential, skill-oriented approach to mathematics. New curricular guidelines will also be interpreted differently by teachers, depending on their specific beliefs about the subject matter. Policy implementation, then, must take into account the role of teachers' existing conceptions of subject matter and how they fit with the intentions of curricular or instructional policies and guidelines. Instructional policies are often introduced as new actions to be taken or curriculum to be covered and do not explicitly incorporate the conceptual base teachers need to think through the proposed policy (Cohen & Barnes, 1993). We believe that explicit attention to the fit between teachers' existing conceptions and goals regarding subject matter and the subject-matter conceptions of proposed reforms is needed for successful introduction of educational reforms.

Professional development efforts must also be sensitive to how different orientations toward subject matter may affect teachers' responses to new instructional or curricular practices. Generic treatments of reform efforts at the secondary level may allow teachers to disengage, if they believe that their subject matter is somehow exempt, as the math and foreign language teachers in Ball's study believed. Those engaged in professional development will

need to be responsive to the subject-specific concerns teachers may raise about proposed reforms or practices and will need to know enough about subject subcultures to know how to respond effectively to such concerns. In this sense, department chairs can serve an important role in reform efforts, as they maintain the credibility of a subject-specialist and understand departmental norms.

This analysis suggests that departments, rather than whole schools, may represent an alternative initial site for reform efforts aimed at large comprehensive secondary schools. Though this strategy runs the risk of reifying subject-matter differences, it offers an opportunity to build from commonalities shared within a subject subculture and move toward more understanding and collaboration across departments.¹¹ Investing in department chairs as brokers of reform takes advantage of subject-specific leadership already available at the school site, while providing a career path for expert teachers who wish to move beyond the classroom. If provided with appropriate release time and opportunities for professional development aimed at leadership of adults, department chairs can work with their colleagues to develop new curricula and experiment with new forms of classroom teaching (Hill, in press). Alternatively, department chairs can also defend the status quo and resist efforts to integrate the curriculum or to blur the boundaries of their departments (Ball & Bowe, 1992). If reformers choose instead to create interdisciplinary structures that replace departments, they will need to acknowledge explicitly the subject-specific backgrounds and concerns of the participants (Ladwig & King, 1992; Little, in press).

Responses to policy, implementation of various reform efforts, and classroom practice all depend upon the complex interweaving of the contexts in which teachers teach. Subject matter represents a critical strand in this intricate web, one we ignore at our peril in our efforts to understand and reform secondary school teaching.

Notes

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¹This may reflect the larger issue of subject matter as a "missing paradigm" in research on teaching until very recently (Shulman, 1986).

²Our understanding of content as a central context for teaching has emerged from our work with the Center for Research on the Context of Secondary School Teaching (McLaughlin & Talbert, 1993). Subject matter is clearly not the only arena within which teachers work, nor is it necessarily the most important. As McLaughlin and Talbert (1993) demonstrate, secondary teachers' work is profoundly influenced by the multiple and embedded contexts of department, school, district, and state. Part of our interest has also been in studying how content interacts with other contexts that define teaching. For example, the mission of the school may add a different twist to the status and role of school subjects. A performing arts magnet school will give a preference to the arts that is missing in most comprehensive high schools. The kinds of students served by a particular school serves as a crucial context for teachers, as much of teachers' work involves adapting subject matter for specific students.

³Alternatively, different kinds of personalities may be attracted to different subjects, which may account for subject-matter differences among teachers. Certain individual characteristics may be associated

with teachers' choices of their college majors and the subjects they teach. Some of the norms, beliefs, and preferences shared by teachers of a given school subject may emanate from shared proclivities, orientations, and values, in addition to, or in tandem with, specific features of the school subjects themselves.

⁴See Grossman and Stodolsky (1994) for a complete review of related research. It is interesting to note that much of the existing research in this area comes from Britain and Europe, reflecting, perhaps, the greater influence of the sociology of knowledge in these countries.

⁵As part of a smaller project within the Center for Research on the Context of Secondary School Teaching, we have had access to the large body of data collected by the Center over a 3-year period on issues related to school context (McLaughlin & Talbert, 1993). Both qualitative and quantitative data were collected from teachers, administrators, and students at 16 different schools in two states. Surveys over a 3-year period inquired into teachers' goals for instruction, perceptions of subject matter, their professional roles and responsibilities, the role of state and district resources and reform efforts, professional development activities, reports of instructional practice, and department and school climate. In addition, core interviews were conducted with teachers and administrators at all 16 schools on issues related to school context, instructional practice, and professional roles and responsibilities. Finally, we conducted a set of 12 case studies of math and English teachers at 3 of the 16 high schools. We selected English and math as they possess both similarities with regard to their importance within the high school curriculum, and differences with regard to the nature of the school subjects and parent disciplines. These case studies were designed around issues central to our own investigation of content as context. Data for these case studies included two to three interviews with each of the 12 teachers, classroom observations, and survey data.

⁶See also Protherough and Atkinson (1992) for discussion regarding teachers' beliefs about the permissive nature of English.

⁷We have just replicated these findings (with the exception of one item on coordination) regarding differences among teachers' conceptions of subject matter and curricular activity in a national sample of over 600 high school teachers.

⁸As many of the studies that have investigated and found subject subcultures are British, it is possible that there are cross-national differences in the strength of disciplinary socialization that account for the research findings.

⁹One of the authors took "Physics for Poets" and "Biology and Human Affairs" in college, but nowhere in her English courses did she encounter courses entitled "Poetry for Physicists" or "Books for Biologists!" We suspect that more specialized courses for nonmajors exist within math and sciences than they do in the humanities.

¹⁰See Protherough and Atkinson (1992) for British English teachers' recent response to National Curriculum movement.

¹¹It would be interesting to study whether or not efforts that succeeded in developing interdisciplinary curricula or teaching in large high schools began with leadership from a strong departmental base.

Appendix

Scale Items^a

Scales

Defined Subject Matter: $\alpha = .55$

There is a well-defined body of knowledge and skills to be taught in my subject area.

There is little disagreement about what should be taught in my subject area.

There is a clearly defined body of knowledge that guides my work.

Static Subject Matter: $\alpha = .57$

Thinking creatively is an important part of the subject matter I teach. (scored in reverse)

Knowledge in my subject area is always changing. (scored in reverse)

The subject I teach is rather cut and dry.

Sequential View of Learning: $\alpha = .47$

Students must practice basic skills within my subject area before tackling more complex tasks.

If I do not cover my curriculum, students' future learning in this subject will be jeopardized.

Student Differentiation: $\alpha = .46$

Curriculum materials (textbooks, books, a.v., etc.) for a given course should be different for classes with different achievement levels.

Instruction in my subject is most beneficial when students are grouped by prior academic achievement.

^aItems are from the 1991 CRC survey.

References

- Ball, S. (1981). *Beachside comprehensive: A case study of secondary schooling*. New York: Cambridge University Press.
- Ball, S. (1987). *The micropolitics of the school: Towards a theory of school organization*. London: Methuen.
- Ball, S. J., & Bowe, R. (1992). Subject departments and the "implementation" of national curriculum policy: An overview of the issues. *Journal of Curriculum Studies*, 24, 97-115.
- Ball, S., & Lacey, C. (1984). Subject disciplines as the opportunity for group action: A measured critique of subject subcultures. In A. Hargreaves & P. Woods (Eds.), *Classrooms & staffrooms*. Milton Keynes, England: Open University Press.
- Barnes, D., & Shemilt, D. (1974). Transmission and interpretation. *Education Review*, 26, 213-228.
- Becher, T. (1989). *Academic tribes and territories: Intellectual enquiry and the cultures of disciplines*. Milton Keynes, England: Open University Press.
- Bernstein, B. (1971). On the classification of educational knowledge. In M. F. Young (Ed.), *Knowledge and control: New directions for the sociology of education* (pp. 47-69). New York: Collier Macmillan.
- Boyer, E. (1983). *High school: A report on secondary education in America*. New York: Harper & Row.
- Clark, B. R. (1987). *The academic life: Small worlds, different worlds*. Princeton, NJ: Carnegie Foundation for the Advancement of Teaching.
- Cohen, D. K. (1990). A revolution in one classroom: The case of Mrs. Oublier. *Educational Evaluation and Policy Analysis*, 12, 327-345.
- Cohen, D. K., & Ball, D. L. (1990). Relations between policy and practice: A commentary. *Educational Evaluation and Policy Analysis*, 12, 249-256.
- Cohen, D. K., & Barnes, C. A. (1993). Pedagogy and policy. In D. K. Cohen, M. W. McLaughlin, & J. E. Talbert (Eds.), *Teaching for understanding: Challenges for policy and practice*. San Francisco, CA: Jossey Bass.
- Cusick, P. A. (1983). *The egalitarian ideal and the American high school*. New York: Longman.
- de Brabander, C. J. (1993). Subject conceptions of teachers and school culture. In F. K. Kieviet & R. Vandenberghe (Eds.), *School culture, school improvement, and teacher development* (pp. 77-105). Leiden University, The Netherlands: DSWO Press.
- Gamoran, A., & Weinstein, M. (1995, August). *Differentiation and opportunity in restructured schools*. Paper presented at the annual meeting of the American Sociological Association, Washington, DC.
- Goodson, I. (Ed.). (1985). *Social histories of the secondary curriculum: Subjects for study*. London: Falmer Press.
- Grossman, P. L. (1993). *English as context: English in context* (Tech. Rep. No. S93-2). Stanford, CA: Stanford University, Center for Research on the Context of Secondary School Teaching.
- Grossman, P. L., & Stodolsky, S. S. (1994). Considerations of content and the circumstances of secondary school teaching. In L. Darling-Hammond (Ed.), *Review of Research in Education: Vol. 20*. Washington, DC: American Educational Research Association.
- Gutiérrez, R. (1995, April). *Practices, beliefs, and cultures of high school math departments: Understanding their impact on student advancement*. Paper presented at the Annual Meeting of the American Educational Research Association, San Francisco, CA.
- Hayes, K. (1976). Which subjects can be taught in mixed-ability classes—Teachers' views. *Cambridge Journal of Education*, 6, 32-38.
- Hill, D. (in press). The strong department: Building the department as a learning community. In L. S. Siskin & J. W. Little (Eds.), *The subjects in question: Departmental organization and the high school*. New York: Teachers College Press.

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both Wilson and I referred to our recent experiences as researcher/teachers. Our challenges and triumphs, and those of others, would be better illuminated by examining how the various elements of our practice fit together and the effectiveness of this practice, rather than by examining the degree to which these elements conform to a particular model

When considering the issue of fit, one also realizes that the challenge of the researcher/teacher extends beyond the intellectual task of coordinating the goals and method of teaching and research. In finding a productive fit, we must frequently adopt a modified or alternative stand on research, teaching, learning, and curriculum. In my own work I had to make significant changes in the expectations and practices of my classroom. My students and I both had to understand and participate in different goals, activities, and roles in science class. Although I did manage to develop a more productive relationship between my research and teaching agendas, it would be ill-advised to suggest that others should do exactly as I did. We have unique personal and professional strengths and weaknesses as researchers and teachers. To do a certain kind of research and, in particular, to teach in a particular way requires not only knowledge and skills, but also the ability, opportunity, and willingness to "be" a certain kind of person. In addition, our particular classroom, school, or community contexts have particular opportunities, demands, and constraints. These personal and contextual elements should be included—along with goals and methods for research and teaching—in the analysis of what makes this work difficult, why it takes the form it does, and why variations necessarily arise between individual researcher/teachers.

Finally, one of the central issues throughout this discussion has been whether research and teaching are, in some ways, conflicting practices. Some would suggest that the tension can be ameliorated when teaching and research are construed to be essentially the same activity. This recommendation should be approached carefully, even reluctantly, for to fail to distinguish between research and teaching is to create a dangerous conflation that does disservice to both the practice and the practitioner. Research and teaching are complex activities characterized and distinguished by their goals, methods, knowledge base, and rationale. Granted, it is important to recognize that teaching can be an act of inquiry and that research can be pedagogical. However, reducing our conceptions of teaching and research to their common denominator eliminates much of what makes each a disciplined, professional practice.

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- Jackson, P. W. (1990). *Life in classrooms*. New York: Teachers College Press.
- Johnson, S. M. (1990). The primacy and potential of high school departments. In M. W. McLaughlin, J. E. Talbert, & N. Bascia (Eds.), *The contexts of teaching in secondary schools: Teachers' realities* (pp. 167–184). New York: Teachers College Press.
- Lacey, C. (1977). *The socialization of teachers*. London: Meuthen.
- Ladwig, J. G., & King, M. B. (1992). Restructuring secondary social studies: The association of organizational features and classroom

- thoughtfulness. *American Educational Research Journal*, 29, 695–714.
- Lave, J. (1988). *Cognition in practice*. Cambridge: Cambridge University Press.
- Lightfoot, S. L. (1983). *The good high school: Portraits of character and culture*. New York: Basic Books, Inc.
- Little, J. W. (in press). Subject affiliation in high schools that restructure. In L. S. Siskin & J. W. Little (Eds.), *The subjects in question: Departmental organization and the high school*. New York: Teachers College Press.
- Loveless, T. S. (1994). The influence of subject areas on middle school tracking policies. In A. Pallas (Ed.), *Research in sociology of education and socialization* (pp. 147–175). Greenwich, CT: JAI Press.
- McLaughlin, M. W., & Talbert, J. E. (1993). *Contexts that matter for teaching and learning: Strategic opportunities for meeting the nation's educational goals*. Stanford, CA: Stanford University, Center for Research on the Context of Secondary Teaching.
- Muncey, D. E., & McQuillan, P. J. (1993). Preliminary findings from a five-year study of the Coalition for Essential Schools. *Phi Delta Kappan*, 74(6), 486–489.
- National Council of Teachers of Mathematics. (1991). *Professional standards for teaching mathematics*. Reston, VA: Author.
- Powell, A. G., Farrar, E., & Cohen, D. K. (1985). *The shopping mall high schools: Winners and losers in the educational marketplace*. Boston: Houghton-Mifflin.
- Protherough, R., & Atkinson, J. (1992). How English teachers see English teaching. *Research in the Teaching of English*, 26, 385–407.
- Romberg, T. A., & Middleton, J. A. (1994). Conceptions of mathematics and mathematics education held by teachers. In N. L. Webb & T. A. Romberg (Eds.), *Reforming mathematics education in America's cities: The urban mathematics collaborative project* (pp. 83–104). New York: Teachers College Press.
- Schwab, J. J. (1978). Education and the structure of the disciplines. In I. Westbury & N. J. Wilkof (Eds.), *Science, curriculum, and liberal education* (pp. 229–272). Chicago: University of Chicago Press.
- Shulman, L. (1986). Those who understand: Knowledge growth in teaching. *Educational Researcher*, 15(2), 4–14.
- Siskin, L. S. (1991). Departments as different worlds: Subject subcultures in secondary schools. *Educational Administration Quarterly*, 27, 134–160.
- Siskin, L. S. (1994). *Realms of knowledge: Academic departments in secondary schools*. Washington DC: Falmer Press.
- Siskin, L. S., & Little, J. W. (Eds.). (in press). *The subjects in question: Departmental organization and the high school*. New York: Teachers College Press.
- Stodolsky, S. S. (1988). *The subject matters*. Chicago: University of Chicago Press.
- Stodolsky, S. S. (1993). A framework for subject matter comparisons in high school. *Teaching and Teacher Education*, 9, 333–346.
- Stodolsky, S. S., & Grossman, P. L. (1995). The impact of subject matter on curricular activity: An analysis of five academic subjects. *American Educational Research Journal*, 32, 227–249.
- Talbert, J. E. (in press). Boundaries of teachers' professional communities in U.S. high schools: Power and precariousness of the subject department. In L. S. Siskin & J. W. Little (Eds.), *The high school department: Perspectives on the subject organization of secondary schools*. New York: Teachers College Press.
- Talbert, J. E., & McLaughlin, M. W. (1993). Understanding teaching in context. In D. K. Cohen, M. W. McLaughlin, & J. E. Talbert (Eds.), *Teaching for understanding: Challenges for policy and practice* (pp. 167–206). San Francisco: Jossey Bass.
- Talbert, J. E., & Perry, R. (1994, April). *How department communities mediate mathematics and science education reforms*. Paper presented at the Annual Meeting of the American Educational Research Association, New Orleans.
- Tyack, D., & Tobin, W. (1994). The "grammar" of schooling: Why has it been so hard to change? *American Educational Research Journal*, 31, 453–479.
- Wheelock, A. (1992). *Crossing the tracks: How "untracking" can save America's schools*. New York: New Press.
- Yaakobi, D., & Sharan, S. (1985). Teacher beliefs and practices: The discipline carries the message. *Journal of Education for Teaching*, 11(2), 187–199.

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