7. Conclusions and Implications

In this final section, we discuss implications of our findings for designing classrooms that are able to impart generic skills and attitudes. Our review of the literature and our analysis of classrooms point to many lessons that could be followed by those attempting to design classrooms that work. We view these lessons as general indicators of the policy environment that would be conducive to teaching generic skills, rather than specific recommendations. Our sample is too small to generalize to the wide variety of classrooms and school environments at large. Many basic questions remain unanswered about the effectiveness of teaching generic skills, both in our sample and in other classrooms where such instruction is carried out. Despite claims about the importance of generic skills for workplace success, for example, hard data to support such claims are lacking. On the other hand, for reformers who believe that students can benefit from instruction in generic skills and useful work-related attitudes, our study has implications that can stimulate and inform their efforts.

Generic Skills Can Be Taught in Academic and Vocational Classrooms

Generic skills and positive work-related attitudes can be taught in both academic and vocational classrooms. The first step is simply to include the teaching of generic skills as an instructional goal in addition to domain-specific knowledge and skills. Once identified as an instructional goal, teachers can further specify which skills can be feasibly taught in their particular domain. Similarly, schools that desire to improve generic skills instruction for their students must begin with an articulated vision that can be communicated to teachers and must follow up with the resources and support that teachers will need (discussed below).

Of course, teachers face constraints in incorporating generic skills into subject-matter instruction, including their own lack of knowledge as to how to go about it or school policies that dictate curriculum content. As we discuss below, however, many constraints are amenable to intervention. And while every attempt to incorporate generic skills teaching into classroom instruction will be faced with a unique set of barriers, the nature of the subject domain itself should not be one of them.
Designing Classrooms to Provide Authentic Practice Is Key

Once a teacher decides to incorporate teaching of generic skills and attitudes, he or she must design classroom activities to support this instructional goal. Our data indicate that one successful approach is to design classroom instruction around project work that situates learning in a specific context and provides opportunities for authentic practice in a domain. The project that students engage in should permit them to apply domain-specific knowledge and skills to a real, complex problem. Students should begin with enough basic knowledge to get started and be permitted to work on their own. Teachers should guide and facilitate learning, while encouraging students to experiment and to work through emergent problems the students may encounter.

Situated learning can be enhanced by creating a culture of practice in the domain. Depending on the goals of the class, the culture of practice may or may not need to mimic a culture of “expert” practice in the adult world of work. If the class is part of a program that intends to prepare students for work directly out of high school, then creating a relevant culture of practice might be an important teacher goal. In the classrooms we studied, however, few students saw the class as training for immediate employment. Except for Ms. Adams, teachers in classrooms that worked were not experts (e.g., a professional writer or an electrical engineer) and had no actual work experience in the relevant culture of practice. But they were skilled and experienced adult practitioners with enough expertise to create a situated learning environment where students could acquire high-level skills, including domain-specific and generic skills. While Ms. Adams’s professional experience as an interior designer clearly influenced classroom design and the explicit teaching of relevant workplace skills, her experience seemed more a useful asset than a necessary condition for creating a culture of practice.

Situated Learning Enhances Student Learning and Engagement

Many educators and the general public voice concern over students’ disengagement from learning. While we did not formally evaluate learning, the students we observed in classrooms that worked were on-task and involved with their learning. Focus group discussions and survey responses reinforce this view; students clearly articulated what they had learned, how their attitudes about learning had changed, and so on. By contrast, students in other classrooms were clearly less motivated and challenged. They either did not appear to learn
much at all (as in the landscape class) or focused their energy on just “getting a
task done” (as in the chemistry classes).

An important outcome of classrooms that worked was that students became
“enculturated.” While many came into the class with vague or nonexistent
learning goals, they came to accept and become a part of a culture of practice. In
our view, the situated learning approach, coupled with the teachers’ emphasis on
appealing to intrinsic motivation (interest and challenge), were most influential
in engaging students’ participation. While student abilities and interests
undoubtedly affect learning, effective classroom design can make a difference in
students’ attention and engagement in the learning process.

**Teachers Need to Hold High Expectations for Students**

A clear difference between classrooms that work and those that did not rests
with performance expectations that teachers and others held for students. This
difference was especially startling in the two classes taught by Mr. Price, English
and landscape. Mr. Price ably demonstrated skills for designing an English class
that offered students a challenging and rewarding experience that went beyond
requirements outlined in the state curriculum framework. For this group of
college-bound students, he and others in the school had high-performance
expectations.

In contrast, the class for landscape students provided menial, often boring work
and few academic lessons, despite the science credit that came with it. School
officials, teachers, and other students viewed these students as academically
marginal and behaviorally problematic.¹ While Mr. Price himself did not malign
his students, he did acknowledge that some had nonacademic problems that
needed to be dealt with. He saw it as his responsibility to help these students in
any way that he could. This explains, in part, his adopted role of “therapist” to
troubled students. His expectations for these students—that some would behave
badly, not cooperate, not work very hard—influenced the decisions he made
about what to teach and how to organize the class. To be fair, we did observe
some student behavior that seemed intolerable in a classroom setting. Again by
choice, Mr. Price decided to deal with this behavior—and perhaps try to change
it—rather than simply throw the student out of class. The point here is not to
judge the wisdom of Mr. Price’s decision to carry on as he did, but that

¹The view that landscape class was for “troubled” students was held almost universally. In fact,
when students in the English class asked the fieldworkers whether they were observing any other
classes, students expressed disbelief that landscape was our other choice. One student’s response
was, “That’s too bad.”
expectations for students, once made, will shape other decisions about instructional goals, classroom design, teacher roles, and so on. In this school, the overwhelming feeling was that landscape class was indeed the “dumping ground” for marginal students.

Like Mr. Price, Mr. Stone viewed his chemistry students—mostly minority students in an urban school—as needing help and nurturing. He adopted somewhat of a “missionary” role toward students, which appeared to suit the students as well. Mr. Stone was the “oracle” of knowledge, who provided students with answers to problems. He also gathered up their papers after class “so they would not lose them,” and admittedly had different expectations for the two classes, which had been formed on the basis of students’ math ability. Because of the bureaucratic “C,” students knew he would tutor them or help them until they passed. Since teachers were expected to help students achieve a “C”, students felt the academy teachers “cared” more than other teachers. On the downside, these students—many of whom had college aspirations—went through the motions of doing work to get a grade. The “C” mastery criterion seemed to set a floor of performance that most students did not try to exceed. These students did not acquire generic skills (to read, think, and write critically) in the ways that those in Mr. Price’s English class were able to. Mr. Stone’s inexperience may have also contributed to this.

Ms. Adams and Mr. Benson stand out as teachers with uniformly high expectations for students, in spite of the low view of vocational students (and even of vocational teachers) in their schools. From their perspective the students who enrolled in their classes were “what they had,” and it was important not to “throw them [students] back.” Both teachers defined clear relationships with students: They would be a friend to students but would also fail them. They cared about students’ personal lives (Ms. Adams spoke knowingly of former gang members in her class), but they did not accept laziness or bad behavior. Every student who applied effort could count on a knowledgeable teacher’s help—apprentices to the “master” teacher.

Unlike Mr. Price’s landscape class, Mr. Benson’s and Ms. Adams’s classes had a more heterogeneous group of students who took the class for various reasons. This mix—of both skill and interest—was anticipated by these teachers, who designed classroom activities to both accommodate and take advantage of student differences and viewed each student as an individual for evaluation purposes. This mix, coupled with the teachers’ high expectations, differentiated
these classes from the others. Two examples of how this difference affected classrooms is the contrast between Mr. Price’s and Mr. Benson’s view of how to structure the class. Mr. Benson believed the class should be structured to enhance students’ motivation by teaching basic skills needed for more complex tasks, and by incorporating technology to capture students’ interest. Mr. Price structured the landscape class more to control students than to motivate them: He developed a point system for student performance on well-defined tasks, a divide-and-conquer strategy to separate and contain consistent troublemakers from the rest of the class, or gave students a choice of menial tasks. Some students responded by demanding “paychecks” instead of points or grades for the work. Many students in landscape class (even some of the “troublemakers”) said they would have preferred longer projects to short, simple tasks.

The interplay between expectations, mix of students, and classroom design is particularly interesting in Mr. Benson’s case, because some of his students were also in the landscape class, or had similar “profiles” to landscape students. One student in particular, who seemed to relish his role as a troublemaker in landscape, was more cooperative and engaged in the manufacturing class. We cannot generalize from a single student’s behavior, but this example illustrates that simple explanations that blame the student or the teacher or some other factor for failed instruction are likely to miss the mark. Many factors conspire to make effective or ineffective classrooms. This study suggests that expectations about students can markedly affect instruction: Administrators’ and counselors’ expectations influence course development and class placement; teachers’ expectations affect instructional goals and classroom design decisions. Differential expectations tied to tracking practices still pervade public education, and their ill effects are widely documented (cf. Oakes, 1986; Oakes et al., 1992).

**Teacher Training and Staff Development Need to Change**

Traditional teacher training and staff development practices pose a barrier to widespread adoption of the classroom design principles and teaching practices defined in classrooms that work. New teachers are rarely trained to acquire the skills they will need to design classrooms that work. Much of teacher education involves perfecting the skills of writing behavioral objectives, lesson plans, and worksheets. Once graduated and working, newcomers are likely to receive staff development.

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2Oakes (1986) and others would argue that the heterogeneous mix of students was beneficial both because it enhanced the learning of all students and circumvented institutionalized labeling and stigma often associated with vocational education.
development that deals with schoolwide issues, i.e., drug and alcohol problems and changes in state policy. This leaves them largely unprepared to experiment with mixing domain-specific and generic skills, designing situated learning opportunities, or taking on innovative and flexible teacher roles.  

Staff development for teaching generic skills was sorely lacking across our three sites. As seasoned teachers, Ms. Adams, Mr. Price, and Mr. Benson had come to expect that school-level staff development would neither address their disciplinary and domain interests nor their focus on fostering student ingenuity and exploration. Each sought their own staff development opportunities outside the school. In contrast, Mr. Stone, in his first year of full-time teaching, struggled to implement his philosophy in the classroom. He had no mentors (i.e., someone like Mr. Benson) or staff development to help him incorporate his ideas. He instead sufficed by employing the same traditional methods, i.e., “cookbook” labs and question drills, used by other science teachers.

Recently, research in cognitive science has begun to influence the content and methods of instruction in some subject areas. But new models of curriculum and instruction have not widely influenced preservice teacher training. The teachers in classrooms that worked relied on intuitive models of learning based on their long experience. As discussed above, their teaching of generic skills and work-related attitudes was often implicit rather than explicit. Research supporting the Collins et al. (1989) model, however, emphasizes the importance of bringing tacit cognitive processes, like problem recognition and evaluation, into the open where students can observe, enact, and practice them with help from the teacher and other students. If Mr. Benson had followed this principle in his teaching, for example, he might have named the different problem-solving steps in designing a circuit and discussed how these steps might generalize to other problems as well. It is possible that a formal model might have helped Mr. Stone, who lacked the experiential background that the other teachers relied on. It is our view that formal models of learning and instruction from cognitive science research would be an important element in a teacher training program that aims to help new or current teachers design the kinds of learning environments outlined in Sections 4–6.

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3In a recent RAND study of integrating academic and vocational education (cf. Bodilly et al., 1993), for example, a 1990 teacher education graduate reported that her former university instructors were surprised to learn that her first teaching assignment (as a math teacher) required her to correlate math with occupational lessons. Despite the fact that integration of academic and vocational education was a statewide reform mandated by the State Department of Education, the faculty in the teacher training program at the state’s major public university had not even heard of curricular integration and could offer their former student little practical advice.

In addition to changing teacher preparation, new teacher evaluation strategies might encourage changes in teaching practices that accompany classrooms that work. Typically, administrators evaluate teachers on the basis of “parental or peer complaints,” or lack thereof, and a couple of visits to the classroom. Proper evaluation of the teaching behaviors that we suggested as important in our study requires more attention and time than is commonly allocated. It would also require administrators to link staff development with evaluation, such that teachers needing improvement would get needed assistance. Although the teachers in our study received positive evaluations from administrators, these evaluations were, with one exception, completely based on their “reputations,” rather than actual knowledge of their instructional goals, classroom design, teaching techniques, student learning, or the degree to which teachers’ professional development efforts had in any way positively transferred to the classroom.5

Another implication of our study is that teachers may benefit from entirely new forms of staff development, beyond the typical one- or two-day workshops, on topics such as cooperative learning techniques or new curriculum frameworks. Ms. Adams’s experience in the world of work, for example, clearly contributed to her desire and ability to teach work-related attitudes. Mr. Price attended a one-year writing course that placed him in the company of experts. Although vocational teachers often have occupational experience—sometimes as a requirement for teacher certification (cf. Lynch and Griggs, 1989)—academic teacher training typically follows the baccalaureate model, which emphasizes subject-matter preparation with the addition of courses in teaching methods.

Further staff development for teachers might include, for example, summer internships in firms that would broaden teachers’ understanding of work outside of school in their chosen domain. The trend toward closer relationships between schools and the business community indicates that both see benefits for closer connections between schools and workplaces. The forum for discussing staff development needs and possible business involvement in teacher training exists in many communities implementing school to work programs. For example, the academy program that employs Mr. Stone is attempting to structure a closer relationship between students and business through mentoring, summer jobs, and job shadowing. Thus far, however, there has been little exploration in the United States of ways to “partner” teachers and business.

The exception was Ms. Adams, whose immediate vocational supervisor was well versed with her methods and professional development efforts. However, the school-level administrator gave a positive evaluation of Ms. Adams based on her reputation alone (Stasz et al., 1990).
In short, what is currently missing in traditional forms of teacher training and staff development is the opportunity for teachers to come in contact with “expert practitioners” in business and industry or in college departments who are engaged in a culture of practice. While teacher education programs employ “teaching experts” to enhance teachers’ professional development, they do not provide the link to a culture of practice outside schools. Further research is needed to develop and evaluate methods for teacher training and staff development that depart from current tradition and explore ways to expand teachers’ views of and contacts with the world of work.

**Teachers Need Autonomy and Additional Resources**

Teachers in classrooms that worked had a great deal of autonomy in developing their curricula and classroom activities. This freedom to innovate, however, was more a by-product of other school policies than a belief that teacher autonomy would lead to improved instruction. As vocational teachers, Ms. Adams and Mr. Benson taught elective courses to primarily non-college-bound students. Their courses were not prerequisites for any others. The schools in which they taught placed value on college-bound students, which tends to create the standard of worth both for students and teachers (cf. Little and Thrett, 1992). School administrators paid little attention to these vocational classes, as long as they met enrollment standards and served the needs of students who proved least successful in the academic curriculum. In contrast, Mr. Benson spoke of how his teaching differed in his algebra class because the required content constrained what and how he could teach.

Mr. Price’s college-prep English class was one of three that students could choose to satisfy a fourth-year English requirement for college entrance. Having convinced the English department that his course went beyond the state curriculum guidelines, Mr. Price was given leeway to teach literary criticism. Importantly, students viewed this class as nontraditional, but also low risk, because most had already been accepted to college by second semester and their course grade did not really matter.

The policies that influence autonomy have to do with course prerequisite requirements, graduation requirements, and credit standards set by the state college and university system: All are tied to the college-preparatory curriculum. If teachers don’t teach college-prep courses, these policies don’t constrain what they teach and how they teach it. Mr. Price had to fight for permission to teach his English composition class, even though it was unlikely to affect students’ college going.
These cases raise an important issue about teachers’ ability to innovate, particularly in traditional academic disciplines, where there is a trend toward more proscribed curricula. Similar issues have arisen in other curriculum reform efforts as well. The integration of academic and vocational education, for example, is a curriculum reform mandated in vocational education through the 1990 Amendments to the Carl Perkins Act. One barrier to integration concerns crediting of “applied academic” courses for academic credit. Even when applied courses are taught by academically certified teachers, school districts, state departments of education, and postsecondary institutions debate course accreditation (cf. Bodilly et al., 1993). The trend to increase high school graduation requirements in many states further muddies the waters. In the process of reviewing any new course or program, history suggests that courses that smack of something new or nontraditional run the risk of failing to garner credit that either attracts students or satisfies college entrance requirements. Student enrollment, in turn, is often tied to course offerings and can determine if a course is taught at all. Given this picture, one can easily surmise that a teacher’s failure to innovate may in fact be a wise choice in a constraining regulatory environment.

In addition to regulatory constraints associated with accrediting courses, teachers often lack the resources they need to design classrooms that work. Except for Ms. Adams, teachers complained about lack of basic materials, like dictionaries and books, let alone the more sophisticated tools needed in electronics and manufacturing classes. Without the promise of additional resources, there is little incentive for teachers to design more innovative instructional activities of the type described earlier. Lack of resources in education is a familiar story that becomes more and more alarming as states, which bear the greatest share of costs in public education, face increasing fiscal constraints. This problem and its solution, of course, go well beyond the issue of providing resources for teaching generic skills. On the other hand, even if adequate funds become available, teachers must be attuned to the materials and equipment required by “authentic” activities. It is not resources per se that make the difference in a quality educational program, but the use to which the resources are put (Oakes, 1989). Teachers may still need training in the best uses of available resources.

**Assessment Needs to Measure Generic Skills Learning**

Assessment strategies employed at most schools do not serve the needs of generic skills instruction. Popular forms of assessment test students’ knowledge of facts, concepts, and processes in a particular domain. They rarely assess students’ ability to solve problems, reason, cooperate with others, or demonstrate
other capabilities and skills learned in situated learning environments. Currently, new assessment standards, and the influence that such standards might have on improving curriculum, are widely debated nationwide.\textsuperscript{6} While these new standards encompass the types of assessments needed to evaluate generic skills instruction, new tests are just in the process of being developed and piloted in schools. While testing reforms appear to be going in the right direction, it will be several years at best before new measures are widely available. In the meantime, a patchwork of teacher-made, nonstandardized assessments could be adopted, but such a move is unlikely. For a variety of reasons, schools rely on standardized testing regimes or qualitative assessments to evaluate program goals associated with student outcomes.

Teaching Generic Skills Connects to Other School Reforms

With the exception of chemistry classes, the cases we identified and described in this study were individual teacher efforts not linked to any broader schoolwide reform effort. Nonetheless, the result of their efforts and, by extension, the model we define for designing classrooms that work, can apply to other reforms.

As discussed in the Introduction, reforms attempting to improve the transition between high school and postsecondary education and employment address curriculum changes that seek to improve preparation for work and to make academic learning more meaningful. While these programs vary in detail, many include teaching generic skills and work-related attitudes as instructional goals. Results from this study can inform those ongoing efforts.

This study also clearly connects with recommendations for skill learning advanced by SCANS (1991, 1992a, 1992b). As mentioned earlier, our conceptualization of generic skills aligns with the SCANS foundation skills. While the SCANS work provides a vision for teaching new skills and competencies, and resources for identifying skills and tasks related to various jobs, this research provides a conceptual framework for designing classrooms that teach a broad range of domain-specific and generic skills. This framework presents a strategy for teaching high-level skills with both a schooling-for-career and college emphasis. It complements the SCANS work but focuses more on effective teacher practices. The framework suggests that teachers should use

project work or exploratory labs, not single session tasks or labs, as the central activity for authentic practice in a domain. It stresses socially organized work in groups or interdependent teams over individual activity. It aims to create a culture of practice where the classroom becomes a flexible “workplace”; students work in parallel on a variety of tasks and projects. The goal is not one of narrow vocationalism, the preparation of students for entry-level jobs. Rather, the goal is to foster student engagement, ingenuity, and exploration in a learning process that incorporates the teaching of both domain-specific and generic skills and knowledge and useful work-related attitudes. Classrooms are still places for learning, not simulated work sites.

Focus on Generic Skills Can Help Integrate Academic and Vocational Education

Finally, teaching and learning generic skills can be viewed as a “model” for integrating academic and vocational education. Research on integration has identified several models in practice that involve changes in curriculum, pedagogy, and the school organization (Grubb et al., 1991; Bodilly et al., 1993). One prominent feature of integration—and one of the significant barriers to its success—is the (often forced) collaboration between academic and vocational teachers. As a vocational education reform mandated by the 1990 Perkins Amendments, the thrust of integration has been to enhance the academic content of vocational programs by having academically certified teachers teach “applied” academics that, for example, correlate math instruction with a specific occupational focus. Because academic teachers lack relevant vocational training and because vocational teachers are typically not certified to teach academics, the solution has been for these teachers to pool their knowledge and skills in designing curriculum. This is an uneasy collaboration: Vocational and academic teachers, curriculum, and students have been separated in our educational institutions for decades (for further discussion see Little, 1992; Little and Threatt, 1992; Bodilly et al., 1993; Oakes, 1989).

Our study of teaching generic skills offers a different perspective. The instructional goals of classrooms that work aim to integrate the teaching of a variety of domain-specific and generic skills in a situated learning environment that actively engages students in learning. These goals mirror the spirit of integration of academic and vocational education. But this model does not require the teacher-to-teacher collaboration that creates a stumbling block for implementing many other models of integration. Rather, it requires a teacher to enter the company of experts, become a learner, and then translate a culture of practice into the design of classrooms that work. This focus has the advantage of
bridging schooling with working and, thereby, improving the school’s ability to prepare high school students for a future beyond school.