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ABSTRACT

A study tested the claim that work-based learning can have positive effects on academic learning. Data were obtained through interviews with faculty, staff, students, and employers, and observation of classroom-based links to the work-based learning components at three sites involved in a work-based learning project. At the three sites, a total of 25 student interns were chosen as subjects and were observed several times for several hours each time and interviewed before and after their work placements. The study found that for 9 of the students, no evidence of academic reinforcement in the workplace were found. For 16 students, evidence was found for some aspects of the claim. Almost half the students experienced instances of the simple application of school-based knowledge at work. It was determined, however, that knowledge gained in the workplace could reinforce academic learning, especially if there is intentional instructor intervention connecting the two venues. In other words, work-based learning can have positive effects when it is done well. (Contains 20 references.) (KC)

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WORK-BASED LEARNING AND ACADEMIC SKILLS

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Educators who are proponents of the school-to-work strategy identify five primary purposes for work-based learning: (1) acquiring knowledge or skill related to employment in particular occupations or industries, (2) providing career exploration and planning, (3) learning all aspects of an industry, (4) increasing personal and social competence related to work in general, and (5) enhancing students' motivation and academic achievement. This Brief addresses the claim that work-based learning will improve students' academic performance. While opponents see the school-to-work initiative as a threat to the college-prep curriculum, advocates assert that work-based learning contributes to, rather than takes away from, academic achievement. Internship coordinators and cooperative education directors claim that learning in the workplace reinforces school-based knowledge. Since that claim seems to underlie much of the pedagogical practice and social policy in the field, it is important to subject it to more rigorous scrutiny.

METHODOLOGY

This Brief reports on the third part of a multi-year research project on work-based learning. We first examined employer participation in work-based learning programs and then focused on pedagogy for on-the-job learning (see Bailey, Hughes, & Barr, 1998; Hughes, 1998; and Hughes & Moore, 1999). The initial schools or programs studied were selected on the basis of their strong work-based learning components and solid employer involvement. For the third part of the project, we continued work at three of our sites where there were efforts to connect work-based learning with classroom-based learning. In addition, we chose two new sites on the basis of program staff's assertions that academics were a high priority and were integrated with the work experiences. Thus we believed these programs showed promise for academic reinforcement.

IEE researchers interviewed faculty, staff, students, and employers, and observed any classroom-based links to the work-based learning components. At each program, between four and eight student interns were chosen as subjects. The students were observed several times (for several hours each time) over the course of their internships, as well as interviewed before and after their work placements. Data were collected from observations and interviews of 25 student interns. The students were placed in a variety of workplaces, ranging from small non-profit organizations to large Fortune 500 companies, and they worked in many different fields, for example, health, business and administration, education, the arts, and construction.

We also draw on the work of Stasz and her associates (Stasz & Brewer, 1998; Stasz & Kaganoff, 1997) and the earlier work of Moore (1981a; 1981b; 1986), all of whom also observed student interns.

THE REINFORCEMENT CLAIM

James Herndon's (1971) story about his student who could keep score flawlessly in the bowling league but who flunked every math test (even when Herndon gave him bowling-score math problems), demonstrates the serious disjuncture between classroom operations and real-world operations. Indeed, people rarely perform the kinds of cognitive operations outside of classrooms that they perform inside them (Scribner 1986; Sternberg 1986; Lave 1988).

Resnick (1987) enumerates the broad differences between school learning and other learning: individual cognition in school versus shared cognition outside; pure mentation in school versus tool manipulation outside; symbol manipulation in school versus contextualized reasoning outside school; and generalized learning in school versus situation-specific competencies outside. Her point is that schooling is not organized so as to transmit the skills and abilities required for performance outside of school, and increasingly even fails at imparting academic competencies: "Modifying schooling to better enable it to promote skills for learning outside school may simultaneously renew its academic value" (p. 18).

Thus there is now a body of research that demonstrates not the connection between, but the disjuncture between classroom knowledge and that outside the classroom (also see Berryman and Bailey, 1992). If school and work are so different, and individuals do not transfer knowledge gained from one to the other, it follows that in order to be fully prepared, young people should have both. But it does not directly follow that learning out of school will improve learning in school. Yet the reinforcement argument makes three kinds of implicit assumptions about the connection between academic knowledge and workplace experience: First, school-based knowledge may be applied in work settings, and thus reinforced. Second, school-based knowledge might be explored and tested. Third, work-based learning may have motivational effects, providing an incentive to study.

EXISTING DATA

The research on the academic achievement of students in programs that include work-based learning is fairly new, and the results so far are mixed. Hamilton and Hamilton (1997) and Stasz and Brewer (1998) found that student interns primarily learned job-related skills and work-readiness-related attitudes and behaviors, with little or no effects on their academic achievement.

Other research has yielded indications that participation in such programs enhances academic achievement, usually as measured by grade point average (Hanser & Stasz, 1999; Foothill Associates, 1997; Stasz & Kaganoff, 1997; Westchester Institute for Human Services Research, 1997; Hollenbeck, 1996). However, one cannot necessarily attribute the positive academic outcomes to the work-based learning portions of the programs studied by these researchers. It is unclear whether all of the students in the studies actually participated in work-based learning, and, in one of the studies, the largest gains in performance occurred between the ninth and tenth grades, when it is likely that these students had not yet engaged in work-based learning.

TESTING THE CLAIM

To substantiate the claim that work-based learning can have positive effects on academic learning, we contend that one must be able to see it in the details of students' workplace experiences, in the texture of their participation in specific situated activities. Thus, in the data on students' experiences, we would need to find:

- Student-interns using forms of knowledge—content, skills, and higher-order thinking—that are substantively analogous to the forms of knowledge acquired and used in school;
- Interns engaging these forms of knowledge often enough to strengthen them by means of practice;
- Interns having opportunities to explore, elaborate and test these forms of knowledge in the context of situated activities, where they can recognize the meaning and utility of school knowledge and its connection to situated knowledge-use; and
- The engagement of the interns with this knowledge organized in such a way that they encounter a substantial range of the knowledge used in school, rather than just fragments of it.

Content Knowledge

Among other things, students in high schools acquire information and ideas: that the Erie Canal was opened in 1825; that economic struggles between the industrializing North and the agricultural South were among the causes of the Civil War; that blood carries oxygen and nutrients throughout the body. One empirical question is whether students encounter this kind of knowledge in their internships. Sometimes, according to our studies, they do: A student working at a local history museum learned the names of colonial governors, the dates of key events in English settlement, and so on (Moore, 1986). A student working as an aide in a hospital had a conversation with a physician in which he heard facts about the liver and its disorders.

More often, though, it is difficult to locate content-knowledge in the workplace that corresponds in any clear way with the content-knowledge encountered in the classroom. What the tour-guide may remember a year after the internship is not the name of the last Dutch governor of New York so much as how to deliver a lecture and how to manage a group of third-graders. The hospital aide had only a single, fragmentary lesson on the liver, but he did learn how to make beds with people in them, and how to demonstrate care and sensitivity in interactions with sick people.

Skill-Oriented Knowledge-Use: Reading, Writing, Math, and Science

We did not often find students performing school-like tasks, or even tasks that implicitly drew on knowledge obviously derived from school. Even *reading* was not a significant part of their experience. Some (not all) occasionally read at work: instruction manuals, organizational brochures and reports, and so on. Our best guess is that the grade level of those reading materials rarely exceeded 8th or 9th grade. The function of their reading was usually to provide specific information that the student needed to perform a work task, or perhaps to construct a bit of background knowledge. Interns did not need to interpret or analyze long texts. Moreover, we rarely saw students being held accountable for things they had read; rather, they were held accountable for performing the tasks for which they were doing background reading. Thus, in terms of reading skills, one could conclude that work-based experience did not provide much in the way of reinforcement: There was not much practice and virtually no testing.

In a rare case, a student who was interning as a middle-school teacher's aide was given reading assignments by her supervisor, a music teacher:

> I do a lot of reading for him and the way I show him my knowledge is the way I am able to apply that knowledge in the class. Like I'm able to teach a certain way, and he can say, 'Oh, isn't that a Kane and Kane way? You got that part, didn't you? Oh, isn't that Howard Gardner?'

Yet even in this instance, it was unclear whether this knowledge was connected back to her in-school classes. Although the school programs did sometimes inject work-related reading into the students' assignments, we rarely saw students doing sustained, complex reading.

Moore's research and Stasz's work included sites where interns did substantial reading: to prepare for giving tours related to state history, a student at a history museum spent time in the library reading about such topics as colonial government and transportation (Moore, 1986); students in a medical research lab were sometimes assigned to the hospital library to find articles related to current work, and their supervisor occasionally gave them background reading on the fundamental science involved in the experiments (Stasz and Kaganoff, 1997). In both instances, the reading was substantial, challenging and clearly related to work tasks. But these examples are in the distinct minority.

Nor did we find many instances of student interns doing much *writing* in their work activities. An intern in the legal department of a municipal agency was asked to digest the transcripts from cases, producing memos for the attorneys. A student working with an independent filmmaker wrote his own short script, and a student working for a travel magazine wrote an article for the magazine. Some other positive examples show up in Moore's (1981b) data: a reporter for a community newspaper, even a cabinetmaker's apprentice who was required by the master to write commentaries on historical styles of furniture. But these students were in the minority: Very few of the subjects in any of the studies did any sustained, significant writing.

Similarly, only a few of the students we observed engaged in substantial *mathematical* work, especially anything requiring complex operations and problem-solving. The young man working with a filmmaker had to create a budget for his film, and a young man working on a construction site said that he could see how geometry was used in carpentry. One student used math in an inventory project, and another subject worked in an investment bank's mutual funds department and performed significant computations.

The best example is a community college student who worked as an assistant accountant in an advertising firm.

This student's work came as close to *application* of school-based knowledge as anything we saw. She used bookkeeping techniques leamed in class to handle the accounts, and she adapted those methods to her specific setting—that is, she *tested* her school learning, went beyond it to make it useful in her work. For instance, she had to check expense vouchers for "reasonableness," which required that she develop a sense of what kinds of expenses were appropriate by the company's standards. In that sense, although her duties stayed on a fairly rudimentary level, her work experience may have reinforced her school leaming.

None of our other subjects had real practice or testing experience in mathematics—and thus little reinforcement of school-based math knowledge. They did not even seem to engage in the kinds of everyday math that Lave (1988) describes among grocery shoppers or Scribner (1986) among dairy workers. Some of the students in Stasz's study worked extensively with numbers, and some of their tasks had characteristics akin to school math, and therefore represented a form of academic reinforcement (Stasz and Kaganoff, 1997).

If the data from these studies are representative of high school students' work-based leaming experiences, one could conclude that interns rarely have occasion to practice or explore mathematics skills in the workplace. It might be, of course, that even a small amount of exposure to math-like problems in the non-classroom world motivates students to work harder at math in school. We simply have no data to confirm that hunch. In any case, with a few notable exceptions, the observations do not yield much to support the idea that work-based learning can help students strengthen their quantitative reasoning.

The reinforcement of *science* concepts and theories does occasionally happen. Three students in a high school health program came across school-based science knowledge in their hospital internships. By observing, asking questions, and playing peripheral roles in the activity, these three were introduced to information that might also have been encountered in school. The medical careers academy in Los Angeles that Stasz and Kaganoff (1997) studied gave students regular and systematic exposure to sophisticated scientific information and procedures. These researchers point out that the teaching hospital where the interns worked had educational practices deeply embedded in its culture.

Motivation

The motivation claim of the academic reinforcement argument for work-based learning is the notion that, by encountering school-related knowledge in the meaningful contexts of work activity, students will develop a stronger incentive to study hard in school. We find some evidence for this. A few students claimed that they were doing better in school because, through their internship, they had become more interested in a particular topic or field. One student, who had a reading disability, said that her grades had improved because she "cared more" because there was "more stuff that interested me." Another said he had "straightened out" "because now I know what I want to do and I know what I have to do to get there." He agreed that the program was hard, but being interested in the topic made it easier. A student from a high school economics and finance program said, "When I'm interested I study harder." While these effects are worthwhile, it is not the same thing as discovering direct relations between specific academic knowledge and particular work practices.

Summary

For each of the 25 students in our study, we noted whether the three claims for academic reinforcement (school-based knowledge is applied, school-based knowledge is explored and tested, and motivation towards school is positively affected) were met. For nine of the students (over one-third of our sample), over the course of multiple visits to the internship sites, and before-and-after in-depth interviews with the students, we found no evidence for any of the claims. For sixteen students, we found evidence for one or two of the claims. As for the motivation effect, we found evidence in only seven of our cases.

Almost half (twelve out of twenty-five) of the students experienced instances of the simple application of school-based knowledge at work. The medical-site internships offered through the health programs were particularly promising in this regard. Regarding the testing and exploration of school-based knowledge, we found evidence for this in only three of the internships. These three cases are instructive: in each, the internship matched the student's major field of study or was paired with an independent study. These cases could be viewed almost as training in the students' chosen occupational fields, in which the work-based learning corresponded closely to, and built upon, academic and theoretical knowledge.

What was more often the case was that the interns' tasks were productive for the work of the office or site. Two community college interns had useful, challenging internships in a highly technical field. Although these jobs required cognitive ability, one could not characterize them as having academic content or requiring academic skills. In the transportation program Stasz studied, students reported that nearly 90 percent of their duties were either "general clerical/office work" or "computers/data entry" (Stasz and Kaganoff, 1997). Except for the students who were taking courses in clerical skills and data entry in school, academic reinforcement was minimal.

Moreover, in most cases, students' exposure to situated knowledge was episodic, driven by the contingencies of the work process rather than by a rational conception of the sequence of learning. When a veterinary assistant went beyond the menial work of cleaning up after surgeries and maintaining the office files, the specific content was determined by the particular patients in the clinic. Since there were many neutering operations, he had opportunities to observe and ask questions about reproductive organs; in these instances he participated in practice and engaged in exploration.

This sort of episodic exposure to complex knowledge at work could be the basis for more extensive and systematic investigations. That is the strategy that Dewey (1938) advocated. But, contrary to those who translate his mes-

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sage as simply "learning by doing," Dewey insisted on the carefully designed intervention of the educator to exploit and extend the learning potential in natural experience. He did not believe that such experience was educationally sufficient in its own right.

CONCLUSION: ALTERNATIVE POSSIBILITIES

Should (and could) educators and employers structure internships to try to bring about the academic reinforcement effect? There are alternative ways to use knowledge gained in the workplace and apply it to academic subject-matter. Activities engaged in at the workplace can be used to bring about a better understanding of knowledge or concepts being taught in the classroom. A student interning at a hospital who is able to observe surgeries would then understand human anatomy (at school, in biology class) more deeply and would better retain the knowledge. The student's authentic experience with biology would reinforce the classroom lesson in the subject.

This more promising way to reinforce academics through work-based learning was found in one program. Rather than assuming that academic learning would be possible at the workplace, real-world situations and examples were imported into the classroom. In this particular program, a medical careers initiative, the teachers created assignments that called upon students to use their hospital internship experiences to illustrate and better understand academic concepts such as division of labor and productivity. This is one small example of a strategy that teachers could take to try to bring about academic reinforcement.

We are not arguing here that work-based learning never reinforces academic learning. Our examples suggest, however, that such a claim is more tenuous than common wisdom and the prevailing rhetoric would have it. The school-work connection does happen in some situations, sometimes as a natural consequence of the work itself and sometimes as an intentional pedagogical intervention; the latter circumstance is probably the more likely one. But work-based learning proponents who stand on the reinforcement claim as a way to convince skeptics of the program's value are standing on thin ice. We argue that there are other, non-academic but equally important forms of learning that can come from work experience and that these forms give us good grounds for supporting work-based learning—*when it is done well.* Our experience with work-based learning teaches us that one cannot easily generalize about its impact. Poor placements can lead to dismal, mis-educative experiences, but quality work-based learning can provide benefits above and beyond what students get even in excellent classrooms.

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