Different viewpoints and opinions on education

Indoctrinational vs. democratic/participatory teaching methods and techniques

John Dewey argued that education should use a critical democratic approach to raise student consciousness about values, attitudes and worker responsibilities. He stated that the primary purpose of education in United States was to foster the growth of democratically minded citizens, and Dewey made no distinction in the education of those who would manage the companies and those who would work on the shop floors. Dewey strongly advocated vocational exploration as a means to acquire practical knowledge, apply academic content and examine occupational and societal values. However, he adamantly opposed the use of vocational education as merely trade education as it would overemphasize technical efficiency. If this occurred, and some would argue it has, " education would then become an instrument of perpetuating unchanged the existing industrial order of the society, instead of operating as a means of its transformation" (Dewey, 1916). Dewey believed that it was education's role to combat social predestination, not contribute to it.

In contrast, Charles Prosser and David Snedden advocated an indoctrinational approach for teaching work value and attitudes; students should learn, without question, the ethical standards of dominant society and the professional ethics of the desired professional area (Prosser, 1939). Supporters of this approach believed the primary purpose of public education was the development of human capital for the success of industrial economy. To accomplish this, they argued that scientific management principles, drawn from the industrial sector, were employed in the public school setting, creating a hierarchically structured and production

oriented educational system (Spring, 1990). Prosser's sixteen theorems of vocational education support this vision of schooling. According to him, vocational educational should replicate the occupational environment (i. e. processes, machinery, tools), emphasize efficiency (e. g. outputs, costs) and teach " functioning facts rather than in the mere acquiring of abstract and socially useless knowledge" (Prosser & Quigley, Vocational education in a democracy, 1949).

In the past thirty five years the argument initiated by Dewey, Prosser and Snedden has resurfaced between educational theorists, outside the realm of vocational education, and business leaders concerned about the decline of industrial productivity in industrialized nations. Expanding upon Dewey's perspective, these educational theorists have used a socio-political-economic framework to guide their critique. Specifically reproduction theorists have criticized vocational education for transmitting work values and attitudes necessary for a compliant workforce as well as primarily employing indoctrinational pedagogies for work values and attitudes instruction (Bowles & Gintis, 1976). Reproduction and critical theorists have argued that the indoctrinational approach is exploitative because it produces attitudes in students that correspond to the type of work in which students will most likely participate upon completion of their formal education (Anyon, 1980); (Giroux, 1983); (Macleod, 1987).

Another facet of this debate was represented in the report " America's choice: high skills or low wages!" which focused on corporate organizational structure and its relationship to worker behaviors (National Center on Education and the Economy's Commission on the Skills of the American

Workforce, 1990). It stated that about 80% of United States companies utilize a pyramidal mass manufacture model that values reliable and compliant workers who perform their tasks almost " robot like." This is in contrast to democratically structured organizations that need workers who are adaptable, resourceful, critical and capable of making decisions. While Dewey and critical theorists are concerned primarily with implementing democracy in the schools and the workplace to create a more just and equitable society, the industrial sociological literature has provided evidence that work organizations that employ democratic processes or participatory management also increase worker productivity (Hall, 1987); (Jain, 1980); (Zuboff, 1983). The Commission suggested that, while there is a trend towards companies implementing more participatory management, vocational education needs to teach democratic skills and utilize primarily democratic strategies so that future workers will be prepared to participate in, and assist in transforming companies into high performance organizations.

Ineffective learning

The nature of work has changed and our understanding of how people learn has also changed. Both developments call into question the organization, goals and pedagogy of our educational system. What makes these developments so powerful is that our new understanding of both work and learning suggest very similar directions for reform. Strengthening the educational system so that it conforms more to the ways people learn will also directly enhance the ability of that system to prepare students for the

type of workplaces that are emerging in factories and offices throughout the industrialized world.

The following discussion of effective learning emerges from a powerful knowledge base known as cognitive science. From the perspective of cognitive science this discussion purports to underscore two basic points about learning and teaching. First, school routinely and profoundly violates what we know about how people learn effectively and the conditions under which they apply their knowledge appropriately to new situations. Second, these practices seem to permeate all levels and sectors of education and training in developed countries - right from elementary grades to corporate training.

Mistaken assumption # 1: The educational enterprise assumes that people predictably transfer learning to new situations

As a society, we presume that the ultimate point of schooling is to prepare students for effective and responsible functioning outside of school. Accepting this assumption means that we have to confront what is known as the " knowledge transfer problem." Knowledge transfer simply means the appropriate use in a new situation of concepts, skills, knowledge and strategies acquired in another.

Historically, lower-skilled workers had a very limited need for transfer. Transfer becomes important when you encounter the unfamiliar and non-routine, and lower skilled workers encountered little that was not familiar and did not have the responsibility for handling the non-routine that they did encounter. Goods and services were limited in number, allowing long

production runs of the same thing or service and reducing the number of events that have not been previously encountered. Within this limited product or service range, companies organized the work as " specialist" work - workers had responsibility for a narrow range of activity. Supervisors and managers were expected to handle the non-routine events that did occur within this narrow, repetitive world. That is, responsibility for events that required problem solving, judgment, heuristics, analogues, or other mental activities enhanced by the access to knowledge and skills acquired in other situations was detached from lower-skill jobs and vested in middle-skill managerial jobs.

However, technological innovations and changed market conditions ushered by globalization and in its wake increased competition means an increased number of non-routine events. Companies in developed countries are gradually shifting from highly specialized and repetitive jobs at lower skill levels toward teams expected to handle a broader range of activities, and they are also increasingly vesting problem-solving, supervisory responsibilities in these teams. Thus, a broader range of workers is being asked to exercise the mental activities enhanced by access to knowledge and skills acquired in other situations.

Extensive research, spanning decades, shows that individuals do not predictably transfer knowledge in any of the three situations where transfer should occur. They do not predictably transfer school knowledge to everyday practice (Pea, 1989); (Lave, 1988). They do not predictably transfer sound everyday practice to school endeavors, even when the former seems clearly relevant to the latter. They do not predictably transfer their learning across

school subjects. We focus on the first two transfer problems: from school to nonschool and from nonschool to school.

Transferring from school to outside of school:

This transfer situation is at the heart of schooling. Usually, the major claim for school-type instruction is its generality and power of transfer to situations beyond classroom (Resnick, 1987). The fundamental question is whether knowledge, skills and strategies acquired in formal education in fact get used appropriately in everyday practice.

Students in college physics courses designed for physics majors can solve " book" problems in Newtonian mechanics by rote application of formulae. However, even after instruction, they revert to naÃ¯ve pre-Newtonian explanations of common physical situations to which their school learning is relevant (diSessa, 1983).

Studies of expert radiologists, electronic troubleshooters and lawyers all reveal a syrprising lack of transfer of theoretical principles, processes or skills learned in school to professional practice (Resnick, 1987). For example, Morris and Rouse found that extensive training in electronics and troubleshooting theories provided little knowledge and fewer skills directly applicable to performing electronic troubleshooting (Morris & Rouse, 1985)

Transferring from outside of school to school:

People learn outside of school all the time. The question then is what people do with what they learn outside of school when they move into school. Does sound, everyday practice get transferred to - get used in - school learning?

How does " incorrect" learning outside school affect " correct" learning inside school?

Dairy workers, although almost errorless in their use of practical arithmetic at work, performed badly in on arithmetic tests with problems like those encountered in their jobs (Scribner & Fahrmeir, 1982). Brazilian street vendor children successfully solved 98% of their marketplace transactions, such as calculating total costs and change. When presented with the same transactions in formal arithmetic word problems that provided some descriptive context, the children correctly solved 74% of the problems. Their success rate dropped to 37% when asked to solve the same types of problems when these were presented as mathematical operations without descriptive context (Carraher, Carraher, & Schliemann, 1985).

Other studies show that training on one version of a logical problem has little, if any, effect on solving an isomorphic version that is represented differently (Hayes & Simon, 1977). Teaching children to use general context-independent cognitive strategies has no clear benefits outside the specific domains in which they are taught (Pressley, Snyder, & Cariglia-Bull, 1987)

Cognitive experts agree that the conditions for transfer are not fully understood. Even though studies cited in previous paragraphs continue to find no evidence of transfer, others identify conditions under which transfer seems to occur (Holyoak, 1985); (Nisbett, Fong, Lehman, & Cheng, 1987); (Lehman, Lempert, & Nisbett, 1988); (Singley & Anderson, 1989). We know that people routinely apply skills such as reading, writing and arithmetic to new situations with some success. These skills are used most effectively in

well understood content domains. For example, readers get more out of their reading when they know something about the domain in which they are reading than when they do not. Nonetheless, skills such as reading do let us " enter" unfamiliar content areas - we do use these skills in new situations, and they do help us.

At the same time, we also keep finding lack of transfer. We now know that certain practices in school impede learning. More effective learning may not be sufficient for transfer, but poor initial learning will certainly impede it.

Mistaken assumption # 2: Learners are best seen as passive vessels into which knowledge is poured

In a typical schoolroom or a corporate training session, the teacher - or " expert" - faces the learners in the role of knowledge source. The learner is the passive receiver of wisdom - a glass into which water is poured.

This instructional arrangement comes out of an implicit assumption about the basic purpose of education: the transmission of society's culture from one generation to the next. The concept of transmission implies a one-way flow from the adult members of the society to the society's young, or, from the expert to the novice (Lave, The culture of acquisition and the practice of understanding: Report No. IRL88-0007, 1988).

In fact, schooling is often talked about as transmission of " canonical" knowledge - in other words, of an authoritative, structured body of principles, rules and knowledge. Education as canonical transmission thus becomes the conveying of what experts know to be true, rather than a process of inquiry,

discovery and wonder. This view of education leads naturally to the student as the receiver of the word, to a lecture mode of teaching, and to the teacher as the controller of the process.

This organization of learning, with the teacher as order-giver and the student as order-taker, fits the traditional organization of work for lower-skilled workers in both civilian workplaces and the military. " The worker's ... responsibility was ... to do what he was told [to do by the management]" (Callahan, 1962). Ben Hamper, an auto assembly line worker, uses more colorful language: " Working the line at G. M. was like being paid to flunk high school for the rest of your life" (Marchese, 1991).

The assumption that the teacher is the pourer and the student the receptacle has several unfortunate consequences.

Passive learning reduces or removes chances for exploration, discovery and invention:

Passive learning means that learners do not interact with problems and content and thus do not get the experiential feedback that is key to learning. Students need chances to engage in choice, judgment, control processes and problem formulation; they need chances to commit mistakes. The saying, " experience is the best teacher," is borne out by the research - you learn what you do. While not sufficient for effective learning, doing is nonetheless necessary.

However, schools usually present what is to be learned as a delineated body of knowledge, with the result that students come to regard the subject being

studied - mathematics, for example - as something received, not discovered and as entity to be ingested, rather than a form of activity, argumentation and social discourse.

This organization of learning mirrors the traditional organization of work, especially for lower skilled workers. Under the system of industrial management known as " scientific management" or the " Taylor System", " each man's task was worked out by the planning department. Each worker received an instruction card which described in minute detail 'not only what is to be done, but how it is to be done and the exact time allowed for doing it'" (Callahan, 1962). This system was highly prescriptive; it left no room for deviation or innovation.

Passive learning places control over learning in the teacher's, not the learner's, hands:

Passive learning creates learners dependent on teachers for guidance and feedback, thus undercutting the development of confidence in their own sense making abilities, their initiative and their cognitive executive skills.

The example of Brazilian street vendor children may be recalled at this juncture. The researchers found that when the children tried to work school math problems, they did not check the sensibleness of their answers by relating them back to the initial problem. Although virtually errorless in their street math activities, they came with preposterous results for school math problems (Carraher, Carraher, & Schliemann, 1985).

In a study of supermarket shopper's use of arithmetic, the researchers assessed the shoppers' command of structurally similar school math problems. The shoppers spoke with self-deprecation about not having studied math for a long time.

Lave clarifies what is happening here. Individuals experience themselves as both subjects and objects in the world. In the supermarket, for example, they see themselves as controlling " their activities, interacting with the setting, generating problems in relation [to] the setting, and controlling problem solving processes. In contrast, school … create[s] contexts in which children … experience themselves as objects, with no control over problems or choice about problem-solving processes" (Lave, Cognition in Practice, 1988) in sum, control in the teachers', not the students' hands undercuts students' trust in their own sense making abilities.

As companies have started shifting decision-making power to the shop floor, managers find that workers conditioned to depending on their supervisors' telling them what to do are frightened and lack confidence in their ability to solve problems and make decisions.

In addition to its effects on confidence, passive learning also undercuts the development of a particular set of higher order cognitive skills called the " cognitive self-management", or " executive thinking," skills. These are simply the skills that we use to govern our problem-solving attempts. They include goal setting, strategic planning, checking for accurate plan execution, monitoring our progress and evaluating and revising our plans.

We now know that those who function as independent and effective learners are people with these skills. However, as Pea has observed, passive learning is disastrous for developing them. Classroom studies of reading, writing, and math and science instruction show that the executive processes for controlling thinking and learning processes are under the teacher's control, not the student's. These processes seem to get developed when the learning situation is structured to shift control from the teacher to the student, the teacher gradually removing the support that students need initially as they begin to show the ability to work autonomously (Pea, 1989).

Passive learning creates motivational and " crowd control" problems:

Jordan describes a Mexican public health training program designed to improve the practice of Mayan midwives. Her analysis spotlights behaviors that American teachers constantly complain about their students (Jordan, 1987).

The teaching is organized in a straight didactic material in a mini-lecture format. When these lectures begin, the midwives shift into what Jordan calls their " waiting-it-out" behavior: " they sit impassively, gaze far away, feet dangling, obviously tuned out. This is behavior that one might also observe in other waiting situations, such as when a bus is late or during sermons in church," (p. 3).

We see the same behaviors in American third graders. Hass found that students were deeply engaged in team problem-solving during their drill and practice time, but invested little attention or involvement in the teacher's instructional sessions. During three weeks of observation, the children did

not adopt any of the specific strategies demonstrated by the teacher during general instruction time (Hass, 1988).

As teachers know it so well, motivational problems often end up as crowd control problems, as illustrated by the behaviors of different groups of children at a Metropolitan Museum display of Ice Age art and artifacts. Most of the school groups were moved from one exhibit to the next, pausing before each to hear a guide's or teacher's lecture. Since the children were bunched in front of an exhibit, they could not all hear the lecture, and even when they could, they lacked understanding of the time frames involved or the archaeological significance of bits of bone. Teachers had not set up the museum visit so that students became involved in what they were going to see. Groups were therefore restless and crowd control became the teacher's primary concern.

One junior high school class behaved very differently, exhibiting a quiet intensity as they moved through the exhibit gallery. They had packets of worksheets with questions about issues and problems that they were expected to solve at the exhibit. Some questions were factual, but most required inference and thought. The students had to figure out for themselves where and what the evidence would be concerning particular questions (Farnham-Diggory, 1990).

Motivational and crowd control problems with students have shown up for decades with lower-skilled workers in the forms of high turnover, absenteeism and, in extreme cases, sabotage.

Mistaken assumption # 3: Learning is the strengthening of bonds between stimuli and correct responses

Based on his animal experiments, the brilliant psychologist Edward Thorndike developed a new theory of learning. As Cremin observed, the theory presumed that learning was the wedding of a specific response to a specific stimulus through a psychological bond in the neural system. The stimulus [S] then regularly called forth the response [R]. the bond between S and R was " stamped in" by being continually rewarded; an undesired bond was extinguished through punishment or failure (Cremin, 1961).

For the purpose of this research, this psychological theory had three major effects. It led to the breakdown of complex ideas and tasks into components, subtasks and items (" stimuli") that could be separately trained. It encouraged repetitive training (" stamping in"). And it led to a focus on the " right answer" (" successful response") and to the counting of correct responses to items and subtasks, a perspective that ended up in psychometrically elegant tests that were considered the scientific way to measure achievement.

The result was fractionation: having to learn disconnected subroutines, items and subskills without an understanding of the larger context into which they fit and which gives them meaning. As Farnham-Diggory notes, fractionated instruction maximizes forgetting, inattention and passivity (Farnham-Diggory, 1990). Since children and adults seem to acquire knowledge from active participation in complex and meaningful environments, " school

programs could hardly have been better designed to prevent a child's natural learning system from operating" (p. 146).

The phrase " a child's natural learning system" goes to the heart of why the usual school programs do not meet their own learning objectives well. Human beings - even the small child - are quintessentially sense-making, problem-solving animals. The word " Why" is a hallmark of young children's talk. As a species, we wonder, we are curious and we want to understand. Pechman talks about the child as the meaning maker. Fractionated and decontextualized instruction fails to mobilize this powerful property of human beings in the service of learning (Pechman, 1990).

Mistaken assumption # 4: What matters is getting the right answer

Bothe the transmission and the behaviorist views of learning place a premium on getting the right answer. A transmission view stresses the ability of the learner to reproduce " the Word"; a behaviorist view, the ability of the learner to generate the correct response. The end result is the same: students and teachers focus on the " right answer," jeopardizing the development of real understanding. The focus plays out in several ways.

An instructional focus on the right answer discourages instruction in problem solving:

A right answer focus encourages an emphasis on facts. Facts are important, but by themselves constitute an impoverished understanding of a domain; a fact-focus does not help students' abilities to think about the domain in different ways. Cognitive analyses of a range of jobs show that being able to

generate different solutions to problems that are formally the same is a hallmark of expert performance (Scribner, Head and hand: An action approach to thinking, 1988). Employers and college educators both complain that American high school graduates are limited in their thinking and problem-solving abilities, deficiencies that stem partly from an educational emphasis on facts and right answers.

Students resort to veneers of accomplishment:

Students respond to a focus on right answers by learning to test " right" within the school system. They figure out what answers the teacher or the test seems to want, but often at the cost of real learning. These surface achievements have been called the " veneer of accomplishment" (Lave, Smith, & Butler, Problem solving as an everyday practice, 1988). Also, Jordan's analysis of a Mayan midwives' training program illuminates basic truths about the learning and testing of American students (Jordan, 1987).

She found that midwives who had been through the training course saw official health care system as powerful, in that it commanded resources and authority. They came to distinguish " good" from " not good" things to say. Specifically, they learned new ways of legitimizing themselves, new ways of presenting themselves as being in league with this powerful system, but with little impact on their daily practice. Although they could converse appropriately with supervisory medical personnel, their new knowledge was not incorporated into their behavioral repertoire. It was " verbally, but not behaviorally fixed." Jordan notes that the trainers evaluated their program by asking the midwives to reproduce definitions, lists and abstract concepts.

She observes that " if these tests measure anything at all, they measure changes in linguistic repertoire and changes in discourse skills [not changes in behavior]" (pp. 10-12)

The same behaviors show up with Hass's American third graders. He noticed that in mathematics lessons the students got much practice in problem-solving methods that they had brought into the classroom with them - methods that were not being taught and were not supposed to be used. The children used these methods to produce right answers, which the teacher took as evidence of their having grasped the formal procedures that she was teaching them. In fact, all that had happened was the appearance of learning.

Teachers do not get behind the answers:

We end up with appearances of learning because, in their search for right answers, teachers often fail to check behind the answers to insure that students really grasp the principles that they want the students to master.

In typical American classrooms the time devoted to a lesson on a particular topic makes it hard to bring to the surface, let along change, the ideas and assumptions that individuals bring to the lesson. Traditional curriculum design is usually based on a conceptual analysis of the subject matter that ignores what is already in the learner's head, with the result that students make mistakes that arise from undetected ideas that they brought to the lesson. Or they can play back memorized canonical knowledge and conceptions but return to their own ideas when confronted with unfamiliar questions or non-routine problems. As noted earlier,, students in college

physics courses designed for physics majors can solve " book" problems in Newtonian mechanics by rote application of formulas, but - even after instruction - revert to naÃ¨ve pre-Newtonian explanations of common physical situations (Raizen, 1989).

Teachers do not focus on how to use student mistakes to help them learn:

In their search for right answers, teachers tend to regard student errors as " failures' rather than as opportunities to strengthen students' understanding. American teachers placed little emphasis on the constructive use of errors as a teaching technique, a practice that the researchers attribute to the strong influence of behaviorism in American education. Behaviorism requires teaching conditions that help learners make only correct responses that can be reinforced through praise.

Mistaken assumption # 5: To insure their transfer to new situations, skills and knowledge should be acquired independently of their contexts of use

This idea is often talked about as " decontextualized learning," which simply means learning out of context or meaning. The rationale for decontextualised learning goes back to the presumed conditions for the transfer of learning. As Lave observes, extracting knowledge from the particulars of experience was thought to make that knowledge available for general application in all situations (Lave, Cognition in Practice, 1988).

Almost seventy five years ago, John and Evelyn Dewey wrote about the learning costs of decontextualized education.

" A statement, even of facts, does not reveal the value of the fact, or the sense of its truth - of the fact that it is a fact. Where children are fed only on the book knowledge, one 'fact' is as good as another; they have no standards of judgment or belief. Take the child studying weights and measures; he reads in his textbook that eight quarts make a peck, but when he does examples he is apt, as every schoolteacher knows, to substitute four for eight. Evidently the statement as he read it in the book did not stand for anything that goes on outside the book, so it is a matter of accident what figure lodges in his brain, or whether any does. But the grocer's boy who has measured out pecks with a quart measure knows. He has made pecks; he would laugh at anybody who suggested that four quarts made a peck. What is the difference in these two cases? The schoolboy has a result without the activity of which it is the result. To the grocer's boy the statement has value and truth, for it is the obvious result of an experience - it is a fact.

Thus we see that it is a mistake to suppose that practical activities have only or even mainly a utilitarian value in the schoolroom. They are necessary if the pupil is to understand the facts which the teacher wishes him to learn; if his knowledge is to be real, not verbal; if his education is to furnish standards of judgment and comparison." (Dewey & Dewey, Schools of tomorrow, 1915)

Get over the traditional distinctions between head and hand

The indictment of traditionally organized learning was coming out of a powerful research base, cognitive science. At the heart of this research was the presumption that intelligence and expertise are built out of interaction

with the environment, not in isolation from it. It thus challenged the traditionally held distinctions between:

Head and hand

Academic and vocational education

Knowing and doing

Abstract and applied

Education and training

School-based and work-based learning

Recent EU policy indicates a reassessment both of the relationship between work and education and the role of work experience in academic and vocational programs, on the basis that 'globalization' is generating the need for new learning relationships between education and work which will support lifelong learning (European Commission, 1995). Thus, in the case of work experience in both general and vocational education, it is now envisaged that it could fulfill an important new role, providing an opportunity for those young people in full-time education and training to develop their understanding about changes in the 'world of work', to enhance their key skills and to make closer links between their formal programs of study and the world of work (Green, Leney, & Wolf, 1999).

However, although there has been