Constructivism Versus Students

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Constructivism has captured the imagination of many educators, but it is not a strong theory. The tenets that serve as a foundation for constructivism don't rigorously or even vaguely imply any of the theory's practices. If we look at examples of first-grade children "learning" in a constructivist classroom, we may observe very few teacher-initiated activities; however, it's clear that the teacher's role is not to teach, but to facilitate. Children make decisions about their learning or at least the experiences that are designed to promote learning.

This format of experiences and interactions of children with material, other children, and the teacher is supposed to have been generated by the theory of constructivism. But the theory does not have any provisions that would prioritize these activities over more formal teacher-directed activities.

Stated more bluntly, the "theoretical foundations" that constructivists use to support their practices are capable of generating an enormous range instructional formats—from one in which the teacher directly teaches intricate details of what children are to learn to being something of a time keeper, peace-maker, and multi-purpose resource.

What this means is that anybody with virtually any preference for how young children are to "learn" can assert that the theory behind what they do derives from the idea that underpins constructivism.

The most celebrated assertion that is supposed to justify constructivists' practices is: Children construct their own reality (most prominently developed by Jean Piaget).[1]

Who could possibly argue with this premise? Kids who grow up in China speak Chinese; kids who grow up in England speak English. These kids have different words for the same objects—books, rocks, fathers and children. Both

[1] 1955. Piaget, Jean. *The Construction of Reality.* Translated by Margaret Cook.

have learned that fire burns and ice feels cold. Both children have private knowledge in the form of preferences and interpretations of how events are related. Particular colors and shapes are more appealing to one child than the other.

Some relationships that they formulate may be inaccurate, such as the notion that liquids expand and contract, but these inaccuracies are consistent with children's experiences. The water that sprays out of a sprinkler appears to be a lot bigger than the water that flows from a faucet.

The evidence shows incontestably that children create their own reality, but there are two important issues. The first is precisely how that fact leads to a "discovery" format for instructing children rather than directly instructing them in what they are to learn. It doesn't. The truth is that the student is faced with the same learning problem regardless of the type of instruction that is provided.

For instance, an objective may indicate that grade-2 students are to memorize addition sums for all pairs of numbers 1-10. This specification clearly implies the content children are to be taught. It doesn't indicate what they discuss, whether they share their experiences or whether they go through a strictly specified series of exercises that provide the practice with the facts.

The second issue is that "objectives" imply areas in which students are not permitted to learn their way but must learn what is publically accepted. In other words, the "learning" that we provide does not tolerate negotiation. We can't negotiate about which facts are to be taught. We can't negotiate the character of the facts. 3+7 will always equal 7+3, and will always equal 10. We can't let C.J. learn facts that are best suited to his orientation and let Carla learn from her preferences. Equally important, we can't negotiate the "answers" and hence the strategies that children prefer. All students will learn an effective personal strategy for identifying and remembering the facts. Whether students like 7+3 better than 3+7 is irrelevant. Whether they have unfortunate associations with 7 or 3, and prefer 8+2, is interesting but irrelevant.

Data

We can use a wide variety of approaches, but according to the standard, all approaches will be evaluated by the performance of the students. If we omitted data as a key variable, we could use a host of ineffective and preposterous ways to evaluate the outcome. The outcome, however, derives directly from the standard. All children are to memorize addition sums for all pairs of numbers 1-10. So the effectiveness of the program and practices used to teach the facts is clearly implied by a performance test in which items appear in an unpredictable order.

Since students are to memorize the answers, they are not permitted to count on their fingers or use any other types of counting or calculating. No calculators. If all children score near perfectly on an exhaustive test of addition problems presented in random order, the instruction was highly effective.

Of those approaches that are most successful with a population of average-to-low performers, the approaches that require less instructional time are superior to approaches that required more time. A reasonable assumption is that the more children learn during a given time span, the relatively smarter they become because they are learning at an accelerated rate. Therefore the program that meets the objective of requiring the least instructional time is the best program.

So the central instructional issue is not how children construct their own reality about addition facts but how we effectively shape their reality in a way that accommodates the facts they are to learn.

Anticipating Misconceptions

A version of this analysis applies to everything students are to learn. The standard indicates precisely how their awareness and knowledge will change if the standard is met. Therefore, we are required to teach all students the material described in the standard. The only way to achieve this goal is to fashion experiences that are effective for all students with a particular skill set. However, if we remain true to the idea that students are creating their own realities from the teaching we provide, we design that teaching so it is sensitive to the possible misconstructions students may develop. Stated differently, we do not assume that all children learn at the same rate or make the same mistakes. The two main ways we address these differences is to (1) vary the rate at which program content is introduced and (2) design the material so it preempts major misconceptions that some students will otherwise learn.

We can identify students who require more practice to learn things. We can provide appropriate instruction for them by slowing the rate at which new material is introduced. The students are grouped homogenously, placed in instructional programs according to their skill level, and taught at a rate that assures they perform at about 70% correct on any new material introduced in the lesson and nearly 100% correct at the end of each daily lesson. Applying this formula assures that all groups will remain properly placed.

The program we use to teach the specified content must reflect awareness of the mistakes some students will make unless the program is designed to obviate these problems. For example, some beginning students make mistakes in identifying the letters b and d. These are perfectly reasonable errors, because the letters are the same shape in different positions. Students have never encountered objects that have one name when they face left and another name when they face right. So b-d confusion is probably not a result of students having "perceptual problems." Their perception may be impeccable, but they don't know when to call that object "dee" and when to call it "bee."

The simplest way to address this problem is to introduce the letters at different times. For example, introduce d first. Then provide writing and reading practice for several weeks before introducing b. In most cases, b-d confusion is not a problem of students' learning mechanisms or "perception"; it's a problem of the program designers and teachers being unable to identify the problem that some naïve learners have in conceptualizing b and d as characters that change their name when they are flipped.

Note that classroom discussions in a typical constructivist classroom never identify the real problem some children have or the fact that their "perception" of b and d being the same are perfectly consistent with their mental schema and experiences.

Program Expectations

The reason it is important to obtain detailed data on student performance is that data reveals qualitative information about the extent to which students are altering their realities according to “expectations” of the program. If students make many errors on items that test what they have been taught, students are not formulating proper internal models of how things should work, or they are not able to process the material quickly enough. Performance problems imply more practice, and possibly a revised model for what they are to learn.

In summary, learning objectives, standards, and evaluations are based on the premise that all children, regardless of their predilections, desires and personal preferences, will learn the same body of skills or information. This imposition is not negotiable. Children are to learn that 2 is more than 1 and less than 3 and all the numbers that follow 3. Children cannot impose preferences or predilections to modify this demand.

So the first major clue that there is something seriously specious about constructivism is that it is at odds with the nature of standards, goals, and grade-level expectations. Constructivists apparently think standards are somehow compatible with the idea that children should figure out their own relationships; however, each standard specifies the only acceptable learning that is to take place and indicates a time frame in which the specific learning is to occur.

Given these constraints, the first question that must be answered by constructivists is: Do you accept standards as indicators of specific content and relationships students are to learn? If their answer is no, they reveal themselves as radicals whose objectives are inconsistent with agreed-upon skills and information that students are to learn. If they say yes, they must next face what is the most fundamental question about their approach: How successful is your version of the constructivist approach? This question is not answered by how much the teachers or students enjoy their school experiences, but by data on how well students met specific standards. Did they do comparatively as well as students in a highly structured approach?

Mislearning as a Form of Constructivism

I worked with sixth grade “gifted” students who had been in a discovery-math program since kindergarten. The gulf between their verbal skills and their math performance was profound. They thought that the daily discussions about their math experiences were required steps in learning math. In other words, students didn’t simply work math problems; they discussed them and other things that seemed related to the problem or the students’ math history. Possibly the most telling incident of how handicapped they were occurred after I had been working with them for three days. I presented them with a set of word problems that paralleled the problems we had worked in the preceding lesson.

One of the highest performers in the classroom was making no progress on the first problem. He drew some ilk of Venn diagrams and was doing a lot of erasing.

I asked him to read the problem aloud.

Then I asked, “Have you worked any other problems like this one?”

He responded, “What do you mean?”

I said, “Do you remember the problem you worked yesterday about the birds in the barn?”

“Yes.”

“Isn’t that problem like this one?”

“I don’t know.”

“Don’t both of them tell about each part and ask about the whole group?”

“Yes.”

“You worked that problem correctly. Why aren’t you working this problem the same way?”

“Why should I?”

“Because they’re the same kind of problem.”

Long pause, followed by, “You mean if the problems are the same you want me to work them the same way?”

“Yes.”

Imagine being in the sixth grade and not understanding that if two word problems have the same form, you use the same solution strategy to work them.

The student didn't understand this relationship because he had never worked two word problems that were the same and had precious few experiences of solving any problem before the teacher went over the problems and led the discussion of various ways students could have solved them.

At the time this student struggled with the fundamental assumption of word problems, we were working with a class of disadvantaged third graders who were at the same place as the gifted students. By the end of the school year they were more than 40 lessons ahead of the gifted students. They progressed much faster because they didn't have the misconceptions that prevented them from learning. The learning of the gifted students continued to be painful unlearning and relearning. The disadvantaged students had long since discovered that what they learned next built on what they had already mastered. Other discoveries they made included: I am smart; I learn fast and do well in math; I know how to use what I learn; I like math.

The chaotic experiences and failures of the gifted students preempted them from making these discoveries. Their discoveries were consistent with their experiences. Their responses on a questionnaire we gave them indicated serious misconceptions: they thought working a word problem required a preamble that contained many random observations and much discussion; they had learned key word strategies that sometimes helped them figure out how to work some problems; they gave up trying to learn something from the ensuing discussion; more than half indicated that they hated math.

Who Is the Teacher?

The theme of constructivism is that children formulate their awareness of the world from their experiences. In the typical classroom students share their perceptions. Why? Does this provision benefit the student who is sharing or those who are supposed to be attending? If the input is supposed to benefit the listeners, what makes the input better than that of a knowledgeable teacher who has information about both what students are to learn and the students' current performance? If the input is supposed to benefit the speaker, only about 1/20th of the total time benefits a given student. Compounding the problem is the fact that this discussion robs time from the period, leaving less time for possible productive instruction.

In summary, the “learners” in a constructivist classroom are very strange creatures. They learn from their experiences; they supposedly benefit from the often-inarticulate observations of other children; however, they are prohibited from learning from a knowledgeable teacher who understands what students are trying to learn and who has information about the various mistakes students make. Not surprisingly, those who promote this orientation don’t have one shred of empirical data to support their prejudices. In other words, constructivism is philosophically impoverished and empirically sterile.