THE CONSTRUCTIVIST

Magazine of the Association for Constructivist Teaching

Volume 13, Number 1 Spring 1998

ASSOCIATION for CONSTRUCTIVIST TEACHING

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Don't miss the 1999 ACT Conference! October 22–23, 1999 Frontenac Hilton Hotel St. Louis, Missouri

(See page 25 of this magazine for the call for proposals.)

Photo courtesy of Project Construct National Center.

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A Letter From the President of the Association for Constructivist Teaching

Dear Members,

Happy New Year to all of you! We are looking forward to an exciting and productive new year for ACT. The business meeting at our annual conference in Oakland generated a number of great suggestions from members about future directions for our organization. I will be working with the Board of Directors in the next few months to pursue several of these ideas, which included: exploring the possibility of establishing an internet discussion group for members; holding regional conferences; posting reviews of research and new publications on constructivist learning and teaching on our web site; adding a focus on constructivist approaches with high-risk populations and children with special needs; providing options for visits to schools during the annual conference or as a pre-conference experience; and including more classroom teacher representation on the board.

To all of you who participated in our conference in Oakland, thank you. The conference evaluations indicated that you found the quality of presentations and keynote addresses both interesting and challenging. The weather and setting on the San Francisco Bay couldn't have been better. The interactive features of breakout sessions and lively conversation among participants during break periods indicated that presenters and attendees alike were stimulated to engage in thoughtful discourse about constructivist learning and teaching.

Thanks, once again, to Paul Ammon for his work in regard to local arrangements, keynote speakers, logistics, and overall orchestration of the workings of the conference. Thanks to Jill Bodner Lester for taking on the challenging job of organizing an excellent program of presentations. Thanks to Linda Kroll and her students from Mills College for working at the registration table. A special thanks is given to our terrific keynote speakers, Geoffrey Saxe and Marilyn Watson, and to a distinctive group of presenters who came from across the United States to share and exchange points of view with participants.

Please mark your calendars now for next year's annual conference to be held in St. Louis, Missouri. The dates and location are announced in this issue of *The Constructivist*. We anticipate a large turnout from across the country. Please consider submitting a proposal for a breakout session. The conference is a great opportunity to share our work, ideas, research, and interests.

—Brenda Fyfe

A Letter From the Executive Editor of *The Constructivist*

I am pleased to assemble and edit this edition of *The Constructivist*. For a long time, I have been concerned that many misconceptions are held about "constructivist teaching." Too often in the past, reforms in practice have not been grounded in theory and thus took on a "cookbook" faddism. Many interpretations and misconceptions about constructivism abound and the public often criticized pedagogical reforms in the name of constructivism when indeed they are nothing more than activity or discovery approaches. This issue is an attempt to clarify the confusion.

Constructivism is a theory of learning that describes how children construct meaning. As Kamii makes clear in her article, "The Importance of a Scientific Theory of Knowledge," constructivism describes how children theorize. Any actions we take as teachers to affect children's thinking—the heart of what good teaching is all about—should be based on a scientific theory of learning. Instead and for too long, educational practice has been eclectic, haphazard, and often disconnected to what cognitive psychologists know truly affects concept construction. Yet as we attempt to take a theory of learning to the arena of the classroom, we must propose pedagogical principles that are not laid out in the theory but only stem from our beliefs about the application of the theory to teaching. Because this is a leap, many interpretations and misconceptions have developed. Rheta DeVries and Rebecca Edmiaston address this problem admirably in their article, "Misconceptions about Constructivist Education." They describe four common misconceptions and lay out clearly the connection between the theory and practice. The last article in this issue is by Suzanne Martin and Marjorie Fields. They describe the journey of a kindergarten teacher as she begins to construct a practice based on her emerging beliefs about constructivism. Many readers will perhaps identify with Ms. Martin as she reflects on her practice and questions the very core of her teacher decision-making.

Although we have tried to put together an issue to clarify "constructivist teaching," many readers may disagree with the points made in these articles. We encourage you to write in response for our Letters to the Editors section.

We also continue to seek fresh, new manuscripts for publication. Articles should be approximately 10–15 pages in length and should be written in a colloquial style with references cited in APA fashion. We welcome color photographs and samples of children's work. Send manuscripts to me (original and two copies) at the following address: Association for Constructivist Teaching, NAC 3/217, The City College of New York, 138th Street and Convent Avenue, New York, NY 10031.

We also intend to include a Job Market section under classified ads. Please contact Sharon Schattgen at the Project Construct National Center (1-800-335-PCNC) for information on placing a classified advertisement.

—Catherine Twomey Fosnot

Classified Ads

Job Market

Assistant/Associate Professor, Early Childhood Education, Troy State University Dothan

Troy State University Dothan, an independently accredited university with the Troy State University System, seeks applicants for this tenure-track position at the assistant/associate professor level within the School of Education. Requires earned doctorate in specified field, minimum of three years successful teaching experience in the field of early childhood education, ability to teach undergraduate/graduate courses in a constructivist early childhood program, supervise field experiences and interns, and provide student advising.

Salary range: $35,000 to $39,000. Review of applicants will begin immediately and continue until filled. Interested applicants should submit a letter of application, curriculum vitae, resume, transcripts, and three professional references to: Human Resource Coordinator, Troy State University Dothan, P.O. Box 8368, Dothan, AL 36304-0368.

Send job announcements to Sharon Ford Schattgen, Project Construct National Center, 27 S. Tenth St., #202, Columbia, MO 65211-8010. Fax: 573/884=5580. E-mail: sfs@projectconstruct.org.

Letters to the Editors

The editors of *The Constructivist* want your feedback! Please send all Letters to the Editors to Catherine Twomey Fosnot, The City College of New York, NAC 3/217, 138th Street and Convent Avenue, New York, New York 10031.

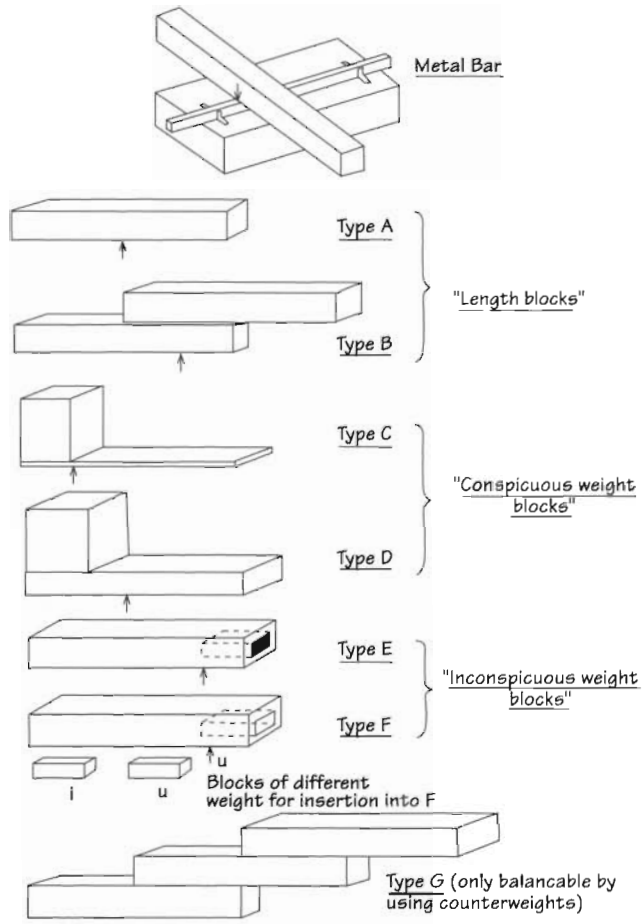
The Importance of a Scientific Theory of Knowledge*

Constance Kamii

Noted researcher and writer Constance Kamii reminds us of the critical role that scientific theories play in education and discusses how theories are modified.

Karmiloff-Smith and Inhelder (1975) described a simple experiment that suggests some parallels between children and adults as theorists. In this article, I will discuss their experiment and then explain how the findings relate to adults and their theory building. First, I will discuss children's and adults' *implicit*, *intuitive* theories. Next, I will point out that some adults go on to create *explicit*, *scientific* theories and conclude by discussing my own recent research, which shows that scientific theories are necessary but not sufficient in education.

Using the materials illustrated in Figure 1, Karmiloff-Smith asked children to balance each of three different kinds of blocks on a metal bar. The metal bar can be seen at the top of this figure. The



* Arrow underneath each block indicates the point of contact with the bar when the block is in equilibrium. For Type F blocks, this point is a function of the weight of the blocks to be inserted into the cavity.

Figure 1. The materials used by Karmiloff-Smith

Reprinted from *Cognition, 3*(3), A. Karmiloff-Smith and B. Inhelder, "If You Want to Get Ahead, Get a Theory," pp. 195-212, 1975, with kind permission of Elsevier Science, NL, Sara Burgerhartstraat 25, 1055 KV Amsterdam, The Netherlands.

* *This article was first published in* the Journal of Early Childhood Teacher Education, *18(2), 1997, pp. 5–11, by the National Association of Early Childhood Teacher Educators.*

Why do educators keep doing the traditional things that are not working?

first kind, called "length blocks," was either a regular, long block (Type A) or two long blocks glued together (Type B). The second kind, called "conspicuous weight blocks," had a block glued to one end of a length block (Types C and D). The third kind, "inconspicuous weight blocks," looked like regular length blocks, but they each had a cavity at one end that could be filled with a weight.

The subjects ranged in age from four to nine. Those who succeeded in balancing the blocks were the youngest (4- and 5-year-olds) and the oldest (8- and 9-year-olds). Those in the middle, the 6- and 7-year-olds, were often *un*successful because they had a geometric-center theory.

These 6- and 7-year-olds easily balanced the "length blocks" but continued to place the other blocks on the metal bar at the geometric center. When the conspicuously and inconspicuously weighted blocks did not balance, the 6- and 7-year-olds looked for an error in their *procedure* instead of modifying their theory. For example, they placed a block slowly and gently on the metal bar, expecting this careful action to produce a better result. When this modification did not produce the desired effect, the children pressed down on the block directly above the metal bar! This attempt, of course, did not help, and the children rejected the "weight blocks" as *exceptions* that were impossible to balance.

The youngest and oldest groups were both successful, but they succeeded in two different ways. The 4- and 5-year-olds did not categorize the blocks and did not make any theory about *why* each block balanced. They approached each block as a new and separate problem and used trial and error with great sensitivity to proprioceptive information.

By contrast, the 8- and 9-year-olds categorized the blocks instead of picking up the one closest to them. They first created a geometric-center theory for the "length blocks." When they got to the "conspicuous weight blocks," this group thought of a new theory based on *weight alone*. When they came to the "inconspicuous weight blocks," however, they kept their geometric-center theory and rejected these blocks as exceptions. But these children went on to realize that what was important in all the situations was to have equal weight on both sides of the metal bar. Equal length on both sides of the bar thus became a particular instance of having equal weight on both sides.

The children in Karmiloff-Smith's study were all logico-mathematizing what they observed. Logico-mathematizing refers to putting observable factors into relationships. The blocks are observable; their weight is observable; and whether or not a block balances is observable. But to create an explanation of *why* certain blocks balance, we have to choose the relevant factors and put them into relationships. The 4- and 5-year-olds' logico-mathematization was minimal. The geometric-center theory was more advanced but still very limited. The 8- and 9-year-olds' logico-mathematization was better but still inadequate at first because they thought of the "conspicuous weight blocks" as having weight but no length. As for the "length blocks" and the "inconspicuous weight blocks," there was length but no weight for these children. Later, however, the oldest children explained all the observable information within a single theory that took both weight and length into account.

Implications of Karmiloff-Smith's Study for Education

Why do educators keep doing the traditional things that are not working? For example, many educators believe in workbooks because they (the educators) embrace a theory called empiricism. According to empiricism,

Children need opportunities to solve problems.

knowledge and moral values exist outside the child, and children acquire these by *internalizing* them directly from the environment. Workbooks require repetition and practice of specific skills and facilitate the internalization of knowledge according to empiricist assumptions. Empiricism also states that this internalization is facilitated if we use *reward* and *punishment*.

Our current societal problems show the outcome of such a reliance on the use of reward and punishment. For example, the drug problem would not be so common if people were more autonomous and not so sneaky. The daily news is filled with drug busts, but it does not occur to most educators that fear of punishment teaches children to be sneaky. The news has also been full of sex scandals, but it has not occurred to most educators that fear of punishment teaches children to be calculating and careful not to get caught.

On the side of rewards, many educators manipulate children with stickers, gold stars, and smiley faces. Such actions by educators have resulted in children who become adults and engage in cover-ups and wrongdoings. People in the tobacco industry have been rewarded for covering up the evidence about the harmful effects of smoking. Adults often do what is morally wrong because they have been raised to be manipulated by reward and punishment.

In spite of all the evidence about the ineffectiveness of reward and punishment, adults go on believing in the theory that reward and punishment cause high achievement and moral behavior. Furthermore, empiricism has led adults to organize schools by grade levels, so that the empty vessels can be filled up to a certain level in first grade, to the next level in second grade, and so on all the way to twelfth grade. This factory model maintains that empty vessels are filled at each filling station. If a vessel is not properly filled the first time, it is put back on the conveyer belt for a second attempt with the same procedure.

Up to this point, I have discussed the similarities between Karmiloff-Smith's (1975) children and adult educators. But there is a big difference between the two groups. The children who rejected certain blocks as exceptions went on to the next level of development by creating a theory based on weight. In education, most adults *don't* progress to the next level. Instead, educators go back and forth, like a pendulum, between one implicit theory and another.

For centuries, many educators have had the intuition that much of learning depends on what comes from inside the child, and that we can't just stuff children from the outside. Socrates, Comenius, Rousseau, and Dewey all had this intuition about the importance of learning from the inside. "Progressive education" was strong during the first half of this century, but it gave way to "back to basics" after Sputnik in the 1950s. "Open education" then came into fashion as a kind of recycled progressive education. However, that movement was short-lived for a variety of reasons, and education went back to drill and practice. More

recently, the "whole-language movement" and "child-invented arithmetic" have gained considerable strength all over the country. I hope that the backlash in California does not foreshadow another return to drill and practice.

In addition to the pendulum that always goes back to what did not work before, education is characterized by another phenomenon: an incredible amount of contradictions. For example, we want well-educated adults who can solve problems and think critically, but we widely use achievement tests that encourage the exact opposite of problem solving and critical thinking. Some people say that children should not be allowed to go to the next grade without demonstrating a certain level of mastery. However, others say that repeating a grade usually results in better performance only during the year that a student is repeating a grade.

... education is characterized by another phenomenon: an incredible amount of contradictions.

Implicit, intuitive theories like the ones I have mentioned so far cause the pendulum effect in education. The geometric-center theory is an intuitive, implicit explanation of observable facts. The theory of internalization is likewise an intuitive, commonsensical explanation of how children acquire knowledge and moral values. There are other theories. I would like to discuss some of those explanatory theories, namely scientific theories that are explicit.

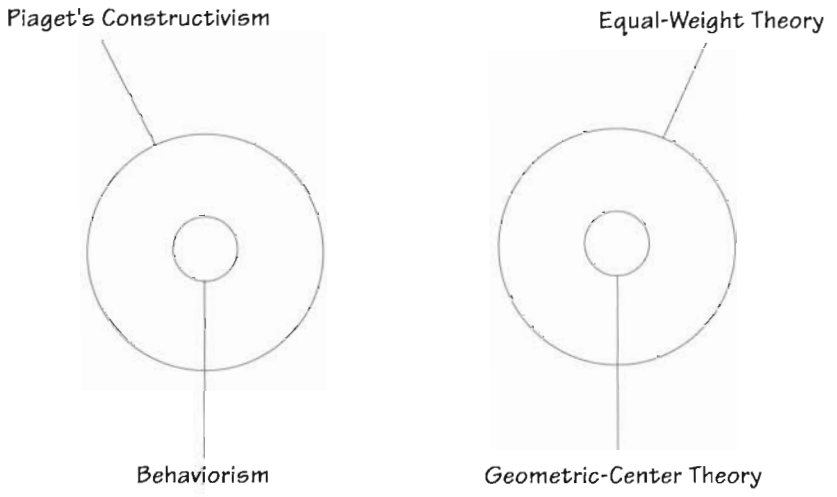


Figure 2. The relationships (a) between behaviorism and Piaget's constructivism and (b) between the geometric-center theory and the equal-weight theory

Scientific, Explanatory Theories in Education

The characteristic of a scientific theory is that it is based on evidence and rigorous logic, i.e., rigorous logico-mathematization. The geometric-center theory is not a scientific theory because it applies only to certain blocks and is, therefore, inadequate from a logical point of view.

An example of a scientific theory is behaviorism. Behaviorists have verified all over the world that the behavior of animals can be changed by using reward and/or punishment in a variety of ways. Worms, fish, birds, dogs, and human beings have been put on various reinforcement schedules and conditioned successfully to turn toward a light, to dance, to salivate, or to memorize nonsense syllables.

But behaviorism cannot explain how children learn to talk. For example, when a child first begins to say "Ball," mothers usually react with great pleasure. However, instead of being reinforced to say "Ball" forever, children go on to make more complex utterances, such as "Ball gone" and "Gimme it!" When one of Hermina Sinclair's grand-

... scientific theories can be enormously useful in an applied field like education because they permit us to shift the focus of the debate from this method of teaching versus that method to *how children learn.*

sons came home full of mud, she asked him what had happened. The child's reply was: "Markie falled me. Markie me pushed." We cannot say that children learned these expressions by internalization from the environment or proper reinforcement because adults do not say "Markie falled me. Markie me pushed." These are examples supporting the view that human beings construct knowledge from the inside, by going through one level after another of being "wrong."

Piaget's constructivism is the only scientific theory that can explain these and other changes in children's knowledge and behavior. The relationship between behaviorism and Piaget's theory that I wish more psychologists and educators knew about is illustrated in Figure 2. This figure shows that Piaget's theory can explain everything behaviorism can explain, but that the converse is not true. For example, conditioning is a key tenet in behaviorism. With regard to conditioning, Piaget pointed out that all animals adapt to reward and punishment and that higher animals like dogs can anticipate the appearance of meat when they hear a bell. His explanation of what behaviorists call "extinction" was that when the meat stops appearing, the dog simply stops anticipating its appearance.

Figure 2 also shows the relationship between the geometric-center theory and equal-weight theory in Karmiloff-Smith's (1975) study. The geometric-center theory explains the balancing only of the "length blocks." The equal-weight theory can explain everything the geometric-center theory can explain, but the converse is not true. In other words, the explanatory power of the equal-weight theory is much greater than that of the geometric-center theory. Behaviorism can likewise explain only changes in surface behavior.

All that a scientific theory does is to *describe* and *explain* phenomena. However, scientific theories can be enormously useful in an applied field like education because they permit us to shift the focus of the debate from this method of teaching versus that method to *how children learn*. For example, the phonics-versus-whole-language debate illustrates this point. The debate is endless because each side can select its own tools for assessment within its own theoretical framework. The evaluation research therefore looks scientific, but the comparison is often pseudoscientific and misleading.

Anyone who has looked at an achievement test can see that behaviorists have a very different conception of what reading and writing are. Figure 3 is an example of options from a multiple-choice item on an achievement test. In an achievement test, the only answer for which a child gets credit is the correct answer, "night." On the other hand, a constructivist maintains that when a child becomes able to write "nit," this is a major achievement. Because of the differences in conceptions about reading and writing, a much more fruitful discussion would be to argue scientifically about how children learn to read and write rather than to argue endlessly about this method of teaching versus that method based on this kind of data.

O nite
O nit
O night
O nyte

Figure 3. An example of multiple-choice options in an achievement test

Is Piaget's Constructivism Sufficient in Education?

Scientific theories do not change back and forth like a pendulum. Once we have embraced Piaget's constructivism, we cannot go back to behaviorism, just as once children become conservers, they can simply not go back to nonconservation.

I would now like to say that, in education, a scientific, explanatory theory is necessary but not sufficient. I hypothesized in the late 1970s, on the basis of Piaget's theory of logico-mathematical knowledge, that all the teaching that goes on in primary mathematics is neither necessary nor desirable. This hypothesis was amply supported (Kamii, 1985, 1989, 1994), but I went back to first-grade arithmetic in 1996 to rewrite *Young Children Reinvent Arithmetic* (Kamii, 1985). My reason for rewriting this book was mainly that first graders can do much more than I thought when I wrote this book. I did my research in the early 1980s with traditional first-grade textbooks as my reference, which still only go up to double-digit addition without "regrouping." Since I thought that place value was too hard for first graders, my research went only up to 10 + 10.

Since the early 1980s, I have learned about the work of Thomas Carpenter and Elizabeth Fennema (1992) called Cognitively Guided Instruction. These University of Wisconsin-Madison researchers did not have the benefit of Piaget's scientific theory explaining the nature and development of knowledge. They had studied what types of word problems kindergarten children can solve before receiving any formal instruction. They found out that kindergartners could solve all kinds of problems, including division problems such as "Tad had 15 guppies. He put 3 guppies in each jar. How many jars did Tad put guppies in?" (Carpenter, Ansell, Franke, Fennema, & Weisbeck, 1993, p. 434). Using this kind of information about what kindergartners can do, the teachers working with Carpenter and Fennema developed an approach to teaching very similar to mine, except that they also encouraged first graders to invent ways of solving multiplication, division, and double-column addition problems.

I found out in Birmingham that first graders are indeed capable of solving multiplication and division word problems. The following is an example of a word problem I gave to first graders in May, 1997: "David had 3 small packages of crackers. Each package had 6 crackers in it. He ate 15 of the crackers. How many crackers does he have left?" I also gave this problem to two classes of first graders in the same neighborhood who used the traditional textbook and workbook. The first graders I worked with had been in constructivist classes both in kindergarten and first grade, and 74% of these children answered the question correctly. In the traditional, textbook/workbook classes, by contrast, the percentage was 27.

Conclusion

In conclusion, neither children nor adults deal directly with observable "facts." Children logico-mathematize observable "facts" and make theories as they try to make sense of what they observe. Adults, too, make theories as they try to deal with observable facts. While children go on to construct higher-level theories, adults in education often do not. They keep going back to the same old method that did not work before. In science, however, adults go on making progress because the only way

scientific theories can go is toward a higher level. Scientific theories do not change back and forth like a pendulum. Once we have embraced Piaget's constructivism, we cannot go back to behaviorism, just as once children become conservers, they can simply not go back to nonconservation.

While Piaget's theory gave me faith in children's ability to invent their own arithmetic, it turned out not to be sufficient. Carpenter and Fennema's theory is implicit and intuitive rather than scientific. Their intuitive theory nevertheless contributed a great deal to my pedagogical research.

Intuitive, implicit theories do have an important place in an applied field like education. Piaget himself said that educators should not translate his theory directly into pedagogical practice. Although intuitive theories can take us far, good intuitions can take us only so far and no farther. For example, Carpenter and Fennema use Unifix Cubes and speak of "addition facts" and "derived facts" reflecting empiricist assumptions. They also speak of "informal knowledge" as if logico-mathematical knowledge were merely "informal" as opposed to "formal" knowledge.

With respect to the current reform efforts, I do not think these attempts can improve education significantly because the explanatory theory underlying them is limited by empiricism. Writing standards, giving tests, and not passing students who don't pass a test can lead only to limited results. As for children's sociomoral development, most leaders in education have not even heard of autonomy and heteronomy (Kamii, 1985).

Whether or not we can have real improvement in education depends on teachers and administrators who can foster children's construction of knowledge and moral values from within. Children who have been educated to do their own thinking are likely to become adults who can decide for themselves what is true and untrue in the intellectual realm and what is right and wrong in the moral realm. ❐

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Constance Kamii is Professor of Education at the University of Alabama at Birmingham.

Misconceptions About Constructivist Education

Rheta DeVries and Rebecca Edmiaston

Rheta DeVries and Rebecca Edmiaston respond to four prevalent misconceptions about (and criticisms of) constructivist education, providing valuable clarifications about the ways in which Piagetian theory informs teaching practice.

Constructivist education inspired by Piaget's research and theory provides the impetus for many current educational reform efforts. However, four commonly held misconceptions about constructivist education[1] confuse discussion of the educational implications of constructivist theory. These misconceptions are that (1) Constructivist education addresses individual cognitive development without regard for social factors, (2) Constructivist education is permissive, (3) Children in constructivist classrooms "just play" and do not learn subject matter, and (4) Constructivist education is limited to "discovery learning." In discussing these misconceptions, we try to uncover the possible sources of each. We discuss Piaget's theory in relation to each misconception and connect the theory to educational implications with examples from constructivist classrooms.

A pervasive myth has emerged that education based on Piaget's work deals only with individual cognitive development without regard for the social context.

Misconception #1: Constructivist education addresses individual cognitive development without regard for social factors.

Many critics of constructivist education base their criticism on the misconception that Piaget presented the child as a lone scientist constructing knowledge by himself (for example, Haste, 1987; Lubeck, 1996). A pervasive myth has emerged that education based on Piaget's work deals only with individual cognitive development without regard for the social context. This misconception may have arisen because Piaget's research was conducted with individual children and because he sought to describe and explain the development of knowledge in the epistemic subject. In Piaget's theory, however, "the development of the child is an adaptation of his mind to the social milieu as much as to the physical milieu" (Piaget, 1976, p. 45). In addition, Piaget stressed that "social life is a necessary condition for the development of logic" (Piaget, 1928/1995). In this regard, it is helpful to distinguish when Piaget was talking about

The first principle of constructivist education is that a sociomoral atmosphere must be established in which mutual respect is continually practiced.

knowledge development and when he was talking about *child* development. When he talked about child development, he always strongly emphasized the importance of social factors.

The most important of Piaget's writings for a discussion of educational and social implications of constructivist theory is *The Moral Judgment of the Child*, in which Piaget (1932/1965) described two types of adult-child relationships that lead to two different types of morality. The first is a coercive or heteronomous relationship in which the adult expects the child to obey "Because I said so!" The adult is an authoritarian who uses power to control the child's behavior through continual directing, bribes, threats, and punishments. Respect is a unilateral or one-way affair, the child's respect for the adult. In a context dominated by this type of relation, the child's reasons for behaving are outside his or her own reasoning and system of personal convictions. Piaget warned that coercion socializes only the surface of behavior and actually reinforces the child's tendency to rely on regulation by others. Moreover, according to Piaget, too much coercion can lead to rebellion, mindless submission, or calculation (where children are obedient and follow adult rules only when under surveillance). Coercion thus leads to heteronomous morality in which the child is regulated by others rather than by the self.

In contrast, in a cooperative relation, the adult minimizes the exercise of unnecessary authority in order to open up possibilities for children to construct their own reasons and feelings of necessity about rules and other social relationships. In a cooperative relation of mutual respect, the adult returns the child's respect by giving the child as much opportunity as possible for regulating his or her own behavior. Cooperation[2] is a social interaction among individuals who regard themselves as equals and treat each other as such. Obviously, children and adults are not equals. However, when an adult is able to respect a child as a person with a right to exercise his or her will, one can speak about a certain psychological equality in the relationship. For example, when a teacher asks children what they want to learn about or how to have more space for block building, the teacher shares her authority in making classroom decisions, for the benefit of the development of children's autonomy.

Piaget further specified the importance of children's interactions with peers for their intellectual, social, emotional, and moral development. In peer relations, equality is easier to attain than in relations with adults. In particular, Piaget saw clashes with peers as fruitful because they confront the child with perspectives other than his or her own. This creates a situation in which the child has the opportunity to coordinate his own perspective with that of others. This coordination is intellectual and emotional as well as social/moral and thus contributes to development in all domains.

A fundamental practical implication is derived from this part of Piaget's theory: the first principle of constructivist education is that a sociomoral atmosphere must be established in which mutual respect is continually practiced. "Sociomoral atmosphere" refers to the entire network of interpersonal relations in a classroom. A constructivist sociomoral atmosphere provides the cooperative context in which children can develop moral and intellectual autonomy. Constructivist teachers consult children (for example, about what to prepare for the lunch with parents and what book to enact in a drama). Visitors to constructivist classrooms see a co-

Constructivist education based on Piaget's theory cannot be permissive because this would be contradictory to the principle of mutual respect.

operative community in which children work with classmates on projects, help each other edit their writing, play group games involving strategy, and figure out together how to achieve goals (for example, how to make the wheels work on the vehicles they are constructing). Conflicts are considered part of the curriculum as they provide an opportunity for perspective-taking, negotiating, and working to reinstate the individuals' relationship. Social and moral dilemmas from literature and life in the classroom are discussed (for example, "Should Mitsu ask Rosa to help him prepare snack for the class again after she ate more than her share the last time?"[3] and "What is a fair way to decide who is first in a game?"). Classroom management avoids punishment, emphasizing logical consequences and the importance of relationships with others.

To summarize, Piaget's constructivist theory gives social factors a central place in child development, and constructivist education is both active and interactive. (For further documentation and discussion of Piaget's social theory, see DeVries, 1997.)

Misconception # 2: Constructivist education is permissive.

Some educators mistakenly believe that constructivist teachers take an entirely permissive "hands-off" approach and abandon their authority. According to this misconception, children in constructivist classrooms are allowed to do as they please. Worse, some conclude that children are in control and out-of-control.

Several possible sources may underlie this misconception. Some educators mistakenly believe that Piaget's theory of stages is a maturational theory, and, therefore, the teacher should refrain from interfering with natural development. Another possible source of the myth that constructivist education is permissive may be a misunderstanding of the fact that constructivist teachers encourage child initiative and choice. In constructivist classrooms, children move freely, creating, choosing, and pursuing activities that appeal to their interests and purposes. To the uninformed or misinformed observer, constructivist classrooms may appear to be chaotic because children are active and because many different types of activities go on at the same time. However, the informed observer of constructivist classrooms sees that children's actions occur within a general framework of order including rules to which everyone has agreed, and that children are productively working, playing, and reasoning.

Constructivist education based on Piaget's theory cannot be permissive because this would be contradictory to the principle of mutual respect. Children cannot do whatever they want because this would lead to violations of the rights of others. It would also be inconsistent with the principle of promoting autonomy because autonomy is defined in terms of relations to others. That is, in Piaget's view, autonomy involves coordination of one's own feelings and perspectives with those of others. Self-regulation develops in a social context.

The idea of minimizing unnecessary adult authority, as discussed above, may be misunderstood to mean that the constructivist teacher abandons authority. While a constructivist teacher does reject an authoritarian role in relation to children, he or she does not give up responsibility for children's behavior and learning in the classroom. We want to state emphatically that constructivist education is not permissive. When children

cannot regulate their behavior, the teacher firmly takes action. For example, when 4-year-old Jeff pushed Carol down and made her cry, the teacher insisted that Jeff listen to what Carol had to say to him. She told him, "I didn't like it when you pushed me down." The teacher supported Carol by repeating her statement and asked Jeff if Carol did something to make him mad. When he refused to talk, the teacher thanked Carol who skipped away, no longer feeling like a victim. The teacher then told Jeff that she could not let him hurt the children and that she would not let them hurt him. She clearly communicated, "If you get mad at someone, you can come and get me and I will help you, but if you hit the children, that is not going to work because I can't let you do that." The constructivist sociomoral atmosphere supports the development of respect for others.

Constructivist teachers, rather than punishing children, use reciprocity sanctions (Piaget, 1932/1965) that are logical consequences of children's actions. One example shows how a constructivist teacher tried to help children construct their own feelings of necessity about clean-up. In a 3-year-old classroom, most children were not taking responsibility for cleaning up at the end of the activity period and the teacher felt too coercive when she had to nag children to do it. The big problem with clean-up is that it feels coercive to children who do not see the need for it. After several discussions of the problem, it became clear that children just did not feel a personal necessity to clean up. Finally, the teacher decided to let children experience the consequence of not cleaning up. Children went home one day without cleaning up, and the teacher told the custodial staff to leave things as they were. When children came in the next day, they found that the room was a mess, and that it was difficult to start new activities when the remains of the activities from the day before were still there. In this way they were able to construct for themselves the consequences of not cleaning up. The children then made the rule that "You can only get out one activity at a time, and you have to clean it up before you go to a new activity." They also more willingly took responsibility at clean-up time. The children had become personally convinced about the need for clean-up. This is an example of the kind of self-regulation that constructivist teachers aim to promote.

Constructivist education is neither permissive nor authoritarian, but democratic. As problems arise in a cooperative classroom, the teacher and children meet to discuss problems and create solutions. The teacher who invites children to make rules promotes children's feelings of necessity about rules and fairness, their feelings of ownership of rules, and their feelings of shared responsibility for what happens in the class and how people get along together. Children are "in control" in the sense that they are given opportunities to be self-regulating, but they are not "out of control" in the sense of being allowed to follow unrestrained and unsocialized impulses. In fact, constructivist educators recommend strategies of teaching to help children move from impulsivity to reflectivity (see DeVries & Zan, 1994, 1995).

Misconception #3: Children in constructivist classrooms "just play" and do not learn subject matter.

The constructivist emphasis on the importance of child choice to insure interest as the motivator for the constructive process leads some to assume that children in constructivist classrooms simply engage in frivolous play that has no educational value. However, the work of many educators (e.g., Biber, Shapiro, & Wickins, 1971) and psychologists (e.g., Fein, 1981; Fein & Rivkin, 1986; Piaget, 1945/1962) makes clear that many forms of what is called "play" do have educational value. For example, children consolidate their knowledge, work through emotionally important experiences, and strengthen their symbolic competence in the course of pretend play. Accord-

For constructivist teachers, the issue is not *whether* to teach academics, but *how* to teach them in ways that do not impede sociomoral development and that promote both learning and intellectual development.

ing to Piaget (1945/1962), symbolic play evolves into games with rules in which children have possibilities for constructing academics (for example, Kamii & DeVries, 1980, argue for the value of dice and card games involving number) and social and moral values (for example, the necessity for turn taking and following agreed-upon rules). Piaget's emphasis on the structure of thought has led some to conclude that education based on this theory implies the absence of subject matter. However, structures cannot exist without content, and constructing knowledge does not occur in a vacuum. One has to construct knowledge *about* something. For constructivist teachers, the issue is not *whether* to teach academics, but *how* to teach them in ways that do not impede sociomoral development and that promote both learning and intellectual development.

Actually, we agree that education oriented to children's play sometimes leads to inadequate attention to academics. Unfortunately, some child-centered teachers interpret play in a global way that leads them to promote a low level of play in the classroom. It may be useful to distinguish between low level play and more challenging educational play. For example, simple pouring and catching in the water table may be of little value for older preschoolers. However, when pouring and catching is transformed into an activity with plastic glasses with holes of various sizes in various positions and a pegboard with hooks to hold the glasses, children have much more to try to figure out, exercise their reasoning more, and learn more about the properties of water.

In developing activities and teaching strategies that focus on subject-matter content, constructivist teachers find helpful Piaget's (1970) distinction among three types of knowledge: physical knowledge, logico-mathematical knowledge, and arbitrary conventional knowledge. Briefly, teachers promote physical knowledge when they encourage children to act on objects and find out properties of objects (such as that water flows in an arc from a hole in the side of a plastic glass) by observing objects' reactions. Teachers promote logico-mathematical knowledge when they encourage children to reason about physical, logical, and social phenomena and construct *relationships* (such as that things move *faster* down a *higher* than a *lower* inclined plane, that eight is *more* than seven, and that others respond *more positively* to persuasion than commanding.). When arbitrary conventional knowledge is involved, constructivist teachers do not hesitate to tell children information about arbitrary facts (such as names of objects and scientific terms and that Saturday is not a school day in the United States).

Having made the distinction among the three kinds of knowledge, Piaget made clear that they are not altogether separate. In fact, both physical knowledge and conventional knowledge must be structured in logico-mathematical relationships. For example, understanding shadows involves construction of spatial relationships among light, object, and shadow as well as constructing the idea that light moves. Knowing colors requires organization of similarities and differences, and knowing that Washington, DC, is the capital of the United States requires organization of spatial, geographical, and political relations. Therefore, the constructivist teacher is always concerned with facilitating the construction of a network of knowledge and relations. The challenge for the constructivist

teacher in approaching any academic content is to distinguish what must be *constructed* from what must be *instructed*.

Those who accept the myth of the absence of subject-matter in constructivist education assume that the constructivist teacher does not plan curriculum. Not so! However, the principle of mutual respect leads the teacher to a good deal of planning with children. This does not mean, however, that teachers never make curriculum decisions. They may suggest topics to children. They may introduce materials they expect will interest children (for example, nursery rhymes or simple machines) and then evaluate whether children engage in activities with purposes that become their own. Planning with children also does not mean that district curriculum is ignored. In our experience, subject-matter in school district curricula is amenable to inclusion in constructivist classrooms, with a few exceptions where content is too simple or too difficult.

The challenge for the constructivist teacher in approaching any academic content is to distinguish what must be *constructed* from what must be *instructed*.

Visitors to constructivist classrooms have no difficulty locating academics and subject-matter learning, although they see little large-group instruction. Rather, children individually and in small groups pursue a variety of projects involving research, experimentation, invention, and integrating subject matter. Therefore, constructivist educators are just as serious as anyone else about children's learning of subject matter. However, the approach to subject matter takes into account how children best come to understand it in a sociomoral atmosphere that promotes all aspects of development, not just cognitive development.

Misconception #4: Constructivist education is limited to "discovery learning."

We have frequently heard the erroneous statement that education based on Piaget's theory is limited to "discovery learning." This myth may arise from misunderstanding Piaget's contention that children construct knowledge rather than simply learning through a stimulus-response process. It is true that constructivist education provides a rich variety of materials with which children can explore and discover properties of objects in physical-knowledge activities (see Kamii & DeVries, 1978/1993). However, the goal is not limited to exploration and discovery, but extends to experimentation and invention. Piaget (1948/1973) made a useful distinction between discovery and invention, noting that the American continent existed before it was discovered by Europeans, but the automobile did not exist before its invention. Children can now discover the wheel in their environment, but they must construct their physical knowledge of its properties through their actions and observations of its reactions. While they discover the wheel, they must still reinvent for themselves its logico-mathematical differences with other objects and causal relationships about how wheels function to make various types of machines and transportation possible. Similarly, children can discover numerals in their environment, but they must reinvent numerical relations such as seriation (5 is at the same time more than 4 but less than 6) and class inclusion (6 includes 5, and "flowers" include "roses"), and addition (Kamii, 1985). As constructivist teachers plan curriculum, they keep in mind what is knowable by children through discovery and what must be invented.

Here we would like to point out the important role of error in children's construction of knowledge. The logico-mathematical process of invention is not simply

As constructivist teachers plan curriculum, they keep in mind what is knowable by children through discovery and what must be invented.

error-free discovery of physical, logical, and cultural truths. Children inevitably have erroneous ideas that must be overcome. For example, in Furth's (1980) fascinating studies of how children make sense of various aspects of their societal reality, he found children to have surprising ideas about money as a result of their observations of its exchange. Many children had the idea that "change received after payment for goods is considered a primary source for obtaining money" (Furth, 1980, p. 49). We have seen this misunderstanding enacted in a pretend restaurant where the "waitress" insists on "paying" the "customer!" The principle of respecting children leads constructivist teachers to value children's errors as intelligent efforts to make sense of experience.

In short, discovery is only one way in which learning occurs in constructivist classrooms. Invention and reinvention are even more important in children's activity and their construction of knowledge.

Discussion

Our continuing debate about what constitutes best educational practices should not waste time on misconceptions about positions or debaters. With these misconceptions out of the way, we can move on to more fruitful debate of issues such as: How does a teacher manage to avoid both permissiveness and authoritarian control? How, specifically, are academics promoted in constructivist classrooms? When is direct instruction appropriate and how is this provided? What is the nature of high-level, in contrast to low-level play?

Finally, we need to continue to ask: How do constructivist practices relate to constructivist theory? If we are to be justified in our claim that certain educational practices are constructivist, then we have the responsibility of connecting these practices with the scientific theory. Otherwise, constructivist education will go the way of all educational fads and fashions, sliding into a murky juxtaposition of opinions. Clarifying the theory-practice links is a worthwhile venture because in constructivist education we have the possibility of creating alternatives to behavioristic practices based on cultural transmission theory. These alternatives may well carry the possibility of transforming teachers, students, schools, and ultimately society. ❐

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Footnotes

[1] One caveat concerns the use of the term "constructivist." This word refers to a psychological, not an educational theory. Therefore, when we refer to "constructivist education" and "constructivist teacher," we are using a convenient shorthand to refer to an educational approach that is inspired by constructivist theory.

[2] People often use the word "cooperative" when what they really mean is "compliant." The "cooperative child" is thus understood to mean an obedient child. This is not what Piaget meant by "co-operation." Co-operation, often written with a hyphen, means operating in terms of another. It means coordinating one's own feelings and perspective with a consciousness of another's feelings and perspective.

[3] This dilemma is from the children's book, *When a Friend Eats More Than Her Share* (Goolsby & DeVries, 1994).

Rheta DeVries is Professor of Curriculum and Instruction and Director of the Regents' Center for Early Developmental Education at the University of Northern Iowa.

Rebecca Edmiaston is Research Fellow at the Regents' Center for Early Developmental Education at the University of Northern Iowa.

A Kindergarten Teacher Reflects on Her Practice

Suzanne Martin and Marjorie Fields

Suzanne Martin, a kindergarten teacher and graduate student, describes her own personal journey as a constructivist educator, offering an honest and thoughtful appraisal of her changing ideas and practices. Although written in the first person, this article benefits from the reflections of her advisor and fellow traveler, Marjorie Fields.

Taking graduate courses in a constructivist early childhood teacher education program has created a major shift in my beliefs about how children learn. This means my practice has had to shift as well. Kamii, Clark, and Dominick (1994) emphasize that traditional teaching practices have to change if autonomy is the goal of our teaching. I agree that changing old practices is the hardest part of constructivist teaching; I am finding the changes both exhilarating and frustrating.

My views of myself as a teacher and my ways of interacting with children have changed a lot this past year. I started from a theory and practice of transmitting knowledge and am moving to an approach of helping students construct their own knowledge. This requires big changes in my role as a teacher. As I work on these changes, I am inspired by this statement: "If we base instruction on the principles of constructivism, the role of the teacher is raised from someone who simply dispenses information to someone who structures activities that improve communication, that challenge students' pre-conceived notions and that help students revise their world views" (UMPERG, 1997). I like being reminded that I'm working in a higher level role, just as I am trying to get my students to think on a higher level.

Sharing Power

It seems that my students this year view me differently than students from past years. Perhaps it is because I am consciously working to reduce my "adult power as much as possible and exchange points of view with children" (Kamii, 1985, p. 161). I have definitely been exchanging ideas with my students more than ever before, but I'm not sure if I have reduced my adult power. I think that idea makes teachers nervous. Instead of reducing my power, I may be choosing to share it with children. Therefore, I am increasing their power, while not diminishing my own. Regardless of what I am actually doing, the results are fine. I still have all the respect from students that I have had previously, while, at the same time, their power to think and to learn has been increased.

Observing

I have also been working on my observation skills because I know they are an essential part of facilitating learning (Chaille & Britain, 1997). I watch my students more closely than ever before, finding out what they are thinking and figuring out ways to extend their ideas. I know observation takes practice, but I

Learners must actively explore mathematical concepts.

think I am getting better at it every day. Since many of my class activities are new to me, I find that I want to just stand back and watch the children. I am in awe of what they are capable of doing. But soon I begin thinking I'm not doing my job. Then I remember that I'm also supposed to be asking children questions about what they are doing and perceiving (Marxen, 1995).

Questioning

It's not easy to know exactly when to ask questions or what type of questions to ask. I want to be careful not to interrupt a child's work with my questions, and I want to be sure that the questions are truly related to what the child is doing. I have been guided by Marxen's advice about asking open-ended questions that "prompt children to predict outcomes, encourage problem solving, consider feelings, and even introduce conflict" (1995, p. 215). This questioning process has been one of the main change agents in my teaching. It feels good not to be just giving answers all the time, but instead to observe the thinking processes of the students, no matter what answer they come up with.

When I first heard the recommendation not to correct children's wrong answers, I really didn't think I could ever do that. Like most teachers, I had always supplied the answers; I wondered how anyone could just let the "right answer" slip by. But then I studied and began to understand the value of helping children think instead of memorize. Fosnot's (1996) writing helped me with the idea of errors being an important part of the learning process. Then I observed children and asked them questions, and I was impressed by the results. As a result, I am convinced that good questions and good ideas are much more important than always having the right answers.

Teaching math

I am being guided by many wonderful ideas in the professional literature as I attempt to create an atmosphere that promotes mathematical understanding in my classroom. For example, Schifter and Fosnot remind us that "no matter how clearly and patiently teachers explain *to* their students, they cannot understand *for* their students ... the learner must herself actively explore mathematical concepts in order to build the necessary structures of understanding" (1993, p. 9).

I am working to create such learning opportunities through math games, "snack math" (McPhetres, 1998), and other math activities as the need arises. It is nothing short of amazing to me to witness the thinking processes of my students. I think of all those years I wasted on meaningless tasks in workbooks, endless counting activities (just to practice counting) and rote memorization of arithmetic "facts."

As I listen to children count and divide up their snack items, I find it incredibly hard not to give them the answers when they are "stuck." It's even harder not to give them the answer when they come up with a totally wrong one. As Schifter and Fosnot note, school is a "culture in which good teaching is assumed to

What is Snack Math?

Counting, distributing and sorting snack items engages children in mathematical thinking about problems that are meaningful to them.

A few examples:

Do we have enough apples for everyone? If we cut them in half will we have enough? How can we divide these cookies fairly among our class? Are there more raisins or more peanuts in the trail mix? (McPhetres, 1998).

It is difficult for others to understand the value of what my students are doing.

mean ensuring that students get right answers" (1993, p. 14). Though it is hard to break away from that culture, I am getting better at just asking questions that help children examine their thinking instead of telling them if they are right or wrong. As I work on this, some generic questions come in handy: I often ask, "How could you find out . . ." or "What could you do to . . ." I keep reminding myself that "the imposition of the right answer that is incomprehensible from the child's point of view teaches him only to go along silently with the adult in power" (Kamii, 1982, p. 48-49). I have seen this very result day after day. There have been times when I slipped and gave a solution; subsequently, the children became more reliant on me rather than thinking for themselves. However, I have been able to quickly back off and see them once again solving the problem for themselves.

On the other hand, it is still very difficult for me not to say, "Great job." or "Right on!" when they come up with a solution that is "correct." I don't think a day has gone by when I haven't thought of Kamii's words, "Avoid both the reinforcement of the correct answer and the correction of wrong answers and encourage, instead, the exchange of ideas among children" (1982, p. 40).

When I understand a child's thinking, it gives me clues about which activities I might try next to help that child continue to refine his or her ideas.

By heeding this advice, I have become aware of some incredible thinking by children.

I have come to know that even though a child's idea may result in an incorrect answer, it may nevertheless be a wonderful idea. The ideas—right or wrong—are indicators that children are thinking; as long as they are thinking, I know that

I know children need to work with the same materials over time.

they are learning and I am teaching. I learn so much about the thinking processes of my students when I truly listen and value their ideas. When I understand a child's thinking, it gives me clues about which activities I might try next to help that child continue to refine his or her ideas. Sure, I want to help my students get the right answers, but only if they have constructed an understanding to go along with those answers.

Documenting learning

I realize that appropriate assessment processes are needed to validate constructivist theory and practice. It is very difficult for others to understand the value of what my students are doing; they want to see test scores or papers with correct answers. It is so hard for people to understand that there is much more to learning than getting the right answer. Kathy Richardson (1988) says best what I want to say to every teacher: "As long as we teachers judge our success by how well we get children to perform, without considering whether they understand what they are memorizing, we will be interfering in, rather than helping with the development of mathematical concepts" (p. 41).

It is my job to make sure that somehow I find out how the children are thinking and that I document that thinking. I never thought I would ever do this, but now I carry around "sticky notes" and a pencil in my pocket so that I can write at a moment's notice. I'm not always good about remembering what children say or do, so I have to write it down immediately. It's not as difficult as I had thought it would be to make notes right then and there. The more I do it, the better I get at doing it. I have also discovered that just writing things down helps me remember them; at the end of the day, I can report to a parent or another teacher exactly what happened without even looking at my notes. I'm so glad I started this process.

Remembering to make the notes is the easy part; figuring out exactly what to write down is much harder. As I struggle with this, I think through the purposes of the learning activities. This gives me focus for what to look for and make notes about. I usually write down things children say that demonstrate their thinking processes. Sometimes children's ideas provide a different focus than I'd planned. For example, during snack math one boy was breaking up his crackers into small pieces. When I went over to inquire about it, he told me that now he had more crackers. I asked him if he had more

I realize that appropriate assessment processes are needed to validate constructivist theory and practice.

than the others at his table and he said yes, he did. This was fascinating to me. I had read about this kind of thinking, but I had never observed it first hand. I made note of this so that later in the year I can check on whether his thinking has changed.

This experience made me realize that others in the class might share his view of how to get more crackers. Further observation and questioning have confirmed that many of my students believe that they have more when they break up the whole into smaller pieces. As a result, I have decided I need to provide more opportunities for my class to experiment with this idea. These observations were extremely valuable to my teaching; yet, if I was only concerned with children's correct answers, I would have focused only on the failure to attain them. As I continue learning to assess what is happening in my classroom, I am guided by these words from Kathy Richardson (1988, p. 39): "We must look beyond the question, 'What can this child do?' to 'What does this child understand?'" It is a continuing journey for me, but if I constantly think about valuing the understanding of my students, then documenting their thinking during learning activities will be an integral part of my instructional planning.

Frustrations

I think the most difficult part of trying to start something new is the frustration you feel when others do not share your enthusiasm or your understanding. Last spring, the kindergarten teachers in my school decided not to order the textbooks and commercial kits that were on the list for the new science curriculum. Knowing that students do not learn science best from textbooks and kits, we chose to order many authentic items such as pulleys, water tables, and magnets. Our order was never processed because someone in the school district's purchasing department determined that these were not appropriate items for this order. When I discovered that our supplies weren't ordered, I wanted to immediately call someone and discuss all that I had found out about how children learn.

Even though we were upset about not receiving the materials we needed, we would never again succumb to having our students merely look at a textbook to learn science. I know now that no matter whether the learner is 4-years-old or 40, no one deserves to be presented with science concepts that way. Instead, we managed to give the children many opportunities to gain physical and logico-mathematical knowledge, despite our limited supplies. We see that we have come a long way from where we were at this time last year.

Nevertheless, I still question some of the "themes" that we do in our classes. I am concerned that I am still emphasizing too much social knowledge and not enough physical and logico-mathematical knowledge. For instance, we just finished with a unit on bones. Even though we showed x-rays, encouraged playing with plastic animal skeleton parts to reconstruct the figure, helped children make bones out of clay, I'm wondering if they really understand why bones are important. Maybe it's okay if they don't. Perhaps we are too worried about what we want our students to get out of our planned activities. I've certainly learned that children's thinking can take an entirely different path than the teacher intended. Our curriculum guides tell us what curriculum we have to "cover" in the year, but that doesn't mean anything in terms of what children will learn.

I've certainly learned that children's thinking can take an entirely different path than the teacher intended.

It is so easy to read wonderful ideas, but putting them into practice is quite another thing. There always seems to be a discrepancy between what I really believe and some of the things I actually do. For instance, I know that children are scientists, constantly puzzling, testing

and probing ideas. If I am going to encourage this behavior in my students, I need to give them lots of time working with the same materials. But I often find myself feeling so pressured to teach all the mandated skills that I don't allow children the time necessary for exploring and thinking. State and national policies are putting more and more inappropriate pressure on schools: I don't think my practice can match my values until this situation changes.

Accepting my imperfections

I don't know any teachers who feel that their theory and practice exactly mesh. After talking to many teachers, I realize I'm not alone in striving to close the gap between my current practices and my goals as a teacher. These words describe how I feel: "The best I can do is just try, knowing there will always be contradictions between my beliefs and classroom practice" (Newman, 1992, p. xiv). Even though I have captured the excitement of many new things going on in my classroom, I think I am finally coming to the realization that I will never truly "arrive" at my destination: my vision of the perfect classroom. Because there will always be new research to ponder and new ideas to consider, my teaching will continue to evolve. Our goals for ourselves must be the same as for our students: that we never stop growing, learning, puzzling, testing or probing ideas. I realize that I am not only a teacher, I am a student and a scientist as well. ❐

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Suzanne Martin, kindergarten teacher in Sterling, Alaska, is the voice heard in this article. The article is about her exploration of her teaching and her reflection on that exploration.

Marjorie Fields, professor of early childhood education at the University of Alaska Southeast, assisted **Suzanne Martin** in her teaching explorations and reflections. She also encouraged and assisted with the writing of this article.

ASSOCIATION for CONSTRUCTIVIST TEACHING

Annual Conference

October 22–23, 1999
Frontenac Hilton Hotel
St. Louis, Missouri

The Board of Directors of the Association for Constructivist Teaching is pleased to announce that the 1999 conference will be held at the Frontenac Hilton Hotel in St. Louis, Missouri, on October 22 and 23. Please note the call for proposals below.

St. Louis is a wonderful conference site, especially in the autumn. Conferees will enjoy its many fine historical and cultural attractions, museums, restaurants, and shopping areas. The Frontenac Hilton Hotel, located at Lindbergh Boulevard and Interstate 64, is about ten minutes from St. Louis Lambert International Airport and is adjacent to Plaza Frontenac, one of the city's premier shopping and restaurant centers.

CALL FOR PROPOSALS

APPLICATIONS OF CONSTRUCTIVISM FOR ALL LEARNERS

The Association invites proposals for workshops (1 1/2 hours in length) for the 1999 conference. We seek presentations regarding applications of Piaget's theory of constructivism to both general and special-needs populations. We also welcome research papers and symposia regarding implications for educational practice.

Please write a descriptive statement of your session's purposes, activities, and intended audience. Presenters should include a brief overview of their current position and previous experience in education. Send your proposal to:

Jill Bodner Lester
Summermath for Teachers
Mount Holyoke College
South Hadley, Massachusetts 01075-1441.

For more information, you may contact Jill by phone (413/538-2654) or by e-mail: <jlester@mtholyoke.edu>.

Proposals must be postmarked by May 20, 1999.

It is time to renew your

ACT membership!

Turn to page 28 for the form to

enclose with your ACT dues.

ACT is the . . .

ASSOCIATION for CONSTRUCTIVIST TEACHING

Constructivist teaching provides a rich, problem-solving arena that encourages the learner's investigation, invention, and inference. The constructivist teacher values learner reflection, cognitive conflict, and peer interaction. ACT is a professional educational organization dedicated to fostering teacher development based on these principles.

Our Mission . . .

Is to enhance the growth of all educators and students through identification and dissemination of effective constructivist practices in both the professional cultures of teachers and the learning environments of children.

Membership . . .

Is open to anyone interested in the field of education including classroom teachers, administrators, supervisors, consultants, college and university personnel, students, and retired educators. Dues are $30 per year regular and $20 per year for students and retirees; the membership period runs from January through December.

ACT Goals

1. To provide increased and varied resources to an expanding membership.
2. To increase attendance at and participation in ACT's annual conference.
3. To publish effective and practical strategies for applying constructivism in the classroom through ACT's scholarly magazine, *The Constructivist*.
4. To provide a network through which teachers, researchers, speakers, and other professionals can support and extend each other's efforts to integrate Piaget's theory of learning into their classroom and within the context of federal, state, or local mandates.
5. To encourage members to contribute actively to the association's development and engage others in expanding the network of those who are willing to support each other's growth as constructivists.

Benefits of Membership

- THE CONSTRUCTIVIST . . . a scholarly magazine, published three times a year.
- ANNUAL CONFERENCE . . . discounted registration fee and early notice of call for presenters.
- AFFILIATION . . . with an association committed to supporting you.

Visit Our Web Site

http://www.users.interport.net/~roots/ACT.html

The Association for Constructivist Teaching

Membership Application

_____ New
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Name: _____ Title: _____

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Please check the address and phone to which we should address our contacts.

Annual* Dues: $30.00 [Regular]
$20.00 [Students & Retirees]
*January–December

Please make your check payable to: The Association for Constructivist Teaching, c/o Dr. Catherine Fosnot, ACT, NAC Room 3/217, The City College of New York, 138th Street & Convent Avenue, New York, NY 10031

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Announcing

Institutes for Summer 1999

for Early Childhood Educators

June 14–18	Columbia, MO
July 12–16	Kansas City, MO
July 19–23	St. Louis, MO
July 26–30	Lamar, MO
August 2–6	St. Louis, MO

for First-Grade Educators

July 12–16	St. Louis, MO
August 2–6	Columbia, MO

for Early Education and Care Professionals

June 21–22	St. Louis, MO
July 19-20	Columbia, MO

for Elementary Educators

June 21–25	Kansas City, MO
July 12–16	St. Louis, MO
July 26–30	Columbia, MO

Project Construct, an approach to teaching that is based on what we know about how children learn, embraces teaching strategies and resources that are consistent with validated theories of learning and development.

Project Construct institutes provide opportunities for teachers and administrators to invent practical strategies that support children's ways of thinking and challenge them to construct new knowledge. Institutes are designed to help individuals make sound educational decisions as they implement a constructivist approach. Sessions deal with a range of issues that early childhood and elementary educators face in the classroom every day.

For more information, contact:

Project Construct National Center
27 South Tenth Street, Suite 202
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