A Constructivist Approach to Staff Development

Martin Brooks

Adult logic applied to children's thinking neglects the importance of the child's point of view; the Cognitive Levels Matching Project takes another approach.

In the summer of 1980, four teachers and an administrator from Shoreham-Wading River Central School District participated in a summer institute at Brandeis University. It was there that we began developing plans based on an intriguing notion that was to become the initial working hypothesis of the Cognitive Levels Matching (CLM) project: *cognitive development can be facilitated by appropriate educational intervention*. The intervention, as initially envisioned, required teachers to assess the cognitive demands of curriculum and the cognitive abilities of students, and match the two. We hoped to reduce much of the frustration typically felt by teachers and students when curriculum is poorly matched to students' needs and abilities (Hunt, 1961).

Our first step in structuring the intervention was to organize a 20-session inservice course that introduced participants to cognitive developmental theories and research, most prominently the works of Inhelder and Piaget, Arlin, Elkind, Sigel, and Duckworth. Course requirements included extensive reading of cognitive developmental literature and the modification or adaptation of a specific curriculum unit based on the notion of appropriate matching. The course emphasized application of developmental theories to classroom settings and encouraged teachers to try with students the ideas discussed in class.

An advanced course was developed during the project's second year, after the first group of participants had completed the introductory course. This course focuses on refining teacher skills and techniques, such as questioning and elaboration. Teachers discuss such issues as appropriate wait-time after posing questions to students, the recognition and valuing of students' ideas, methods of informally assessing students' cognitive abilities, and ways to structure environments in which students feel free to reveal their points of view. Participants are also required to modify/adapt curricula based on analyses of student cognitive abilities and curricular cognitive demands.

The abilities to analyze and adapt curriculum and to assess the cognitive abilities of children are critical. Smock (1981) writes:

> . . . curriculum development, from a Piagetian perspective, necessitates information about the logical-mathematical structures characterizing a particular "content" so as to make judgments as to the possibility that a child, in a particular cognitive-developmental stage, will be able to learn at either the figurative or conceptual levels (p. 64).
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> . . . the teacher needs to have procedures for determining "appropriate mismatches" and the extent to which the child's learning is dependent on figurative and/or operative processes (p. 67).

Since the project began, approximately 70 percent of the district's teachers have voluntarily taken the introductory course. Both the introductory and advanced courses, which are held after school, have been offered for inservice credit, university graduate credit, or a stipend (via funds obtained through a private foundation grant).

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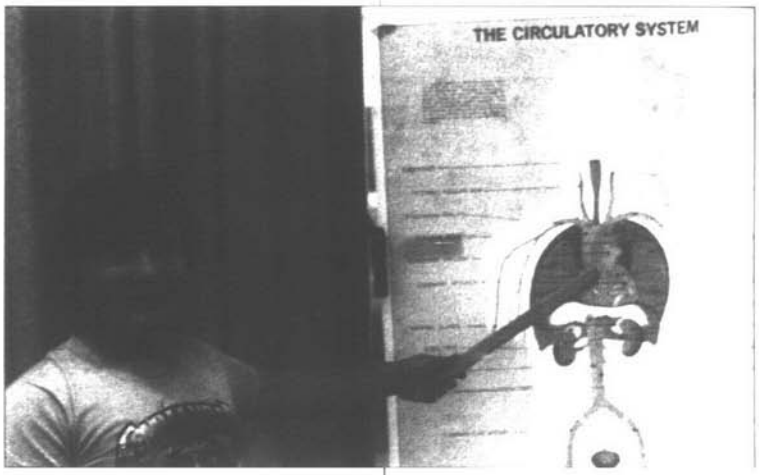

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Thinking as a Process, Not a Product

Recently, the thrusts of both courses have been shifting in subtle ways. More attention is being paid to the philosophical and psychological underpinnings of Piaget's theories and observations—namely, *contructivism*. Briefly, the constructivist theory of learning states that each person constructs a unique reality to organize emerging knowledge of the world. During infancy and early childhood, much of the construction is concrete and physical, involving action on objects. For example, a young child is likely to learn more about marine ecology by actually seining than by reading a book about fish. As the child moves into adolescence, much of the construction becomes abstract. For example, when presented with the ratio "5 chain links = 1 cube" in weight, many adolescents can abstractly construct rules to help them understand this equation. Most young children, however, still need to physically manipulate the objects and may not even then understand the weight relationship between chain links and blocks: they are simply not yet ready to mentally construct this knowledge.

A vital tenet of constructivism concerns the relationship between the knower and the known. Smock (1981) calls this "subject-object unity" and writes:

> Knowledge does not arise from the object nor from the subject, but from their interactions . . . (p. 65).

Traditional views of teaching and learning assume that there exists a given, identifiable body of knowledge and that the function of schools is to teach children these conventionally accepted "truths." von Glasersfeld (1981) identifies this assumption as being "at the very core of traditional epistemology" and writes of people who espouse this view:

> . . . they face the scenario that was set up by the pre-Socratics and then formally and definitively by Plato. There is, on one side, an existing, fully structured world and, on the other, a Knower whose eternal task it is to *get to know* that world (p. 89).

This "one-truth" orientation has some rather disconcerting manifestations in school settings. First, since knowledge is thought to be predefined, little value is given to activities such as hypothesis development, experimentation, and speculation. Instead, emphasis is on learning that which is already defined as knowledge. Next, since only one truth—or body of knowledge—is recognized, little effort is made by teachers to discover and understand other truths that exist in every educational setting: *students' points of view* (Elkind, 1976).

The notion that knowledge can be acquired via incremental skill or subskill acquisition, the sequence of which is pre-identified and imposed through *adult* logic applied to children's constructions, ignores the primacy of the child's point of view. Yet it remains a preeminent foundation of our educational system. For instance, an adolescent may possess the necessary cognitive schemes (conservation and proportional reasoning, for example) to understand "5 chain links = 1 cube" in weight. A five-year-old, however, may not be able to conserve weight as the salient variable in the problem and may instead perceive size as the key to successful solution. Consequently, the child may construct the ratio "2 chain links = 1 cube" in size. To the teacher who does not seek to understand the child's point of view, and who instead looks only for the "correct" answer, the child is "wrong." To the teacher who values the child's point of view, and who asks elaborative questions to elicit it, the child has given the correct answer to a different question: the question the child asked himself or herself. This teacher understands that the child

does not yet possess the cognitive schemes required to address the issue of weight, and may either introduce readiness activities as a means of preparing the child to understand more complex concepts or may wait until the child naturally constructs the necessary schemes before adding such activities to the curriculum.

The child's point of view is most often elicited through thoughtful questioning. It is no secret that the vast majority of questions asked in a classroom have only one correct answer, which the teacher already knows. Most students, being both intelligent about and sensitive to their environments, understand these dynamics and often decide not to waste time pondering the questions but to quickly determine the answers valued by the teacher. These dynamics serve not only to stifle creative thinking but to thwart risk-taking: if a child understands that the teacher is seeking one correct answer to a question, and the child is somewhat unsure of that answer, the likelihood of offering a response is reduced. A strong focus of the CLM project has been the thoughtful structuring of questions. Teachers are encouraged to ask open-ended and elaborative questions, and to value the students' responses as pathways to understanding their points of view.

Constructivism stands in sharp contrast to the more traditional, skills-based approach to teaching. The thrust of most skills-based curriculum models is to divide the whole into the sum of its parts, clearly defining those parts, developing criterion-referenced tests to evaluate student mastery of those parts, and moving students steadily and sequentially through each until the whole has been taught. Examples of such models are publisher-developed management systems, which often accompany basal texts in reading and mathematics, and some mastery learning systems. The skills-based orientation to the teaching/learning process has resulted in some not-so-subtle changes in the structure of many educational programs and environments: that which is directly observable and directly measurable is highly valued. Cognitive development is generally regarded as too delicate and complex to observe and measure. Consequently, even when educators do stress the need for greater emphasis on teaching thinking, some approaches often look remarkably similar to skills-based models of instruction. Beyer (1984), for example, proposes breaking the whole of thinking into a curriculum of its subskills. The CLM project views thinking as a whole that transcends the sum of its parts; as a process, not a product.

Making Change Happen

Since the CLM project has neither a prepackaged, fixed curriculum nor specific curriculum materials, it has affected different teachers differently. For some, it has sparked changes in the sequence of curriculum introduction and presentation. For others, it has facilitated changes in questioning style and methodology. For still others, it has provided a rationale for adapting or modifying specific lesson units.

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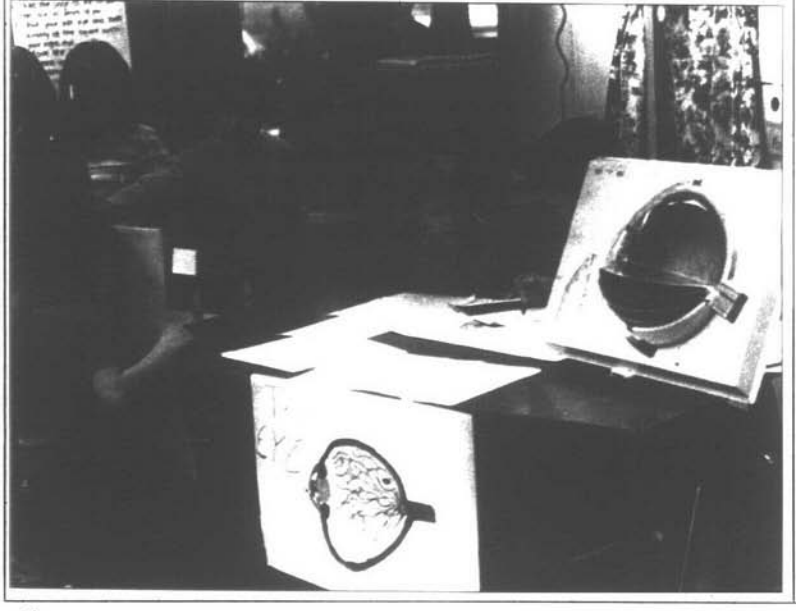
The common thread that has tied together these changes is increased attention by the teacher to child development: what we call "taking a developmental perspective." The various manifestations of this emphasis are a function of each teacher's style. Regardless of the manifestation, however, teachers understand that children develop at different rates, that for most children cognitive development occurs sequentially and at generally predictable times, and that children's points of view are often different from both teachers' points of view and from correct answers. Each teacher has been involved in both formal and informal assessment of students' cognitive abilities, and each has adapted or developed at least one curriculum unit/lesson/activity. The dilemma for participants in the CLM project is: how does one translate this knowledge into changes in classroom practice?

Many unsuccesful change efforts have used an approach seemingly similar to the CLM project: a large-scale inservice course is conducted by consultants external to the district. Upon completion of the inservice work, teachers are expected to return to their classrooms and implement, with great fidelity, that which they just learned in the course. This assumption has proven faulty. Completion of the inservice course is not completion of the change effort. Indeed, the most difficult aspect —implementing change in the classroom—is just beginning.

Helping teachers make changes has become a major concern of the CLM effort. First, in addition to conducting the courses, project consultants spend time in classrooms, working with teachers who are puzzling through questions about implementation. This coaching (Joyce and Showers, 1983) has proven mutually beneficial. Spending time in classrooms has helped consultants develop more relevant and practical inservice content, while the opportunity to meet individually with consultants has sparked some teachers to try new techniques with their students.

Next, all building administrators have been encouraged to take the introductory CLM course. Because this enables administrators and teachers to speak a common language and view development the same way, it has alleviated some of the frustrations felt by teachers who, after being observed, wanted to discuss their child-centered adaptations only to have the administrator focus on other aspects of the lesson. The training also helps the administrator serve as a coach/monitor when observing classrooms and to offer ongoing facilitative feedback to teachers concerned with implementing CLM techniques.



Third, peer teaming and peer observations are critical to CLM implementation. Because observations by consultants are usually infrequent and those by administrators threatening, observations by a trusted colleague who is also concerned with CLM allows for consistent feedback. Peer teaming also provides an institutionalized support system for making change happen (Miles, 1983).

Observations by consultants and teaming with colleagues center around a list of CLM descriptors that enumerate classroom behaviors differentiating CLM teaching from more conventional methodologies. For example, descriptors at the primary level include teacher behaviors aimed at eliciting representational and relational ("bigger than," "first, second, third," and so forth) thinking. At the intermediate elementary level, descriptors include activities designed to elicit children's thinking about classification ("What attribute do these objects have in common?"); seriation ("Can you place in order the events that happened in this story?"); and some forms of conservation ("If two beakers contain the same amount of water, what happens when I place the contents of one into a differently shaped beaker?"). At the middle and high school levels, descriptors include activities that provide opportunities for students to reason abstractly (proportions, propositions, probability, combinations, coordinating multiple frames of reference, and so on). Before the observation, the person to be observed explains to the observer his or her rationale for structuring the lesson, developing questions, grouping students, and so on. After the lesson, the observer and the observed meet again to discuss the lesson in light of the pre-stated objectives and the CLM descriptors. Missed opportunities are identified and positive teacher behaviors are reinforced. In addition, many teachers have requested to be videotaped.

Concerns About the Project

Not all teachers in Shoreham-Wading River have participated in the CLM project. Some are concerned that "good teaching" will become synonymous with having a CLM orientation. They feel that good teachers have already been using the practices and techniques advocated through the CLM course. Others do not subscribe to constructivist notions of cognitive development, and still others feel that child development theories have no place in the classroom. These concerns are certainly valid. CLM is not the only path to effective teaching, and many teachers do, in fact, intuitively use child developmental techniques. Indeed, many of the teachers who have chosen not to participate in the project are considered among the finest teachers in the district.

Another concern pertains to labeling and all its ramifications. Some teachers, for example, perceive the beginning and end of the project as the ability to determine if a child is at the pre-operational, concrete operational, or formal operational stage of reasoning. Such an orientation can limit the child if the teacher feels that concrete operational children should be exposed only to concrete activities and experiences. Moreover, most formal measures of cognitive ability are obtained from instruments that usually test reasoning through mathematics and science tasks. If a child reasons concretely on given science activities, it is dangerous to assume that he or she will also reason concretely when asked to interpret a work of literature or compose a song.

Another concern is the difficulty involved in evaluating a project as complex as CLM. Before effects on children can be examined, it is first necessary to determine if CLM is actually occurring in classrooms. Do teachers view children differently? Have teachers altered their curricula or teaching techniques? Are teachers asking more questions that require students to think and elaborate? In order to determine the effects of CLM on teachers and children, the district hired an independent evaluator—Irving Sigel—to conduct a longitudinal evaluation of the project.

Informal Evaluation

Just as we ask teachers to be sensitive, when assessing students' cognitive development, to the ongoing, unobtrusive, informal information they receive from their students, so too is informal feedback from teachers essential to an accurate formative assessment of the project. Preliminary data indicate that:

1. The CLM experience has significantly touched most participants: "I never realized that my questions were so closed"; "I finally understand why my students never understand this concept"; "The problem I presented to the class was not the same problem most of the children perceived."

2. It gives teachers a common focus for communicating about children: "Missing addends is a tough concept for John because he is unable to conserve numbers."

3. It gives teachers a way to assess the appropriateness of curriculum materials: "The metaphors in this book may be too complex for my class."

The CLM project enables teachers to understand, within a constructivist framework, the dynamic interplay between teaching and learning. How well this understanding translates into improved classroom practices and ultimately proves facilitative to children's cognitive development is yet to be answered.□

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