Reflections...from page 10

Dakota, or any other state for that matter. Otherwise, I think, the scores would have been higher. (Are you listening George?) Unless we improve the quality of the teaching and learning in this country, the tests will be a meaningless standard that will continue to annually depress us. What will improve the test scores significantly is improved teaching. A shining example includes the work of Jamie Escalante (as demonstrated in the movie Stand and Deliver) who didn't allow poverty and low self esteem to stand in the way of his students' achievement. There is very little motivation for teachers to improve their teaching skills and even when they want to there is little guidance or models to follow. If George Bush wants to make a difference with his model schools then the most important question to be asked is: "How should this learning and teaching environment be set up so that it empowers teachers to develop the teaching skills that enables students to become active and interested learners and problem solvers?"

An Opportunity

Despite the lack of clear understanding by our president as to what needs to be done, this is a unique time in history that may not return. The NCTM standards, restructuring schools, and Logo all speak to the same issues. This means that there is a realistic opportunity for the emergence of Logo into the mainstream of mathematics education. But the hope of opportunity depends on the commitment of teachers and administators to take a course of action and to follow it through until positive results are achieved. This means that teachers will have to restructure how they teach mathematics. Now this is not something that will happen overnight. In the next issue of the CLIME News I will share some strategies that Stevens Institute of Technology is using to help participating school districts restructure their math program.

- Just in case you haven't been following the initiatives of the NCTM, the Standards is short for "Curriculum and Evaluation Standards for School Mathematics" and is published by the National Council of Teachers of Mathematics.
- 2. Edward Thorndike's "connectionist" ideas assured teachers not to worry about meaning. "Meaning," he said, "would come later." What is important is to have students practice skills over and over again. It's interesting to note that in today's schools you see examples of all the previous reform movements.

LME...from page 11

The main technical thing was about recursion. Paul (Goldenberg) says recursion doesn't have to be hard, and showed various examples in which it's a natural extension of easy things. The main trick is instead of a normal stop rule you use randomness to control the recursion. For example, take this

```
to weed
1t 45
fd 50 flower bk 50
rt 90
fd 50 flower bk 50
1t 45
end

to flower
run pick [[square 10][circle 10][star 10]]
end
```

where square, circle, and star are the obvious polygon procedures. This draws vee-shaped plants with a randomly chosen flower shape at each stalk. Now you just modify flower a little:

```
to flower
run pick [[square 10][circle 10][star 10] [weed]]
end
```

The result is that sometimes instead of a flower, another weed is drawn at the end of a stalk. Students expect that this will produce two-level weeds. When they discover that sometimes you get multi-level weeds, they are surprised but easily figure out why.

Other than that, I think the main focus of the conference turned out to be the importance of human relationships in education, rather than anything about computers or math or Logo. It started when Bruce (?) from New Zealand gave a paper arguing that instead of talking about Piaget all the time, Logo people should talk about Vygotsky's idea of developmental psychology. I'd never heard about him before; he's a Russian psychologist who's kind of like Piaget in his concern with how people construct their understanding of the world, but different in that his emphasis is much more social. For Piaget each child constructs reality essentially alone, with other people's inputs acting like any other sensory data, and further, the process is controlled by developmental capabilities that are wired into us. Vygotsky apparently takes a more Hegelian view in which the process of reality construction in each person is inherently social, and can happen only in the context of social relationships. The form in which it happens is determined by the particular society in which one grows up. So what's centrally important in learning is the teacher/ student relationship. Then Liddy asked if we could think of this as a three-way relationship: teacher, student, and computer. Bruce thought that that was okay, but I got very upset; I think that (1) if you understand the word "relationship" in a way that includes people's interactions with computers, that impoverishes your sense of what a real human relationship means, and you end up thinking about it in cognitive psychology terms, as if each person were some tree structure of ideas