Teach Nothing About Geometry

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Contrary to a likely interpretation of the title, I am not advocating the deletion of geometry from the mathematics curriculum. In fact, I am quite concerned about the near future of geometry in the curriculum and would not wish to see its position eroded any more than it is. I am concerned because the coming emphasis on and enthusiasm for computer literacy and microcomputer applications could easily push geometry further into the background, simply because geometry doesn't lend itself easily to microcomputer uses.

To return to the title, I am advocating the teaching of nothing about geometry in the sense of "no-thing." Perhaps it is obvious, but I wish to emphasize that "no-thing" implies that we are not talking about a "thing." It is generally held that geometry instruction ought to include practice in space visualization, skills for organizing knowledge about space, attitudes favorable to local space exploration, and so on. But these are no-things which are about things. They are procedural skills, attitudes, or the seeing of relationships. The notion that no-things can be about things is crucial here, since the distinction between things and no-things is frequently the essence of arguments about the value of using geometric activities in the classroom. As an example, the "seeing of geometric relationships" might be acknowledged as an important mathematical goal, but nonetheless be slighted because it lacks a certain concreteness; for example, it is difficult to define as a teaching objective and is certainly difficult to test. Nonetheless, there is a growing body of research indicating the existence of certain generalized skills and abilities that are important in problem-solving and applications. In this paper I am suggesting that we ought to recognize these no-things of geometric activities and acknowledge their importance by insisting on their inclusion in the mathematics curriculum.

To further illustrate some of the points that I have been trying to make, I will describe and use a family of geometric activities. (Incidentally, these activities can easily be put into a game format if desired.) The activities will be defined and references will be made to the no-things of geometry that they illustrate.

The Game of "Turn a Pattern" (TAP)

(This is adapted from Marion Walter's *Boxes, Squares and Other Things*.) I will begin with a discussion of the rules for the two-dimensional version of the game:

1. Use line segments of the same length.
2. The line segments must be placed end-to-end with a right angle at every joint.
3. Play the game first with two line segments, and then with three, four, five segments, and so on.
4. The objective is to generate as many "different" patterns as possible in each case.

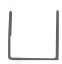
Discussion

The following no-things would probably be exemplified in the activity above:

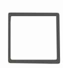
1. Two-dimensional space visualization skills would be exercised.
2. Inevitably, the process of defining "different" for Rule 4 above would include some no-things. For example, devising a rational decision rule for calling patterns different would probably be included.

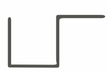
   (Are the three-segment patterns above different?)
3. Systematic methods for generating all possible patterns might emerge naturally or could be encouraged.
   e.g. from

   we can obtain either

   or

   
4. Systematic record-keeping could also be practised so that number patterns might be explored.

These are just a few of the possible important no-things that could emerge in such a geometric activity.

This game has an obvious extension into three dimensions. One additional rule forbidding more than two sticks to come from each joint is necessary here. The rest of the rules are the same.

Conclusion

Some additional no-things could emerge in this setting:

1. Three-dimensional space visualization skills would be exercised particularly when combined with some of the three-dimensional space transformations.
2. By permitting the variation of rules it would be possible to set up natural comparisons between different systems.
3. The enjoyment of experiencing and exploring the familiar space around us could be enhanced. Most importantly, this can be done without the need for much formal knowledge of geometry.
4. That questions can be raised and problems posed is a recognition skill that would probably emerge naturally in these activities.

The activities and statements above are only suggestive of the importance of the no-things of geometry. Other activities and discussion points could be devised to illustrate these notions equally as well.

As a final note, I would like to make a paradoxical plea that we recognize the possibility that teaching the no-things of geometry may be the most important thing that we can do in geometry.

Reference

Walter, M. I. *Boxes, Squares, and Other Things*. National Council of Teachers of Mathematics, 1970.