

Children Can Learn Complex Concepts

*Curriculum research must attend
not simply to what children know
but to what they can learn
at certain stages of growth.*

DEVELOPING adequate concepts is a matter receiving increased attention by those who teach. This concern for meaning is no new phenomenon, for educators have long deplored the learning of unrelated facts and ideas and the superficiality of verbalism.

What teacher has not observed, and occasionally been disheartened by, the misconceptions evidenced by his pupils? "I pledge a legion to the United States and to the Republicans. . . ." Often the objects of humorous comment, misconceptions and misunderstandings are also cited as evidence of children's inability to conceptualize. The more numerous the "mistakes" and the more frequently these "mistakes" are made, it is argued, the lower the level of one's ability to deal with more complex relationships.

All elements of the curriculum require children and youth to deal with concepts. In some areas, the ability to handle concepts is of major importance. The social studies is such an area. The nature of much social studies materials is such that

it must be learned about rather than learned through actual experiencing. Instruction and learning in this field, therefore, are highly verbal. Reading, writing, speaking, and viewing comprise the major categories of activities for pupils in the social studies. Whether in the classroom or on a field trip, whether studying a current city charter movement or the organization of the Zollverein, the principal learning medium is words. The basic instructional materials are essentially verbal materials.

Since social studies learnings are highly verbal, the development of accurate concepts is a difficult element of instruction. This difficulty, in part, may be ascribed to the social studies' relative remoteness from the present concerns and active experiences of the learners.

Many social studies concepts are rather definite, such as hour, week, and league of land, yet even these have sub-

O. L. Davis, Jr. is associate secretary, *Association for Supervision and Curriculum Development, NEA, Washington, D. C.*

tleties of meaning which are not readily apparent. Indefinite and not clearly defined concepts, such as justice, territory, Indians, and the Legionnaires, constitute a large grouping. A number of authorities in the elementary school social studies curriculum maintain that too many concepts are presented too soon to pupils. By this they mean that the immaturity of the child does not permit his development of clear concepts. Also, they hold that insufficient time is allotted to the important and slow procedure of concept building. To the concept load and to the early introduction of many concepts are attributed the ills of misconceptions, undesirable stereotypes, confusion, errors in thinking, and misinterpretations. Certainly, without adequate underlying meanings, learning is characterized as "verbalism," centering on the superficiality of words, rather than on the ideas they represent.

Children's misconceptions of meanings which are considered elements of the social studies programs have received considerable attention by researchers. In their classic study, Scott and Myers (13) reported many inaccuracies in historical and geographic ideas. They found, for example, almost half of the children tested who could name two explorers but who were unable to tell what was meant by "an explorer." Horn (6: 142-45) cites several examples of the shortcomings of children's concepts in this field. Studies such as those by Hart (5), Lord (9), Jersild (7), and Friedman (4) add to the accumulation of evidence that many children do not have a firm grasp of various social studies concepts.

Most of the research in the nature and development of social studies concepts was conducted over twenty years ago. This research centered primarily on status and genetic studies. Answers were

sought to the questions: What concepts do children possess at certain ages? How do these concepts develop?

Many of the studies concluded that since children at certain age levels did not understand some concepts, instruction about them should be deferred until the children had matured sufficiently to profit from teaching. A deferment theory of instruction developed, substantiated by studies of misconceptions and of the growth of concepts, which influenced curriculum development to a considerable extent. Introduction of some social studies topics, formerly taught at early grade levels, was postponed to later grades. It is noteworthy to observe that little experimental evidence has been presented to bolster this theory of delayed teaching.

Need for New Research

For effective learning, the curriculum must be geared to the growth and development of children. Two basic questions must be faced in acknowledging this principle for curriculum planning. What concepts should children be encouraged and given opportunities to develop at the various stages of schooling? When are a child's concepts developed to the extent that instruction is profitable to him? These questions are related.

Attempts to provide answers to these problems must not be limited, as most investigations in the past have been, to determining what meanings and misconceptions children possess. Serious attention must be concentrated on the basic curriculum research problem of determining what concepts children *can develop* when they are guided into rich and meaningful experiences. Such a research orientation takes into account the vast and fundamental changes in society

which constantly occur and the implications of these changes for children's conceptualizing. The need is paramount for experimental research about the development of children's concepts.

Geographical Time Zones

Time and space concepts are two which have been greatly affected by the deferment doctrine. Along with instruction in a number of other ideas related to these concepts, study of geographical time zones frequently has been postponed in the belief that such delay was psychologically sound and educationally wise.

Most authorities in the elementary school social studies agree that learning about geographic time zones is too difficult for children until late in their elementary schooling. Wesley and Adams state the position in unequivocal terms. "It is a waste of time and effort to try to teach these involved concepts relating to the sphericity of the earth before Grade VI or VII" (15: 307-308). They maintain that the difficult concept of the earth's sphericity is responsible for the failure of children to understand zones, dateline, longitude and latitude. They believe that only the process of maturation will enable children to gain these meanings. Other authorities insist that children have no need to know some of these concepts (1, 10). Yet, this reservation does not deny the importance of the concepts and the necessity for teaching them at a later time in school.

Little agreement, however, exists as to the appropriate time to begin instruction about time zones. It is commonly held that instruction should be deferred at least until grade six. Some authorities have advocated that these concepts be postponed even later.

Generally, those holding a theory of deferment cite studies of children's lack of understanding of direction, map reading, orientation, and related ideas to substantiate their position. Inferences are also drawn from children's understandings of other elements of time and space concepts to support deferred grade placement of time zone ideas. Reference is sometimes made, in this regard, to Pistor's study (11) which cast doubt on the utility of beginning instruction in chronology earlier than grade six.

As with other concepts of time and space, little classroom experimentation has been reported which indicates that children can or can not profit from instruction about time zones. Some has been reported, but it is fragmentary and inconclusive. Walker (14) found that seven- and eight-year-olds could functionally understand elementary earth-solar system relationships. Kelton and Hotchkiss (8) were enthusiastic about their efforts to teach direction, longitude and latitude, and map reading to fourth graders. Wilson (16) reported that her attempt to teach these ideas at this grade level was unsuccessful. Schaeffer (12), while believing a unit on time measurement was generally successful with her fourth-graders, noted the difficulty of calendar development and standard time. That children of junior high school age can learn the concept of the sphericity of the earth is indicated by Forsyth's landmark study (3).

An Experiment in Learning

A recent experimental study (2) indicates that children in the intermediate grades can profit from instruction about geographical time zones. Six classes, two at each of the fourth, fifth, and sixth grade levels, chosen from six different

Davidson County, Tennessee, public elementary schools, were used in this study. One class at each grade level was designated as the experimental section and the other class served as the control group. As far as could be determined, none of the classes had had prior instruction about time zones. Prior to the beginning of the experiment, the experimental and control classes did not differ significantly with respect to their mean intelligence quotients, social studies achievement, and understanding of time zones.¹ Significant differences between grade levels were what were anticipated.

The experimental classes were taught a unit specifically embodying material relating to the development of an understanding of geographic time zones during their regular social studies period.² The experimenter taught the unit to control for variations in teaching method, learning materials, and subject matter presented. The length of instruction was approximately 30 minutes per day for 14 class days during a three-weeks period. The control classes received no instruction about geographical time zones except that which was a part of the normal program of studies.

The criterion measure of time zone learnings was composed of items relating to direction, rotation of the earth, clock time, the International Date Line, and standard time zones in the United States and the world. Various map projections and real and imaginary maps were included in the test. Satisfactory reliability and validity were demonstrated. This test was administered prior to teaching the unit, at the conclusion

¹ All data were treated statistically by analysis of variance, and, where appropriate, t-tests. The .05 level of significance was used throughout.

² Some details of these lessons are included in an appendix to the original study.

of the unit, and one month after concluding the unit.

An analysis of results indicated that all experimental classes significantly profited from instruction about geographic time zones. At all points of development tested, sixth graders demonstrated significantly better understanding than fifth and fourth graders, and fifth graders had significantly higher comprehension than fourth graders. Such achievement is what reasonably should have been expected. Fourth graders gained significantly more understanding as a result of instruction than did sixth graders.³ All classes that had instruction gained significantly and equally well from the beginning of the experiment to the test of delayed recall and continued their significant gain of understanding following termination of instruction.

Concepts and the Curriculum

The experiment reviewed indicates that instruction about time zones is profitable earlier than was formerly thought possible. These results raise serious questions concerning social studies theory which advocates deferment of these concepts. If this study is indicative of possible findings in other areas of concept development, the deferment theory may have to be modified radically. Much additional experimentation must be conducted in order that curriculum workers may have substantial and realistic evidence with which to make decisions about what should be included in the instructional program and when it is to be taught.

The importance of maturation is in no way minimized by the findings and

³ This finding may have been due to limitations of the criterion test, the upper limits of which may not have been high enough.

interpretation of the study reviewed. Rather, it is believed that beginnings of development must be made and that advances in concept development make possible further learning. More rapid learning may be possible at later ages, but additional and allied learnings may be possible if instruction is begun earlier, utilizing the experiential base which the child has at that time. Maturation is not sufficient to guarantee concept development.

A child will not learn the most intricate subtleties of most concepts, but he may be able to learn something about them. That his understanding may be incomplete is no cause for complaint and no justification for deferment. There is reason, however, for serious attention to be given to the level of meaning he has attained and for careful selection of experiences which will stimulate his continued growth.

Rigid assignment of concepts to particular grade levels probably is impossible and certainly undesirable. Provision should be made for opportunities for the sequential development of concepts throughout the curriculum. Continuity, and not "complete" mastery, is an essential element of all instructional plans. Instruction about concepts should be planned as integral portions of the ongoing school program. The plans, however, should not be allowed to crystallize into separate units taught at specified times. Flexibility and possibilities for meaningful reinforcement of understanding should also be included in such plans.

Curriculum planning to guide the growth of concepts must consider carefully the experiences of present-day children living in a rapidly changing world. Modern transportation and communication may well make distant places and remote occurrences more familiar at

times than are happenings nearer home. Television viewing and travel are but two types of experiences which stimulate interests and give meanings, knowledge and skills to young children earlier than was thought possible a generation ago.

The school has an unprecedented opportunity to enrich, extend and guide the growth of the concepts which children experience daily. A curriculum which overly concentrates on the here and now and is primarily committed to a logical extension of horizons according to expanding geographic areas may, in fact, be unrealistic. Such a program might conceivably restrict children's learnings unduly, limiting children to experiences which are no longer exciting, and ruling out possibilities of rich school experiences to deepen and broaden social studies meanings.

Heightened concern and an experimental approach to the development of children's concepts should presage marked changes, not only in the social studies, but in all areas of the curriculum. The major question in this attention to concepts must not be, "What do children know?" but rather, "What can children learn?" This difference in focus should point the direction toward a more adequate understanding of concept development and the relation of instruction to the acquisition of concepts.

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Foundations

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ence does not exist, neither the funds nor the organization can accomplish much.

While the great general purpose foundations certainly are influenced by one another, the variations among them in policy and problem area emphasis are appreciable. The burden of the argument of this short introductory piece is that within these variations, and with special reference to educational practice, the

foundations should try to differentiate sharply between supporting research and experimentation, on the one hand, and promoting a favored solution to an educational problem, on the other. When the foundations do the latter they may not be betraying a public trust, exactly, but they can expect that their carefully developed reputations for objectivity and disinterestedness will be attacked vigorously by men and women with different favored solutions but less money to support them.

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