

Inquiry Training for Kindergarten Children

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To develop an inquiring mind is an elusive goal, yet one that beckons educators. This study reports an effort to develop and, at least partially, to test, a procedure for improving questioning behavior of kindergarten children.

THE CONCERN shown in language arts and early reading circles for such matters as concept development, eye-hand-motor coordination, and the like is concretely demonstrable in the observable lesson strategies of real teachers and the observable activities of the real children whom they teach. The concern so vocally expressed in these same circles for inquiry teaching, on the other hand, while ostensibly of equal ardor, has failed to achieve the same degree of concrete fulfillment in the classroom.

The gap between expression and practice occurs, we think, primarily for lack of clear understanding of the importance of questioning, and for lack of recent and stimulating data to draw attention to the questioning behavior of young children. This

article briefly reaffirms that teaching children to question is important; in addition, it summarizes a three-phase quasi-experimental study of the questioning behavior of kindergarten children and of attempts to improve it.

Questioning, Why?

Questioning is needed to focus learning, dissolve obstacles to understanding, and impose some system on the natural sequence of learning-discovery episodes that occur in reading. Students who learn to question are equipped to learn much of what is known. Further, students who develop inquiring minds to accompany their questioning will better be able to transfer their learning from one context to another, and most important, to scrutinize systematically the environment so as to originate new information, as well as alternate means of interpreting information which already exists.

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Questioning Behavior of Kindergarten Children

The researchers observed the morning and afternoon sections of a predominantly white, urban kindergarten class. Information, ranging from risk-taking behavior to basic concept development, was collected on each child to offset the smallness of the sample size. A few factors were found to be significantly correlated at the .01 level with questioning behavior: curiosity, reading readiness, and family position. These findings, summarized elsewhere (Legenza, 1972), were found to have relatively little import for this study.

Organization of the Study: In Phase I we determined the types of questions children ask, their frequency, and the situations in which they are asked; in Phase II we identified means of influencing the questioning patterns of children; and in Phase III we learned how to increase the frequency of student questions.

Phase I—*Types, Frequencies, and Situations Under Which Kindergarten Children Ask Questions.* Observations were made of children during free play in their regular classroom. Time was allowed for the children to become familiar with the presence of two observers.

A review of several days of tape-recorded questions suggested four possible categories for classifying their queries: social amenities questions (Soc. A.), "How are you today?"; questions for information about social or play matters (Soc. Info.), "Do you want to play house with me?"; unsolicited questions for general information (Gen. Info.), the child sees a book and asks "What is that book about?"; questioning in response to some stimulus information (Resp. Info.), the child is being shown and told about a book, and in response to this asks "Who is the boy on the cover of the book?"

To discover the relative frequency of occurrence of each type of question, each of 15 randomly selected children was observed

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for three 15-minute free play periods. The accuracy and reliability of this observational schema were established by correlating observations of the same child taken on different occasions (Pearson Product Moment correlations averaged above .90). Additionally, correlations were similarly high between the questioning patterns observed in the morning and afternoon sections. Generally, the pattern for free play was as follows: very few "response to information" (Resp. Info.) questions, a medium amount of general information (Gen. Info.) and social amenities (Soc. A.) questions, and a high number of questions related to social play (Soc. Info.). See Table 1.

Type of Questions	Number of Questions
Social Information (Soc. Info.)	62
Social Amenities (Soc. A.)	21
General Information (Gen. Info.)	14
Response to Information (Resp. Info.)	1
Total	98

Table 1. Frequencies of Questions of Each Type, Recorded from Three 15-minute Observations of 15 Kindergarten Children During Free Play

In summary, we learned four important things in Phase I: questions could be conveniently grouped into four categories; our observational schema was reliable; the morning and afternoon sections were comparable; and, question type for the most part appeared to be a product of what children were doing when observed, but this seemed to require further study.

Phase II—*Identifying Means of Influencing Questioning Behavior.* To determine the extent to which questioning behavior is a function of activity involvement, two situations or conditions were devised to stimulate questions previously found to have low frequency of occurrence. The situations devised were a "Show and Tell and Question" (STQ) condition designed to increase General Information (Gen. Info.) questions, and a "Show and Question Only" (SQO) condition designed to increase Response to Information (Resp. Info.) questions.

All the children in the class were involved in this phase of the study, but data were recorded only for the 15 children for whom we had baseline data from Phase I.

Situation 1: STQ—In the Show and Tell and Question condition, one child at a time shows the class an item of his or her choosing and tells about it. When the child finishes, the rest of the group can ask all the questions they care to about that item.

Situation 2: SQO—In the Show and Question Only situation, a child shows the item and permits others to look at it, but is not allowed to tell anything about it. The other children must ask questions to find out about the item. Information is given only in response to questions.

Resulting data supported the hypothesis that situation strongly influences questioning patterns. In Situation 1 (STQ), no questions were asked in the formerly high categories of Social Information (Soc. Info.) and Social Amenities (Soc. A.); very few questions were asked in the General Information (Gen. Info.) category. Conversely, there was a marked increase in Response to Information (Resp. Info.) questions, over six times more than the highest of other categories. Comparable results were found in Situation 2. General Information questions (Gen. Info.) occurred more than three times as often as Response to Information (Resp. Info.) questions, the second highest category.

In addition to questions asked, a record was also kept of the number of unsolicited statements made by the children. These gave an indication of the quality of the situation for stimulating language and thinking. Twenty-eight such unsolicited comments were made in the "Show and Question Only" situation and twelve in the "Show and Tell and Question" situation. See Table 2.

Type of Questions	Situation 1: STQ	Situation 2: SQO
Social Information	0	0
Social Amenities	0	0
General Information	5	39
Response to Information	34	12
Statements	12	28
Total Statements & Questions	51	79

Table 2. Number of Questions and Statements Obtained During Two Structured Situations

Phase II confirmed our belief that question type and frequency are situation specific; manipulate the situation in which children are involved and the types and frequencies of their questions will change accordingly.

Coincidentally, it was also learned that the STQ and SQO situations are potentially very useful. In classroom practices they can be used to generate response to information and general information type questions respectively.

Phase III—*Improving Questioning Behavior*. To begin to develop strategies for *improving* the questioning behavior of kindergarten children, we chose as our first step to increase the frequency of student questions.

The procedure tried was a variation of the ReQuest, or Reciprocal Questioning Procedure (Manzo, 1969). This procedure has been shown to improve reading comprehension by teaching students how to raise questions and set their own purpose to guide reading. An important function of the ReQuest Procedure is to remove factors which inhibit questions and simultaneously to encourage questioning by providing the student with a competent model of questioning behavior.

Ten of the original 15 students were randomly selected for close observation. A Questioning Behavior Index (QBI) was obtained for each student to measure pre- to post-test changes in questioning. To obtain an index, each student was individually shown three pictures in succession and asked to tell all that he or she could about each one. These pictures had been previously equated for question-drawing power by means of the Picture Potency Formula technique for this purpose by the authors (Manzo and Legenza, in press). The next day the pupil was shown the same three pictures, but this time the pupil was told that he or she could ask anything about the picture. All questions were answered. The child looked at each picture for a required minimum of five minutes to a required maximum of ten minutes. A Questioning Behavior Index (QBI) was formed from the total number of questions he or she asked for all three pictures. Test-retest reliability on the QBI was calculated at .94 (Pearson Product Moment correlation).

The ten students were then divided into two groups on the basis of the Questioning

Behavior Index (QBI): the student with the highest QBI was assigned to the Statement-Question Treatment, the student with the second highest QBI to the ReQuest Picture Treatment. This was continued until all students were assigned to a group.

In addition to these groups, two other groups of five children each, one group from the morning section and one group from the afternoon section, were chosen to be pre- and post-tested with no treatment whatever. These children served as a control group to determine the possible effects of normal growth and development over the treatment period on questioning behavior, and to further ensure the reliability of the QBI.

The Questioning Behavior Index and all treatment sessions were administered to the children individually by a single experimenter.

Eight sessions were held with each child in the ReQuest Picture and Statement-Question groups. One picture was reviewed each session. Pictures came from two sources: Richard Scarry's *Best World Book Ever*, and *Teaching Pictures*. Each session lasted 10 to 15 minutes.

Treatments

ReQuest Picture Treatment (5 students). Protocol: "Let's ask each other questions about this picture to see if we can learn all the things we can about it. In order to help us to learn all we can, let's both look at the picture and see who can ask the most and best questions. You go first and ask me any questions you can think of about this picture and I'll see if I can answer them. Then I'll ask you some questions and you see if you can answer them."

Statement-Question Treatment (5 students). "Let's look at this picture and see if we can learn all that we can about it. To help us learn all we can, let's see who can tell the most things about the picture. You go first and tell me all you can about the picture then I'll tell you some things. Then I want to ask you some questions. Then you can ask me anything you want to about the picture."

	ReQuest Picture Group N-5				Statement-Question N-5				Afternoon Control N-5				Morning Control N-5			
	Pre	Post	Gain	% Gain	Pre	Post	Gain	% Gain	Pre	Post	Gain	% Gain	Pre	Post	Gain	% Gain
1)	52	55	+3		56	26	-30		47	42	-5		47	47	0	
2)	34	39	+5		41	41	0		44	43	-1		35	34	-1	
3)	16	63	+47		28	25	-3		18	15	-3		18	20	+2	
4)	7	35	+28		15	28	+13		3	6	+3		7	2	-5	
5)	0	46	+46		3	3	0		0	0	0		0	0	0	
	109	238	+129		143	123	-20		112	106	-6		107	103	-4	
	118%				0				0				0			

Table 4. Pretest and Post-test Gains in Numbers of Questions Produced in Experimental Groups

Treatment Modification. The primary purpose of this study was to develop and, at least partially, to test, procedures for improving questioning behavior. Consequently modifications in treatment were expected and tolerated within the exploratory model. After four sessions, one student in the experimental group had not asked a single question. In an attempt simply to get her to talk, the experimenter asked her to repeat simple recall questions word-by-word. She did this for four sessions, and then began to initiate her own questions with no other prompting. (See subject #5 in the ReQuest Picture Treatment group of Table 4.)

The increase in the number of questions in the ReQuest Group was overwhelmingly superior to that of the Statement-Question and the control groups, even if subject #5 were removed. With only a few hours of instruction the ReQuest Picture trained group increased their questioning behavior on the Questioning Behavior Index by 118 percent, which should be compared to no gains at all for either the Statement-Question or the Control Group.

It is notable, but not necessarily significant, that the children in all groups who were highest in pre-treatment questioning remained so in post-treatment questioning.

Summary of Findings

1. The questioning behavior of kindergarten children can be conveniently divided into four categories: social information, social amenities, general information, and response to information.

2. In a free play situation kindergarten children seem to ask predominantly Soc.

Info. questions (60 percent), some Soc. A. questions (20 percent), a few Gen. Info. questions (14 percent), and almost no Resp. Info. questions (10 percent).

3. The questioning behavior of kindergarten children (within the same socio-economic range and with the same teacher) tends to vary little from group to group.

4. Manipulation of the activity or context in which the child is involved seems to influence dramatically the quantity and types of questions that will be asked. This seems to be especially true with the STQ and SQO situations described earlier.

5. The ReQuest Picture Procedure seems to be an effective means of increasing the frequency of questions asked by kindergarten children.

6. It would appear that in some cases word-by-word parroting of questions must be used to start the flow of language and to establish a pattern of imitating a model.

Fostering the acquisition of an inquiring mind is still an elusive and lofty goal. It appears, however, that the critical component of questioning is more manageable than could be guessed from a review of teacher plans and student activities.

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