Thinking Skills and Philosophy for Children: The Bethlehem Program, 1982-1983

During the past decade, the Philosophy for Children Program has offered teacher-training workshops throughout the United States and elsewhere. The workshops frequently supported by grants, enable teachers to work with a professional philosopher in developing the skills required for teaching critical thinking in elementary and intermediate schools.

During the period from 1980 to 1983, the Bethlehem Area School District successfully obtained funding from the National Endowment for the Humanities for a pilot project. Sixty-five teachers in Bethlehem Schools were given the opportunity to participate in training in Philosophy for Children. Participating teachers were chosen on the basis of programming factors: fifth- and sixth-grade teachers taught their own classes, social studies teachers taught the seventh-graders, and foreign language teachers taught the eight-graders. Teachers were offered standard IAPC training. The amount of training received by teachers during the three-year period of the existence of the program ranged from zero hours to sixty hours of training.

Classes taught by participating teachers ranged in grade from fifth through seventh. The grades chosen for participation in the Philosophy for Children Program reflected the developmental appropriateness of the middle school years for beginnning training in formal operations (Piaset, 1928). The "Harry" program was used by fifth- and sixth-grade classes. During the period examined, the seventh-grade classes used the "Mark"program. At present, the "Lisa" program has been substituted in the seventh-grade. In all, 31 fifth grade teachers, 14 sixth grade and 11 seventh grade teachers participated, with their classes, in the study.

Over the years, the IAPC programs have been positively evaluated, using a variety of qualitative and quantitative techniques. There is reason to believe that Philosophy for Children has a significant effect on reading, mathematics, and mental maturity (Cinquino 1981; Cummings 1982; Lipman 1979; Lipman, Sharp and Oscanyan 1980; Yeazell 1981). But the basic test instrument to evaluate the success of the program in teaching thinking skills has been a critical thinking test developed over several generations by Virginia Shipman of the Educational Testing Service at Princeton, New Jersey, in conjunction with Matthew Lipman, Director of the IAPC. At the time the Bethlehem program was being evaluated the most recent available test instrument was the Questioning Task #4 (Q4). The Q4 is based on some twenty definable areas relevant to thinking skills, including syllogism, induction, detecting assumptions and ambiguity, evaluating reasons, causal analysis, part-whole relations, among others. The questions also include less formal issues, such as the use of authority in reasoning, stereotyping, and jumping to conclusions. A recent study, using the Q4, has confirmed the effectiveness of the Philosophy for Children program in increasing critical thinking skills in pupils (Iorio, Weinstein & Martin, 1984).

All classes participating in the Bethlehem program were pretested in October, 1982, with the Q4. Posttests were ad ministered in May, 1983. The posttests, unfortunately, were lost in mailing. Students were posttested again the following fall. This analysis, therefore, reflects student scores after a three-month hiatus in instruction.

Demographics

The sample consisted of 2500 fifth - , sixth - , seventh - and eight - grade pupils in various schools in the Bethlehem (PA) area. For each pupil participating in the program, math and reading scores were obtained. These scores represented the total reading and math scores from spring, 1982, and spring, 1983. Although the original sample was 2500 subjects, only students who had completed both a pre - and posttest in critical thinking (Q4) and for whom reading and math scores were available were included in the final study. The population represented in this study consisted of the 1420 pupils for whom all data was available. A preliminary statistical analysis proved that the smaller groups was statistically indistinguishable from the larger. Our choice of the smaller group as representing the Bethlehem (PA) Philosophy for Children Program was prompted by our desire to explore the relationship between critical thinking, as measured by the Q4 and basic skill areas, as measured by SRA scores in reading and math.

Reading ability is an obvious candidate for consideration as a plausible factor related to success in critical thinking, especially, given that the test administered required that the students read each question and choice of answers (Lehr 1982; Malicky & Shienbein 1981). Table 1 shows the distribution of reading scores by grade.

Table 1
Means And Standard Deviations Of
Reading 82 And Reading 83
By Grade

	Grade 5		Grade 6		Grade 7	
	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation
Reading 82	5.032	2.091	6.564	2.581	8.116	2.549
Reading 83	6.432	2.543	7.800	2.782	9.175	2.761

Although the Philosophy for Children program does not directly involve math skills, previous test results have shown some relationship between achievement in critical thinking and math competence (Lipman, 1979). Table 2 shows the distribution of math scores by grade.

Table 2
Means And Standard Deviations Of Math 82 And Math 83 By Grade

	Grade 5		Grade 6		Grade 7	
	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation
Math 82	5.170	1.724	6.734	2.007	8.527	2.676
Math 83	7.145	4.601	8.556	5.303	8.527	9.603

Results

Analysis of data was done at the Teachers College, Columbia University, computer facility using standard software for statistical analysis: SPSS (Nie 1975). We found that the Bethlehem (PA) Philosophy for Children Program resulted in an increase in critical thinking at the highest possible level of statistical significance.

Table 3 summarizes the data of the mean scores and standard deviations on the Q4 pretest and posttest for all pupils. The values of t are significant beyond the .001 level of confidence. The difference in mean scores varied from grade to grade. Ranging from a 5.72 in grade 5, 4.01 in grade 6, to 3.16 in grade 7. All of these are statistically significant. Notice that the pretest score for each grade was higher than the score for each earlier grade, as were the posttest scores.

Table 3
T-Tests Of Q4 Pre And Q4 Post By Grade

Variable	Number Of Cases	Mean	Standard Deviation	T Value	2-tail Prob.
Q4 Pre		32.52	8.25		
Grade 5	287			17.78	< .001
Q4 Post		38.24	8.19		
Q4 Pre		35.43	8.02		
Grade 6	428			13.18	< .001
Q4 Post		39.44	8.71		
Q4 Pre		38.67	6.20		
Grade 7	249			9.74	< .001
Q4 Post		41.83	6.27		

We explored the possibility that success in critical thinking was correlated with student achievement in reading and mathematics. We also looked at workshop participation by teachers as a possible correlate. Table 4 shows the correlations the critical thinking pre and posttests and the reading from the year prior and from the spring of the year studied. There was a strong correlation between reading scores and success in critical thinking.

Table 4
Correlations Between Q4 And Reading

	Q4 Post	Rdng 83	Q4 Pre	Rdng 82
Q4 Post	1.0000	0.6993 P<.001	0.7338 P<.001	0.6668 P<.001
Rdng 83	0.6993 P<.001	1.0000	0.7380 P<.001	0.8483 P<.001
Q4 Pre	0.7338 P<.001	0.7380 P<.001	1.0000 P<.001	0.7056 P<.001
Rdng 82	0.6668 P<.001	0.8483 P<.001	0.7056 P<.001	1.0000

(N=1006)

The relationship between Q4 test scores and math scores is shown below in Table 5.

Table 5
Correlations Between Q4 And Mathematics

	Q4 Post	Math 83	Q4 Pre	Math 82
Q4 Post	1.0000	0.3544 P<.001	0.7359 P<.001	0.5718 P<.001
Math 2	0.3544 P<.001	1.0000	0.3516 P<.001	0.4237 P<.001
Q4 Pre	0.7359 P<.001	0.3516 P<.001	1.0000	0.6292 P<.001
Math 1	0.5718 P<.001	0.4237 P<.001	0.6292 P<.001	1.0000

(N=989)

As the preceding tables show, all factors had statistically significant correlations with all others. If we want to explore the relationship between particular variables, we must control statistically for factors which intuitively affect the results of interest. The most plausible choice for confounding variables are the pretests, Q4 Pre, Rdng 82 and Math 82. We used partial correlation to control for pretests, thereby providing a single measure of association between Q4 Post and Rdng and Math 83. Table 6 exhibits these relationships.

Table 6
Partial Correlations Of Q4 Post With Rdng 83 And Math 83 Controlling For Q4 Pre And Rdng 82 And Math 82

Controlling for:	Q4 Pre	Rdng 82
	Rdng 83	
Q4 Post	0.1907 P<.001	
Controlling for:	Q4 Pre	Math 82
	Math 83	
Q4 Post	0.0994 P<.01	

As the tables show, there is a statistically significant correlation between the growth in critical thinking skills and achievement in reading and mathematics under strict statistical assumptions.

In exploring the relationship between workshop attendance by teachers and pupil growth in critical thinking, we conducted an analysis of covariance. The choice of test was mandated by the fact that workshop attendance was a dichotomous rather than a normally distributed continuous variable. We divided teachers into three mutally exclusive and exhaustive categories: teachers who had no training, teachers who had less than 60 hours of training, and teachers who had received 60 hours of training. We then compared these groups by pairs, using pupils' Q4 Post test scores with Q4 Pre held constant. In no case did the resulting F values prove to be statistically significant. That is to say, workshop attendance was not a significant determinant of pupils' success in critical thinking. The Analysis of Covariance tables are included below in appendix A.

Conclusions

Looking at the data just presented, a number of conclusions seem warranted. First, Philosophy for Children has a significant effect on raising pupils' level of critical thinking, where critical thinking is measured by a test that includes the performance of abstract inferences and the evaluation of arguments. Second, critical thinking skills are correlated, to at least some extent, with standard measures of basic skills. It should be noted that the correlation, although statistically significant, is not sufficiently robust to enable us to draw a strong conclusion as to causal efficacy. That is to say, the correlation squared, the standard measure of determination, would not in fact yield a value consistent with the claim that success in critical thinking was a determining factor in the growth of the basic skills examined.

The lack of correlation between workshop attendance and student achievement may be explained in part by the fact that all teachers were given significant in-classroom support by the teacher trainer. Further, many teachers had students who had participated in Philosophy for Children during previous school years with various other teachers. These teachers may certainly have had different histories of participation in Philosophy for Children workshops. Never the less, the lack of statistically significant relationships between teacher training and student growth in critical thinking remains to be explained. Since neither of the authors participated in the Bethlehem program except as program evaluators, we look to those intimately involved in the teacher training process to account for this seemingly counterintuitive result.

Appendix A
Analysis Of Variance

Q4 Post By No Workshop vs. Some With Q4 Pre Held Constant

Source of Variation	Sum of Squares	df	Mean Square	F	Signif of F
Covariates	35522.815	1	35522.815	1172.700	0.000
Q4 Pre	35522.815	1	35522.815	1172.700	0.000
Main effects	7.666	1	7.666	0.253	0.615
No Wkshp vs. Some	7.665	1	7.665	0.253	0.615
Explained	35530.480	2	17765.240	586.477	0.000
Residual	30442.936	1005	30.291		
Total	65973.416	1007	65.515		

Covariate	Raw regression coeffiecient
Q4 Pre	0.744

Analysis Of Variance

Q4 Post By Difference In Workshop Hours With Q4 Pre Held Constant

Source of Variation	Sum of Squares	df	Mean Square	F	Signif of F
Covariates	18884.125	1	18884.125	708.280	0.000
Q4 Pre	188884.125	1	18884.125	708.280	0.000
Main effects	3.217	1	3.217	0.121	0.728
Diff Wkshp Hrs	3.217	1	3.217	0.121	0.728
Explained	18887.343	2	9443.671	354.200	0.000
Residual	13890.876	521	26.662		
Total	32778.219	523	62.673		

Covariate	Raw regression coeffiecient
Q4 Pre	0.754

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