

Can the Level of Instruction Be Raised Through the Use of Interaction Analysis?

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THE search for some superior teaching methodology has been under way in dozens of research centers throughout the country. From this research has come Flanders' interaction analysis which, since its beginning in 1957, has become thoroughly developed. This system has isolated 10 verbal elements, mutually exclusive, from which a researcher is able to select one or more categories every three seconds during a teacher's lesson. In practice a trained observer is capable of coding as many as 1,000 responses during a 45-minute lesson. Once the coding has been completed, the total number of tallies and the percentages of time spent in each category are calculated. The categories are shown in Figure 1.

Teacher Talk	Indirect Influence	1.* Accepts feelings 2.* Praises or encourages 3.* Accepts or uses ideas of students 4.* Asks questions
	Direct Influence	5.* Lecturing 6.* Giving directions 7.* Criticizing or justifying authority
Student Talk		8.* Student talk-response 9.* Student talk-initiation
Silence		10.* Silence or confusion.

* There is no scale implied by these numbers. Each number is classificatory, designating a particular kind of communication event.

Figure 1. Flanders' Categories for Interaction Analysis

To further reduce the data, the category totals may be added in numerous combinations in order to produce a wide variety of

interaction ratios. The two most widely used ratios are determined as follows:

$$I D = \frac{\text{Indirect}}{\text{Direct}} = \frac{\text{Sum total for Categories 1 through 4}}{\text{Sum total for Categories 5 through 7}}$$

$$i d = \frac{\text{Indirect}}{\text{Direct}} = \frac{\text{Sum total for Categories 1 through 3}}{\text{Sum total for Categories 6 through 7}}$$

Using this system of recording verbal behavior, Flanders (1965) as well as Amidon and Flanders (1961-62) found that pupil achievement was higher from classes of indirect teachers (I/D ratios) 1.0 or above. Soar (1967), in verifying Flanders' assumption, found that high achieving groups of elementary youngsters tended to have more indirect than direct teachers. Davidson (1968) went a step further and found that in a study of children in grades two to six, indirect teachers produced higher levels of critical thinking.

It is thus apparent from these and other studies (as reported in Amidon and Hough, 1967) that there is some relationship between the indirect/direct ratios (or indirectness of teachers) and achievement at almost every grade level K-9. What is not apparent, however, is the specific cognitive aspects of this classroom interaction. Amidon and Simon (1965) state that perhaps the greatest limitation found in research using the Flanders

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system was the lack of emphasis upon specific cognitive aspects of the classroom interaction. Does the higher level of achievement produced by indirect teaching, then, represent a higher level of cognitive behavior in the classroom?

To answer this question it becomes necessary to find an adequate measure for the cognitive level of behavior within the classroom.

Bloom's *Taxonomy* (1956), although originally intended as a classification of educational goals, does represent a useful inventory of cognitive objectives against which a teacher can gauge the variety and range of his own goals. It also, according to Farley and Clegg (1967), is useful in the measurement of classroom learning. Sanders (1966), using Bloom's *Taxonomy*, developed a system for analyzing classroom questions in a hierarchical form. Sanders replaced Bloom's term "knowledge" with "memory," holding that "memory" better described the mental activity and was parallel with the names of the other categories. Sanders also divided "comprehension" into two of its component parts, "translation" and "interpretation." He considered each to be a separate classification. Sanders' model is in Figure 2.

Low Level Cognitive Process	1. Memory
Higher Level Cognitive Process	2. Translation 3. Interpretation 4. Application 5. Analysis 6. Synthesis 7. Evaluation.

Figure 2. Sanders' System for Analyzing Classroom Questions

This represents a hierarchical scale, memory being the lowest and evaluation the highest form of cognitive behavior.

To further reduce the data, a ratio can be determined as follows:

$$M/AM = \frac{\text{Low level cognitive process}}{\text{Higher level cognitive process}} \\ = \frac{\text{Total in Category 1}}{\text{Sum totals of Cat. 2 through 7}}$$

Since classroom behavior can be an-

alyzed by Flanders' system and since the Bloom-Sanders Taxonomy can record the cognitive level of classroom questions, then it is possible to see if there is any relationship between the indirectness of the classroom (I/D ratio) and the cognitive level of teacher questioning (Low level/Higher level ratio).

Method

To determine the relationship between the indirectness of the classroom teacher and the cognitive level of the teacher's questioning, five-minute sections of 12 classroom tapes, randomly selected from the Northwest Educational Laboratories, were analyzed by two trained observers for both their directness (I/D) ratio, as determined by Flanders' technique, and for the Low level/Higher level ratio of teacher questioning, as measured by the use of Sanders' variation of the Bloom Taxonomy. Procedural and rhetorical questions were omitted from the data being analyzed as the Sanders coding provided no category for these. Tables II and III show the categories and their frequencies that resulted from the five-minute samples of the 12 tapes that were used for this study. Correlations were derived for three pairs of scores: Sanders' M/AM and Flanders' I/D, Sanders' M/AM and Flanders' i/d, as well as Sanders' M/AM and the number of questions asked. The Pearson Product-moment coefficient was used for these analyses.

Results and Conclusions

Examination of the *r* scores resulting from the correlation of pairs found several items to be true (see Table 1).

Sanders' M/AM	Flanders' I/D	Sanders' M/AM	Flanders' i/d	Sanders' M/AM	Number of Questions Asked
<i>r</i> = -.460 n.s.*		<i>r</i> = -.324 n.s.*		<i>r</i> = .290 n.s.*	

* With only ten degrees of freedom, the *r* necessary for significance is .576 at the .05 level.

Table 1. Summary of Correlations of 12 Classroom Tapes

To summarize these findings briefly, the generally non-significant correlations between the Flanders categories and the Sanders classifications indicated that (a) there is only a small correlation between the indirectness of the teacher and the cognitive level of the teacher's questions; (b) this relationship is negative rather than positive; (c) the large I/D has a higher negative correlation than the small i/d; and (d) the number of questions asked by the teacher had little to do with the cognitive level of those questions.

These results are not surprising considering the small number of tapes used, but the direction of the relationship between the cognitive level of the questions and the indirectness of the teacher (I/D ratio) is interesting and deserves more study. Does the cognitive level of the questioning actually go

down as the teacher becomes more indirect, or can this negative relationship be attributed to the small size of the sample? More work needs to be done in this area. Perhaps with the use of a more precise instrument such as VICS¹ or the OSAR² measure of the indirectness of the teacher, a closer relationship could be found.

With the present emphasis on and use of Flanders' Interaction Analysis, it seems critical that more research be carried out on all aspects of classroom behavior as related to the cognitive level of achievement within the classroom before we can answer the question, "Can the level of instruction be raised through

¹"Verbal Interaction Category System" by Edmund Amidon and Elizabeth Hunter.

²"Observation Schedule and Research" by Donald Medley and Harold Mitzel.

Tape No.	1	2	3	4	5	6	7	8	9	10	Total Tallies	I/D	i/d
1	0	3	1	29	36	7	1	21	2	5	(105)	.75	.50
2	0	8	10	22	14	10	2	10	22	8	(106)	1.53	1.50
3	0	5	10	23	25	1	0	12	20	13	(109)	1.46	15.00
4	0	3	5	32	9	1	0	22	23	3	(98)	4.00	8.00
5	0	2	2	42	10	12	0	28	2	16	(114)	2.09	.33
6	0	3	5	15	55	7	1	11	2	4	(103)	.36	1.00
7	0	4	12	30	18	8	0	36	2	12	(122)	1.77	2.00
8	1	7	10	22	13	10	1	25	3	19	(111)	1.67	1.63
9	0	3	13	43	7	3	0	25	4	7	(105)	5.90	5.33
10	0	2	4	36	22	0	10	14	4	8	(100)	1.31	.60
11	0	5	14	8	3	0	0	6	67	2	(105)	9.00	19.00
12	0	0	8	14	8	0	0	0	96	8	(134)	2.75	8.00

Table 2. Twelve Classroom Tapes (Flanders' Categories)

Tape No.	Total Questions	Memory	Translation	Interpretation	Application	Analysis	Synthesis	Evaluation	M/AM
1	11	5	1	3	2	—	—	—	.42
2	9	3	—	4	2	—	—	—	.33
3	19	10	6	3	—	—	—	—	.52
4	12	—	1	6	6	—	—	—	.00
5	11	11	—	—	—	—	—	—	1.00
6	9	8	—	—	1	—	—	—	.99
7	21	14	3	4	—	—	—	—	.67
8	19	1	12	5	—	1	—	—	.05
9	36	24	4	6	—	2	—	—	.67
10	20	12	—	8	—	—	—	—	.60
11	6	1	—	5	—	—	—	—	.17
12	4	—	3	—	1	—	—	—	.00

Table 3. Twelve Classroom Tapes (Sanders' Classifications)

the use of Interaction Analysis?" The potential productivity of the answer to such a question is worth considering in both the training and retraining of teachers as well as its effect upon the cognitive level of classroom instruction.

Tape No.	Sanders' M/AM	Flanders' I/D	Flanders' i/d	Number of Questions
1	.42	.75	.50	11
2	.33	1.53	1.50	9
3	.52	1.46	15.00	19
4	.00	4.00	8.00	12
5	1.00	2.09	.33	11
6	.99	.36	1.00	9
7	.67	1.77	2.00	21
8	.05	1.67	1.63	19
9	.67	5.90	5.33	36
10	.60	1.31	.60	20
11	.17	9.00	19.00	6
12	.00	2.75	8.00	4

Table 4. Sanders' and Flanders' Scores for Classroom Tapes

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