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ABSTRACT

The Instrument for Analysis of Science Teaching (IAST) was developed as a 26-category system of interaction analysis. Following conceptualization and several research studies, the IAST was redeveloped with 14 basic categories (IAST Base) and an expanded 32-categories version (LAST v.2) which is based on subdividing the IAST Base categories. In this paper the IAST Base and the IAST v.2 are described and some ideas for using the system with preservice and inservice teachers and supervisors are given for research studies and teacher feedback. (Author/AL)

THE USE OF INTERACTION ANALYSIS IN THE MODIFICATION OF SCIENCE TEACHER BEHAVIOR

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Interaction analysis has been employed in many areas of education. During the approximate ten years since the introduction of interaction analysis to the educator, interaction analysis has been employed in many types of research studies as well as being used as a tool in the preparation of teachers.

Interaction analysis has been applied as a research instrument and also has been employed as a treatment effect. Since interaction analysis makes it possible to quantify the occurrence of described behaviors and to also quantify the sequencing of these behaviors, interaction analysis has been used as a research tool to identify varied relationships and patterns of interactions within a teaching situation. By using interaction analysis

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the researcher is able to obtain numbers that can be treated statistically. For the teacher and supervisor, interaction analysis provides a basis for specific feedback during supervisory conferences.

When interaction analysis is employed as a treatment effect, that is to modify teacher behavior, several approaches are possible: (1) The teacher can be trained in using interaction analysis. (2) The supervisor can be trained in using interaction analysis. (3) Both the teacher and supervisor can be trained in using interaction analysis. The literature describes many studies where each of these treatment effects have been employed.

The treatment effect to be described here is the use of interaction analysis for feedback for the teaching of science. However, it should be pointed out that the system of interaction analysis that is to be described is also applicable to other content areas. This system of interaction analysis is The Instrument for the Analysis of Science Teaching (IAST). There are three forms of the IAST. However, only two of the forms are considered appropriate for use in modifying the behavior of teachers of science. The IAST Parts I and II (R & D Report Series Number 19) is not judged to be appropriate for teacher training. However, the IAST base and IAST v.2 are considered to be effective in modifying science teacher behavior.

The IAST base is a fourteen category system of interaction analysis which the teacher is trained in using. It has been demonstrated that teachers can easily learn fourteen categories. The IAST base was designed in such a way that the fourteen categories, the resulting matrix and

ratios emphasize behaviors that are considered to be important in science teaching. A Research and Development Center Instructional Module, The Analysis of Teaching Behavior, is a description of a method for introducing teachers to the categories of the IAST base. The Analysis of Teaching Behavior module also contains descriptions of activities that deal with construction and interpretation of ratios and matrices.

The IAST v.2 is a 32 category system of interaction analysis which supervisors would be trained in using. The 32 categories are based on the fourteen categories of the IAST base, the IAST v.2 categories being more refined and specifically defined subcategories of the IAST base categories. A supervisor can also provide specific feedback to teachers who have not been trained in using the IAST base. Once a teacher has been trained in using the IAST base, he is apt to find that the categories do not distinguish specifically enough between certain types of behavior such as teacher questions. The supervisor trained in using the IAST v.2 can then make suggestions for subdividing the IAST base categories to get at those specific behaviors that a teacher is concerned about.

The IAST base and the IAST v.2 make a complimentary package for modifying the behavior of teachers. By having some combination of teacher and supervisor IAST training, the supervisor and/or the teacher can identify specific areas for modification of teacher behavior. The IAST system then can function as a method for collecting data for feedback to the teacher on how well his attempts to modify his behavior are succeeding.

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IAST Base

TEACHER

1. Accept feelings: Recognizes and identifies with feelings of students (empathetic), non-evaluative encouragement or joking, positive affective response.

2. Praise: A positive value judgment.

3. Acceptance of student's statements: A restatement of the student's statement, either written on the board or verbal. This category would also include short, non-evaluative confirmation such as "okay," "all right."

4. Question: All questions which require a student response.

5. Direction: Giving directions and procedures; telling the students how to do something. This requires an immediate student response or behavior.

6. Initiate substantive information: Lecturing, giving facts, calculating, including writing new information on the board, and review information would be included in this category.

7. Justification of authority: Disciplinary action and criticism of a student's behavior would be included in this category. Also jokes that are injurious to one or more people.

8. Teacher controlled silence: Periods of silence which would include teacher demonstration, or a teacher examining her notes would be included under this category.

STUDENT

9. Student statements: This would include all student statements that are not questions.

10. Student questions: Questions asked by the students of one another or of the teacher would be placed in this category.

11. Affective response: Student responses that reflect student emotions or feelings.

12. Student activity: This would include activity such as students working in workbooks, reading silently to themselves or working with scientific apparatus, etc.

13. Division of student-to-student interaction: A mark for the separation between two students' interactions.

14. Nonfunctional behavior: Behavior without direction or purpose where no effective instruction is occurring.

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REACTIVE

1. Accept feelings:

   Recognizes and identifies with feelings of students (empathetic), non-evaluative encouragement or joking positive affective response.

2. Praise:

   A positive value judgment.

3. Acceptance of student's statements:

   - R — Restatement of student's statements. Expansion of student's statement, clarification of student's ideas, the restating of the idea of a student, either verbal or written, on the board.
   - Q — Questions student's statement inducing the student to clarify the student's statement.
   - S — Gives non-evaluative confirmation - "yes," "no," "okay," "all right" - a short response accepting student's ideas with no value judgement implied; no expansion or clarification of student's statement.

4. Question:

   - C — Closed - a narrow, specific, channeled question requiring a specific student response; application of simple or complex skills to a convergent, memorative, or cognitive situation.
   - O — Open - a broad question providing space for the student to be original in his response; a "think" type question.

5. Direction:

   - P — Giving directions and procedures, telling the students how to do substantive behaviors. This would require an immediate student response or behavior.
   - M — Managerial directions not dealing directly with content of the lesson.

TEACHER

6. Provide substantive information:

   - L Lecturing facts, calculations, etc., including writing new information on the board.
   - P Previous information; information presented from a previous class period.
   - R Reading aloud, e.g., from a textbook, teacher's commentary, etc.

7. Criticizes or rejects student's ideas or behaviors:

   Self justification and disciplinary statements that may be critical in a defensive manner and negative value responses to a student's idea establishing authority.

8. Teacher controlled silence:

   - D Teacher demonstration - a demonstration in front of the class while there is no verbal behavior.
   - C Controlled silence.
   - L Looking at notes or lesson plan.
   - E Preparing for and distributing material.

STUDENT

9. Student statements:

   - C Closed - student's statements that are cognitive, memorative or convergent in thought.
   - O Open - student's statements are divergent or evaluative in thought.
   - R Reading aloud -students reading from written material such as a textbook.

10 Student questions:

S	Substantive	C	Closed
P	Procedural	O	Open

11. Affective response:

   - P Positive affective response
   - N Negative affective response.

STUDENT

12. Student activity:

O	Overt activity: students raising their hands, lab activity, manipulating materials, and group response. This activity must be purposeful; a simultaneous verbal response by several students would also be in this category.
C	Covert activity: internalized behavior providing reading; this activity must be purposeful.
G	Group overt activity: where the class is subdivided into two or more groups.
X	Class (group) verbal response.

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13. Division of student-to-student interaction:

Student response to a mark for the separation between two student's interactions.

14. Nonfunctional behavior:

Behavior without direction or purpose.

BIBLIOGRAPHY

Amidon, E., Interaction Analysis: Background, Rationale, and Application to the Improvement of Instruction. Paper presented at the Administration Institute on the Process of Instruction, Queens College.

Bandis, J. C., "The Effects of Interaction Analysis Feedback on the Verbal Behavior of Student Teachers." Educational Leadership Research Supplement, May 1969. Pp. 794-799.

Campbell, J. R., Cognitive and Affective Process Development and Its Relation to a Teacher's Interaction Ratio. Paper presented at the annual meeting of NARST, Pasadena, 1969.

Flanders, N. A., Teacher Influence, Pupil Attitudes, and Achievements. Cooperative Research Monograph, No. 12. U.S. Government Printing Office, Washington, D. C., 1965.

Flanders, N. A., "Interaction Analysis and Inservice Training." Journal of Experimental Education, Fall, 1968. 37. Pp. 126-133.

Furst, N. and Amidon, E., "Teacher-Pupil Interaction Patterns in the Elementary School." In E. J. Amidon and J. B. Hough (Eds.), Interaction Analysis: Theory Research and Application. Reading, Mass.: Addison-Wesley, 1967. Pp. 167-175.

Hall, G. E., A Comparison of the Teaching Behaviors of Second Grade Teachers Teaching SCIENCE - A PROCESS APPROACH with Second Grade Teachers Not Teaching a Recently Developed Science Curriculum. Paper presented at the Forty-Second Annual Meeting of the National Association for Research in Science Teaching. Pasadena, February 1969.

Hall, G. E., The Instrument for the Analysis of Science Teaching: A System for Measuring Teaching Behavior. Report Series No. 19. The Research and Development Center for Teacher Education, University of Texas at Austin, 1969.

Hall, G. E., Analysis of Teaching Behavior. First Trial Edition. An Instructional Module. The Research and Development Center for Teacher Education, University of Texas at Austin, 1969.

Moskowitt, G. "The Attitude and Teaching Patterns of Cooperating Teachers and Student Teachers Trained in Interaction Analysis." In E. J. Amidon and J. B. Hough (Eds.), Interaction Analysis: Theory Research and Application. Reading, Mass.: Addison-Wesley, 1967. Pp. 271-282.

Pankratz, R., "Verbal Interaction Patterns in the Classrooms of Selected Physics Teachers." In E. J. Amidon and J. B. Hough (Eds.) Interaction Analysis: Theory Research and Application. Reading, Mass.: Addison-Wesley, 1967. Pp. 189-209.

Parakh, J. S., Teacher-Pupil Interaction in Biology Classes. Paper presented at the Annual National Association for Research in Science Teaching meeting, Chicago, February, 1968.

Stovlie, T., "Applications of Interaction Analysis to the In-Service Training of Teachers." In E. J. Amidon and J. B. Hough (Eds.) Interaction Analysis: Theory Research and Application. Reading, Mass.: Addison-Wesley, 1967. Pp. 262-270.

Strawitz, B., The Development and Evaluation of a Verbal Interaction System Designed to Modify the Verbal Behavior of Secondary Science Student Teachers. Doctoral Dissertation in progress. University of Texas at Austin, 1970.