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ABSTRACT

The research conducted in this study was specifically designed to examine the changes in teacher behavior exhibited during student teaching and those behaviors exhibited during the last three weeks of the subjects' first year of teaching. The specific behaviors examined were assessed by the Classroom Observation Record (which included four dimensions of pupil behavior and 18 dimensions of teacher behavior) and teacher behaviors which could be examined through a 16-category system of interaction analysis. The subjects were 50 secondary teachers who were completing their initial year of teaching, all of whom had been participants in a previous research study which established the "pre" data on teaching behaviors. Twenty-five were members of an experimental preservice program which emphasized indirect teaching behaviors. Twenty-five were members of a control group. Among the conclusions derived from extensive data were: (1) Certain teaching behaviors are significantly modified by teaching experience (e.g., increases in such areas as fairness, kindliness, responsiveness, understanding, poise, confidence, reliance upon directed practice and indirect methods); and (2) Significant differences existed between the experimental and control groups. (See document for detailed analysis.) Pupil behavior and teacher ability to stimulate students did not seem to be significantly altered as a result of teacher experience. (Author/ES)

FINAL REPORT

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TEACHING EXPERIENCE AS A MODIFIER OF TEACHING BEHAVIOR

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J. T. Sandefur, Project Director
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Emporia, Kansas

1969

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PART I

The Problem, Objectives, Related Research, and Design

I. The Problem

Teaching behavior, that is, the behavior of teachers as they relate to students in the teaching–learning process, has understandably become an important concern of educational researchers. Flanders[1] has amassed considerable evidence that teachers who display greater amounts of indirect influence are more effective than those who exert highly direct influence. Hough[2], Amidon[3], and Pankratz[4], through the use of interaction analysis systems, have provided support for Flanders' theories. Pankratz, for example, studied two groups of physics teachers of which one group was rated as highly effective and the other was rated as significantly less effective. He found that the more effective teachers used more praise for their students, accepted and used their ideas more often, asked more questions, and used more demonstration. More recently, Sandefur et al[5] found that a particular experimental program of professional preparation was significantly responsible for producing desired behavioral change in pre-service secondary teachers.

Despite the fact that research knowledge is increasing about the nature of effective teaching behavior and the relation of teacher preparation programs to teaching behavior, little is known about the extent to which teaching experience modifies teaching behavior. This lack of information is easily understood when one considers the difficulty of isolating experience as a research variable. The program is further compounded by the fact that teaching as a process or an outcome is neither easily identified nor easily measured.

The problem, that of determining the extent to which teaching experience modified the behavior of a selected group of first year secondary teachers, was identified as a result of previous research completed by the investigator in which the teaching behaviors of the subjects were carefully evaluated in their pre-service student teaching. In the previous research it was found that a specific program of professional preparation designed to elicit specific behaviors generally described as indirect and democratic was successful to a significant degree over a traditional and a conventional teacher preparation program[6]. The question arose as to the durability of these behaviors and the extent to which they are acquired as the result of experience in teaching rather than as a result of formal programs of teacher preparation.

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[1] Flanders, Ned A., Teacher Influence, Pupil Attitudes' and Achievement, Cooperative Research Monograph. No. 12, Washington, D.C.: United States Government Office, 1965.

[2] Amidon, E.J. and Hough, John B.. Editors, Interaction Analysis: Theory, Research and Application, Addison–Wesley Publishing Company, Reading, Massachusetts, 1967.

[3] Ibid., pp 329–345.

[4] Ibid., pp 189–209.

[5] Sandefur, J.T. et al, An Experimental Study of Professional Education for Secondary Teachers, Project No. 5–0768, Bureau of Research, U.S.O.E., Final Report, July 1967.

[6] Ibid.

The problem, then, is contained in the following question: To what extent does one year of teaching experience modify the initial teaching behaviors of secondary teachers, assuming that initial teaching behaviors are those exhibited during student teaching and that all data gathering techniques utilized during student teaching are carefully replicated near the end of the first year of teaching.

II. Hypotheses and Questions

A. Hypotheses

To further delineate the problem, the following hypotheses were formulated to be tested with the Classroom Observation Record as the measure of teacher behavior:

1. There are no significant differences in the teaching behavior of secondary teachers completing their first year of teaching when compared to their teaching behavior exhibited during student teaching.

2. There are no significant differences in the teaching behaviors exhibited at the end of the first year of teaching experience between 25 teachers who displayed highly indirect and democratic-influence in student teaching and 25 teachers who displayed more direct, authoritarian behavior during student teaching.

B. Questions

To delineate the problem with respect to those teaching behaviors measured by interaction analysis the following questions were stated:

1. How does the use of the 16 categories of verbal behavior for 50 first year teachers compare with their use of the same behavior during student teaching.

2. How do the verbal behaviors of 25 first year teachers who exhibited more indirect teaching behavior in student teaching compare with the verbal behaviors of 25 first year teachers who exhibited more direct teaching behaviors during student teaching.

3. How do verbal behaviors in the classrooms of 50 first year teachers compare with the verbal behaviors in the classrooms where they were student teachers, as measured by:
   a. the I/D ratio
   b. the revised I/D ratio
   c. the indirect/student talk ratio
   d. the direct/student talk ratio

III. Related Research

Of particular importance to the project was a study conducted by the investigators which was designed to determine the extent of behavioral change in students subjected to an experimental program of teacher preparation in comparison to those who followed a conventional teacher education program. All data collected were designed to reveal behavioral characteristics rather than factual information. The data were derived primarily from the Classroom Observation Record and a system of interaction analysis.

Data relevant to the Classroom Observation Record and interaction analysis were obtained by six independent observers who were not connected with the College or the project. The observers held not only the highest degrees in their fields but also positions which required them to demonstrate knowledge about teaching. The observers were trained to administer both the Classroom Observation Record and the 16–category system of interaction analysis. At the conclusion of their training, the observers were found to correlate in their judgments on both instruments at above .80.

The observers made three observational visits to each student of both the experimental and control groups. They attempted to space these visits at three-week intervals. The identity of the student's assignment to either the experimental or the control group was concealed from the observer who was instructed to enter the classroom when the student teacher was in charge, hold no conversation with the student, observe ten minutes, and to begin the interaction analysis precisely at the eleventh minute and continue through the thirtieth minute. The observer was then to observe the remainder of the period. At the end of the period, the observer was instructed to leave the classroom and complete the Classroom Observation Record immediately.

The data revealed several significant differences between the experimental and the control groups at the conclusion of the experimental program.

A. Findings from the Classroom Observation Record.

1. Pupils (public school) taught by students of the experimental group were rated by the observers as being more alert, responsible, confident, and initiating than those taught by students of the control group. The t-ratio computed on total pupil behavior was 3.364 and was statistically significant at the .001 level.

2. The students (college) of the experimental group were rated by the observers during their student teaching as being more fair, democratic, responsible, understanding, kindly, stimulating, original, alert, attractive, responsible, steady, poised, confident, systematic, adaptable, optimistic, integrated, and broad than were the students of the control group. The total teacher behavior mean rating for the experimental group was 101.78 as compared to a mean rating of 93.15 for the control group. The difference was statistically significant at the .001 level.

B. Findings from Interaction Analysis.

1. In terms of mean tallies per category, the students of the experimental group tended to use the following categories more frequently than did the students in the control group: Praise, Acceptance and Use of Ideas of Students, Teacher Questions, Answer Questions, Lecture, Student Talk, Student Questions, and Demonstration.

2. In terms of mean tallies per category the control group tended to use the following categories more frequently than did the experimental group: Corrective Feedback, Directions, Criticism, Directed Practice, Silence and Contemplation, and Confusion.

3. The academic area taught was more influential than the experimental program in determining the frequency of use of these categories: Praise and Reward, Corrective Feedback, Requests and Commands, Student Talk, Directed Practice, and Teacher Demonstration. The difference of usage of each of these categories attributable to the academic area was found through an analysis of variance to be statistically significant at the .01 level.

4. Students in science and mathematics used considerably fewer indirect activities than did students in the humanities.

5. Students in foreign language made more use of the direct categories than did students of other academic areas. They also made more use of the student talk categories.

6. Students in science and mathematics, and in practical arts, used more directed practice and more teacher demonstration than did students in other academic areas.

7. The i/d ratio (indirect categories 1, 2, and 3 divided by the direct categories 7, 8, and 9) of the experimental students as a group was significantly higher than was the i/d ratio of the control group. The difference was significant at the .01 level. In other words, the experimental students used more praise and reward and accepted and used the ideas of their students more, while using less corrective feedback, commands, and criticism than did the control group.

8. The significantly higher i/d ratio of the experimental students was found to be directly attributable to the experimental program.

9. The experimental students in the humanities used more praise, accepted and used the ideas of the students more, and had a higher i/d ratio, than did the control students in the humanities. The differences were significant at the .02, .01, and .001 levels.

10. An examination of the total matrices of the experimental and control students in the humanities revealed that the experimental students used the following patterns of teaching more frequently than did the control group:

    a. used more extended use of acceptance of ideas
    b. acceptance of students' ideas was more often followed by student talk
    c. used more extended use of teacher questions
    d. were less likely to command the student to answer the questions asked
    e. teacher questions were more often followed by student talk
    f. used more extended answering of student questions
    g. were more likely to have student talk following teacher questions
    h. were more likely to accept the students' ideas following student talk

One of the recommendations for further study was:

Considerable evidence was amassed in this study pointing out a significant difference in the teaching behaviors of the students in the experimental group as compared to those of the control group. Since all data were collected during the period of student teaching, it seems important that evidence of the durability of the change be collected. For example, will the difference still be evident after one year of teaching or after three years of teaching? It seems possible that the difference could diminish rapidly in the public schools, particularly if the teacher is under the supervision of traditional administrators. Therefore, it is recommended that further study be made concerning the durability of change achieved in pre-service programs such as this.

IV. Procedures

A. Definition of Terms

In order to clarify certain terms which have appeared repeatedly in the study, the following definitions have been made:

Teaching behavior: For purpose of this study, teaching behaviors are those actions of teachers, usually verbal, which can be identified through the classification of 16–category system of interaction analysis: specifically, verbal acceptance of feeling, praise or encouragement of students, accepting and using ideas of students, asking questions, lecturing, correcting students, giving directions, or criticizing or justifying authority. In addition to the behavior identified by the system of interaction analysis, the Classroom Observation Record assesses teaching behavior relevant to partiality, autocracy, aloofness, understanding, kindliness, ability to stimulate, originality, extent of apathy, attractiveness, responsiveness, excitability, confidence, flexibility, optimism, maturity, and depth of background.

Teaching experience: For the purpose of this study teaching experience is limited to the initial year of teaching.

B. The Experimental Design

1. The background of the study. As has been indicated in the Realted Research, the principal investigator conducted previous research in which it was established that a specific experimental program for the professional preparation of secondary teachers was able to produce significanlty different teaching behaviors from those exhibited in a more conventional program. As a result of the study extensive data were collected on the teaching behaviors of approximately 120 pre-service secondary teachers. It was from these data that the establishment of initial teaching behavior for the participants of the present study was made possible.

2. The population. The subjects of the study were 50 students who had participated in the previous study and for whom initial teaching behavior had been established by independent observers using a system of interaction analysis and the Classroom Observation Record. Of the 50 subjects, 25 had participated in the experimental group of the previous study and 25 had participated in the control group.

   The criteria for the selection of the subjects were that each subject (1) must have participated in the previous study, (2) be teaching in the state of Kansas, and (3) be willing to participate in the study. Of the 53 teachers who met the criteria, only three refused to participate and the remaining 50 became the population of the study. Complete data were collected on each of the 50 participants.

C. Data and Instrumentation

The purpose of this investigation was to determine the extent of behavioral change in secondary teachers who had completed their first year of teaching from the teaching behaviors exhibited during their student teaching. All data have replicated, as nearly as possible, those collected during the student teaching period. These data were derived from the Classroom Observation Record and a system of interaction analysis. Both the instruments and the procedures used to collect the data have been described in the following paragraphs.

1. The Classroom Observation Record. The Classroom Observation Record was developed by Dr. David G. Ryans from the Teacher Characteristics Study sponsored by the American Council on Education[8]. The Classroom Observation Record has attempted to assess four dimensions of pupil behavior and 18 dimensions of teacher behavior on a seven-point, or seven-dimension, scale; the specific behaviors contributing to the descriptions of the 22 dimensions have been presented in Figure 1.

   Three Classroom Observation Records were completed for each subject during the last four weeks of his first year of teaching. The Records were completed at approximately one-week intervals by the independent observers. The subject's former assignment to either the experimental or the control group of the previous study was concealed from the observer to prevent observer bias. The observers were instructed to enter the classroom when the teacher was instructing, to observe the entire class period, to hold minimum conversation with the teacher, and to complete the Classroom Observation Record immediately upon leaving the Classroom.

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[8] Ryans, David G. Characteristics of Teachers: Their Description, Comparison, and Appraisal. Washington, D.C.: American Council on Education, 1960, p.450.

FIGURE 1

Classroom Observation Record

Teacher Characteristics Study

Teacher_____ No.____ Sex____ Class or Subject_____

City_____ School_____ Time_____ Observer____

PUPIL BEHAVIOR									REMARKS:
1. Apathetic	1	2	3	4	5	6	7	N	Alert
2. Obstructive	1	2	3	4	5	6	7	N	Responsible
3. Uncertain	1	2	3	4	5	6	7	N	Confident
4. Dependent	1	2	3	4	5	6	7	N	Initiating
TEACHER BEHAVIOR									
5. Partial	1	2	3	4	5	6	7	N	Fair
6. Autocratic	1	2	3	4	5	6	7	N	Democratic
7. Aloof	1	2	3	4	5	6	7	N	Responsive
8. Restricted	1	2	3	4	5	6	7	N	Understanding
9. Harsh	1	2	3	4	5	6	7	N	Kindly
10. Dull	1	2	3	4	5	6	7	N	Stimulating
11. Stereotyped	1	2	3	4	5	6	7	N	Original
12. Apathetic	1	2	3	4	5	6	7	N	Alert
13. Unimpressive	1	2	3	4	5	6	7	N	Attractive
14. Evading	1	2	3	4	5	6	7	N	Responsible
15. Erratic	1	2	3	4	5	6	7	N	Steady
16. Excitable	1	2	3	4	5	6	7	N	Poised
17. Uncertain	1	2	3	4	5	6	7	N	Confident
18. Disorganized	1	2	3	4	5	6	7	N	Systematic
19. Inflexible	1	2	3	4	5	6	7	N	Adaptable
20. Pessimistic	1	2	3	4	5	6	7	N	Optimistic
21. Immature	1	2	3	4	5	6	7	N	Integrated
22. Narrow	1	2	3	4	5	6	7	N	Broad

Figure 1 (Continued)

GLOSSARY

(To be used with classroom observation record.)

Pupil Behaviors

1. Apathetic-Alert Pupil Behavior

Apathetic	Alert
1. Listless.	1. Appear anxious to recite and participate.
2. Bored-acting.	2. Watch teacher attentively.
3. Enter into activities half-heartedly.	3. Work concentratedly.
4. Restless.	4. Seem to respond eargerly.
5. Attention wanders.	5. Prompt and ready to take part in activities when they begin.
6. Slow in getting under way.	

2. Obstructive-Responsible Pupil Behavior

Obstructive	Responsible
1. Rude to one another and/or to teacher.	1. Courteous, co-operative, friendly with each other and with teacher.
2. Interrupting; demanding attention; disturbing.	2. Complete assignments without complaining or unhappiness.
3. Obstinate; sullen.	3. Controlled voices.
4. Refusal to participate.	4. Received help and criticism attentively.
5. Quarrelsome; irritable.	5. Asked for help when needed.
6. Engaged in name-calling and/or tattling.	6. Orderly without specific directions from teacher.
7. Unprepared	7. Prepared.

3. Uncertain-Confident Pupil Behavior

Uncertain	Confident
1. Seem afraid to try; unsure.	1. Seem anxious to try new problems or activities.
2. Hesitant; restrained.	2. Undisturbed by mistakes.
3. Appear embarrassed.	3. Volunteer to recite.
4. Frequent display of nervous habits, nail-biting, etc.	4. Enter freely into activities.
5. Appear shy and timid.	5. Appear relaxed.
6. Hesitant and/or stammering speech.	6. Speak with assurance.

4. Dependent-Initiating Pupil Behavior

Dependent	Initiating
1. Rely on teacher for explicit directions.	1. Volunteer ideas and suggestions.
2. Show little ability to work things out for selves.	2. Showed resourcefulness.
3. Unable to proceed when initiative called for.	3. Take lead willingly.
4. Appear reluctant to take lead or to accept responsibility.	4. Assume responsibilities without evasion.

Figure 1 (Continued)

Teacher Behaviors

5. Partial-Fair Teacher Behavior

Partial	Fair
1. Repeatedly slighted a pupil.	1. Treated all pupils approximately equally.
2. Corrected or criticized certain pupils repeatedly.	2. In case of controversy pupil allowed to explain his side.
3. Repeatedly gave a pupil special advantages.	3. Distributed attention to many pupils.
4. Gave most attention to one or a few pupils.	4. Rotated leadership impartially.
5. Showed prejudice (favorable or unfavorable) towards some social, racial, or religious groups.	5. Based criticism or praise on factual evidence, not hearsay.
6. Expressed suspicion of motives of a pupil.	

6. Autocratic-Democratic Teacher Behavior

Autocratic	Democratic
1. Tells pupils each step to take.	1. Guided pupils without being mandatory.
2. Intolerant of pupils' ideas.	2. Exchanged ideas with pupils.
3. Mandatory in giving directions; orders to be obeyed at once.	3. Encouraged (asked for) pupil opinion.
4. Interrupted pupils although their discussion was relevant.	4. Encouraged pupils to make own decisions.
5. Always directed rather than participated.	5. Entered into activities without domination.

7. Aloof-Responsive Teacher Behavior

Aloof	Responsive
1. Stiff and formal in relations with pupils.	1. Approachable to all pupils.
2. Apart; removed from class activity.	2. Participates in class activity.
3. Condescending to pupils.	3. Responded to reasonable requests and/or questions.
4. Routine and subject matter only concern; pupils as persons ignored.	4. Speaks to pupils as equals.
5. Referred to pupil as "this child" or "that child."	5. Commends effort.
	6. Gives encouragement.
	7. Recognized individual differences.

8. Restricted-Understanding Teacher Behavior

Restricted	Understanding
1. Recognized only academic accomplishments of pupils; no concern for personal problems.	1. Showed awareness of a pupil's personal emotional problems and needs.
2. Completely unsympathetic with a pupil's failure at a task.	2. Was tolerant of error on part of pupil.
3. Called attention only to very good or very poor work.	3. Patient with a pupil beyond ordinary limits of patience.
4. Was impatient with a pupil.	4. Showed what appeared to be sincere sympathy with a pupils' viewpoint.

Figure 1 (Continued)

9. Harsh-Kindly Teacher Behavior

Harsh	Kindly
1. Hypercritical; fault-finding.	1. Goes out of way to be pleasant and/or to help pupils; friendly.
2. Cross; curt.	2. Give a pupil a deserved compliment.
3. Depreciated pupil's efforts; was sarcastic.	3. Found good things in pupils to call attention to.
4. Scolds a great deal.	4. Seemed to show sincere concern for a pupil's personal problem.
5. Lost temper.	5. Showed affection without being demonstrative.
6. Used threats.	6. Disengaged self from a pupil without bluntness.
7. Permitted pupils to laugh at mistakes of others.	

10. Dull-Stimulating Teacher Behavior

Dull	Stimulating
1. Uninteresting, monotonous explanations.	1. Highly interesting presentation; gets and holds attention without being flashy.
2. Assignments provide little or no motivation.	2. Clever and witty, though not smart-alecky or wise-cracking.
3. Fails to provide challenge.	3. Enthusiastic; animated.
4. Lack of animation.	4. Assignments challenging.
5. Failed to capitalize on pupil interests.	5. Took advantage of pupil interests.
6. Pedantic, boring.	6. Brought lesson successfully to a climax.
7. Lacks enthusiasm; bored acting.	7. Seemed to provoke thinking.

11. Stereotyped-Original Teacher Behavior

Stereotyped	Original
1. Used routine procedures without variation.	1. Used what seemed to be original and relatively unique devices to aid instruction.
2. Would not depart from procedure to take advantage of a relevant question or situation.	2. Tried new materials or methods.
3. Presentation seemed unimaginative.	3. Seemed imaginative and able to develop presentation around a question or situation.
4. Not resourceful in answering questions or providing explanations.	4. Resourceful in answering question; had many pertinent illustrations available.

12. Apathetic-Alert Teacher Behavior

Apathetic	Alert
1. Seemed listless; languid; lacked enthusiasm.	1. Appeared buoyant; wide-awake; enthusiastic about activity of the moment.
2. Seemed bored by pupils.	2. Kept constructively busy.
3. Passive in response to pupils.	3. Gave attention to, and seemed interested in, what was going on in class.
4. Seemed preoccupied.	4. Prompt to "pick up" class when pupils' attention showed signs of lagging.
5. Attention seemed to wander.	
6. Sat in chair most of time; took no active part in class activities.	

Figure 1 (Continued)

13. Unimpressive-Attractive Teacher Behavior

Unimpressive	Attractive
1. Untidy or sloppily dressed.	1. Clean and neat.
2. Inappropriately dressed.	2. Well-groomed; dress showed good taste.
3. Drab, colorless.	3. Posture and bearing attractive.
4. Posture and bearing unattractive.	4. Free from distracting personal habits.
5. Possessed distracting personal habits.	5. Plainly audible speech; good expression; agreeable voice tone; good inflection.
6. Mumbled; inaudible speech; limited expression; disagreeable voice tone; poor inflection.	

14. Evading-Responsible Teacher Behavior

Evading	Responsible
1. Avoided responsibility; disinclined to make decisions.	1. Assumed responsibility; makes decisions as required.
2. "Passed the buck" to class, to other teachers, etc.	2. Conscientious.
3. Left learning to pupil, failing to give adequate help.	3. Punctual.
4. Let a difficult situation get out of control.	4. Painstaking; careful.
5. Assignments and directions indefinite.	5. Suggested aids to learning.
6. No insistance on either individual or group standards.	6. Controlled a difficult situation.
7. Inattentive with pupils.	7. Gave definite directions.
8. Cursory.	8. Called attention to standards of quality.
	9. Attentive to class.
	10. Thorough.

15. Erratic-Steady Teacher Behavior

Erratic	Steady
1. Impulsive; uncontrolled; temperamental; unsteady.	1. Calm; controlled.
2. Course of action easily swayed by circumstances of the moment.	2. Maintained progress toward objective.
3. Inconsistent.	3. Stable, consistent, predictable.

16. Excitable-Poised Teacher Behavior

Excitable	Poised
1. Easily disturbed and upset; flustered by classroom situation.	1. Seemed at ease at all times.
2. Hurried in class activities; spoke rapidly using many words and gestures.	2. Unruffled by situation that developed in classroom; dignified without being stiff or formal.
3. Was "jumpy"; nervous.	3. Unhurried in class activities; spoke quietly and slowly.
	4. Successfully diverted attention from a stress situation in classroom.

17. Uncertain-Confident Teacher Behavior

Uncertain	Confident
1. Seemed unsure of self; faltering, hesitant.	1. Seemed sure of self; self-confident in relations with pupils.
2. Appeared timid and shy.	2. Undisturbed and unembarrassed by mistakes and/or criticism.
3. Appeared artificial.	
4. Disturbed and embarrassed by mistakes and/or criticism.	

Figure 1 (Continued)

18. Disorganized-Systematic Teacher Behavior

Disorganized	Systematic
1. No plan for class work.	1. Evidence of a planned though flexible procedure.
2. Unprepared.	2. Well prepared.
3. Objectives not apparent; undecided as to next step.	3. Careful in planning with pupils.
4. Wasted time.	4. Systematic about procedure of class.
5. Explanations not to the point.	5. Had anticipated needs.
6. Easily distracted from matter at hand.	6. Provided reasonable explanations.
	7. Held discussion together; objectives apparent.

19. Inflexible-Adaptable Teacher Behavior

Inflexible	Adaptable
1. Rigid in conforming to routine.	1. Flexible in adapting explanations.
2. Made no attempt to adapt materials to individual pupils.	2. Individualized materials for pupils as required; adapted activities to pupils.
3. Appeared incapable of modifying explanation or activities to meet particular classroom situations.	3. Took advantage of pupils' questions to further clarify ideas.
4. Impatient with interruptions and digressions.	4. Met an unusual classroom situation competently.

20. Pessimistic-Optimistic Teacher Behavior

Pessimistic	Optimistic
1. Depressed; unhappy.	1. Cheerful; good-natured.
2. Skeptical.	2. Genial.
3. Called attention to potential "bad."	3. Joked with pupils on occasion.
4. Expressed hopelessness of "education today," the school system, or fellow educators.	4. Emphasized potential "good."
	5. Looked on bright side; spoke optimistically of the future.
5. Noted mistakes; ignored good points.	6. Called attention to good points; emphasized the positive.
6. Frowned a great deal; had unpleasant facial expression.	

21. Immature-Integrated Teacher Behavior

Immature	Integrated
1. Appeared naive in approach to classroom situations.	1. Maintained class as center of activity; kept self out of spotlight; referred to class's activities, not own.
2. Self-pitying; complaining; demanding.	2. Emotionally well controlled.
3. Boastful; conceited.	

22. Narrow-Broad Teacher Behavior

Narrow	Broad
1. Presentation strongly suggested limited background in subject or material; lack of scholarship.	1. Presentation suggested good background in subject; good scholarship suggested.
2. Did not depart from text.	2. Drew examples and explanations from various sources and related fields.
3. Failed to enrich discussions with illustrations from related areas.	3. Showed evidence of broad cultural background in science, art, literature, history, etc.
4. Showed little evidence of breadth of cultural background in such areas as science, arts, literature, and history.	4. Gave satisfying, complete, and accurate answers to questions.
5. Answers to pupils' questions incomplete or inaccurate.	5. Was constructively critical in approach to subject matter.
6. Noncritical approach to subject.	

a. Selection of the Independent Observers. One of the critical aspects of the investigation was the selection of the Independent Observers. The investigators believed that the observers should be independent and associated with neither the project nor the College. Since the Classroom Observation Record required some value judgments on the part of the observers, it was believed desirable that the observers should hold the highest degree in their field of specialization and also should be serving in a position which required demonstrated competence in instruction. The names and positions of the five observers chosen are as follows:

Dr. Ralph Chalendar, Principal, Milburn Junior High School, Shawnee Mission, Kansas

Dr. Wayne Craven, Principal, Hillcrest Junior High School, Shawnee Mission, Kansas

Dr. Ruth Stout, Associate Secretary of the Kansas State Teachers Association, Topeka, Kansas and past president of NEA

Dr. Dale Jantze, Head, Department of Education, Friends University, Wichita, Kansas

Dr. Donald Barber, Head, Department of Education, Saint Mary of the Plains College, Dodge City, Kansas

b. Training of the Observers. The observers were brought to the campus for three training sessions. The initial training session was of two days duration during which the observers were acquainted with the Classroom Observation Record and the Glossary. The observers were instructed in the prescribed use of the Record and given several opportunities to practice on video tapes of teaching situations after which the observers compared their observations. The observers were instructed never to use the record without having the Glossary before them and to limit their observations to those descriptions contained in the Glossary.*

At the conclusion of the three training sessions, the observers were shown four video tapes which they had not seen before and asked to complete a Classroom Observation Record for each. Each video-tape had a duration of 20 to 50 minutes. Correlations were computed between the observers on the four observations and the results have been presented in Table 1.

A high degree of correlation was found between the observers on the four video-tapes. The highest correlation was between observers 4 and 5 (.98), and a lowest correlation was between observers 1 and 4 (.76). The average correlation between all observers was .88.

*See page 8.

Table 1. The average coefficients of correlation between the five observers over 22 items of the classroom observation record[a]

Observer	1	2	3	4	5
1	1.00	.82	.82	.76	.87
2		1.00	.87	.96	.97
3			1.00	.87	.88
4				1.00	.98
5					1.00

[a] Average correlations were computed through Fisher's z.

2. The System of Interaction Analysis. A 16-category observational system for the analysis of classroom instruction developed by John B. Hough was used in the study. A summary of the 16 categories has been shown in Figure 2[9].

[9] The 16–category system shown in Figure 2 was developed by John B. Hough and is a modification of Flanders' 10–category system of Interaction Analysis. This 16–category system is described in "An Observational System for Analysis of Classroom Instruction," a paper read at the American Educational Research Association's National Convention in 1965.

Category Number		Description of Verbal Behavior
1		ACCEPTS FEELING: accepts and clarifies the feeling and tone of students in a nonthreatening manner. Feelings may be positive or negative. Predicting and recalling feelings are also included.
2	TEACHER	PRAISES OR ENCOURAGES: praises or encourages student action or behavior. Jokes that release tension not at the expense of another individual, nodding head or saying "uh-huh" or "go on" are included.
3		ACCEPTS OR USES IDEAS OF STUDENT: clarifying, building on, developing and accepting ideas of students.
4		ASKS QUESTIONS: asking a question about content or procedure with the intent that the student should answer.
5		ANSWERS STUDENT QUESTIONS: direct answers to questions regarding content or procedure asked by students.
6	TALK	LECTURES: giving facts or opinions about content or procedures; expressing his own ideas; asking rehetorical questions.
7		CORRECTIVE FEEDBACK: telling a student that his answer is wrong when the incorrectness of the answer can be established by other than opinion, i.e., empirical validation, definition or custom.
8		GIVES DIRECTIONS: directions, commands or orders to which a student is expected to comply.
9		CRITICIZES OR JUSTIFIES AUTHORITY: statements intended to change student behavior from a nonacceptable to an acceptable pattern; bawling out someone; stating why the teacher is doing what he is doing so as to achieve or maintain control; rejecting or criticizing a student's opinion or judgment.

Figure 2. Summary of the 16 Categories in the Observational System for the Analysis of Classroom Instruction.

10	STUDENT TALK	STUDENT TALK-RESPONSE: talk by students in response to requests or narrow teacher questions. The teacher initiates the contact or solicits student's statement.
11		STUDENT TALK-EMITTED: talk by students in response to broad teacher questions which require judgment or opinion. Student declarative statements emitted but not called for by teacher questions.
12		STUDENT QUESTIONS: questions concerning content or procedure that are directed to the teacher.
13	SILENCE	DIRECTED PRACTICE OR ACTIVITY: non-verbal behavior requested or suggested by the teacher. This category is also used to separate student to student response.
14		SILENCE AND CONTEMPLATION: silence following questions, periods of silence interspersed with teacher talk or student talk and periods of silence intended for the purpose of thinking.
15		DEMONSTRATION: silence during periods when visual materials are being shown or when non-verbal demonstration is being conducted by the teacher.
16	NON-FUNCTIONAL	CONFUSION AND IRRELEVANT BEHAVIOR: periods when the noise level is such that the person speaking cannot be understood or periods of silence that have no relation to the purposes of the classroom.

Figure 2. Continued

The 16–category system of interaction analysis was used for a 20–minute interval in each of three visits made by the independent observers. Again the information concerning the subjects' assignment to either the experimental or the control group during the previous research project was withheld from the observer. The observer's instructions were to enter the classroom when the subject was teaching, observe the class for 10 minutes, begin the system of interaction analysis precisely at the eleventh minute and continue through the thirtieth minute. At the end of the three observations, a full 60 minutes of interaction analysis had been recorded for each subject.

a. Selection of Independent Observers. The same independent observers who collected data with the interaction analysis system collected data with the Classroom Observation Record.

b. Training of the Independent Observers. The observers were trained in the use of the interaction analysis system in the same training sessions in which they were instructed in the use of the Classroom Observation Record. They were first required to become so familiar with the 16 categories that they could readily categorize any teaching act. The instructions accompanying the Flanders' Interaction Analysis System were used[10]. The instructions required that the observer write the number of the category occurring in the classroom every three seconds or every time the category changed. The observer, writing approximately 20 numbers per minute, recorded these numbers sequentially in a column.

In the initial training sessions, audio-tapes were used in short sequences after which the instructor discussed the categories with the observers and compared their results. Video-tapes were used in later training sessions to stimulate the classroom more nearly. After having used video-tapes, the observers went into the classrooms in their own schools to practice the system until they felt confident in its use. More than 30 hours were spent in training. Finally, the observers were asked to conduct the system of observation on two audio-tapes 15 minutes and 20 minutes in length which they had not used previously as a check on their accuracy. Inter-observer reliability coefficients were computed by a formula suggested by Scott[11]. The reliability coefficients of the five observers on the two reliability checks ranged from .75 to .94.

D. Statistical Methods

Statistical treatments were applied to data from the Classroom Observation Record and from the system of interaction analysis. The techniques have been described in the following paragraphs:

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[10] Flanders, Ned A. "Teacher Influence Pupil Attitudes and Achievement," Final Report; 1960, University of Minnesota; Project 397; United States Department of Health, Education, and Welfare; Cooperative Research Programs; Office of Education.

[11] Scott, W. A. "Reliability of Content Analysis: The Case of Nominal Coding". The Public Opinion Quarterly, 1955, p. 321–325.

1. The Classroom Observation Record. The Classroom Observation Record was actually administered six times to each subject: three administrations were made during the last three weeks of the subjects' student teaching and three administrations were given one year later during the last three weeks of the subjects' first year of teaching. Scores made during the pre-service student teaching were established as the "pre" data and scores made at the end of the first year of teaching were considered to be the "post" data. Of the 50 subjects of the study, 25, designated as Group A, were participants in a previous research study in which they were taught a system of interaction analysis and encouraged to use indirect or democratic teacher influence in the classroom. The second sub-group, designated Group B, were participants of the previous research who were in the control group and who experienced a conventional teacher–education curriculum, and who, presumably, could be considered as typical teachers. The composite scores of Group A and B have been used to determine the extent of behavioral change for the combined groups.

   The data from the Classroom Observation Record were examined first by establishing "t" values for the pre and post data of Group A, Group B, and the combined groups. The formula was:

$$t = \frac{X_1 - X_2}{\sqrt{\frac{s^2}{N_1} + \frac{s^2}{N_2}}}$$

where

s^2 is the unbiased variance estimate used to obtain an estimate of the standard error of the difference between the means.[12]

An analysis of covariance was used to determine if there was a difference between the post test scores between Group A and Group B. The covariate used was the pre-test scores. The complete randomized one-factor design was used as by Myers in Fundamentals of Experimental Design, Allyn and Bacon, Inc. Boston, 1966, pp. 301–315.

2. Interaction Analysis. The results obtained from interaction analysis have been reported in tables structured to show the mean percentages of tallies in each of the 16 categories for Group A and B and the combined groups.

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[12] Ferguson, George M. Statistical Analysis in Psychology and Education, McGraw–Hill New York, 1966, pp. 167–169.

PART II

Interpretation of Data

As was described in Part I, data were obtained for 50 secondary teachers who were completing their first year of teaching. The teachers were participants in a previously conducted research project in which data relevant to their teaching behavior were collected during their student teaching. The data collected herein was at the end of their first year of teaching and were a replication of data collected in the previous study. The major assumption of the research was that any major change in teaching behavior found at the conclusion of the initial year of teaching as compared to behavior in student teaching might reasonably be attributed to the effects of one year of teaching experience.

The 50 secondary teachers in this study represented all but two students of the prior project who were completing their initial year of teaching in Kansas schools. Of this number, 25 subjects were members of the experimental group of the original project and 25 were members of the control group. In an effort to determine whether the previous treatments to which each of the groups were exposed in their pre-service teacher education program could be differentiated, those originally assigned to the experimental group have been designated as Group A, and those assigned to the control group have been designated as Group B. All statistical presentations have been made to designate Group A, Group B, and the total or combined groups.

All data presented in this part were obtained from two sources: (1) independent observers who made three visits to the classroom of each participant and completed a Classroom Observation Record and (2) also conducted a 20-minute session of interaction analysis during each visit. The identity of the participants assignment to Group A or Group B was concealed from the observer in order to prevent bias.

Data relevant to the Classroom Observation Record have been presented in tables structured to identify the group, mean score, t-ratio, and level of significance. The data relevant to the system of interaction analysis have been treated statistically to reveal the mean percentages of tallies in each category, and, where appropriate, analysis of covariance and the level of probability or significance.

For the purpose of this study, it was determined that a t-ratio or F-test must equal or exceed the .05 level of confidence to be considered significant. Probabilities equalling or exceeding the .01 level of confidence have been considered very significant, and scores showing significance at or beyond the .001 level have been considered highly significant.

A. The Classroom Observation Record

The Classroom Observation Record required that the observer make judgments on four dimensions of pupil behavior and eighteen dimensions of teacher behavior. The observer's judgments were recorded on a seven-point scale. To avoid problems of definition and semantics, the observers limited the criteria upon which judgments were made to those descriptive statements of the specific behavior contained in the Glossary (see page 8 of Part I). Inter-observation correlation was found to exceed .88.

20.
Tables 2, 3, and 4 have presented the student teaching ratings and the experienced teacher ratings on the Classroom Observation Record for Group A, Group B, and the total Group indicating the t-value and the probability.

Table 2. A comparison of mean ratings, t-values and the significance of the student teacher and experienced teacher ratings on the Classroom Observation Record for Group A.[1]

BEHAVIOR	Mean Rating		t	p
	Pre	Post		
PUPIL BEHAVIOR				
1. Apathetic—Alert	5.480a	5.720	1.169	N.S.
2. Obstructive—Responsible	5.667	5.933	1.380	N.S.
3. Uncertain—Confident	5.413	5.627	1.186	N.S.
4. Dependent—Initiating	4.933	5.387	2.054	N.S.
TEACHER BEHAVIOR				
5. Partial—Fair	6.133	6.266	0.950	N.S.
6. Autocratic—Democratic	5.223	5.560	1.469	N.S.
7. Aloof—Responsive	5.587	6.173	3.343	.01
8. Restricted—Understanding	5.627	6.133	2.751	.05
9. Harsh—Kindly	5.520	6.187	2.916	.01
10. Dull—Stimulating	5.173	5.560	1.839	N.S.
11. Sterotyped—Original	4.267	4.960	3.005	.01
12. Apathetic—Alert	5.640	5.907	1.544	N.S.
13. Unimpressive—Attractive	5.960	6.373	2.806	.01
14. Evading—Responsible	5.800	6.173	1.907	N.S.
15. Erratic—Steady	6.093	6.333	1.834	N.S.
16. Excitable—Poised	5.933	6.387	3.185	.01
17. Uncertain—Confident	5.920	6.360	2.958	.01
18. Disorganized—Systematic	5.760	6.093	1.774	N.S.
19. Inflexible—Adaptable	5.387	5.747	1.817	N.S.
20. Pessimestic—Optimistic	5.787	6.080	1.656	N.S.
21. Immature—Integrated	5.413	6.013	3.499	.01
22. Narrow--Broad	4.893	5.720	4.488	.001

1. Group A represents a sub-group of 25 participants of a previous study in which they were encouraged to use indirect teacher influence.

a. Mean ratings above 4.0 describe the behavior listed at the right.

Table 3. A comparison of the mean ratings, t-values, and significance of the student teacher and experienced teacher ratings on the Classroom Observation Record for Group B.

BEHAVIOR	Mean Rating		t	p
	Pre	Post		
PUPIL BEHAVIOR				
1. Apathetic–Alert	4.933	5.000	0.271	N.S.
2. Obstructive–Responsible	5.387	5.440	0.226	N.S.
3. Uncertain–Confident	4.747	4.787	0.177	N.S.
4. Dependent–Initiating	4.293	4.413	0.491	N.S.
TEACHER BEHAVIOR				
5. Partial–Fair	5.760	6.253	3.385	.01
6. Autocratic–Democratic	4.720	4.760	0.167	N.S.
7. Aloof–Responsive	5.427	5.680	1.498	N.S.
8. Restricted–Understanding	5.560	5.600	0.240	N.S.
9. Harsh–Kindly	5.560	5.760	1.033	N.S.
10. Dull–Stimulating	4.880	4.907	0.127	N.S.
11. Sterotyped–Original	3.867a	4.000	0.494	N.S.
12. Apathetic–Alert	5.413	5.453	0.219	N.S.
13. Unimpressive–Attractive	5.893	6.160	1.867	N.S.
14. Evading–Responsible	5.493	5.813	1.545	N.S.
15. Erratic–Steady	5.680	6.080	2.418	.05
16. Excitable–Poised	5.627	6.160	2.932	.01
17. Uncertain–Confident	5.520	6.160	3.670	.001
18. Disorganized–Systematic	5.680	5.813	0.717	N.S.
19. Inflexible–Adaptable	5.067	5.280	1.053	N.S.
20. Pessimistic–Optimistic	5.600	5.907	1.782	N.S.
21. Immature–Integrated	5.187	5.400	1.088	N.S.
22. Narrow–Broad	4.667	5.133	2.229	.05

a. Mean ratings below 4.0 describe the behavior listed at the left whereas ratings above 4.0 describe the behavior listed at the right.

Table 4. A comparison of the mean ratings, t-values and significance of the student teacher and experienced teacher ratings on the Classroom Observation Record for the combined Groups A and B.

BEHAVIOR	Mean Rating Pre	Mean Rating Post	t	p
PUPIL BEHAVIOR				
1. Apathetic–Alert	5.207	5.360	0.936	N.S.
2. Obstructive–Responsible	5.527	5.687	1.041	N.S.
3. Uncertain–Confident	5.067	5.207	0.925	N.S.
4. Dependent–Initiating	4.613	4.900	1.677	N.S.
TEACHER BEHAVIOR				
5. Partial–Fair	5.946	6.260	3.073	.01
6. Autocratic–Democratic	4.960	5.147	1.079	N.S.
7. Aloof–Responsive	5.507	5.927	3.407	.001
8. Restricted–Understanding	5.593	5.867	2.173	.05
9. Harsh–Kindly	5.540	5.973	2.882	.01
10. Dull–Stimulating	5.027	5.233	1.367	N.S.
11. Stereotyped–Original	4.067	4.480	2.270	.05
12. Apathetic–Alert	5.533	5.673	1.103	N.S.
13. Unimpressive–Attractive	5.927	6.267	3.312	.01
14. Evading–Responsible	5.647	5.993	2.418	.05
15. Erratic–Steady	5.887	6.207	2.992	.01
16. Excitable–Poised	5.780	6.273	4.247	.001
17. Uncertain–Confident	5.720	6.260	4.668	.001
18. Disorganized–Systematic	5.713	5.947	1.757	N.S.
19. Inflexible–Adaptable	5.227	5.513	2.003	.05
20. Pessimistic–Optimistic	5.693	5.993	2.429	.05
21. Immature–Integrated	5.300	5.707	3.068	.01
22. Narrow–Broad	4.780	5.427	4.576	.001

Tables 2, 3, and 4 show higher ratings in all categories of behavior in assessments made at the end of the first year of teaching over ratings assessed during student teaching for Groups A, B, and the total group. Group A, for example received significantly higher mean ratings in nine of the 18 behaviors described. They were found by the observers to be more responsive, more understanding, more kindly, more original, poised, confident, integrated, broad, and even more attractive. Each of these descriptive behaviors were significant at the .01 level or greater.

Group B received significantly higher experienced teacher ratings in five of the 18 teacher behaviors. At the .05 level of significance they were found to be more steady and broader. Significantly higher post ratings at the .01 level of significance were found in behaviors listed as fair and poised. The gain in teaching confidence of Group B was significant at the .001 level.

The total group of 50 teachers were found to have received significantly higher experienced teacher ratings in all but four of the 18 teacher behaviors. The behaviors in which a significant change was not found were autocratic–democratic, dull–stimulating, apathetic–alert, and disorganized–systematic. It is interesting to note that confidence, poise, responsiveness, and broadness increased to an extent significant at the .001 level. They also become more kindly and less partial at the .01 level of significance.

Table 5 has presented a comparison of the composite ratings for Pupil Behavior, Teacher Behavior, and Total Behavior for Groups A, B, and the combined groups.

Table 5. A comparison of mean ratings, t-values, and significance of student teacher and experienced teacher ratings on the Classroom Observation Record for Pupil Behavior, Teacher Behavior, and Total Behavior.

GROUP	BEHAVIOR	Pre Test	Post Test	t	p
A	Pupil	21.40	22.67	1.224	N.S.
	Teacher	100.08	108.00	2.137	.05
	Total	121.48	130.67	2.085	.05
B	Pupil	19.41	19.64	0.240	N.S.
	Teacher	95.56	100.32	1.360	N.S.
	Total	114.97	119.96	0.930	N.S.
TOTAL	Pupil	20.41	21.17	0.919	N.S.
	Teacher	97.69	104.16	2.420	.05
	Total	118.10	125.23	1.969	N.S.

Table 5 reveals no significant differences on the student teacher and experienced teacher rating of pupil behavior for Group A, B, or the combined groups. On the ratings of teacher behavior, however, Group A increased their mean rating from 100.08 to 108.00, which proved to be significant at the .05 level. Group B increased their mean rating in this area from 95.56 to 100.32, a difference which did not prove to be statistically significant at the .05 level. The total or combined Groups A and B increased their total mean ratings on teacher behavior from 97.69 to 104.16, a difference significant at the .05 level. The rating on the total instrument for the total group was not significant.

It was decided to apply an analysis of covarience to the differences on the experienced teacher ratings on the Classroom Observation Record using the student teacher ratings as the covariate. Tables 6, 7, and 8 have presented data obtained from an analysis of covariance between the experienced teacher ratings of the Classroom Observation Record for Groups A and B on Pupil Behavior, Teacher Behavior, and on the Total Instrument. This has been structured to show the sources, the degrees of freedom, the F-values and the levels of significance.

Table 6. An analysis of Covariance on Pupil Behavior of the Classroom Observation Record between Groups A and B.

SOURCE	DF	SS adj.	MS adj.	F	p
Between Group	1	49,088.398	49,088.398	2.632	N.S.
Within Group	47	876,490.080	18,748.725		
TOTAL	48	925,578.478			

Table 7. An analysis of covariance on Teacher Behavior of the Classroom Observation Record between Groups A and B.

SOURCE	DF	SS adj.	MS adj.	F	p
Between Group	1	1519.8764	1519.8764	13.942	.01
Within Group	47	5123.6567	109.0139		
TOTAL	48	6443.5331			

Table 8. An analysis of covariance on the Classroom Observation Record, total Instrument, between Groups A and B.

SOURCE	DF	SS adj.	MS adj.	F	p
Between Group	1	1,029,368	1,029,368	5.179	.05
Within Group	47	9,341,808	198,761		
TOTAL	48	10,371,177			

An examination of tables 6, 7, and 8 reveals no significant change in Pupil Behavior ratings between Groups A and B. Group A, however, made growth in ratings on Teacher Behavior beyond that made by participants in Group B at the .01 level of significance. When the total Classroom Observation Record was examined through an analysis of variance, Group A made gains in ratings above those of Group B at the .05 level of significance.

B. Interaction Analysis

A system of interaction analysis was used which classified verbal teaching behavior into one of 16 categories. The categories were the following: (1) Accepts Student Feeling, (2) Praise and Reward, (3) Accepts And Uses Student's Ideas, (4) Teacher Asks Questions, (5) Teacher Answers Student's Questions, (6) Lecture, (7) Corrective Feedback, (8) Requests and Commands, (9) Criticism, (10 and 11) Student Talk, Response and Initiated, (12) Student's Questions, (13) Directed Practice, (14) Contemplation, (15) Teacher Demonstration, and (16) Confusion And Irrelevant Behavior.

As in the Flanders' System, each trained observer wrote the category number of the interaction he had just observed every three seconds or every time the category changed. The observer, writing approximately 20 numbers per minute, recorded the numbers sequentially in a column. The sequence of numbers thus acquired was recorded in pairs in a 16-row by 16-column table or matrix according to the method developed by Flanders[13]. Composite matrices representing three 20-minute observations for each participant were prepared.

From the composite matrices it was possible to determine the number of tallies and the percentage of time spent in each of the categories by the teachers of Group A and B and the total or combined groups. Table 9 has presented a comparison of the average percentage of tallies of Group A in each of the 16 categories of teacher behavior.

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[13] Flanders, Ned A., Teacher Influence, Pupil Attitudes, and Achievement, Cooperative Research Monograph No. 12, Washington, D. C.: U. S. Government Office, 1965.

Table 9. A comparison of the student teacher and experienced teacher mean percentage of tallies in each of the 16 categories per hour of observation for participants in Group A[1].

AREA	No. CATEGORY	Percentage of Tallies		Difference	Percentage of Tallies by Areas[4]
		Pre[2]	Post[3]		
INDIRECT INFLUENCE	1. Accepts Feeling	0.42	0.33	−0.09	0.39
	2. Praise and Reward	0.85	0.67	−0.18	
	3. Accepts Ideas	13.16	12.78	−0.38	
	4. Asks Questions	7.94	7.71	−0.23	
	5. Answers Questions	4.15	5.42	1.27	
DIRECT INFLUENCE	6. Lectures	23.27	20.39	−2.88	−4.33
	7. Corrective Feedback	0.69	0.55	−0.14	
	8. Gives Directions	4.35	3.10	−1.25	
	9. Criticizes	0.49	0.55	−0.06	
STUDENT TALK	10. Student Talk, Response	13.88	14.51	0.63	1.17
	11. Student Talk, Initiated	4.94	4.97	0.03	
	12. Student Questions	3.76	4.27	0.51	
NON−VERBAL	13. Directed Practice	14.70	19.74	5.04	5.83
	14. Silence	3.63	1.81	1.82	
	15. Demonstration	3.08	2.05	−1.03	
	16. Confusion	1.14	1.13	−0.01	

1. Group A represents a sub-group of 25 participants who had participated in a previous research study in which they were encouraged to use indirect teacher influence.

2. Data collected during student teaching.

3. Data collected during last month of the initial year of teaching.

4. Categories 1−5 represent indirect teacher influence.
   Categories 6−9 represent direct teacher influence.
   Categories 10−12 represent student talk.
   Categories 13−16 represent non−verbal behavior.

As can be seen in Table 9, Group A was observed to have changed teaching behavior by one or more percentage points in categories 5, 6, 8, 13, 14, and 15 at the end of their first year of teaching experience from that exhibited during their student teaching. A replication of data collection methods was used. The members of Group A as first year teachers answered more questions (1.27%), lectured less (2.88%), gave fewer directions (1.25%), gave more directed practice (5.04%), had less silence (1.82%), and gave fewer demonstrations (1.03%), than they did as student teachers.

When the categories were grouped by areas such as indirect teacher influence, categories 1--5, the subjects of Group A as first year teachers extended their indirect influence by an 0.39 per cent. Apparently more significant was the fact that they reduced their direct influence, categories 6--9, by 4.33 per cent. All categories of student talk, 10, 11, and 12, increased by 1.17 per cent. Non--verbal activities increased by 5.83 per cent, primarily as a result of increased directed practice (5.04%).

A comparison of the mean percentage of the tallies in each of the 16 categories per hour of observation for participants in Group B have been presented in Table 10.

Table 10. A comparison of the student teacher and experienced teacher mean percentage of tallies in each of the 16 categories per hour of observation for participants of Group B.[1]

AREA	NO. CATEGORY	Percentage of Tallies		Difference	Percentage of Tallies by Areas[4]
		Pre[2]	Post[3]		
INDIRECT INFLUENCE	1. Accepts Feeling	0.48	0.32	−0.16	
	2. Praise and Reward	0.51	0.65	0.14	
	3. Accepts Ideas	9.02	8.08	−0.94	1.21
	4. Asks Questions	5.63	5.90	0.27	
	5. Answers Questions	3.48	5.38	1.90	
DIRECT INFLUENCE	6. Lectures	25.79	17.66	−8.13	
	7. Corrective Feedback	0.89	1.00	0.11	
	8. Gives Directions	6.01	4.90	−1.11	-8.02
	9. Criticizes	0.53	0.81	0.28	
STUDENT TALK	10. Student Talk, Response	12.14	15.80	3.66	
	11. Student Talk, Initiated	4.55	3.14	−1.41	4.57
	12. Student Questions	2.61	4.93	2.32	
NON−VERBAL	13. Directed Practice	21.02	24.60	3.58	
	14. Silence	3.54	2.61	−0.93	
	15. Demonstration	3.09	1.69	−1.40	3.06
	16. Confusion	0.70	2.51	1.81	

1. Group B represents a sub-group of 25 participants who completed a regular teacher−education curriculum and may be expected to exhibit typical teaching behavior.
2. Data collected during student teaching.
3. Data collected during last month of initial year of teaching.

As indicated in Table 10, Group B was observed to have changed teaching behavior by one or more percentage points in categories 5, 6, 8, 10, 11, 12, 13, 15, and 16 at the end of their first year of teaching experience from those behaviors exhibited during their student teaching. A replication of data collection methods was used. Group B as first year teachers was observed to answer more questions (1.90%), to lecture less frequently (8.13%), to give fewer directions (1.11%), to have more student talk in response (3.66%), and less student initiated talk (1.41%), to have more student questions (2.32%), to have more directed practice (3.58%), to give fewer demonstrations (1.40%), and to experience more confusion (1.81%) than as student teachers.

Group B increased teacher indirect influence by 1.21 per cent and decreased their direct teacher influence by 8.02 per cent, primarily in questions and responses to the teacher. Non–verbal activities increased by 3.06 per cent, primarily as the result of increased directed practice.

The combined mean percentage of tallies in each of the 16 categories per hour of observation for both Groups A and B appear in Table 11.

Table 11. A comparison of the student teacher–experienced teacher mean percentage of tallies in each of 16 categories per hour of observation of 50 first year secondary teachers.

AREA	NO. CATEGORY	Percentage of Tallies		Difference	Percentage of Tallies by Areas[4]
		Pre[2]	Post[3]		
INDIRECT INFLUENCE	1. Accepts Feeling	0.45	0.32	–0.13	
	2. Praise and Reward	0.68	0.66	–0.02	
	3. Accepts Ideas	11.10	10.42	0.32	1.78
	4. Asks Questions	6.79	6.81	0.03	
	5. Answers Questions	3.82	5.40	1.58	
DIRECT INFLUENCE	6. Lectures	24.53	19.02	–5.51	
	7. Corrective Feedback	0.79	0.78	–0.01	–6.51
	8. Gives Directions	5.17	4.01	–1.16	
	9. Criticizes	0.51	0.68	0.17	
STUDENT TALK	10. Student Talk, Response	15.01	15.16	2.15	
	11. Student Talk, Initiated	4.52	4.05	–0.47	3.20
	12. Student Questions	3.09	4.60	1.51	
NON–VERBAL	13. Directed Practice	17.84	22.18	4.35	
	14. Silence	3.59	2.21	–1.38	
	15. Demonstrations	3.09	1.85	–1.25	2.62
	16. Confusion	0.92	1.82	0.90	

1. Data collected during student teaching.
2. Data collected during the last month of the initial year of teaching.

As shown in Table 11, 50 secondary teachers completing their initial year of teaching indicated a change in teaching behavior of one or more percentage points in categories 5, 6, 8, 10, 12, 13, 14 and 15 over those behaviors exhibited during their student teaching. For example, they answered more questions (1.58%), gave fewer lectures (5.51%), gave fewer directions (1.61%), had more student talk in response (2.15%), had more student questions (1.51%), gave more directed practice (4.35%), had fewer extended periods of silence (1.38%), and gave fewer demonstrations (1.25%).

The total or combined groups expanded their indirect influence by 1.78 per cent while reducing their direct influence by 6.51 per cent. Their students talked more, by 3.20 per cent and there was 2.62 per cent more non-verbal activity.

As has been described in Chapter 1, interaction analysis data were collected by trained observers who wrote the number of the category occurring in a classroom every three seconds in a vertical column. For a statistical analysis of these data, the tallies were tabulated and plotted into a 16 x 16 matrix in pairs which permitted an analysis of the activities which followed any given category as well as permitted the determination of extended activity in a given category. An example of a matrix showing a tabulation of tallies for the total group on data collected during student teaching is presented in Figure 3.

FIGURE 3.

A Tabulation of Tallies of the Total Groups From Observations Made During Student Teaching

CATEGORIES	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	TOTAL
Feelings	76	2	29	32		40	2	18		11	13	24	26	6	6	4	279
Praise	8	22	104	116	7	39	9	19	2	31	18	19	14	11	10	4	433
Accepts	54	223	3939	809	5	467	56	148	15	503	150	169	91	165	195	27	6,915
Ask Questions	11	1	55	725		100	6	651	10	1923	34	99	60	501	23	17	4,216
Answers Questions	21	14	116	124	1095	143	11	65	14	64	100	290	191	61	39	30	2,378
Lectures	24	7	61	717	1	13199	11	215	25	193	55	190	144	157	146	43	15,288
Corrective Feed back	3	1	94	42	2	25	118	11	4	114	8	10	17	28	6	3	486
Directions	10	5	40	107	2	131	5	1285	32	825	65	90	393	189	31	16	3,226
Criticizes			20	35	1	38	3	28	105	23	5	12	20	16	4	9	320
Student talk - Response	25	117	936	677	12	289	217	227	46	3595	85	104	409	186	120	51	8,095
Student talk - Initiated	15	10	254	104	6	44	14	18	18	8	1979	67	233	21	7	11	2,819
Student Questions		7	14	55	1219	3	6	4	6	7	47	549	23	17	6	2	1,965
Directed Practice	8	10	70	181		185	15	307	17	369	208	272	9389	17	15	55	11,118
Silence & Con templation	13		98	300	8	239	20	156	13	373	24	58	37	824	46	17	2,226
Demonstration	7		158	161	13	261		36	1	41	11	17	22	24	1161	9	1,922
Confusion	6	4	22	42	5	75		33	10	20	12	24	40	10	8	266	577
TOTALS	281	423	6969	4227	2376	15268	492	3221	318	8100	2814	1984	11109	2233	1923	574	62,253
PERCENT	0.45	0.68	11.10	6.79	3.82	34.53	0.79	5.17	0.51	13.01	4.52	3.19	17.84	3.59	3.09	0.92	100.000

When a matrix is plotted, the columns and rows are totaled and the percentage for each category can be computed. One can, for example, determine the ratio of indirect activities (Columns 1–5) to the direct activities (Columns 6–9) by dividing the sum of the indirect columns by the sum of the direct columns. The result obtained is called the I/D ratio. The completed matrix may be further analyzed to show patterns of interaction in the classroom by identifying areas of the matrix which contain common elements. The following figure and identification of areas were prepared by John Hough*.

An Observational System for the Analysis of Classroom Instruction

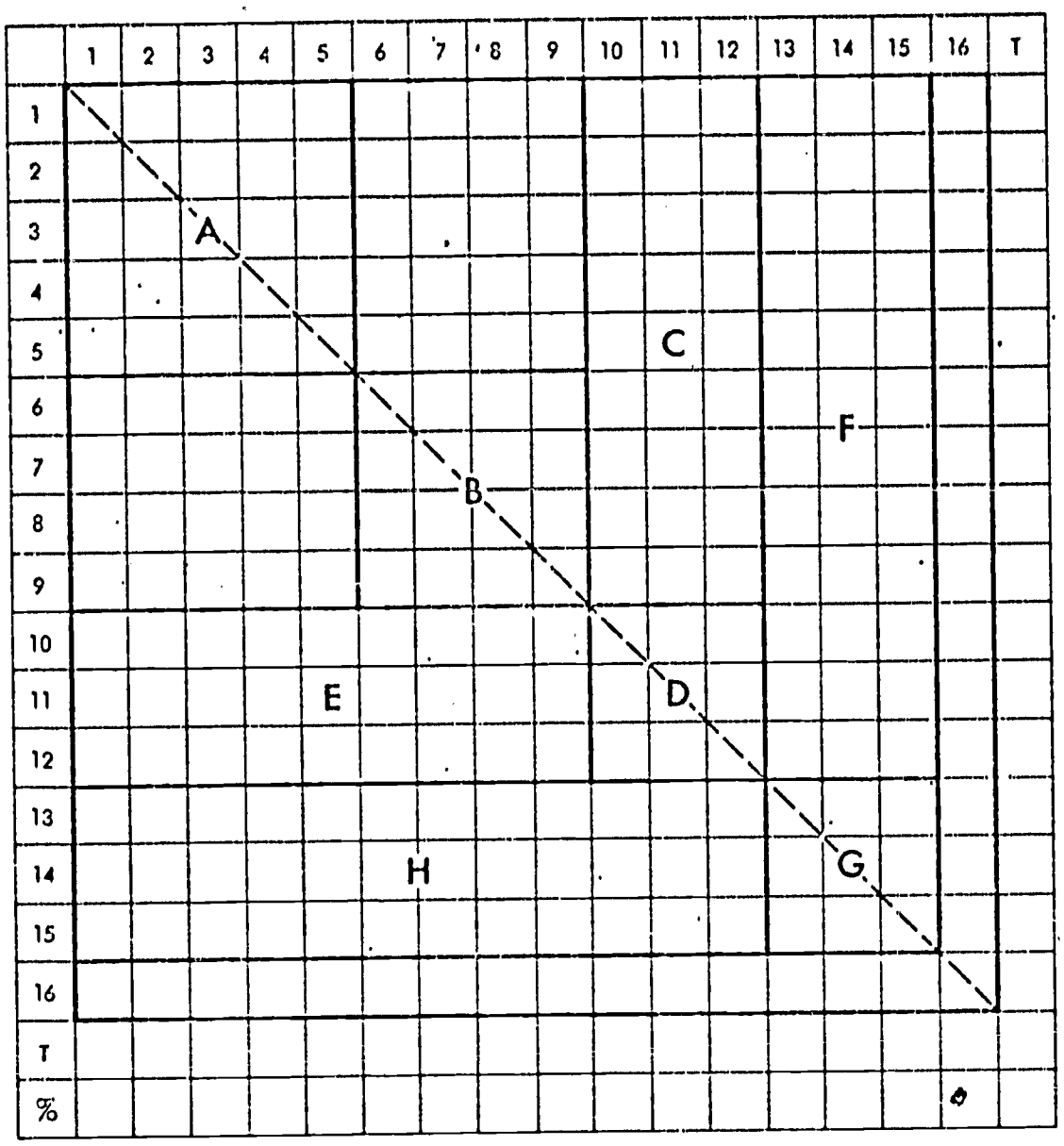

FIGURE 4.

*Interaction Analysis: Theory, Research, and Application, Edited by Edmund Amidon and John Hough, Addison-Wesley Publishing Company, Reading, Massachusetts, 1967, pp. 156–157.

The areas identified in Figure 4 are:

Area A: Contains all instances of extended indirect influence. For example, when a teacher uses extended praise or extended acceptance, tally marks will be plotted into this area, as will instances of transition from one indirect category to another, e.g., shifts from answering student questions to praise.

Area B: Contains all instances of extended direct influence. For example, when a teacher uses extended lecture or extended directions, tally marks will be plotted in this area, as will instances of transition from one direct category to another, e.g., shifts from lecture to criticism of student behavior.

Area C: Contains all instances of student talk following teacher talk. All cells in area C are transition cells; that is, they indicate the beginning of student talk following teacher talk. For example, when a student responds to a teacher's question, the beginning of such a response would be entered in this area, as would student responses to directions or corrective feedback.

Area D: Contains all instances of extended student talk. For example, when a student continues to talk for an extended period of time, tally marks will be plotted in this area, as will all instances of transition from one student—talk category to another, e.g., shifts from an emitted response to asking the teacher a question.

Area E: Contains all instances of teacher talk following student talk. All cells in area E are transition cells; that is, they indicate the beginning of teacher talk following student talk. For example, if a teacher praised a student's answer, the information would be entered in this area, as it would in the case of teacher criticism or acceptance of student responses.

Area F: Contains all instances of silence following either teacher or student talk. All cells in area F are transition cells; that is, they indicate the beginning of periods of silence following talk.

Area G: Contains all instances of extended silence. For example, if a teacher tells the class to think about something for a few minutes, their silence would be indicated in Area G.

Area H: Contains all instances of teacher or student talk following silence. For example, a teacher has asked a question which has been followed by silence. He repeats the question, and the initiation of the second question, following the silence, is plotted in Area H.

A comparison of Groups A, B, and the combined groups percentage of tallies in areas A through H on pre and post data from interaction analysis has been presented in Table 12.

Table 12. A pre–post comparison of the percentage of tallies in area A through H.

AREA DESCRIPTION	GROUP A			GROUP B			COMBINED GROUP		
	Pre[1]	Post[2]	Dif.	Pre	Post	Dif.	Pre	Post	Dif.
A. Extended Indirect	13.90	13.89	0.01	10.10	9.07	–1.03	12.01	11.47	–0.54
B. Extended Direct	22.25	18.16	–4.09	26.72	17.68	–9.04	24.47	17.92	–6.55
C. Student talk Followed By Teacher talk	9.61	10.85	1.24	6.68	9.21	2.53	8.16	10.03	1.87
D. Extended Student talk	10.50	9.12	–1.38	10.19	9.84	–0.35	10.35	9.48	–0.87
E. Teacher talk Following Student talk	9.89	11.30	1.41	7.26	9.91	2.65	8.58	10.61	2.03
F. Silence Following Teacher or Student talk	5.97	7.13	1.16	5,86	7.94	2.08	5.91	7.54	1.63
G. Extended Silence	15.37	16.42	1.05	21.72	20.87	–0.85	18.53	18.65	0.12
H. Teacher or Student Talk Following Silence	5.91	7.07	1.16	5.81	7.82	2.01	5.86	7.45	1.59

1. Data collected during student teaching.

2. Data collected at the end of the first year of teaching.

It is interesting to note that Group A, those who had received pre-service training in the use of indirect influence, remained relatively constant in their use of extended indirect influence (Area A), while Group B actually decreased their extended indirect influence by 1.03 per cent. It is equally interesting to note that Group A spent 13.89 per cent of their time in extended indirect activity to 9.07 per cent by Group B.

Both Groups A and B considerably reduced their use of extended direct influence by the end of their first year of teaching, Group A by 4.09 per cent and Group B by 9.04 per cent. Attention should be called to the apparently significant decrease in Group B's use of extended influence as compared to Group A. Although initially Group A used 22.25 per cent and Group B used 26.72 per cent extended direct influence during student teaching, this difference had been reduced to 18.16 per cent and 17.92 per cent respectively by the end of the initial year of teaching.

Area C, student talk followed by teacher talk increased more for Group B (2.53%) than for Group A (1.24%). The post score for Group B, however, did not equal the student teacher score for Group A. Group B also experienced more change in Area E, teacher talk following student talk, (2.65%) but again did not reach the level of Group A.

Another means of examining data obtained from interaction analysis is the determination of ratios. For example, to analyze teacher use of direct and indirect verbal behavior, called the I/D ratio, the sum of the tallies in the indirect categories (1 through 5) by the sum of the tallies in the direct categories (6 through 9). If, for example, the total sum of tallies for indirect categories were 1000 and the sum of tallies for the direct categories were 1000, 1000/1000=1, the I/D ratio would be 1.0.

Table 13 has presented ratios for Indirect/Direct verbal activity, the Indirect/Student talk ratio and the Direct/Student talk ratio.

Table 13. Interaction analysis Ratios for Groups A, B, and the combined groups.

RATIO	GROUP A		GROUP B		TOTAL	
	Pre	Post	Pre	Post	Pre	Post
INDIRECT–DIRECT RATIO 1,2,3,4,5, 6,7,8.9	0.92	1.09	0.57	.084	0.74	0.96
REVISED INDIRECT–DIRECT RATIO 1,2,3, 7,8,9	2.62.	3.27	1.35	1.35	1.89	2.09
INDIRECT–STUDENT TALK RATIO 1,2,3,4,5, 10,11,12	1.18	1.13	0.99	0.85	1.10	0.99
DIRECT–STUDENT TALK RATIO 6,7,8,9, 10,11,12	1.30	1.04	1.93	1.04	1.50	1.03

The extent to which the ratio of indirect verbal activity to direct verbal activity changed during the first year of teaching is easily read from Table 13. The I/D ratio for Group A changed from .92 to 1.09 indicating more indirect activity in proportion to direct activity. An even greater change in I/D ratio occurred in Group B although Group B post ratio never equalled the pre-ratio of Group A.

The shift toward more indirect verbal activity in proportion to the direct verbal activity is shown to be even more pronounced when a revised I/D ratio was computed. Group A with a revised I/D ratio of 3.27 clearly indicates the teachers' use of indirect categories 1, 2, and 3 to be more than three times more frequent than their use of the direct categories 6, 7, and 8. Group B, in contrast, used indirect categories one 1.35 times more frequently than the direct categories. The total group increased their revised I/D ratio from 1.89 to 2.09, indicating increased use of indirect categories in proportion to the direct categories.

The Indirect/Student talk ratio showed an increase in student talk in proportion to the use of indirect verbal activity in all cases. The Direct/Student talk ratio indicated a decrease in the use of direct verbal activity in proportion to student talk with the greatest change being shown by Group B.

PART III

Summary, Findings, and Conclusions

A. Summary

The research conducted in this study was specifically designed to examine the changes in teacher behavior exhibited during student teaching and those behaviors exhibited during the last three weeks of the subjects' first year of teaching. The specific behaviors examined were assessed by the Classroom Observation Record which included four dimensions of pupil behavior and 18 dimensions of teacher behavior, and the teacher behaviors which could be examined through a 16-category system of interaction analysis.

The subjects were 50 secondary teachers who were completing their initial year of teaching. All of the subjects had been participants in a previous research study which established the "pre" data on teaching behaviors. That is to say that during the student teaching experience in the last semester of their senior year three administrations were made of the Classroom Observation Record and three 20-minute sessions of interaction analysis were conducted. All data were collected by a team of six independent observers who held the highest degrees in their field and who were especially trained to administer the COR and the system of interaction analysis.

The previous research of which the subjects of this study were participants was conducted under a basic research grant from the Bureau of Research of the U.S. Office of Education[14]. The previous study accepted the results of research by Flanders, Amidon, and others which presented evidence that teachers who used more indirect teacher influence tended to teach more effectively and had fewer disciplinary problems than did more direct teachers. Consequently, the study attempted to provide evidence that pre-service secondary teachers could be sensitized to the use of indirect teacher influence in teacher training programs. That assumption was tested through the establishment of an experimental program of professional education which emphasized indirect influence through familiarization with interaction analysis, micro-teaching, observation, participation and seminars. The resultant behaviors of the experimental group were significantly different from those exhibited by a randomly selected control group who were exposed to the conventional professional education courses. The differences were significant generally at the .01 level of significance.

Of the 50 participants of the present study, 25 were members of the former experimental group and 25 were members of the control group. Since the selection of the participants was based on the use of all the participants of the former study who were teaching in Kansas and available, it was considered a bonus to find the exact division between experimental and control subjects and it was considered appropriate to treat them statistically as sub-groups in order to determine if the initial differences had diminished as would be expected. Consequently the 25 who were former members of the experimental group were designated as Group A and the former control group was designated Group B. The composite of the ratings of Group A and B was used to examine the behavioral changes of the participants which might reasonably be attributed to the results of one year of teaching experience.

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[14] Sandefur, Op Cit.

Two hypotheses and three questions were formulated to be tested by the experimental design:

1. Hypotheses

To further delineate the problem, the following hypotheses were formulated to be tested by the Classroom Observation Record as the measure of teacher behavior.

a. There are no significant differences in the teaching behavior of secondary teachers completing their first year of teaching when compared to their teaching behavior exhibited during student teaching.

b. There are no significant differences in the teaching behaviors exhibited at the end of the first year of teaching experience between 25 teachers who displayed highly indirect and democratic influence in student teaching and 25 teachers who displayed more direct, authoritarian behavior during student teaching.

2. Questions

To delineate the problem with respect to those teaching behaviors measured by interaction analysis the following questions were stated:

a. How does the use of the sixteen categories of verbal behavior for 50 first year teachers compare with their use of the same behaviors during student teaching.

b. How do the verbal behaviors of 25 first year teachers who exhibited more indirect teaching behavior in student teaching compare with the verbal behaviors of 25 first year teachers who exhibited more direct teaching behaviors during student teaching.

c. How do verbal behaviors in the classrooms of 50 first year teachers compare with the verbal behaviors in the classrooms where they were student teachers as measured by:
   1. the I/D ratio
   2. the revised I/D ratio
   3. the indirect/student talk ratio
   4. the direct/student talk ratio

B. Findings

All findings were derived from data collected through the use of the Classroom Observation Record and the 16–category system of interaction analysis. The data revealed several significant differences between the teaching behaviors demonstrated during student teaching and those demonstrated at the end of the first year of teaching. Significant differences were observed between the two sub-groups.

1. Findings from the Classroom Observation Record:

a. At the end of the first year of teaching nine teaching behaviors of Group A were found to differ significantly at the .01 level of significance from those behaviors as exhibited during student teaching. Specifically, the

teachers of Group A became significantly more responsible, more understanding, more kindly, taught with more originality, were judged to be more attractive, more poised, more confident, more mature and integrated, and demonstrated more breadth in teaching.

b. At the end of the first year of teaching, five teaching behaviors of Group B were found to differ significantly. At the .05 level of significance the teachers were found to be more steady as opposed to erratic, and more broad as opposed to narrow in teaching content. At the .01 level of significance, the teachers of Group B were found to demonstrate more evidence of fairness as opposed to partiality, more poise, and more confidence.

c. For the total group, 14 of the 18 teacher behaviors were found to have changed significantly at the end of the initial teaching year. The categories of behavior in which no significant change was found were: autocratic–democratic, dull–stimulating, apathetic–alert, disorganized–systematic.

d. For both Groups A and B and for the total group, no significant differences were found in the four categories of pupil behavior.

e. The change of ratings on the 18 categories of teacher behaviors between the pre and post administration was significant at the .05 level for Group A and for the total group. The change for Group B was not found to be significant.

f. When an analysis of covariance was applied to change in teacher behavior between Group A and B, using the pre tests as a covariate, the difference was found to be significant at the .01 level. The difference was in terms of more desirable ratings for Group A.

g. The analysis of covariance applied to all 22 behaviors, including pupil behavior, between Groups A and B, has indicated the change was significant at the .05 level.

2. Findings from interaction analysis

a. In categories 1 through 5 which indicate indirect teacher influence, Group A increased their indirect influence by 0.39 per cent over that exhibited during student teaching.

b. Group A, however, decreased their use of categories 6, 7, 8, and 9, the direct influence categories, by 4.33 per cent.

c. Student talk increased for Group A by 1.17 per cent.

d. Non–verbal activities increased by 5.83 per cent in Group A, primarily as a result of increased directed practice.

e. Group B increased the use of indirect categories 1–5 by 1.21 per cent and decreased the direct categories 6–9 by 8.02 per cent. They increased student talk by 4.57 per cent. Student talk in response to the teacher increased by 3.66 per cent while student talk initiated declined by 1.41 per cent.

f. For the total group, indirect activity increased by 1.78 per cent, direct activity decreased by 6.51 per cent, and student talk increased by 3.20 per cent.

g. Group B experienced approximately twice as much change in extended direct teacher talk (9.04%) as did Group A (4.09%). Both groups diminished the amount of extended direct influence by 6.55%.

h. The I/D ratio increased for all groups indicating that the proportion of indirect activities to direct activities increased.

i. When the revised I/D ratio was determined, (categories 1, 2, 3) it was found that Group A increased the ratio from 2.62 to 3.27 while Group B remained constant at a ratio of 1.35. For the total group, the ratio increased from 1.89 to 2.09.

j. The ratio of student talk to indirect teacher talk increased for Group A (1.18 to 1.13), Group B (.99 to .85) and the total group (1.10 to .99).

k. The ratio of student talk in direct teacher talk decreased for Group A (1.30 to 1.04), Group B (1.93 to 1.04), and the total group (1.50 to 1.02).

C. Conclusions

From an analysis of data obtained from the Classroom Observation Record and interaction analysis, the following conclusions have been drawn:

1. Conclusions relevant to the Classroom Observation Record:

   a. Changes in pupil behavior as a result of the teachers' experience were not observable in this study.

   b. Changes in the teachers behaviors which were attributable to experience observable at significant levels were:

      (1) Teachers become more fair with students as a result of experience.
      (2) Teachers demonstrate more kindliness, responsiveness, and understanding toward students as a result of experience.
      (3) Experience modifies teacher behaviors of poise and confidence significantly.
      (4) The ability to stimulate students as a behavior does not seem to be significantly altered as a result of experience.

2. Conclusions drawn from interaction analyses:

   a. Teachers seem to reduce the percentage of time spent lecturing as a result of experience.

   b. Experienced teachers tend to spend more time in directed practice than do inexperienced teachers.

c. The ratio of indirect verbal activity to direct verbal activity appears to increase with experience.

d. Extended direct influence appears to diminish as a result of experience.

e. Teachers sensitized in pre-service professional programs to the use of indirect teacher influence, specifically to the acceptance of feeling, praise and encouragement, and acceptance of students ideas, seem to expand the use of these categories as compared to their use of direct categories of directions, criticisms, and corrective feedback.

3. General Conclusions

a. Certain teaching behaviors are significantly modified by teaching experience, consequently, hypothesis number 1 was rejected.

b. Significant differences existed between the two sub-groups A and B, therefore, hypothesis number 2 was rejected.

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