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ABSTRACT

Nineteen beginning preservice science teachers were randomly assigned to one of the following treatments given in the first two weeks of the semester: a) training in interaction analysis (a modification of Hall's instrument for the analysis of science teaching; b) training in conducting and interpreting Piaget-type interviews; and c) a control group of elementary school methods lectures on graph interpretation. In a one-to-one setting with elementary students, teacher behavior and concern level were measured at pre-, post-, and delayed post-test sessions. Pretest scores were used as covariates. Concern levels increased immediately after treatment but decreased to initial levels at the end of the semester, regardless of treatment. Of thirteen teacher behaviors measured by the interaction analysis instrument the only one to change significantly was the flexibility score of the interaction-analysis trained group, which increased over the long-term, but not in the time of treatment. (Authors/AL)

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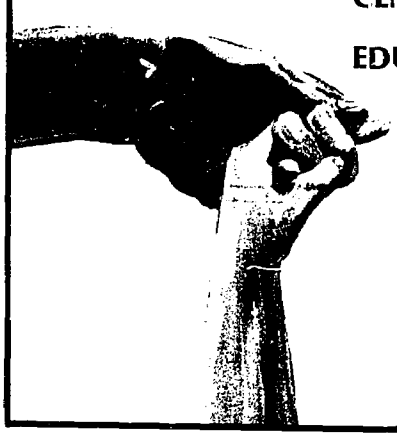

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PIAGET INTERVIEWS AND INTERACTION ANALYSIS IN THE PREPARATION OF SCIENCE TEACHERS: A COMPARISON

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ABSTRACT

The lack of teaching experience by preservice teachers appears to be a serious hindrance to their perception of relevance in education course content. It was felt that an introductory experience might be devised which would mitigate this problem. Two experiences designed to develop perceptual frameworks, that is, means for bringing education course content into personal relevance, were tested in this study. Fuller's (1969) conceptualization of teacher concerns is closely related to relevance perception. This study examined the effects of two experimental and one control experiences on change in teacher behavior and concern level.

Forty-nine beginning preservice teachers were randomly assigned to one of theee treatments: (1) training in interaction analysis, (2) training in conducting and interpreting Piaget-type interviews with children, and (3) a control treatment of elementary school science methods. The treatments were given during the first two weeks of the semester. Teacher behavior and concern level were measured on a pre, post, delayed post basis. Science lessons taught one-to-one to elementary pupils by the subjects were analyzed by the Instrument for Analysis of Science Teaching (Hall) for behavior data.

Using analysis of covariance with pretest scores as the covariate, the results were as follows:

1. Type of introductory experience made no difference in change in concern level. Concern levels increased immediately after

treatment but decreased to initial levels by the end of the semester, regardless of type of treatment.

2. Type of introductory experience made little difference in teacher behavior change. One four of thirteen behavior factors tested showed significant findings. The interaction analysis group became more flexible than did the Piaget-type interviewing groups.

It was concluded that flexibility may be the first behavior factor of those examined to be altered by interaction analysis training. More intensive training with successive behavior measures during and after treatments was recommended to determine other differentiations in treatment effects. Repeat of this study with more advance subjects would be of interest, particularly in regard to concern level.

PIAGET INTERVIEWS AND INTERACTION ANALYSIS IN THE PREPARATION OF SCIENCE TEACHERS: A COMPARISON

The lack of teaching experience by preservice teachers appears to be a serious hindrance to their perception of relevance of much of the content in education courses. This lack of contact with children might be improved by an introductory experience providing prospective teachers with a perceptual framework for more meaningful processing of information about children and teaching. Two such early experiences designed to develop perceptual frameworks, that is, means for bringing education course content into personal relevance, were evaluated in this study.

Combs (1968) has suggested that behavior change is the criterion of the acquisition of meaning, as distinguished from acquisition of knowledge alone. Hough and Ober (1967) also expressed this idea when they interpreted favorable behavior changes by their subjects as the result of a "cognitive organizer" provided by an experimental treatment. In line with such reasoning, certain changes in teacher behavior were suggested as a measurable outcome to assess the effectiveness of the experimental early experiences in this study.

Closely related to the problem of relevance perception is the conceptualization of teacher concern level posited

by Fuller (1969). She has demonstrated that nonteachers, beginning teachers, and experienced teachers can be distinguished by measures of concern level, and that effectiveness in experienced teachers is related to concern level.

This study was an examination of the effect of three introductory experiences on change in teacher behavior and change in concern level. Two of the introductory experiences were designed to develop perceptual frameworks: training in interaction analysis and training in Piaget-type interviewing. The third introductory experience, a control, was instruction in elementary science methods.

The Study

Subjects

The subjects of this study were forty-nine beginning preservice teachers enrolled in two sections of the initial professional sequence for elementary education majors at the University of Texas at Austin during the fall semester of 1969-70. Each subject participated in one of the three introductory experiences. Assignment was made randomly from the combined section rosters. Treatments were administered during the first two weeks of the semester.

Treatments

Each treatment involved two two-hour sessions of group instruction plus outside assignments. The Piaget interview group viewed films and practiced conducting interviews with role-playing peers and the instructor. Each subject interviewed at least two children in the public school to which she was assigned for observation, and submitted reports of the interviews together with interpretations.

The interaction analysis group was trained to use a fourteen-category modification of Hall's (1969) instrument for the Analysis of Science Teaching (IAST). After attaining minimal proficiency with the instrument, each subject used it

to code and interpret a tape recording of her own teaching.

The control group participated in small-group science experiments involving interpretation of graphs.

Design of Study

Measurements of teacher behavior and concern level were made on all subjects three times. (1) Before and (2) immediately after the treatments, and (3) again at the end of the semester. The subjects taught short science lessons at each of the testing times to third- or fourth-grade pupils on a one-to-one basis. The lessons were tape recorded and analyzed with a thirty-two category research version of Hall's IAST (Jones 1970). Concern level was assessed with the Concerns Statement, (Fuller and Case, 1969), which consists of essay response to the question, "When you think about your teaching, what are you concerned about?" The responses are scored by classification into early concerns (nonteaching concerns, orientation to teaching, control), intermediate concerns (student relationships), and late concerns (student gain, personal and professional growth).

Findings

Using analysis of covariance with pretest scores as the covariate, the results were as follows:

1. Type of introductory experience made no difference in change in concern level. Concern levels increased immediately after treatment but decreased to initial levels by the end of the semester, regardless of type of treatment.
2. Type of introductory experience made little difference in teacher behavior change. One out of thirteen behavior factors tested yielded significant change. The interaction analysis group became more flexible over the long-term than did the Piaget-type interviewing group.

Discussion

Of the original population of forty-nine subjects, only nineteen were present at all testing sessions and thus available for analysis. This reduction may account in part for the lack of more changes reaching significance. The probability of nonrandom selection in the reduction was tested by comparing pretest scores of the final nineteen subjects with those of subjects for whom later measurements were incomplete. Analysis of variance comparisons of these two groups were not significant for any of the factors.

It is of interest that the increase in flexibility among subjects trained in interaction analysis occurred over the long-term. A short-term change would have suggested an immediate effect of the treatment. Long-term change alone, however, supports the idea of a conceptual framework which permitted the subjects to cope more productively with the balance of the observation course.

Flexibility may be the first behavior factor of those examined to be altered by interaction analysis training. Simply memorizing the behavior categories of the IAST could provide the subjects with paradigms of alternate teacher behaviors which would ultimately affect flexibility measures. More intensive training and additional behavior measures throughout the semester should reveal other differentiations in treatment effects. A repeat of the study with more advanced subjects would be of interest, particularly in regard to concern level.

Concern Level Change

Fuller (1964) has described two alternate hypotheses about concern level were formulated: (1) that each concern level must be resolved directly before the next higher level is expressed, and (2) that higher level concerns may be aroused through some treatment without prior resolution of the pre-treatment concerns. A comparison of pretest to posttest

scores for all subjects by analysis of variance showed an increase significant at the .01 level. None of the introductory experiences used as treatments was superior to another in arousing concern, however, so it cannot be determined whether the three treatments were equally effective or whether the concern arousal was a general phenomenon related to beginning the observation course. In any case, concern level was aroused initially, but the increase was lost by the delayed posttest at the end of the semester. These findings tend to support Fuller's second hypothesis.

Fuller (1970) has recently suggested that ideal professional growth of preservice teachers proceeds in a stepwise progression of concern arousal followed by resolution of the new concerns, further arousal and resolution, etc. New, higher level concerns appear to be relatively easy to arouse, but if resolution of the new concerns does not occur within a short time, the concern level drops back to the pre-arousal value. The findings of this study are in accord with this idea.

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