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### The Modification of Teacher Behavior Using Audio Video-Taped Models in a Micro-Teaching Sequence

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**D**URING the past decade much has been written on developing theories of teaching and systems for analyzing the teaching act. Research has also been conducted on how to modify teachers' behavior. Techniques such as video-taped feedback, simulated teaching problems, interaction analysis, and micro-teaching have been developed, researched, and incorporated into pilot and established teacher education programs. However, the concept of modeling (a video-taped teaching episode emphasizing a specific teaching behavior), although developed and researched, has not been incorporated into many programs.

The purpose of this article is to provide the reader with a brief review of the research on imitation learning (modeling) in order that he may give serious consideration to its adaptation as a procedure to modify teaching behavior. This review will encompass both basic theoretical research and the research in teacher education.

Three major theories of imitation/observation learning have emerged. Bandura (1965) presents a complete and authoritative review of these theoretical positions. How-

ever, a brief description will have to suffice here.

Miller and Dollard (1941) present the *instrumental conditioning* viewpoint. One learns a specific behavior by observing a model's responses to stimuli either because the model is reinforced, which vicariously reinforces the learner, or the learner is directly reinforced as he matches the model's responses.

The *sensory feedback* theory (Mowrer, 1960) states that the learner assigns a positive value to a model's behavior as a result of the rewards administered to the model. The learner can then have the positive experience by reproducing the model's behavior.

More recently Bandura (1965) has developed the *stimulus continuity* and *mediational* theory. As the learner views a model, the sensory images he forms become structured and his perception responses strength-

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ened through contiguity. It is also postulated that the learner acquires verbal representations of the model's behavior, which become associated with the perceptual images. This suggests that if the learner verbalizes the model's behavior he will acquire it more readily.

Wodtke and Brown (1967) review three alternative theories which have been developed to explain the motivation underlying imitative behavior.

1. A child should identify most strongly with a rivalrous adult receiving many rewards desired by the child. Being envious, the child identifies with the adult.

2. A child should identify most closely with an adult who controls the source of reinforcement.

3. A child should identify most strongly with the adult who administers reinforcement directly to him, since the adult takes on secondary reinforcing properties as a result of his dispensing the reinforcement.

In studies to test the validity of the above theoretical positions, Bandura and Ross found that children were more imitative of the adult who controls the reinforcers. Other investigators (Stein and Wright, 1964; Mussen and Parker, 1965) provide support for the secondary reinforcers theory.

## Related Modeling Research

A review of the literature by Bandura and Walters (1963) reveals that complex social behavior can be acquired almost entirely through imitation. The authors report that face-to-face models serve to accelerate the learning process and, where trial and error learning is costly or even dangerous, imitation learning becomes the essential means for translating behavior patterns. In several studies the learner has completely matched the behavior portrayed by the model (McBrearty, Marston, and Kaufer, 1961).

Most modeling research has primarily involved young children as subjects with acts of aggression as the dependent variable. These studies reveal that children who are shown models engaged in aggressive acts

will subsequently perform more imitative aggression than do children in a "no-model" group.

The relationship of social reinforcement to imitation learning has been the subject of several investigations. Bandura and McDonald (1963) found that models were significantly more effective in changing behavior than was the use of reinforcement alone.

In the experiment, one group of children observed adult models who were expressing moral judgments counter to the group's orientations and who were socially reinforced for adapting the model's evaluative responses. A second group observed the model but received no reinforcement. The third group did not view the models, but were reinforced for moral judgments that ran counter to their dominant evaluative tendencies.

As the investigators predicted and as the study confirmed, modeling cues proved more effective than operant procedures (reinforcing successive approximations of the behavior). Observing models alone was as effective as the combination of modeling and reinforcement. Wodtke and Brown (1967) suggest that the observer received vicarious reinforcement as a result of the model.

Other studies have indicated the effectiveness of social reinforcement alone. Brown and Rogers (1965) found that the aggressive behavior of nursery school children could be modified by controlling reinforcement. Reduction in both verbal and physical aggression could be obtained by withholding attention (reinforcement). Verbal aggression was most effectively controlled when attention was withheld.

Space does not permit a detailed reporting of all the relevant studies on imitation learning, but a brief summary of the findings as reported by Wodtke and Brown (1967) follows:

1. Viewing models of aggression does not necessarily lead to open aggression against anyone. Subjects shown aggressive models direct aggression toward particular targets having appropriate aggression-eliciting cue properties (Berkowitz and Geen, 1966).

2. When shown an aggressive model, boys

perform more imitative aggression than girls do. A comparison of observers viewing male-peer, male-adult, female-peer, or female-adult models show that the male-peer model is more effective in producing behavioral change immediately but a male-adult model is more effective on a follow-up test (Hicks, 1965) after six months.

3. If the observer verbalizes a model's behavior, he will perform significantly more imitative responses than the observer who passively observes the model. Observers who continuously perform a competing response while viewing a model produce fewer imitative responses than those who passively observe (Bandura, Grusec, and Menlove, 1966).

The results of the aforementioned studies provide a basis for subsequent research in teacher education. The fact that prior studies on imitation learning involved young children and that teacher education involves adults suggests that many of the same questions need to be researched in this different context. The next section presents some of the relevant research.

The efficacy of two basic kinds of modeling has been investigated. These two basic kinds of modeling are *perceptual* and *symbolic*. A perceptual model in teacher education refers to a *video-taped* teaching episode which exaggerates a specific teaching behavior. A model is a *constructed* teaching-learning situation in a micro-teaching format.

To prepare a perceptual model, a teacher or teacher educator selects a topic and prepares a 15-minute lesson which lends itself to the teaching skill (behavior) to be modeled. The lesson is taught and retaught several times to different groups (normally 4-5 in number), on each occasion attempting to eliminate as many distracting stimuli (behaviors other than the one being modeled) as possible. The final modeled performance is usually 5-7 minutes in length.

A constructed model should be contrasted with the more common practice of demonstration teaching. In demonstration teaching, a competent teacher is selected and his "total" teaching performance recorded in his regular classroom.

Let us assume that the purpose for using this "demonstration" video tape is to show

how a teacher questions. In an average classroom a teacher uses a variety of teaching methods, all of which might be considered exemplary. However, a person viewing this teacher's performance may be distracted from the skill of questioning by the multiple stimuli (teaching behavior) presented him and attend to other behavioral cues. Although such cues may be viable and valid, they may interfere with the task at hand.

A *symbolic* model is a written description of the specific teaching behavior to be acquired by the teacher. The description is detailed and includes a rationale for using the behavior.

Both the perceptual and symbolic models described here have served as the basic format for the modeling studies in teacher education.

## Modeling Research in Teacher Education

Studies of modeling in teacher education have been designed to answer the following questions:

1. What is the relative effectiveness of perceptual and symbolic models?
2. What is the relative effectiveness of (a) viewing a model alone, (b) viewing a model in the company of a supervisor who provides reinforcement only, and (c) viewing a model in the company of a supervisor who provides discrimination training with reinforcement?
3. What is the relative effectiveness of modeling a specific teaching behavior in the context of a lesson and out of context?
4. What is the relative effectiveness of various modes of focusing a teacher's attention on the specific teaching behaviors modeled?
5. What is the effectiveness of an auditory (only) model of teacher behavior and having the subject verbalize the behavior?

### **Perceptual vs. Symbolic Models**

Studies investigating the relative effectiveness of perceptual and symbolic modeling reveal that teachers (interns) viewing a perceptual model incorporate more of the mod-

eled teaching behavior into subsequent teaching than when studying a symbolic model. A combination of the two modeling modes was more effective than was either alone (Orme, 1966; Young, 1968).

Orme (1966) investigated six modeling protocols using a micro-teaching format with interns in the Stanford Secondary Teacher Education program. Interns taught three five-minute lessons, each one to a different group of five pupils. Between teaching sessions, the interns received training on a specific teaching behavior via a different modeling protocol. The six modeling protocols investigated were:

1. Studying written materials (symbolic modeling) and viewing one's own performance alone.
2. Studying written materials and viewing one's own performance with a supervisor who reinforced the desired behavior, identified salient cues to which the desired behavior should be attached, and suggested alternative forms of the desired behavior.
3. Viewing a video-taped model of the specific teaching behavior (perceptual modeling) and viewing one's own performance alone.
4. Receiving discrimination training and reinforcement as described above while viewing one's own performance and viewing the perceptual model alone.
5. Viewing one's own performance alone and a perceptual model with a supervisor who provided discrimination training based on the salient cues in the modeled performance.
6. Viewing both one's own performance and the modeled performance with the supervisor providing discrimination training as described above.

The data reveal that the latter training protocol is more effective than any of the others in producing the desired teacher behaviors; protocol 5 was more effective than protocol 2 or 1; protocol 3 was more effective than protocol 1.

Young (1967) conducted a study to determine the relative effectiveness of combinations of two different perceptual models and a symbolic model on the acquisition of a repertoire of alternative techniques for

maintaining a student's orientation to a task and/or controlling his deviant behavior. Three groups of interns taught three five-minute lessons to a group of five students who role-played six different nontask-oriented behaviors. Between the teaching sessions, interns were presented one of three modeling protocols.

The modeling protocols were (a) view a 16-millimeter film model *Teacher and Classes* (Allen, 1966) which presents eleven disciplinary classroom situations followed by three alternative teaching responses to the situations. This film emphasizes *desistance* techniques (e.g., verbal or nonverbal expression of disapproval); (b) view a video-tape model emphasizing control techniques in prompted reward and *withheld sanctions* categories (e.g., reinforcing instructional responses and ignoring deviant behavior); and (c) study a symbolic model presenting a rationale and examples of controlling techniques in all three categories.

All subjects studied the symbolic model which was the only training given the control group. One group viewed both the film and video tape and the other viewed only the video-taped model.

The following conclusions are drawn from the results of the study:

1. The second occurrence of a deviant behavior within a five-minute class period stimulated a greater number of different responses than the first occurrence.
2. Subjects viewing a combination of the discipline film and the video-tape model and studying a symbolic model possessed a larger repertoire of alternative control techniques on certain variables in session 3 than those receiving the other training procedures. This conclusion cannot be generalized to responses to all deviant behaviors.
3. Subjects viewing the video-tape model and studying the symbolic model used a greater number of *different* techniques on certain variables in each successive session than those receiving other training protocols. This conclusion is based on consistent trends in the predicted direction. Other training protocols effected changes on specific behaviors but not as consistently.

4. Subjects used multiple alternative techniques in response to a single deviant behavior. However, no training protocol produced significant results. Subjects viewing the video-tape model tended to use more alternative responses than those receiving other training.

5. All groups exhibited a positive increase on all discipline variables.

6. All groups showed an increase in the number of withheld sanctions and a decrease in desistance techniques used from session 1 to session 3.

7. Groups studying only the symbolic model used a greater number of techniques in all categories. This finding suggests that the more general discussion found in the symbolic model prompted more exploration of various techniques.

### **Degree of External Supervision**

Orme's study (1966) tested the effectiveness of different degrees of supervisory guidance while a teacher is viewing a perceptual model. As predicted, the most effective procedure involved the supervisor, who reinforced instances of the desired behavior and suggested alternative forms of the desired behavior. Experimental groups viewing the model alone showed no significant gains in acquisition of the desired behavior. Young (1968) found that teachers viewing a perceptual model alone actually exhibited fewer instances of the desired behavior than on the pretest.

Allen *et al.* (1967) found that for a teaching behavior such as "higher order questions" both the perceptual and symbolic models produced a greater number of higher order questions. Neither model was more effective than the other.

### **Positive vs. Negative Models**

Allen *et al.* (1967) studied the effect of having teachers view a model displaying only the desired behavior (positive) and having them view a model displaying both the desired behavior and unwanted behavior. The authors report that the training effectiveness of a positive instance becomes evident when

a teacher attempts to incorporate the behavior into a new lesson.

### **The Need for a Lesson Context**

Young (1968) tested the effectiveness of presenting a brief example of a specific teaching behavior taken out of context of the lesson, as compared with a demonstration of the skill in a complete lesson context. The results indicated that for learning complex verbal teaching behavior, a brief example was more effective. The combination of brief examples and a complete lesson was more effective for nonverbal behaviors.

### **Self-Instructional Models**

In early studies (Orme, 1966), teachers viewing a model alone did not significantly change their behavior even if they used a written guide. Young (1968) found that the addition of auditory and/or visual cues to a video-tape model provided a "contingent" focus for the viewer and, in essence, provided the reinforcement and discrimination training previously provided by the supervisor sitting with the teacher. This protocol proved to be significantly more effective than viewing a model with a "non-contingent" focus (e.g., written directions and explanation of what to look for in the model). The latter protocol produced no behavior changes.

### **Audio-Tape Models**

White (1968) tested the efficacy of an auditory (only) model in teaching preservice teachers to use indirect verbal behavior in the classroom. The experimental group read a content outline of the lesson to be taught, listened to the model presenting the entire lesson with the teacher's and the children's verbal behavior, listened a second time while following a typescript, listened to the children's verbal behavior and their reading aloud of the teacher's words from the script, and again listened to the complete tape while following the script. The control group taught the same lesson and used the same content outline as the experimental group.

The Flanders Interaction Analysis System I/D ratios were used as a criterion measure. The findings showed that the verbal behavior of the experimental group was significantly more indirect than the verbal behavior of the control group.

In conclusion, the following statements have been supported by the research studies reviewed above:

1. Modeling as a training variable has been demonstrated effective in modifying teaching behavior.

2. Video-taped models are most effective when a supervisor provides a discrimination training while a teacher is viewing or when such discrimination training is provided by the addition of auditory and visual cues on the tape.

3. Models featuring only positive instances of teaching behavior have been demonstrated to have a greater transfer to teaching situations other than the one in which training occurred.

4. Listening to an audio-taped model with a typescript and subsequently verbalizing the model teacher's indirect verbal behavior effected significant behavior changes in the predicted direction.

Although a number of questions need further investigation, the concept of modeling has been demonstrated as an effective technique in modifying teacher behavior and warrants further serious consideration. The self-instructional models (audio and/or video) offer an opportunity for teacher educators to supplement and complement the training of preservice and in-service teachers alike.

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