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ABSTRACT

This study investigated whether stimulated recall could facilitate the transfer of expertise through the provision of models of expert special educators in real-world context to student teachers. Participants were 19 special education teachers with at least 5 years of experience who were recognized as superior special education teachers by their supervisors. Data, which included interviews, videotaping, and observations, were collected by five different researchers. After each observation and videotaping a stimulated recall procedure took place with the teacher to obtain reflections about the classroom interactions or consultations. Field notes and transcripts added to knowledge about the content and nature of instructional thinking by these expert special education teachers. In the second phase of the project 33 preservice special education teachers participated. Fourteen of these students received supplemental training developed from the first phase of the study, and the other 19 served as a control group. Stimulated recall was also used with the experimental and control groups after they had spent 2 months at their student teaching placements. Findings show that it was possible to design contextually rich cases of effective special educators and to use these in instruction for preservice teachers. Both expert teachers and preservice teachers became comfortable with the stimulated recall technique. The technique is easily implemented and requires a minimum of supervision on the part of the teacher educator while producing a maximum opportunity for reflective thought. (Contains 23 references.) (SLD)

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# Using Stimulated Recall in Classroom Observation and Professional Development

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In 1953, Benjamin Bloom at the University of Chicago described a method that he named "stimulated recall" (p. 161). Bloom and his colleagues audiotaped lectures at the university and then used them to stimulate students in the class to recall activities, gestures, and points that were made as part of the lecture. He found "as high as 95 per cent accurate recall of such overt, checkable events within two days" and described this procedure as "a method of reviving memories," (p. 162) and students' thoughts during lectures. Since these initial studies by Bloom, stimulated recall has been used as a method for accessing on-line cognition in a number of different activities including counseling, problem-solving, medical consultations, and teaching.

The "think aloud" protocol had been used early in the history of psychological research to attempt to access the thoughts of subjects engaged in a task. The subject was usually asked to report, in as much detail as possible, their thoughts as they went about solving a problem or performing a task. Stimulated recall procedures were developed as an on-line cognition-capturing devise more appropriately used in situations where think aloud protocols were not possible or where a think aloud protocol would interfere with the performance of the task being examined. For example, in the classroom, teachers are unable to teach and manage their classrooms while simultaneously reporting their thoughts on the activity taking place.

The use of audiotape and videotape for capturing teacher thought in the classroom gained popularity in the 1970's and early 1980's when researchers from the emerging cognitive tradition began to study teachers in classrooms, rather than in experimental, environments (see Calderhead, 1981: Clark & Peterson, 1981; Marland 1984). Many of these researchers used stimulated recall as their primary data source for information about teacher cognition. In this tradition, the teacher was either audiotaped or videotaped while engaging in instruction. The recall session was then conducted after the recording had taken place. Teachers were then asked to retrospectively self-report on their thought processes during the recorded session. These responses were simultaneously recorded on audiotape and usually transcribed by the researcher. Transcripts varied in length, depending on the length of the sessions that were recorded, but even a thirty-minute recall session could easily generate over 20 pages of double-spaced comments.

A number of both qualitative and quantitative methods have been used to analyze transcripts resulting from stimulated recall session. Transcripts may be analyzed in a line-by-line fashion in which the researcher labels themes or categories thickly, or they may be analyzed using "thought-units" in which the researcher looks for larger categories in the data. Interactions occurring during the activity may be recorded and be used as the level of analysis, for example, each time a teacher calls on a student to answer a question the researcher may prompt the teacher to reflect on the resulting interaction.

Precautions in Using Stimulated Recall Data

Ericsson and Simon (1980; 1984) caution that stimulated recall procedures should be conducted as soon as possible after a task is completed as information which is established in long-term memory becomes not a direct report of the experience, rather a combination of the experience and other related memories. Ericsson and Simon, however, focused their comments on recall procedures that did not involve videotapes or other types of multimedia recall. The use of multimedia sources in recall session has the benefit of replaying and reintroducing the original cues that were present during the task in which the participant was engaged. What stimulates responses from the teacher is then a very similar set of cues as those that originally existed during the class session recorded.

Yinger (1986), in noting the complexity of teacher cognition in the classroom, suggested that multimethods of data collection should be used to study teachers, including ethnography,

microanalysis, and interview techniques, rather than sole reliance on stimulated recall as a sole data source. He also notes that the behavior of effective teachers tends to be smooth and quick, which he believes suggests that teacher behavior may be automated and thus difficult to access and explain at a conscious level. Marland and Obsborne (1990), however, refute most of Yinger's criticisms and state the "the evidential base for the criticisms is insubstantial and in many respects runs counter to our own findings (p. 94). They point out that stimulated recall data gives the researcher "a valuable source of information on the teacher's theory of action as well" (p. 94) in that stimulated recall responses allows teacher to explain why they chose one course of action over another in the classroom.

Stimulated recall procedures not only produce data that the researcher can analyze, it produces audiotape and videotape that can be fruitfully used in a number of teacher training formats. Teacher preparation programs have placed increasing emphasis on the importance of teacher reflection since the mid-1980s. Schön (1983) refers to reflective practices as the ability to integrate professional experience with research to produce solutions to problem situations. Reflective practices in training are typically applied in situations, such as teaching, where material is ill-structured and where there is no obvious solution to problems that might arise in a given situation (Moon, 1999). Teacher training programs have attempted to increase reflection in teacher candidates through activities such as journaling, reflective writing, and modeling reflective thought. These activities are designed so that student teachers first describe an instructional event, lesson, or interaction with a student, and then examine how these events then challenge or change their existing belief. Stimulated recall can be used both to collect data on student teacher behaviors in the classroom, but also to capture the reflections-in-action of student teachers in the classroom.

Field-based Models of Teacher Training

In both the traditional student teaching and the Professional Development School (PDS) model of teacher training, much of the apprenticeship experience is incumbent upon the quality of the cooperating classroom teacher who hosts the student teacher. Training with the PDS model increases the probability that student teachers, because they are placed with a wider variety of cooperating teachers, will be more likely to be exposed to teachers that demonstrate effective instructional and behavioral strategies. However, even in cases in which a cooperating teacher is highly skilled, school culture typically does not allow for extensive time in which these cooperating teachers can discuss their instructional decisions with their student teachers. The use of stimulated recall procedures can circumvent many of these limitations of the field-based experience for preservice teachers by presenting a model for how experienced teachers not only respond to students in their classrooms, but their rationale, reflections, and interpretations of these interactions.

Case Studies

An alternative method for transferring expertise, while still providing a real-world example, is with the use of cases. Cases used in teacher training typically incorporate descriptions of teaching and narratives that exemplify competent teaching in the classroom (Doyle, 1990; Leinhardt, 1990; Lampert & Ball, 1998; Merseth, 1996; Sykes & Bird, 1992). Teacher educators such as Schön (1991) and Shulman & Colbert (1988) have used cases to stimulate reflective thought in novice teachers with the end objective of developing reflective practicing teachers. Lampert and Ball (1998) and Berliner (1988) suggest that a library of videotaped expert cases would be helpful to novices in acquiring instructional skills that are used by effective teachers in

their classroom. A byproduct of the stimulated recall procedure is that they then may be used to represent cases of diverse and yet effective teachers.

Using the Products of Stimulated Recall Procedures in Teacher Education

We are using data that we have collected through the use of stimulated recall procedures to attempt to transfer teaching expertise to student teachers via a seminar for student teachers. In a Bay and Bryan (1991) study, it was found that novice teachers, after viewing videotapes of teachers instructing children with disabilities, increased their level of reflectivity after hearing audiotapes from stimulated recall procedures. A 1997 study by Tomlinson, Callahan, Tomchin, Eiss, Imbeau, and Landrum (1997) similarly examined the instructional decision-making used by novice special educators. However, the use of using audio and videotaped cases of special educators to facilitate transfer of teacher expertise has not been explored.

We have found in previous studies (Stough & Palmer, 1996) that stimulated recall and collegial reflection increases self-reflection, while it circumvents the problem of automaticity in expert educators. When teachers in the field have the opportunity to reflect on their teaching, such as in the stimulated recall procedure we have conducted, they find the procedure useful in assessing and understanding their teaching practices. In designing our study, we wished to assess whether this technique could facilitate the transfer of expertise through the provision of models of expert special educators in real-world contexts to student teachers. The following section details the stimulated recall procedures we have used to obtain data on teacher cognition and how we have then used this data to design a student teaching seminar. A comprehensive reporting of our analysis of this data and a discussion of the results of these studies can be found in other manuscripts (see Stough, Sharp, & Palmer, 2000; 2001; Stough, Leyva, & Palmer, 1998).

## Project Design: Phase I

Participants

Participants were 19 certified special education teachers from urban, mid-size, and rural school districts. Special education supervisors in each of these districts were asked to nominate teachers who 1) had at least five years of teaching experience, 2) were recognized among their peers, parents, or the community as being effective teachers, 3) instructed students that generally made excellent progress in achieving their individualized education plan (IEP) objectives, and 4) were generally viewed by their supervisors as superior special education teachers. We chose a minimum of five years of teaching experience as, according to Berliner (1987) experience is a necessary, although not sufficient, condition for developing teacher expertise. We chose professional group membership, namely certification as a special education teacher, as it is another method by which expertise has been defined (see Chi, Feltovich, & Glaser, 1981; Groen & Patel, 1988). Finally, we asked a select group, special education supervisors, to nominate individuals as "experts" as nomination is method that also has been frequently used by other researchers in the area of teacher expertise (see Berliner, 1986; 1987; Bartelheim & Evans, 1993; Blanton, Blanton, & Cross, 1993).

Identified teachers were purposefully sampled so that their classrooms represented a diverse array of instructional settings (i.e. resource, inclusive, co-taught, content mastery, and self-contained), instructional levels (i.e.. preschool, elementary, middle school, and high school), student classifications (primarily; learning disabilities, emotional disturbance, and mental retardation) and ethnicity. We also used purposeful sampling procedures to select teachers and students that were representative of the demographics that were characteristic of the state: diverse

ethnic minority groups were represented in both the teachers and the students who were invited to participate.

Procedure

Data was collected from the participants by five different researchers, each of whom was trained in the same interview and stimulated recall procedures. These researchers used a variety of methods to obtain information from each of the teacher participants. Data was collected in the following order:

Interviews. Each teacher was interviewed and asked a standard series of questions about their classroom experiences and teaching philosophy. The procedures to be used in the study were explained in detail and teachers were encouraged to share any discomforts that they had with the procedure with the researcher. These interviews lasted approximately forty-five minutes, resulting in approximately 15 hours of audiotaped interviews and 738 pages of transcripts across all teachers.

Videotaping. Six one-hour videotapes were made of each classroom teacher instructing students in her classroom. Teachers were asked to select an instructional sequence and content area in which they felt that they were particularly skilled in delivering instruction. Videotapes of these sessions were made during the natural course of the semester and scheduled by the special education teacher. In general, these videotapes were made over a period of two months. Approximately six hours of videotape was used per teacher for a total of 114 hours of videotape.

Observations. Observations were made in conjunction with each videotaping session. Notes were made concerning the number of students in the classroom, number of students who were classified as special education students, ratio of male to female students, ethnicity of the students, content area taught, grade level, and if adults other than the teacher were present in the classroom. A map was made of the classroom and the seating location of all students was noted. For each student enrolled in special education, their classification of disability was noted and the amount of time that they had received instruction from the teacher observed

Stimulated Recall. After each observation, a stimulated recall procedure (see Ericsson & Simon, 1984 for details) took place with the teacher soon after each observation and videotaping, and usually took place the same day. This procedure was used to obtain teacher's reflections about the classroom interactions or consultations. This procedure replicated that used by other researchers in the field of teacher cognition (e.g., Peterson & Cormeux, 1987) in that teachers were asked to recall, to the extent possible, their thoughts and emotions during the instructional sequence.

During the stimulated recall procedure, the teacher viewed the videotape along with the investigator. The teacher was instructed to stop the videotape at points when s/he recalled thoughts or feelings that occurred during instruction or consultation. If a period of two minutes passed without comment by the teacher, the experimenter stopped the videotape and asked open-ended questions such as, "What were you trying to accomplish here?" or "What were your thoughts or feelings at this point?" All comments by the investigator and the teacher were simultaneously recorded on audiotape. Each recall session lasted approximately forty-five minutes, which resulted in approximately four and a half hours per teacher and a total of eighty-five hours of audiotape across all teachers. These session were subsequently transcribed and produced 2,371 pages of transcribed data.

Field Notes. Immediately following each contact with a teacher, the researchers completed field notes in which they noted technical notes (problems in collecting the data, special considerations for during their next contact with the teacher), analytical notes (analytical and

conceptual reflections) and their general observations (the mood, tone, of the session). These notes were meant to supplement observational notes made during observations during classroom instruction. Approximately six pages of field notes were made for each teacher.

Data Analysis

In this study, we were interested in exploring the content and nature of instructional thinking in expert special education teachers. We wished to understand and describe the highly interactive process by which these teachers made decisions in the classroom. Therefore, we chose qualitative methodology, specifically, Grounded Theory (see Glaser & Strauss, 1967; Strauss & Corbin, 1990) to collect and analyze our data. Grounded Theory focuses upon the data that is elicited from the participants in a study and produces an inductively derived conceptual model that is grounded in this data. This methodology allows for the comparison of new data to previous cases so that the addition of new teachers in our study allowed us to revise our emerging conceptual model of teacher cognition.

All interviews and stimulated recall recordings were transcribed, which produced a total of 2,371 pages of transcription. After each individual transcript was completed, the researcher who collected the data analyzed the transcript via line-by-line analysis (Strauss & Corbin, 1990) using open coding. In open coding, transcripts are coded using labels that describe teachers' verbal statements at a higher level of abstraction. For example, a teacher's statement "I was having a hard time keeping their attention, getting them focused, making sure that they were following directions" (Beth, Stimulated recall #3) was given the open codes "attention" and "group focus."

After each researcher coded the first transcript, they met with the first author to discuss the emerging codes and to establish some commonalities in labeling. Following the analytical procedures discussed by Glaser and Strauss (1967) and Strauss and Corbin (1990), we individually and then collectively examined the responses of the nineteen teachers in this study. Thereafter, we discussed the codes that they were using on a weekly basis and met more formally on a monthly basis to review each other's codes and to discuss emerging themes from the data.

Initially, each teacher's interview transcripts and observational notes were analyzed separately. The conceptual labels obtained from open coding were sorted and then compiled. The conceptual labels were discussed among the researchers and then were grouped together to form tentative categories. These categories were then arranged following Strauss & Corbin's (1990) suggestions for axial coding. This secondary analysis thus produced a conceptual model of cognition and instructional decision-making in special education teachers.

Selective coding was used to confirm this core category of teacher concern and to organize the results. In selective coding the categories established in open coding were placed in the paradigm model suggested by Strauss and Corbin (1990) by identifying them as antecedent conditions, contexts, action/interaction strategies, intervening conditions, or consequences of the phenomena of teachers' emotions. This secondary analysis thus produced a conceptual model of cognition and instructional decision-making in special education teachers.

Memberchecks. A second interview was used at the end of the stimulated recall sessions and after open coding to verify the results of the preliminary analysis of the stimulated recall sessions conducted with each teacher. These interviews lasted approximately 30 minutes, however, as the analysis of each teacher's transcripts was individualized, the nature and length of these second interviews varied. Overwhelmingly, the majority of teachers agreed with the major categories that the researchers had identified following open coding.

## Project Design: Phase II

Participants

The second phase of our project included thirty-three preservice special educators enrolled in their student teaching seminar at a large southwestern university. Most of these students were in their early 20's and simultaneously completing their bachelor's degree in addition to the requirements for obtaining state teacher certification in the area of special education. Thirty-two of the students were female, while one was male.

Procedures

All participating student teachers completed an initial survey in order to obtain descriptive data about their past teaching experiences and about their knowledge of their assigned student teaching classrooms. The organization and schedule for that semester's student teaching seminar was explained and students were invited to participate in our intervention.

Non-intervention group. Nineteen student teachers completing their student teaching in the area of special education participated in a student teaching seminar that lasted for approximately two hours per week over the length of a semester. These seminars were organized around Stalling's Active Teaching and Learning and Learning to Teach in Inner City School and with Diverse Populations (1995/1996) curriculum. Stalling's curriculum is specifically designed for use with both prospective general and special education educators during the student teaching semester and includes topics and assignments that rely on experiences that students are expected to have during their student teaching semester. These seminars included discussions about their experiences in the classroom, along with assignments related to their student teaching experiences. Student teachers were encouraged to comment upon incidents of significance that occurred during their week in the classroom.

Intervention group. Fourteen student teachers enrolled in the special education student teaching program participated the intervention. This intervention group of student teachers also participated in the Stalling's seminar, as described above, but received thirty hours of additional training as part of their student teaching seminars.

The supplemental training was developed from data collected from the interviews and stimulated recall procedures collected from the 19 expert special educators in Phase I of our project. From our qualitative analysis of this data, we selected eight of the most frequently mentioned analytical categories by these expert teachers in order to design our seminar topics (see Table 1). These categories, in order, were 1) Classroom Management, 2) Student Characteristics, 3) Teacher Knowledge, 4) Monitoring Behavior and Academics, 5) Student Knowledge and Learning, 6) Instructional Strategies, 7) Student Behavior and Behavioral Strategies, and 8) Instructional Assessment.

During these seminars, student teachers in the intervention group were introduced to each topic as an area of primary concern to expert special educators. Each seminar included videotapes and audiotapes of expert teachers reflecting upon their own instruction in order to illustrate these themes. Student teachers in this group were additionally given a weekly case study that described one of the 19 expert special educators to read in preparation for each seminar. These case studies provided quotes and examples of how these expert educators reflected upon the targeted eight categories. Each week, student teachers in the intervention group were asked to complete a weekly reflection assignment on the focus topic each week while they were in their respective classroom settings, and then to return to the next seminar prepared to discuss these reflective assignments as a follow-up to the previous weeks' seminar. During each seminar, student teachers

participated in discussions about these materials and asked to reflect upon how the topic might influence the students and classrooms in which they were currently teaching.

After the eight topical seminars were completed, the student teachers in the intervention group participated in a "guided reflection" about a videotaped instructional sequence in their classroom. This activity took place after the student teacher had been in their placement for approximately two months. Each student teacher was videotaped and observed in the classroom in which they were completing their student teaching. This videotaped session was followed (usually within 24 hours) by a guided reflection activity, wherein a researcher viewed the videotape with the student teacher and the instructional sequence in the videotape was discussed. In this activity, the discussion focused on topics that were used in the student teaching seminar and student teachers were encourage to model their reflective patterns on those exhibited by the expert teachers.

Stimulated recall procedure. After both the intervention and the non-intervention groups had spent two months in their student teaching placements, they were each observed and videotaped twice while delivering instruction. A stimulated recall procedure, which replicated that, used with the expert teachers in Phase I was used to obtain these students teachers' reflections about the instructional sequence that had been videotaped. In this procedure, the student teachers were asked to recall, to the extent possible, their thoughts and emotions during the classroom sequence. While researchers occasionally prompted comments from student teachers (e.g., "What were you thinking here?") efforts were made to minimize researcher comments while maximizing opportunities for comment by the student teachers. All comments by the research and the student teacher were simultaneously recorded on audiotape. Approximately forty-five minutes of audiotape was obtained per recall session for a total of fifty-one hours of audiotape across all student teachers. These recall sessions occurred within forty-eight hours after the instructional sequence in order to extract the student teachers' thoughts and interactive decision-making.

Field notes. Immediately after each contact with a student teacher, researchers completed field notes in which they recorded technical notes (problems in collecting the data, special considerations for their subsequent contact with a particular teacher), analytical notes (analytical and conceptual reflections) and their general observations (the mood and tone of the session). Approximately two pages of notes were made for each student teacher.

## Analysis

All stimulated recall recordings from student teachers were transcribed, analyzed, and coded following qualitative procedures discussed by Glaser and Strauss (1967) and Strauss and Corbin (1990). Approximately 1,400 transcribed pages were generated from these 34 student teachers. Data obtained from interviews, observations, field notes, and stimulated recall procedures were incorporated into the qualitative analysis of the data. Axial and selective coding was used to produce a conceptual and grounded model of instructional decision-making in each group of student teachers. Differences in the models were noted and a storyline for each model was developed in order to describe the interrelation of the categories.

Our qualitative analysis described above illustrated that there were differences in the ways in which the two student teacher groups thought about and responded to instructional events in the classroom. In order to compare quantitatively the responses of the intervention and non-intervention group in the stimulated recall procedure, a content analysis of each stimulated recall transcript was completed. As part of this procedure, the text of each transcript was divided into thought-units. Each of these units was then sorted into one of the categories that had emerged as

part of the qualitative analysis. At the end of analyzing the two stimulated recall transcripts from each student teacher, the number of comments falling into each category was tallied and summed. The number of comments that fell into each category was then calculated as a percentage of the total number of comments/thought-units expressed by each student teacher. Calculating this percentage score then allowed the researchers to compare the relative number of comments across the student teachers and to control for the differences in the total number of comments made by different student teachers. The percentages across the student teachers within each group were then summed and averaged for each category.

## Discussion

In our project, we used expert models obtained, in part, from data obtained through stimulated recall procedures, to attempt to influence the reflective thought of special education student teachers. These expert models were provided through cases, audiotapes, videotapes, and discussion of their instructional decision-making in the classroom. This is the first attempt, to our knowledge, of using expert educators to design media-supported cases for use with novice special educators. We are in agreement with Carter and Doyle (1988) that the knowledge of expert teachers tends to be "event-structured" and, as such, is closely tied to the particular classroom context and individual characteristics of the students within a given classroom. By designing cases of special educators that were situated in particular classroom contexts and by providing student teachers with the accompanying reflections of these teachers upon events that occurred during particular instructional segments, it was our intention to provide contextually rich cases of effective special educators who were reflective about their teaching.

Teachers who participated in the stimulated recall procedure quickly became familiar and comfortable with the technique. Student teachers seldom relied on prompts from the researcher and readily and prolifically expressed their thoughts and emotions concerning the targeted teaching sequences. Teacher educators should consider the use of a modified stimulated recall procedure as an appropriate intervention in their training of preservice teachers. This technique is easily implemented and requires a minimum of supervision on the part of the teacher educator, while producing a maximum of opportunity for reflective thought. Sessions may be auditaped and reviewed by teacher educators at a later date, if desired, and thus give important insights into how preservice teachers cognitively process their own teaching.

The situated nature of cognition suggests that learning should take place in authentic, contextual settings (Borko, 2000, Brown, 1989). Recent perspectives on teacher training support this notion and argue that the training of novice teachers should include extensive experience in the classroom as well as exposure to diverse classroom environments. Stimulated recall procedures are a method by which teacher educators may generate both a visual display of the classroom via videotaping and an accompanying model of how effective teachers reflect upon classroom interactions.

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