Special Thinking in Special Settings:
A Qualitative Study of Expert Special Educators

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Researchers have suggested that educating learners with special needs entails particular cognitive skills and that teachers make differential judgments about students with disabilities (Bartelheim & Evans, 1993; Bay & Bryan, 1991; Blanton, Blanton, & Cross, 1994). In this study, a stimulated recall procedure was used to examine the instructional decision making of 19 expert special educators. Qualitative analysis of the data indicated that a highly detailed and extensive knowledge base about students enabled these teachers to (a) assess their students' academic and emotional states of mind and (b) effectively address the students' needs within the classroom. The authors suggest that what is central to effective special education instruction is the knowledgeable, reflective, and concerned responsiveness of teachers to individual students.

Availability of qualified educators and related service personnel is a necessary prerequisite to providing an appropriate education for students with disabilities (Individuals with Disabilities Education Act, 1990; Turnbull, 1993). Unfortunately, what it means to be a "qualified" special educator is not clear. Many special educators leave the field within 4 or 5 years (Brownell & Smith, 1992); consequently, many students with disabilities are educated by novices who are certified but who have limited experience and competence. In addition, due to the limited availability of special education teachers, alternative teacher certification programs with few prerequisites or training requirements have been widely initiated (Buck, Polloway, & Robb, 1995). Many individuals participating in these programs may be inadequately prepared to meet the instructional needs of their students (Brownell, Smith, McNellis, & Miller, 1997; Buck et al., 1995; Sindelar & Marks, 1993).

Concurrently, changes in the education system have increased the complexity of the role of special educators. The normalization and mainstreaming movements that have occurred over the last 25 years have made the inclusion of special education students in general education classrooms more common (Reynolds, Wang, & Walberg, 1987; Stainback, Stainback, & Jackson, 1992). As a result, special education teachers are instructing classrooms of students with wide ranges of academic and behavioral needs in varied instructional arrangements (Fuchs & Fuchs, 1994). Special education teachers also are increasingly called upon to consult with and support general educators in their instruction of students with special needs in inclusionary settings (Sugai & Tindal, 1993), which has further complicated the role of the special educator.

Substantial efforts have focused on identifying effective instruction through both process–product studies that link specific teaching behaviors to positive student outcomes (Christenson, Ysseldyke, & Thurlow, 1989; Englert, Tarrant, & Mariage, 1992) and the examination of particular instructional interventions (cf. Forness, 1996; Swanson, 1999) within special education settings. Other researchers have suggested that effective special education teachers process information about students with disabilities differently than do general education teachers (Bartelheim & Evans, 1993; Bay & Bryan, 1991; Billingsley & Tomchin, 1992; Blanton, Blanton, & Cross, 1994; Cambone, 1990; Stough & Palmer, 1996). Blanton et al. concluded, however, that "we know very little about the knowledge possessed about instruction by regular and special education teachers, and especially how these groups of teachers think about, discuss, and approach instruction for special learners" (p. 63).

Researchers have used the construct of expertise to conceptualize the knowledge that superior teachers in general education possess (e.g., Berliner, 1986; Borko & Livingston, 1989; Carter, Cushing, Sabers, Stein, & Berliner, 1988; Peterson & Comeaux, 1987). Expertise generally has been defined as superior knowledge and skill within a specific domain (e.g., Chase & Simon, 1973; Chi, Feltovich, & Glaser, 1981; Ericsson, 1996; R. Glaser & Chi, 1988). Although the domain of expertise may vary from physics to teaching, experts perceive meaningful patterns that enable them to quickly and effectively perform tasks within their particular domain of expertise (Ericsson, 1996; R. Glaser & Chi, 1988). Expert ability is in part a product of extensive experience and the ability to access information from a highly organized knowledge base.

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Research on expert teachers in general classroom settings has focused on the nature and organization of teachers' instructional knowledge and on how these teachers make instructional decisions (e.g., Berliner, 1986; Leinhardt, 1983; Peterson & Comeaux, 1987). Several studies have suggested that expert teachers have amassed more knowledge than novices and differ from novices in how that knowledge is organized (Borko & Livingston, 1989; Carter et al., 1988; Swanson, O'Connor, & Cooney, 1990), that expert teachers make differential judgments about students (Caldwell & Jenkins, 1986; Leinhardt, 1983; Stader, Colyar, & Berliner, 1990), that they use information about their students when planning and implementing their lessons (Carter & Doyle, 1987; Strahan, 1989), and that the content area they teach affects their instructional decisions (Leinhardt & Smith, 1985).

Studies on teacher expertise in general education classrooms have provided only limited insight into teacher cognition in the unique environments in which special education currently takes place. In addition, many studies on teacher expertise have used simulation methodologies in which teachers had limited knowledge of the students in the study, little opportunity to prepare for instruction, and no knowledge of the simulated classroom context in which the study was conducted. As a result, these methodological factors may have limited the validity of the results from studies of this type (e.g., Berliner, 1987) and provide little information about the influence of teaching contexts on teacher cognition. As a result, the cognition of special education teachers within the complex context of the special education classroom has not been fully explored in the research literature.

In this study, we explored the nature of instructional thought in expert special education teachers. Because we wished to understand and describe the interactive process by which these teachers made decisions in the special education classroom, we chose qualitative methodology, specifically, Grounded Theory (see B. G. Glaser & Strauss, 1967; Strauss & Corbin, 1990) to collect and analyze our data. Grounded Theory allows the researcher to build a conceptual model that is grounded in the data directly obtained from participants in a study. So that we might describe the work of special educators within an authentic teaching environment, we observed these teachers delivering a lesson to their own students while in their usual instructional setting. We used a stimulated recall procedure to extract the thoughts and decisions made by these special educators. This procedure consisted of having teachers view videotapes of themselves delivering a lesson and then recalling, as completely as possible, their thoughts and decisions during the lesson.

Method

Participants

The study participants were 19 certified special education teachers from five different urban, midsize, and rural school districts. Special education supervisors in each of these districts were asked to nominate teachers who (a) had at least 5 years of teaching experience; (b) were viewed as superior special education teachers; (c) were recognized by their peers, the parents, or the community as being effective teachers; and (d) instructed students who generally made excellent progress in achieving their Individualized Education Program (IEP) objectives. We chose a minimum of 5 years of teaching experience because, according to Berliner (1986), experience is a necessary, although not sufficient, condition for developing teacher expertise. We chose professional group membership, namely certification as a special education teacher, because it is another method by which expertise has been defined (see Chi et al., 1981; Groen & Patel, 1988). Finally, we asked a select group of special education supervisors to nominate "expert special education teachers" because nomination frequently has been used as a method by other researchers to identify expert teachers (see Bartelheim & Evans, 1993; Berliner, 1986, 1987; Blanton et al., 1994). These special education supervisors were directly responsible for regularly observing and evaluating the teachers and, as such, they were the most appropriate source for nominating expert teachers for this study. In addition, building principals of the nominated teachers were contacted, were given the selection criteria, and then were asked to confirm or disagree with the supervisor's nominations. We used the responses of these principals as an additional and confirmatory check on the identification of the nominated teachers as experts.

Teachers who were nominated were selectively sampled to become participants in the study 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), and student classifications (primarily learning disabilities and mental retardation; see Table 1). Resource rooms were those classrooms in which special education teachers provided direct instruction for several hours a day to students with disabilities. Classrooms categorized as "inclusive" were those in which the percentage of students with disabilities represented less than 50% of the total students in the classroom and in which the general education teacher delivered most of the content. Those classrooms categorized as co-taught were ones in which a general educator and a special educator were jointly responsible for instruction of the class. Content mastery classrooms were ones that were taught by special education teachers whose sole purpose was to remediate or modify instruction that had been previously delivered by the general educator. Student classifications followed standard federal categories for school-age disabilities.

We also used purposeful sampling procedures to select teachers and students who were representative of the demographics of the state. Teachers in the schools selected were part of districts that were urban, midsize, or rural. The school districts that participated roughly approximated the school district demographics of the state in which the data were col-

TABLE 1. Teacher Participant Data

Teacher name	Ethnicity	Experience (yrs.)	Instructional setting	Grade(s) taught	District type	Subject matter
Beth	White	13	Inclusion	5	Rural	Math[a], Language arts
Ruby	Hispanic	16	Self-contained	4	Urban	Science[a]/Math[a], Social skills
Sharon	White	5	Resource[a] Mastery Inclusion	3, 4, 5	Midsize	Math[a], Reading[a]
Katy	White	13	Resource	3, 4, 5	Urban	Reading[a]
Jamesha	African American	8	Resource	6, 7, 8	Midsize	Reading[a]
Susan	White	18	Mastery	3, 4, 5	Urban	Math[a], Language arts
Liz	White	17	Mastery	6, 7, 8	Urban	Math[a], Science
Ellen	White	14	Inclusion	Pre-K	Midsize	Pre-K[a]
Gina	White	7	Inclusion	10	Midsize	English[a]
Donna	Hispanic	7	Inclusion	Pre-K, K	Urban	Life science[a], Pre-K
Bonnie	White	14	Resource	1, 2, 3	Urban	Language arts[a], Math
Lisa	White	4	Inclusion	6, 7, 8	Urban	Language arts[a], Social studies
Diana	White	21	Resource	K-3	Midsize	Reading[a]/Math, English
Connie	African American	21	Inclusion Resource	4, 5	Urban	Language arts[a], Math
Lorena	Hispanic	20	Self-contained	9, 10, 11, 12	Urban	Language arts[a], Life skills/Math
Nina	White	13	Inclusion	Pre-K	Midsize	Pre-K
Joanna	White	17	Resource	5	Rural	Reading[a]/Math, English
Hillary	White	15	Inclusion[a] Resource	9, 10, 11, 12	Urban	Biology
Kimberly	White	22	Mastery	7	Midsize	Pre-K

Note. Instructional settings were classified according to their respective proportion of special education students and the instructional service delivery model of the classroom. Inclusive classrooms contained less than 50% students with disabilities and were the primary instructional settings for these students. Self-contained classrooms contained 100% students with disabilities and were the primary instructional settings for these students. Resource classrooms contained 100% students with disabilities but were secondary (less than 3 hours per day) instructional settings for these students. Content-mastery classrooms varied in their student composition but typically contained 25% to 100% students with disabilities, were secondary (less than 3 hours a day) instructional settings for these students, and provided supplemental, rather than primary instruction.
[a]Denotes the subject matter and instructional setting in which teachers assigned to more than one instructional setting were observed.

lected, with urban districts being slightly overrepresented and rural districts being slightly underrepresented. Our sample also was selected so that diverse ethnic minority groups were represented in both the teachers and the students who were invited to participate (see Table 1). As a result, the number of teachers who were members of an ethnic minority group was 26%, whereas the state average is approximately 24%. All teachers who participated were women. Although two male teachers were contacted for participation in the project, both declined to participate because of the time commitment required. Female teachers who declined to participate also declined for this reason.

Collectively, the 19 participants in this study instructed 302 students, 53% (158) of whom were receiving special education services. Students represented a wide range of categories of disability, with the most common primary diagnoses being learning disability, emotional disturbance, mental retardation, or speech impairment. Sixty-two percent (187) of these students were boys and 38% (115) were girls. The majority of these students (62.6%) were members of an ethnic minority

group, either Hispanic (35.8%) or African American (26.8%). This is higher than the overall state percentage of 55%; however, this number can be primarily attributed to one preschool class that contained a large number of children who spoke Spanish.

During the nomination process, the principal, the special education supervisor, and then later the special educator were each asked to describe the content domains and the curricular activities in which they felt the teacher was "particularly effective." These were the areas of instruction or responsibility that eventually became the focus of our observations.

Procedure

Data were collected from the participants by five different researchers (2 men and 3 women) who were also experienced educators. Each researcher was trained in the same interview, observation, and stimulated recall procedures, and members of the research team met at least monthly to ensure that data collection procedures were carried out consistently. These researchers used a variety of methods to obtain information from each teacher participant.

Interviews. Each teacher was interviewed and asked a standard series of questions about their classroom experiences and teaching philosophy (see the Appendix). The procedures to be used in the study were explained in detail, and the teachers were encouraged to suggest any areas of particular expertise that they felt they had as well as to share any discomforts that they had with the procedure. Each interview lasted approximately 45 minutes, resulting in approximately 15 hours of audiotaped interviews and 738 pages of transcripts for the entire group of teachers.

Videotaping. Six videotapes were made of each classroom teacher instructing students in her classroom. The first videotaped session was also used to explain the researcher's presence in the classroom to the students, to obtain assent from the children who would be filmed, to orient the researcher to the classroom, and to acclimate the class to the presence of the videotape recorder. Teachers were asked to select an instructional sequence and a 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 were scheduled by the special education teacher. In general, these videotapes ranged from 30 minutes to 1 hour in length and were made over a period of 2 months. Approximately 6 hours of videotape was obtained per teacher, for a total of 114 hours of videotape.

Observations. Observations were made in conjunction with each videotaping session. Notes were made to record the activities and interactions that took place in each classroom and to identify events that might elicit reflections from the teachers, such as prolonged exchanges with students or transitions from one instructional activity to another. A map was made of the classroom, and the seating location of all students was noted. Classroom maps included such student demographic data as ethnicity, gender, diagnostic category, and the amount of time that the student had received instruction from the teacher being observed. Observational notes were made while videotaping the classroom and then were refined while the researcher reviewed the videotape at a later date. Also noted was the type of instructional setting, the subject matter taught during the instructional sequence, and the presence of other adults in the classroom.

Stimulated Recall. After each observation and videotaping, a stimulated recall procedure (see Ericsson & Simon, 1984, for details) took place with the teacher, usually on the same day. This procedure replicated that used by other researchers in the field of teacher cognition (e.g., Peterson & Comeaux, 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 usually viewed the videotape in its entirety along with the researcher. In cases when the recall session became overlong (more than 45 minutes), the procedure was stopped to avoid participant fatigue. During the session, the teacher was instructed to stop the videotape at points when she recalled thoughts or feelings that had occurred during the instructional sequence. If a period of 2 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 researcher and the teacher were simultaneously recorded on audiotape. Each recall session lasted approximately 45 minutes, which resulted in approximately 4½ hours per teacher and a total of 85 hours of audiotape across all teachers. These sessions were subsequently transcribed and produced 2,371 pages of transcribed data.

Field Notes. Immediately following each contact with a teacher, the researchers wrote out technical comments (problems in collecting the data, special considerations for their next contact with the teacher), analytical notes (analytical and conceptual reflections), and general observations (the mood and tone of the session). These notes were meant to supplement the observational notes made during classroom instruction. Approximately 6 pages of field notes were made for each teacher, for a total of 114 pages of field notes.

Data Analysis

The qualitative methodology we used for data analysis was Grounded Theory, which produces an inductively derived conceptual model that is grounded in the data obtained from participants in a study. This methodology allows for the com-

parison of new data to previous cases so that as we collected more data and as we added teachers to our sample, we continually were revising our emerging conceptual model of the cognition of these teachers.

We were interested analyzing the data obtained from these special education teachers as a *group* so that we that might identify the commonalties in how this type of professional reflects upon and responds to instructional demands in the classroom. We purposefully selected our sample from a diverse array of teachers who taught in diverse settings, in part to search for these cognitive commonalties. Through its use of constant comparison of new cases that are added to the existing database, Grounded Theory allows the researcher to ascertain if a new case corroborates the theoretical model that is being constructed or if components of the constructed model should be eliminated or revised. Our selection of a diverse sample thus strengthened this inductive analysis while allowing us to examine the similarities in reflections across these teachers.

When the transcription of the data from each individual participant was completed, the researcher who had collected the data analyzed the transcripts using line-by-line open coding (see Strauss & Corbin, 1990). In open coding, transcripts are coded using labels that describe teachers' verbal statements at a higher level of abstraction. For example, the 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 of "attention" and "group focus." After the first stimulated recall session was coded, each researcher met with the first author to discuss the emerging codes and to establish some commonalties in labeling. Thereafter, we discussed the codes that we were using on a weekly basis and met more formally on a monthly basis to review each other's codes and to discuss themes emerging from the data.

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 19 teachers in this study. 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 categories. These categories were then arranged following Strauss and Corbin's suggestions for axial coding. This secondary analysis thus produced a conceptual model of cognition and instructional decision making in these special education teachers as a group.

Selective coding was used to confirm the central category 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*. For example, the category of *student behavior and emotion* was classified as being an antecedent condition, whereas the category of *student outcomes* was classified as an outcome of the strategies that teachers used to manage the classroom. This secondary analysis thus produced a conceptual model of cognition and instructional decision making in special education teachers.

Member Checks. A second interview was conducted 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 teachers' transcripts was individualized, the nature and length of each interview varied. Overwhelmingly, the teachers agreed with the major categories that had been identified following open coding and with the initial interpretations made by the researchers.

After data collection on all 19 teachers was completed and conceptual labels had been applied to the categories, all the teachers were invited to participate in a 2-hour focus group. A total of 11 teachers participated in one of two focus groups in which the major categories from the data analysis were described to them. Teachers were asked in the focus groups to discuss if and how these categories of concern affected their teaching. This information then was used both to confirm the primary categories and to further understand the relationships among the categories.

Results

The following section reports primary categories derived from our analysis. We arranged our categories in accordance with Strauss and Corbin's paradigm model (1990) and as part of our axial coding sorted these categories into the components that can be seen in Figure 1. This schematic diagram represents data analyzed from the interviews, observations, transcripts from stimulated recall procedures, and informal discussions with our 19 teachers. Each of the rectangular boxes in this model represents a part of the paradigmatic model, while the labels within each box are the titles of the categories that we will be discussing here. The figure is a guide for the reader, rather than an exhaustive presentation of our data. In our discussion of the categories in Figure 1, we will use quotes and observations primarily from one teacher (Beth) in order to provide the reader with an in-depth, contextually rich description of our findings.

Interrelationship of Theoretical Categories

Our identified expert teachers were fundamentally concerned about their students' performance in school, and this concern permeated how teachers perceived and responded to their students. Teacher concern was specifically directed at students' academic, behavioral, and emotional progress, as well as at students' abilities to function independently in the classroom.

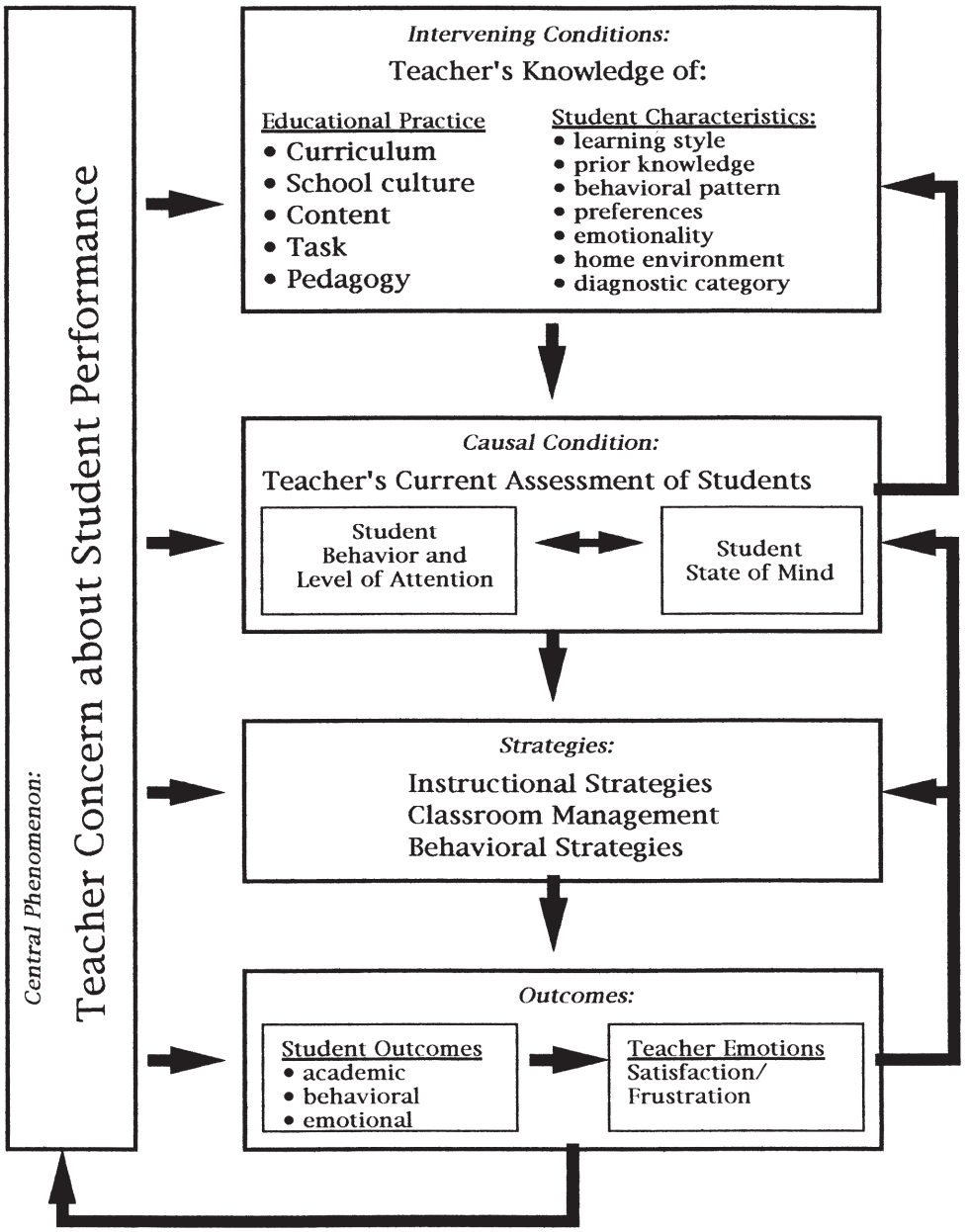

FIGURE 1. Overview of categories that emerged from analysis of the 19 expert teachers arranged in accordance with Strauss and Corbin's paradigm model (1990).

Instructional decision making by these teachers relied heavily upon their prior knowledge about educational practice and upon their background knowledge of student characteristics. Their knowledge about students' characteristics included extensive data regarding learning styles, prior knowledge, behavioral patterns, preferences, emotionality, home environments, and diagnostic categories. Another important knowledge area was educational practice, which included information concerning the curriculum that they were using, the overall school culture—both within their own classroom and in other classrooms, the content that they were teaching, the particular task that they were asking students to complete, and their general pedagogical knowledge about how best to instruct students.

The teachers closely observed the behaviors and attention levels of their students in the classroom and reflected upon their background knowledge regarding the characteristics of particular students. When a student indicated that he or she had problems in completing a task, the teacher used his or her background knowledge, along with knowledge of that student's current behavior in the classroom, to "diagnose" the student's ability to successfully engage in the task. The goal was to form a hypothesis about the student's immediate learning state or

state of mind. This hypothesis, along with the learning and behavioral goals the teacher had set for the student, subsequently led the teacher to use a strategy to assist the student. This strategy might take any one of several forms: instructional, managerial, behavioral, or monitoring, and it was tailored to the specific needs of the student.

Depending on the outcome of these strategies and upon the teacher's assessment of the degree of success that the strategy had on the academic, behavioral, or emotional performance of each student, the teacher experienced either positive or negative emotions about the outcomes. This assessment might lead to the implementation of additional strategies or to an adjustment in the teacher's assessment of the student's learning or behavioral state.

Case Study: Beth

Despite the diversity of the teachers in our sample and the variability of the instructional settings in which they taught, there were *cognitive commonalties* in how these teachers thought about their students. In order to illustrate these commonalties, we have chosen Beth to serve as a "prototype" study participant. Although Beth's background and instructional setting are particular to her own experience, the way in which she reflects upon her students and her classroom is very much representative of all of the teachers in this study. In using this case we do not mean to suggest that all expert teachers perform in the same manner as does Beth, but that they *reflect* upon action and interactions in the classroom using similar patterns and categories of information.

At the time of this study, Beth, a certified special education teacher, had 13 years of experience teaching students with learning disabilities and behavioral disorders. She was nominated as an expert teacher for this study by the district special education director. Her building principal confirmed this nomination and identified areas of particular competence that Beth demonstrated in the classroom. Beth had received her degree in teacher education from a large public university in the southwest. As part of its 4-year certification program, the university required extensive classroom practica along with standard teacher preparation courses. Beth felt that she had been well prepared for the classroom and said that "most of my classes were pretty good and I think at the time I might not have realized how beneficial they were" (Interview 1).

Beth was teaching in a rural town in the southwest. She taught two reading classes each day to a small group of fifth-grade students with disabilities who came to her classroom as part of a pull-out program. For an additional 2 hours each day, she provided instructional consultation and support in general education classrooms. In addition, Beth co-taught two different subjects—mathematics and language arts—to an integrated group of general education and special education students. Although Beth previously had taught in four different schools, it was the first time that she had taught in a setting in which students in general education and special education jointly received instruction on a regular basis. During the interviews, Beth consistently expressed satisfaction with her current program:

> I think it's working very well—I've been really pleased with this program . . . . I think one of the key factors is that the two teachers that I work with volunteered to be a part of this program and therefore they are positive about it—they're willing to work and to do the modifications and whatnot. (Interview 1)

Observations and videotaping of Beth took place during the spring semester in the mathematics class that she taught with her co-teacher, Wanda. During the time of this study, 22 children (12 girls and 10 boys) were students in the mathematics class. Fifty-five percent of the students were Anglo, 27% were of Hispanic origin, and 18% were African American. Nine of these students were receiving special education services and had been classified as having some type of learning disability. Three of these students had been diagnosed as having attention-deficit disorder. In addition, 4 of the students had been classified as gifted. Beth remarked that the class was very much representative of the ethnic makeup and ability level of the school as a whole.

Beth described her teaching style as organized. She felt that it was important to create a dependable classroom routine for her students and to encourage students who became frustrated during the learning process. Although she believed in communicating her high expectations for academic and behavioral achievement to her students, she also felt that it was essential to provide additional instructional support to students who struggled in the classroom. When asked to describe her teaching philosophy, Beth replied,

> I think that all kids can be successful and they all can learn. They don't all learn the same way and [at] the same rate or with the same material and procedures. They have to have a positive self-esteem. I think it's crucial that they feel good about themselves so that they then are willing to take a risk to try something new. (Interview 1)

In their co-taught mathematics class, Beth and Wanda used a standardized mathematics curriculum that Beth felt was appropriate for the special education students in her classroom, but she also enriched her lessons with frequent use of manipulatives and short reviews of previously introduced content. Beth and Wanda typically alternated the days for which they were primarily responsible for delivering the content material, which then allowed the partner teacher to monitor the classroom or to assist students individually. It was not uncommon, however, for either teacher to occasionally interject points or to join her co-teacher at the front of the class to emphasize particular parts of the lesson.

Central Phenomenon: Teacher Concern About Student Performance

A central phenomenon is defined by Strauss and Corbin (1990) as being "the central idea, event, happening, incident about which a set of actions or interactions are directed at managing, handling, or to which the set of actions is related" (p. 96), and as such, the central phenomenon can be seen as the major commonalty that all participants or settings in a qualitative study share. For the 19 special education teachers in this study, their students were undoubtedly their central focus, as well as the most predominate topic in their stimulated recall sessions. The central phenomenon of "teacher concern about student performance" was the driving and principle motivator for these teachers. This concern focused upon four particular areas. First, teachers were concerned with student academic behavior and how to provide instructional supports that would ultimately result in academic achievement. Second, they were concerned with their students' behavior and sought out ways in which to prevent student misbehavior and to increase the expression of appropriate student behavior. Third, they wished to increase student independence and, as part of their instruction, integrated opportunities for student growth and self-determination. Finally, they were concerned for their students' emotional well-being and believed that increasing self-confidence and self-esteem was an important objective. These four components, or properties, of the central phenomenon related most directly to the "student performance" aspect of the phenomenon; however, it was the *teachers' concerns* about student performance and an abiding preoccupation with their students' needs that motivated the teachers to take action in the classroom.

An additional property of the teachers' concern was that it was usually directed at *individual students* rather than at the class as whole. The teachers seemed to focus their strategies upon those students who were having particular difficulties with an assignment or who were displaying behavioral problems. As such, these teachers consistently referred to specific assessments of specific students rather than making more global statements about the performance of the class as a whole.

As was the case with the other teachers in our study, Beth's concern about her students permeated her reflections on her own teaching. She did not often directly articulate this concern, instead manifesting it in her focus upon particular children in her classroom and in the actions that she took to assist them in their progress:

> The boy with the glasses is my procrastinator, so I need to make sure that he gets started. Also this is towards the end of a 2-week period on his checklist . . . and one of the things is staying on task and starting tasks when asked . . . and just my presence to him seems to get him going without having to say anything. Again, we're working for him to have success. He's come a long way since the beginning of the year. (Stimulated Recall 1)

For the teachers in this study, the desired outcome of their efforts, of their concern, as can be seen in this quote from Beth, was for their students to have "success." Teachers explained that this success could take several forms; it could be academic, behavioral, or emotional (for example, wherein the student gains self-esteem or resolves an emotional problem), or the student could become more independent in his or her ability to function in the classroom.

Intervening Condition: Teacher Knowledge

The expert teachers in our study had an impressive knowledge base about the students in their classrooms and about their particular instructional setting. They relied upon this knowledge in making diagnoses about their students' performance. Their knowledge base included two broad categories: student characteristics and educational practice.

Knowledge of Student Characteristics. The category upon which expert teachers in this study reflected most frequently was that of student characteristics. This category included teachers' knowledge about the overall ability characteristics of their students, as well as the personal history of their students. Teachers typically discussed student characteristics as if they were somewhat trait-like, and these characteristics had been observed by them over time. They reexamined and modified this knowledge base, however, when they gathered new knowledge about a particular student. The category included frequent reflections on students' typical areas of learning difficulties as well as how and under what circumstances these particular students typically learned best. Teachers' knowledge about their students' learning styles came from the teachers' shared histories with their students and from their careful observations. This knowledge subsequently made them more effective at selecting instructional interventions for students:

> And Billy . . . his fine motor skills are weak and folding papers and making sharp creases and things like that are difficult for him and that's why I went over and refolded or just made the crease a little bit stronger on his paper there. (Stimulated Recall 3)

Teachers reflected often upon what their students knew and did not know—in other words, the students' prior knowledge. The teachers monitored the prior knowledge of their students and commented on how this knowledge affected students' achievement in the classroom. As a regular part of their lessons, the teachers reminded their students of previously introduced material and then attempted to present information in a manner that would help students to integrate the new material with their prior knowledge:

> I was trying to get it across to the kids here—the special ed. kids specifically—that we had really been doing this a long time. They might have only had one or two problems or examples in each problem set but they have really been doing a lot of this to get them confident and comfortable. . . . and that's why I emphasized the number of times that we had been working with money and decimals and learning the decimals stuff as we were writing our numbers on the board. And some of the special ed. students again, I knew, are weak on hundreds; they can read numbers to the tenth's place but they get mixed up when they go to the hundredth's place. (Stimulated Recall 1)

The teachers also reflected upon their students' behaviors and how they affected classroom instruction. Knowledge of her students' behavioral patterns, learning preferences, and prior exposure to the content being delivered helped Beth be proactive in maintaining an effective classroom environment:

> I needed to make sure that he had [the] basics before we started into it because I know he doesn't like to miss anything and he would have been asking a lot of questions that would have interrupted the flow of the rest of the class, so I just decided to take that time. (Stimulated Recall 4)

Knowing the preferences of a particular student and how they might affect his or her behavior was another area of awareness for these teachers. In one class session, Beth used this knowledge to delay instruction of a math lesson in which the students were using rubber bands to form different geometrical figures:

> That also gave Allan—he's real particular about [having] everything in it's proper place—and that gave him time to get himself organized. If you look, he doesn't have much, he doesn't actually use it, but he's getting everything set up there and then I'll have his full attention when we do start because he's got all the rubber bands just so that none are covering each other and his board is just such so that it's not at an angle and that gave him time to get that done without missing out of any of the actual lesson. (Stimulated Recall 4)

Inherent in this focus on student characteristics was not only the desire that students progress academically and behaviorally but that they gain independence so that they become less reliant on their teacher and other forms of assistance. Similarly, teachers were sensitive to how the emotional characteristics of a student might affect classroom success and chose their instructional strategies accordingly:

> Cindy there was just asking me a question. She had the problem all set up but she wasn't sure what to do next [but] she had it set up beautifully. We're working on self-confidence and she's come a long way and all I needed to say to her here was "Cindy, you've got it right, continue" and it was just enough for her to go on. (Stimulated Recall 2)

Teachers tended to have quite detailed and intimate information about their special education students; however, they rarely mentioned home environment. They made these reflections only when they directly pertained to the student's level of functioning in the classroom and when they were reflecting on how this knowledge helped them design more effective instructional strategies for the student. Similarly, teachers occasionally reflected on students' health history or medical diagnosis but only as a "jumping off place" from which they subsequently evaluated the achievement and behavior of their students, rather than using these labels to govern their instructional decisions in the classroom.

Knowledge of Educational Practice. Along with their knowledge about individual student characteristics, the teachers possessed more general school-related knowledge that contributed to their complex and rich knowledge base. Knowledge of curriculum and of the school culture strongly influenced how the teacher made decisions about what was the most appropriate course of action to support student learning. For example, teachers reflected upon their knowledge of the curriculum and applied pedagogical knowledge in order to modify student tasks. Teachers specifically commented upon what was taking place in the general education classroom, and they considered how the instruction presented in the general education classroom affected students' learning in the special education classroom. Beth commented one afternoon on how she changed her class schedule, given her knowledge of what her students had experienced earlier that morning:

> **Beth:** And this (*referring to her actions in the videotape*) seems like wasted time but that's giving them a change of doing paper–pencil tasks that they were doing. I know what they've done this morning; they had testing this morning in their reading class and their language arts class, so this is just kind of a break time and I know it's more time than we usually use and I'm aware of that—and I'm not really concerned about it now because they need it.
>
> **Researcher:** They need a longer transition time.
>
> **Beth:** They need that longer transition time. Because I knew that this activity was stimulating and if they've settled and ready to go, I'll have an easier time with them. (Stimulated Recall 4)

The teachers' background knowledge about curriculum, school culture, content, academic tasks, and pedagogy, along with knowledge about the characteristics of particular students in the classroom, had been gathered over time through experiences in the particular school setting and through contact with particular students. Although this type of knowledge was trait-like or static in nature, it provided the essential base from which teachers more flexibly interpreted day-to-day student classroom performance.

Teacher's Current Assessment of Students

Teachers in this study closely monitored their students and conducted ongoing assessments. These assessments involved monitoring current behaviors and attention levels and then forming hypotheses about their students' states of mind.

Student Behavior and Attention. Instructional decision making by the teachers was based upon their observations of the students' behaviors and levels of attention. They used this information to update their knowledge base. The teachers focused on students' actions, behaviors, and levels of attention while delivering instruction and managing the classroom action. The teachers frequently commented about and took action in response to subtle cues that they observed in their students. These student behaviors were not necessarily identifiable by an observer, and it became apparent that the teachers were able to interpret the behaviors because of their extensive knowledge of students' characteristics. For example, Beth was able to assess a student's progress because of her knowledge of the task that the student was attempting to complete:

> He was giving me orally the right answer to his multiplication problem, but yet he was writing down 16, instead of 40-something. And I went ahead and called on Brian because I had looked at his paper and I knew that he had the right answer for that one and that he had been raising his hand so often I wanted to go ahead and give him a chance to come on up. (Stimulated Recall 5)

Student attention and group focus were a strong priority for the teachers. Lapses in student attention were not usually tolerated for very long, and these teachers tended to take prompt action to refocus students who were off-task:

> And I picked the little boy on the right because I could see that he was playing, and I wanted to get his attention. I knew he had had the problem done, so I knew that he could look at his paper and come up with the right answer. (Stimulated Recall 5)

The teachers also monitored the attention level and behavior of the class as a whole, and when necessary, they implemented strategies to increase the class' focus. For example, Beth used choral responses from her students to help her monitor their academic progress:

> I knew I had their attention because of the cohesiveness of their answer. It was a group response, and they all knew what to do—they all said the exact same thing—it wasn't jumbled. And that was again to just make sure that they did hear what I said and hadn't tuned me off because it's just about time to start their problem set and a lot of time you might lose them just before because their thinking, "Get my paper out, get my pencil out, get my book. What page number?" So I wanted to make sure that I still had their attention. (Stimulated Recall 3)

Monitoring student attention and behavior thus gave the teacher more information about how the students were learning and about their academic progress. This close monitoring helped the teachers to anticipate learning and behavioral problems, as noted in this example by Beth:

> At this point, they're checking their problem set from yesterday and . . . I could see (I was in the middle of checking the homework) that I was losing them, and I could see that whatever I was doing wasn't the same way that they were used to. . . . I was losing them left and right trying to get their attention. (Stimulated Recall 5)

Beth's awareness of her students' responses subsequently led her to check with her co-teacher about using a procedure that was more familiar to the students.

Student State of Mind. The category of student state of mind was based upon both the teacher's assessment of current student behavior and her knowledge of students' characteristics. These assessments were hypotheses that the teacher made about the students "in the moment" and were not necessarily based on student behaviors that could be interpreted by an outside observer. The teachers also used pedagogical knowledge of learning difficulties to form these hypotheses. A teacher was especially likely to engage in this type of reflection when a student was encountering difficulties:

> Adam is very slow and precise and perfectionist on how he writes his numbers. It takes him a long time. . . . And here I notice the little girl who's right across from him . . . it's almost like she was giving him too much and he couldn't comprehend everything together, and I could see in his face that he was getting frustrated. (Stimulated Recall 1)

Part of forming a hypothesis about a student's state of mind involved reflecting upon prior knowledge of the student and assessing subtle behavioral cues in the learning situation.

These teachers almost always reflected on student state of mind when individual students were actively engaged in learning in the classroom. They monitored subtle student cues to help them make this hypothesis and yet seemed to have precise determinations about what their students were thinking. The teachers also reflected about typical patterns of behavior and emotionality of their students to make deductions about their students' present emotional state:

Researcher: Did she raise her hand? How did you know to go to that particular student?

Beth: She was flipping through her pages really, and she had a look like, "I know I did these, but where are they?" on her face.

Researcher: Do you monitor the students who are special ed. students more closely for those kinds of signs?

Beth: Yes, uh-huh. But then any other child that had that same look I would volunteer to help too. (Stimulated Recall 3)

Although the teachers occasionally reflected on the knowledge or learning of a class as a whole, they seemed to more frequently comment on this category with respect to a particular student. These comments were part of how the teachers then made decisions about which strategies or supports their students might need.

Strategies

The teachers used an impressively large variety of strategies to respond to student needs in their classrooms. The types or categories were not particularly remarkable, but the *manner* in which the teachers tailored these strategies to the needs of their students was precise and refined: They selected a strategy based upon the instructional diagnosis that they made about the state of mind of the particular student. They applied the strategy in the classroom and subsequently assessed its effect upon the academic, behavioral, and emotional outcomes for the student. The most frequent categories of strategies used were instructional, classroom management, and behavioral.

Instructional Strategies. Each teacher mentioned a large repertoire of strategies in our interviews with her. Some of the most commonly used strategies were repeating material, reinforcing students, modeling, and scaffolding students' learning so that the material was acquired with a minimum of error and instruction. The teachers explained that they chose and implemented those instructional strategies that they believed had the greatest probability of increasing a student's academic success.

Somewhat unsurprisingly, an instructional strategy that these teachers frequently used was *modification*. Our analysis identified the following modifications: reteaching the material, using instructional materials, prompting/cueing, modeling, changing the task, and giving students more practice on the task. The teachers carefully observed the results of implementing these modifications and then assessed these results based on their students' subsequent progress. If the teacher believed that the modification was not sufficient in aiding student learning, she typically reevaluated the student's learning difficulty and state of mind and then selected a new modification to apply.

Teachers typically presented instructional information in ways that were accessible through different sensory modalities. Beth consistently attempted to deliver information both orally and visually. During one lesson on improper fractions, she used a small poster to illustrate the difference between a proper and improper faction and then left the poster on the board as the students began working independently on a problem set:

> I wanted to make sure they had a visual representation 'cause we were going to leave this poster up as they started their independent practice. They could then look up and see if they weren't sure about an improper fraction and what constituted an improper fraction so that they could compare. Also, that gave the special ed. children that might not know this, if this was totally new information to them or if they didn't remember it from last year, then they could read it along with everyone else and feel successful. It also shows the pictorial representation of the fraction so that they could see it as well as hear it. (Stimulated Recall 1)

Teachers in inclusive classrooms often used modifications that were effective with the class as a whole. During one observation, Beth had her students copy a textbook problem she projected on the overhead projector rather than having them copy the problem from their individual textbooks.

Researcher: And you are having them write it on the card?

Beth: That was done because we noticed on the last problem set that they were copying the problems wrong from the book; they were getting the right answer for what they wrote down, but they miscopied. So, we wanted just to give those kids practice that have trouble with the transferring from the overhead to the paper. (Stimulated Recall 3)

Beth thus changed her instruction for all of the students in the classroom in order to provide an appropriate modification for the students who had difficulty in correctly copying the problems.

Beth was careful about how she presented content information to her students and tried to ensure that they correctly

learned the material the first time that it was presented. During one class session, she questioned students about the steps in solving a problem. Although Beth usually invited student comments, during one class session she held up her hand to silence a student:

> I had put up my hand as a signal for them 'cause someone chimed in and I wanted to make sure—I just put up my hand like a stop signal so that they would not continue. I wanted to make sure that they heard the correct form first and not someone who might say it with me wrong. To make sure they heard it the right way first. (Stimulated Recall 3)

Beth felt that she was particularly successful in working with children who were frustrated with school and no longer willing to take risks in learning. She felt that she was able to work with these children in a way that did not single them out from their peers. In observing Beth's class, it was difficult to determine from her comments which students had been labeled as special education. Beth did monitor these students more closely, but she took care that her modifications for them did not attract attention from the other students. Beth found that using many visuals and manipulatives seems to help her special education students understand most concepts that were being presented. She also modified the individual seatwork that these students did, often giving them worksheets on which they could write directly rather than requiring them to copy questions from their mathematics book.

At times, instructional strategies also seemed to function as a classroom management or as a behavioral strategy, such as when teachers grouped students for cooperative learning, used a familiar routine to present instruction, or changed the pace of instruction so that all students could participate. Occasionally, a teacher would use peer assistance as an instructional strategy:

> The special ed. students are . . . in the front of the classroom . . . and they change seating arrangements every 6 weeks, but they're kept up in the front with the people whom they're grouped with. [They] are chosen so that they will be [with] someone within that group that'll have the patience and don't [sic] mind working with them. A lot of times all they need is a "Remember—you divide and then you multiply." Just a little reminder to get them back on track. . . . They have their multiplication charts, some of them that they'll use to work the problem. . . . so that the actual multiplication facts don't stop them from doing the process of multiplying three-digit numbers. (Stimulated Recall 1)

Classroom Management. The category of classroom management included the procedures and routines that the teacher established for her students. In this study, the teachers stressed that effective classroom management assisted them in proactively preventing behavioral problems in the classroom. During our observations, student behavior problems were rare, but teacher reflections on classroom management were frequent. Beth explained that by communicating her expectations to her class, she could prevent problem behaviors that might later interfere with her lesson:

> This [referring to her introduction of the lesson] was just giving my expectations so that they know what I expect. It's to cut down on the possibility of that happening and then having to correct someone. They know right from the start that that's what I want them to do. (Stimulated Recall 4)

In one segment, Beth commented on the proactive management strategies she and her co-teacher used to plan the remainder of the instructional sequence:

> Here she's asking how far the children were along with what they had done. And we decided to go ahead and give the answers quickly. Then she was going to do the questions if anyone had a question on the work to do it after the recess time, go back and rework those. And I'm passing out cards that I'm wanting them to work on to do the folding activity that we do with the fractions during that time, so it's already on their desk and I don't have to stop and do that once I have their attention. (Stimulated Recall 3)

Included in the category of classroom management were teacher reflections upon the school rules, the routine of the classroom, and the overall classroom environment. The teachers were also aware that seating arrangement affected students' behavior:

> We found in the seating arrangement it doesn't matter who's sitting here [referring to a spot in the classroom]. . . . the person that sits right there seems to have the most difficulty keeping their attention to the class—that's why these four desks here are now all facing this way so that no one has to have their back to whoever's doing the presentation. (Stimulated Recall 4)

The classroom aide, general education teachers, support personnel, and administrators who filtered in and out of the special education classroom were monitored by the teachers, and these visits were orchestrated so that the flow of the instructional sequence was disrupted as little as possible. Time was an additional major factor for these teachers, and it seemed to affect the pacing of the curriculum and how content was delivered as part of the instructional routine. As was the case with instructional strategies, the effectiveness of the classroom

management strategies used by these teachers seemed to be a result of the skill and timeliness with which they were implemented, rather than the categorical uniqueness of the particular strategy.

Behavioral Strategies. Because the teachers in this study were proactive in their prevention of student behavior problems, few misbehaviors were evident during our classroom observations; however, occasionally teachers were obligated to respond to student behaviors. They became concerned with student classroom behavior primarily when they believed that it affected either their ability to deliver instruction or students' ability to learn. This concern was specific—it usually involved a particular student and a particular incident that was occurring in the classroom, as shown in this example by Beth:

> I could tell in the workings of this group . . . they weren't all getting along and I wanted to stop it before it got into something where someone was gonna get in trouble, stop it before it started. . . . I asked them to sit down and [said], "Roger, could you turn in your chair correctly?" And he replied to me, "I am." And I just said, "I need you to turn around," not giving him an opportunity to argue with me but to do [what] I asked, but not singling him out too specifically. My intent wasn't to embarrass him but to get him back on track. (Stimulated Recall 1)

The teachers visually and aurally monitored their students' behavior, scanning the classroom to note behavioral concerns, such as how these behaviors might be interfering with the learning of the student or the learning of other students in the classroom. Behaviors that the teacher monitored included individual or group level of involvement and participation in a task:

> So I think doing something like this adds toward that because you're monitoring the behavior—and you'll see in a minute one group had a little bit of difficulty getting along but then we're able to deal with it right then—and hopefully they'll learn from that then when they're on their own doing their problem set; if they'll have a question, they'll ask their neighbor, and they can check it there. And you can see Ms. Smith walking around and checking the same things so we can go a little bit faster. (Stimulated Recall 1)

At times, the teachers monitored problem behavior but seemed to ignore low rates of student misbehavior. Throughout the stimulated recall procedures, it appeared that teachers carefully considered their knowledge about the specific student and the particular incident before they intervened. They also monitored more subtle cues—such as the level of student involvement or participation—that indicated that their students were *about to engage* in problematic behavior. This required a knowledge of the student's typical pattern of behavior:

> I would say, in this group of students, he's the student that has the hardest time staying on track, that needs the most [attention]. Either just somebody walking by him or a gentle reminder of what do you do next. And sometimes I time him on how long it takes him to do a problem, because he is very competitive with himself and that just is a little something you can do without having to buy anything. The other kids kind of encourage him . . . to go faster, to finish up, or when he starts to talk to them they'll remind him, "She's timing you," and that gets him back on track too. (Stimulated Recall 3)

The teachers in this study used a wide variety of behavioral strategies. Although they did use reactive strategies, such as changing their tone of voice or using proximity control, their behavioral strategies were frequently positive in tone and included encouragement, praise, and motivational strategies. They also preferred to use behavioral strategies that redirected, rather than called attention to, problem behaviors:

> Some of them were beginning to play with their papers. They [were] fanning themselves and with each other—so that's why I said, "Put it above your head," because they didn't have it to use to distract anyone else. (Stimulated Recall 3)

The teachers also used classroom management techniques such as rearranging seating or implementing a token system when more than one student was exhibiting problems.

Outcomes

The teachers focused on assessing two prominent outcomes: the effect of classroom instruction and interventions upon student outcomes and their own emotional responses to these outcomes. Student outcomes were academic, behavioral, or emotional in nature and were assessed in both positive and negative ways. In the following exchange, Beth commented on the academic success of her students:

> **Beth:** And then you see now we're getting more people with the right answer before we show them. I think there's like three or four examples right here of people that had the right answers and we weren't seeing as many as fast.
>
> **Researcher:** So it's taking them a little more time or . . . ?
>
> **Beth:** Less time.

Researcher: Okay, so you have more students . . .

Beth: Getting more right answers. (Stimulated Recall 4)

Beth also assessed behavioral outcomes, as is seen in this comment about a student who was talking out during her lesson:

> I don't know why he called that number—It wasn't written on the board. . . . He glanced up and he knew that whatever it was he did, he shouldn't have done it. I didn't make an issue of it, I just went ahead on. (Stimulated Recall 6)

When the teachers assessed the outcomes of students in their classrooms negatively, they usually chose another strategy for assisting or correcting the student.

These teachers expressed emotions that directly corresponded with students' outcomes, and the emotions were usually positive in tone. The emotions were not of any particular type but rather were general comments about being satisfied or pleased. In contrast, when the teachers expressed negative emotions, they usually used the word *frustration,* as in the following comments from Beth when she had difficultly in keeping her students' attention: "A little frustration, just anxiety of, . . . wait, I need to keep them together; I don't want to start losing the group and that's why I walk around" (Stimulated Recall 4). This frustration did not seem directed at the students; instead, it appeared to be a dissatisfaction with their the teacher's ability to affect the students' performance.

Summary

The interplay of the just described categories mimics the dynamic nature of the instructional decision making of these teachers. Concerns with student performance motivated these teachers to closely monitor student behavior and attention and to develop a hypothesis about students' states of mind. Strategic actions the teachers took in the classroom were the product of the teachers' hypotheses combined with frequent reflection upon their extensive knowledge of student characteristics and educational practice.

Discussion

Research on teacher thinking has emphasized the multitude of behavioral and instructional decisions teachers make in the classroom each day (Clark & Peterson, 1986; Doyle, 1990). In addition to these demands, the special educator must attend to the challenging learning needs of individual students and manage the complex activity flow that occurs in special education settings. Our analysis of the 19 teachers in this study suggests that the nature of the special educator's thinking is particularly complex and interactive, but that it tends to focus on the needs of the individual learner. Each of the teachers had an extensive student knowledge base that included the prior knowledge, preferences, behavioral patterns, learning abilities, emotionality, and diagnostic categories of their students. In addition, the teachers were acutely aware of the real-time behaviors of students and closely monitored attention levels in the classroom. This knowledge allowed the teachers to plan appropriately and adapt instruction to meet the unique and changing needs of their students.

We observed that special education teachers precisely selected their teaching techniques in order to address the needs of their students with learning problems and frequently engaged in what we have called *instructional assessment*. Of interest to us was that this instructional assessment was not based on the particular diagnostic category assigned to a student; rather, teachers closely observed the behavior of a student and interpreted this behavior given their knowledge of and past experiences with the student. Teachers then used this information to make a hypothetical determination of students' state of mind, which included their learning or emotional state, as well as references to what behavioral intentions students might have in the moment.

The use of the diagnostic cycle is not unlike that described by Groen and Patel (1988) in their description of how a sample of radiologists determined pathology when examining radiographs. Our teachers used extensive knowledge of a particular student and his or her learning needs to arrive at an assessment. Following this assessment, they applied a strategy to remedy the learning or behavioral difficulty. Their assessment process differed, however, from that of doctors in that the procedure was repeated numerous times during an instructional period, with diagnostic reflections about one student often being made several times in the space of 5 or 10 minutes.

As a result of this dynamic assessment activity, the instructional practices of our expert teachers did not lend support to any specific instructional procedure; rather, they drew on an extensive, diverse, and personalized body of background knowledge of teaching. Although their instructional activities reflected current knowledge of effective instruction, they adapted and personalized this instruction to meet a student's unique needs. Although the teachers possessed a significant knowledge base concerning their students and pedagogy, they also actively engaged in gathering new data about their students' performance. This ongoing data collection, along with teacher reflection on the extensive student knowledge base, subsequently guided instructional decision making. This strategic, knowledgeable, and reflective application of instructional interventions in the midst of the instructional moment seems to us to be the *essence of effective instruction.*

In examining skilled performance, a number of researchers (Perkins & Salomon, 1989; Putnam & Borko, 2000; Rogoff & Lave, 1984) have pointed out the contextual nature of knowledge, in that it appears tightly bound to the domain in which it is developed. Despite the variability of instructional settings in this study, similar cognitive patterns were present in the instructional decision making of the teachers as

a whole. Although the declarative knowledge that teachers possessed about their students and educational settings varied, the procedural knowledge remained constant: The teachers responded to contextually varied features in their respective instructional environments in individualistic ways, but the patterns of instructional decision making were consistent.

We have argued that effective special education teachers use highly detailed and extensive knowledge about their students' characteristics to enable them to assess their students' states of mind and needs in the classroom. Adaptation of instructional activities that match the unique characteristics of learners is the raison d'être of special education and has been legally codified as the IEP. Although the promise of individualized instruction is not always realized in special education settings (Kauffman, 1993), an abiding focus on the individual needs of students was a common concern of the expert educators in this study. These teachers constantly monitored the performance of their students and implemented strategies to maximize performance. This concern for the individual student by expert special educators differs from results obtained from general education teachers (see Berliner, 1987; Clark & Peterson, 1986). Although effective teachers in general education settings also have extensive pedagogical and content knowledge (Shulman, 1986), they appear to channel this information into the design of instruction for the class as a whole. In contrast, the objective of the special educators in this study was to design instructional and behavioral modifications for individual students.

What we have learned from this study suggests that what is central to effective special education instruction is the knowledgeable, reflective, and concerned responsiveness of teachers to individual students. Noddings (1984, 1992) has similarly written about caring as an essential element in effective classrooms and schools. The ongoing practice of these expert teachers was concern with their students and assessment of their students' internal cognitive states as a precursor to making instructional decisions. As such, effective teaching appeared to be not a particular method but a complex body of knowledge nested within ever-present concern that allowed these educators to competently address the complex academic, behavioral, emotional, and independence needs of their students with disabilities.

Implications

The search for effective instructional practices for students with disabilities has focused upon specific interventions that result in student success. Although recent meta-analytic investigations (Kavale & Forness, 1996; Swanson, 1999) have identified some specific instructional practices that lead to greater performance gains in students with specific learning needs, even the most effective of these instructional interventions capture only a small proportion of student change. We propose that an important part of improving student performance is the result of complex, dynamic, cognitive processing by skilled special education teachers.

Our findings from this study suggest that teacher training programs should focus on modifying *how* special education teachers think about instruction as well as *what* interventions they implement. We are using our data from this study to attempt to transfer expertise to student teachers via a seminar for this group. In a previous study (Stough & Palmer, 1996), we found that stimulated recall and collegial reflection increases self-reflection and evaluation in novice teachers. We also discovered that when teachers in the field have the opportunity to reflect on their teaching, such as in the stimulated recall procedure we conducted in this study, they find the procedure useful in analyzing their teaching. Finally, we believe that this technique can facilitate the transfer of expertise by providing student teachers with models of expert cognition in current special education contexts.

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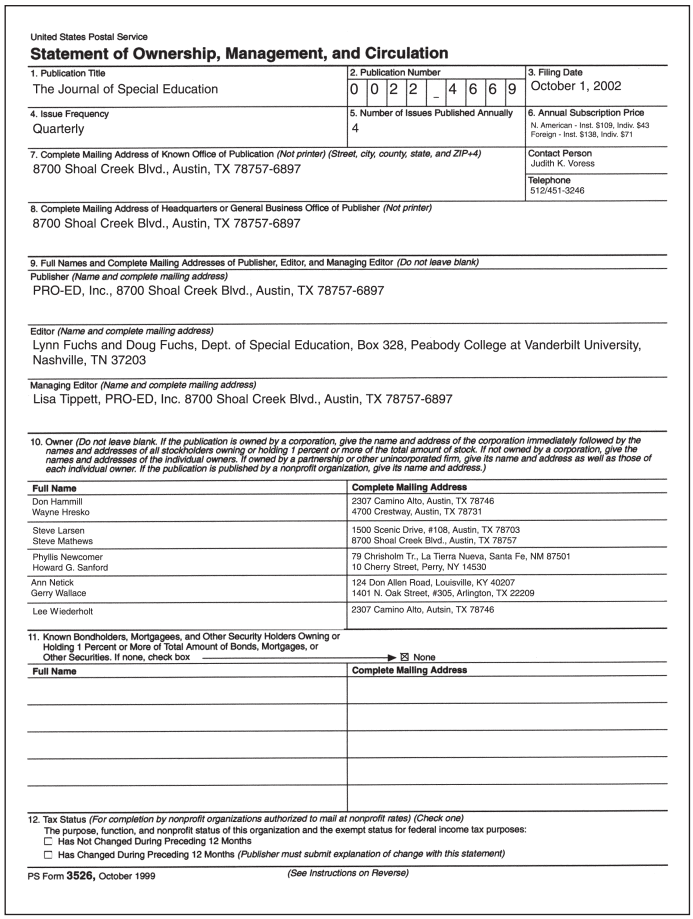
Appendix: Teacher Interview Questions

1. How long have you been teaching?
2. Tell me about previous settings in which you have taught.
3. Describe the classroom in which you are presently teaching.
4. Tell me about the students whom you are currently teaching.
5. How would you describe your teaching style?
6. What would you say is your teaching philosophy?
7. What do you consider to be your teaching strengths?
8. What do you consider to be your teaching weaknesses?
9. Can you think of a particular teaching experience that has changed your perspective on teaching special education?
10. What do you feel is the most rewarding aspect of your job?
11. What do you feel is the most frustrating aspect of your job?
12. When you consider your own teacher training program, what was the most helpful part of that program that led to your development as a teacher? The least useful? What changes would you suggest in designing teacher training programs?
13. What do you think makes a special education teacher "an expert?"



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