ClassWide Peer Tutoring Learning Management System

Applications with Elementary-Level English Language Learners

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ABSTRACT

For the past 18 years, we have engaged in a program of research designed to improve the literacy of poor culturally and linguistically diverse students and English language learners (ELL) in urban elementary schools. Intervention research has addressed the issue of what works best, how it can be applied and sustained schoolwide, and how computer and information management technology can improve quality and reduce teachers' work loads. The net product of this research is the Class-Wide Peer Tutoring Learning Management System (CWPT-LMS). In this article, we report on use of the CWPT-LMS in the literacy instruction of elementary-level ELL. Five ELL teachers and 117 students in a multiracial/multiethnic urban elementary school, including students with disabilities, participated in the study. Results indicated that ELL made considerable progress in mastering the curriculum over periods ranging from 15 to 21 weeks of school across teachers, teachers implemented CWPT to high standards of fidelity, students' and teachers' satisfaction with the CWPT program was high, and consultation improved program implementation and student outcomes of all but one classroom. Implications of these findings are discussed.

Our CURRENT UNDERSTANDING OF WHY CHILdren living in poor urban communities enter school with fewer skills in language, emergent literacy, and general background knowledge than other students has recently been documented (e.g., Hanson & Carta, 1995; Snow, Burns, & Griffin, 1998). Hart and Risley (1992, 1995) reported that by age 3, children of families living in urban poverty and enrolled in government assistance programs had developed spoken vocabulary sizes half as big as those of children of middle-class parents (500 vs. 1,100 unique words). Children in poor families are read to less often by adults, and they achieve a reduced understanding of the value of reading books and printed materials compared to children in moderate- and high-income families (Baker, Scher, & Mackler, 1997). Consequently, poor children frequently come to school lacking essential verbal, language, and early literacy skills, as well as life experiences necessary to successfully learn to read. Children living in urban poverty are at greater risk than other children for being identified as learning disabled and having academic problems related to literacy (Torgesen, Wagner, & Rashotte, 1997; Torgesen, Wagner, Rashotte, Alexander, & Conway, 1997).

A growing number of children entering U.S. schools are experiencing difficulties learning to read and becoming literate because they are not native speakers of English. Their early experiences have not supported learning English, the primary language of U.S. schools (Snow et al., 1998). When addressing the specific educational needs of English language learners (ELL), educators have debated whether instruction should be primarily in the student's native language or in English, and when to make a transition from bilingual to English-language-only classrooms. A more crucial issue, however, is how to merge English language instruction with subject matter instruction. The question is how to success-

fully design instruction that develops literacy skills in English while at the same time promoting second-language acquisition (Arreaga-Mayer, 1998a, 1998b). Gersten and Jimenez (1994) reported that effective instruction for ELL addressed eight design features: challenging expectations, involvement, success, scaffolding strategies, mediation/feedback, collaborative/cooperative learning, second-language techniques, and respect for cultural diversity. More recently, Arreaga-Mayer (1998b) described additional features of effective instruction. These included implementation with heterogeneous groups, promotion of high levels of student engagement; activation of higher-order cognitive processes; opportunities for students to engage in extended English discourse; applicability to small and classwide groups; social acceptance by teachers, students, and parents; and respect for cultural and linguistic diversity. Consequently, combining effective instructional interventions with features of language-sensitive teaching appears to maximize opportunities for ELL to become literate.

CLASSWIDE PEER TUTORING (CWPT): AN EFFECTIVE INSTRUCTIONAL STRATEGY

A growing base of research supports CWPT as an effective instructional intervention in which second-language acquisition and literacy may be accomplished (Arreaga-Mayer, 1998b). CWPT is a form of intraclass, same-age, reciprocal peer tutoring. Unlike other forms of peer tutoring, CWPT is designed to operate only with the children in one particular classroom, not involving upper-grade or higher-skilled tutors from other classrooms. Peer-tutoring roles in CWPT are designed to be reciprocal; that is, each student serves as both the tutor and the tutee during each CWPT session. In CWPT, unlike in teacher-mediated instruction, it is possible for students to experience one-on-one pupil–tutor dyads during sessions; relatively immediate error correction; fast pacing and multiple opportunities to respond; both teacher and learner roles; written and oral learner response formats; inclusion; and social and academic goals addressed during the same instructional time (e.g., Utley, Mortweet, & Greenwood, 1997).

In a review of the Educational Resources Information Center (ERIC), it was noted that at least 25 published CWPT intervention studies report CWPT's superiority to conventional forms of teacher-mediated instruction for accelerating reading fluency/comprehension and mastery of other basic academic skills. Effect sizes have ranged above 0.40, depending on the study and the dependent variable (e.g., Greenwood, 1997; Greenwood, Delquadri, & Hall, 1989; Mathes, Howard, Allen, & Fuchs, 1998). Students with mild and moderate disabilities are reported to often benefit from CWPT to the same degree as nondisabled low-achieving students (e.g., Delquadri, Greenwood, Stretton, & Hall, 1983; Mathes, Fuchs, Fuchs, Henley, & Sanders, 1994).

In previous research (Greenwood, Finney et al., 1993; Greenwood, Terry, Arreaga- Mayer, & Finney, 1992), condi-

tions reflecting key CWPT implementation standards were evaluated and directly linked to CWPT implementation problems and solutions. Using weekly pre- and posttest progress information, an individual student was classified as academically successful if his or her pretest score was 40% or less and his or her posttest score was 80% or more after a week of daily CWPT sessions. Within these two pre- and posttest outcomes, CWPT material assigned to be learned in a week was considered to have been challenging and not too easy, and subsequent growth to 80% or above indicated a successful tutoring experience. Alternatively, students were classified as underchallenged, as undermastering, or as underchallenged/undermastering. Students classified as underchallenged scored higher than 40% at pretest on material that was judged too easy for them. Students classified as undermastering failed to reach 80% or above at posttest after CWPT and were considered to have had a failed tutoring experience. Students classified as underchallenged/undermastering scored higher than 40% at pretest but failed to attain 80% by posttest. By monitoring the proportion of students in each of these groups each week, it was possible to make strategic decisions about increasing the difficulty of material to be learned for individuals and the entire class; or whether improvements in the fidelity and strength of peer tutoring were needed.

In previous CWPT research (Greenwood et al., 1992; Greenwood, Delquadri et al., 1993), implementation factors that related to lowered student outcomes included (a) reduction in students' time to learn in CWPT sessions (e.g., school absences, pulled out from CWPT sessions, fewer than three sessions per week), (b) use of unchallenging material week after week, and (c) low-quality peer tutoring (e.g., failure of tutors to teach using the scripted format, to provide correction, and/or to award points for correct responding). In order for students in CWPT programs to make optimal progress, Greenwood, Finney et al. (1993) recommended "the use of effective and efficient methods to ensure that implementation problems were quickly diagnosed and that teachers were provided appropriate feedback and advice in a form leading to immediate effective action" (p. 21). To provide this information, a computer program was developed for use with CWPT (the CWPT-Learning Management System or CWPT-LMS.) The CWPT-LMS is capable of linking, planning and implementing student progress information (Greenwood, Carta, Delquadri, & Finney, 1989). This program has been substantially improved recently, and it includes software for program planning and implementation support, graphing and data analysis, and information management (Greenwood, 1998; Greenwood & Hou, 1997; Greenwood, Hou, Delquadri, Terry, & Arreaga-Mayer, in press).

Traditional procedures used to improve the quality of CWPT implementation have been based on direct observation and feedback from consultants (Greenwood, Finney et al., 1993). CWPT consultants have addressed quality in a number of ways. First, recommendations provided by a consultant should be contextually specific and appropriate to the

needs of the teacher, based on observational and quantitative data. Second, a consultant should be capable of diagnosing and prescribing changes in the teacher's implementation of the CWPT program, using students' pre- and post-peer-tutoring progress information. Third, a consultant should be able to model and show the teacher how to use these same methods and student progress data as a basis for making decisions about program changes and improvements. Consequently, the consultant's assessments, advice, and feedback to teachers has often led to measurable improvements in program quality and student progress (Greenwood, Delquadri, & Bulgren, 1993).

The current study was part of a larger study of the CWPT Learning Management System (CWPT-LMS) implemented schoolwide in one urban elementary school in support of literacy instruction. As a result, the opportunity arose to report use of the program by five teachers who taught ELL. In the context of literacy instruction for ELL, the following research questions were addressed:

1. What were the outcomes of students overall and within each classroom?

2. What was the fidelity of CWPT-LMS program implementation?

3. What were the effects of consultation on improvement in student outcomes?

4. To what extent were teachers and students satisfied with their experiences in the program?

Method

Design

To address these research questions, a single-subject design across classes and teachers was used. Weekly individual student and classroom group progress in the curriculum taught using CWPT-LMS was monitored over a period of 15 to 21 weeks. The dependent variables were students' pre- and posttest scores on vocabulary and spelling tests representing the material taught using CWPT. Measures of fidelity and satisfaction were collected to monitor the outcome of teacher training and implementation of the CWPT program. After establishing a CWPT program baseline in Weeks 1 through 7, consultation and feedback focused on improving each teacher's program, beginning in Week 8. Thus, for each teacher the design included two conditions: A = baseline implementation of CWPT-LMS; and B = CWPT-LMS plus consultation, progress-based decision making, and feedback.

Participants

Five elementary-level ELL teachers (Teachers 1–5) participated during the 1998–1999 school year. A total of 117 ELL

participated, with 29, 24, 20, 23, and 21 in each classroom, Grades 1 through 5, respectively. Students attended a multi-ethnic, multiracial K–5 elementary school, with a total of 703 students. Student body demographics were 35% Hispanic, 30% African American, 29% White, and 6% Asian. As suggested by these demographics, Spanish was the primary language of ELL. The ELL and special education models espoused at the school were ESL self-contained, partial immersion classrooms for limited English proficiency, and general classroom inclusion for children with disabilities.

All five teachers were White females. Three teachers had taught from 1 to 9 years, and two others had more than 15 years of experience. However, only one teacher had received training in teaching English as a second language. Due to teacher illness, one classroom had a substitute teacher and a paraprofessional for the first few weeks of the school year; both were trained and implemented project activities that the returning regular teacher eventually took over.

School, Teacher, and Student Recruitment. The school and faculty were successfully recruited for participation following a series of orientation meetings and individual discussions with faculty members. Recruitment appeared to have been favorably influenced by teachers' past involvement with CWPT and faculty interest. District approval, parent permission, and informed consents were obtained.

Measurement

Weekly Pretest/Posttest Curriculum Mastery Measures. Teachers administered weekly pre- and posttests of the material assigned to students for peer tutoring. These materials were developed using procedures described by Greenwood, Delquadri, and Carta (1997), which included a task analysis of the material to be taught and preparation of weekly lists of vocabulary and spelling words. These tests were administered in a group format each Friday. Tested items included the list of 10 to 20 words tutored that week (posttest) and the list of words to be taught in the next week (pretest). Teachers read each word aloud and used it in a sentence. They allowed students a brief amount of time to write or write and define the word. When finished, students corrected the tests. Each student passed his or her paper to another student, and the teacher provided the correct answers. Students marked each item as C for correct or X for incorrect, and provided a count of the correct words at the top of the paper, next to each student's name. The tests were returned to their owners and then turned in to the teacher. The CWPT-LMS (Greenwood & Hou, 1997; Greenwood, Hou et al., in press) contained tools for managing student progress information and weekly program implementation. These were (a) the Program Support Tool, and (b) the Data Analysis Tool, and (c) the Data Management Tool.

The teacher, or students trained by the teacher, then entered the number of correct answers into the CWPT-LMS.

The Program Support Tool contained a roster of students in the class and a database for storing student progress information. To ensure reliability, the teacher or designated students checked initial entries against the original documents.

The CWPT-LMS Data Analysis Tool provided a set of graphs for viewing the students' progress over weeks as a group, as individuals, and by individuals within a week. Of particular interest in this research was progress analyzed by outcome groups, which was designed to link outcomes/ differences to implementation problems and solutions in support of teachers' diagnostic and prescriptive thinking about program improvement in the week ahead.

The CWPT-LMS Data Management Tool provided tools for deleting, copying, backing-up, and restoring program data files from one disk or disk drive to another.

Using weekly pre- and posttest progress information, students were classified into four groups. A student was classified in the successful group if his or her pretest was 40% or less and posttest was 80% or above. In this case, the material tutored was considered challenging and not too easy; and growth to 80% or above indicated a successful peer-tutoring experience. A student was classified in the underchallenged group when his or her pretest was above 40%. A student was classified in the undermastery group if his or her posttest was less than 80%. Finally, a student was classified in underchallenged/undermastery group if the material was too easy (less than 40% correct) and the student did not grow to 80% or above. By examining the proportion of children in each of these four weekly outcome groups, it was possible to decide whether to increase the difficulty of material for individuals or the class or whether improvements in the fidelity and strength of peer tutoring were needed.

CWPT Fidelity Assessment. The staff evaluated CWPT-LMS implementation by using a 40-item procedural checklist whose items were grouped into three categories: (a) visibility of CWPT materials during sessions, (b) teacher supervision, and (c) student tutoring behaviors. For the first 2 months, fidelity checks were made twice per month until teacher implementation of CWPT reached 80% or above. Thereafter, one fidelity observation was randomly conducted each month. Over the school year, 33 fidelity observations were conducted, with each teacher receiving between six and eight monthly evaluations. Interobserver reliability checks for fidelity of implementation were conducted for 18% of the total observations. Item-by-item percentage agreement statistics (Percentage Agreement = 100 [No. Agreements/No. Agreements + No. Disagreements]) were used to evaluate that two observers' records agreed. Mean agreement was 98% overall, with a range of 96% to 100%.

Teacher and Student Satisfaction Assessment. During the last month of the study, teachers completed a 13-item Likert-type survey to examine opinions about academic and social benefits of CWPT. They were also asked to evaluate the mechanical aspects of CWPT (e.g., ease of implementation, points, transitions during CWPT). To examine the students' satisfaction, a 16-item survey was administered in Spanish and English during the last month of the study. The students were asked questions about their overall satisfaction with CWPT, academic utility, changes in peer interactions, and mechanics of the CWPT program (e.g., points, partnering, subject matter). A shorter version of the student satisfaction survey was administered to the first-grade class. This 6-item survey asked questions about the CWPT program's effectiveness and the students' desire to participate in CWPT programs in the next school year. In both surveys, a dichotomous rating scale—with happy faces indicating like or agreement with the CWPT program and sad faces indicating dislike or disagreement with the CWPT program—was used. In addition, a subset of ELL were interviewed to determine their perceptions about CWPT. Interviews were conducted by a Spanish interpreter in either Spanish or English, depending upon the student's preference and videotaped.

Procedure

CWPT-LMS. The CWPT-LMS provided software tools for teachers to use in implementing the program. The CWPT-LMS runs on PC-compatible desktop computers and network file servers. The software enables teachers to set up multiple classroom CWPT program rosters by subject matter and, if desired, integrate and examine progress information from all teachers' programs (Greenwood & Hou, 1997). Program support software helps a teacher set up, plan, implement, record outcomes, and evaluate progress. Data analysis charting software displays individual and classroom progress over time and within individual weeks. Data management tools enable sharing, deleting, and modifying of program information.

The CWPT Core Process. At the beginning of each week, all students in a class were paired for tutoring. The teacher used the Program Support Tool to assign each tutor–tutee pair to one of two competing teams (Greenwood et al., 1997). Before daily CWPT sessions, teachers reviewed students' prior knowledge and then introduced new material to be learned. During tutoring, tutees earned points for their team by responding to the tasks their tutors presented. Tutor roles were highly scripted to ensure that tutees received frequent, distributed response trials in a consistent format designed by the teacher and to ensure that a standard error-correction procedure was applied to errors made by tutees. When instructed to begin, the tutor presented the word, and the tutee said the word and spelled it by writing it on paper. The tutor checked the tutee's response and awarded 2 points if correct or corrected the error by having the tutee practice it 3 times. The tutor then presented the next word. After the first 10-minute tutoring period (timed by the computer), students switched roles; the tutor became the tutee, the tutee became

the tutor, and the second 10-minute tutor period began. Upon completing the full 20-minute session, students reported points earned to the teacher, who tallied them by team and recorded them on the computer, also using the Program Support Tool. The winning team was determined daily and weekly based on which team had the highest point totals.

CWPT Standard Teacher Training. Teachers first learned to implement CWPT by using the manual for teachers (Greenwood et al., 1997) combined with consultant training, to a criterion of 80% fidelity on the implementation checklist. They were then trained to use the CWPT-LMS to guide implementation, enter student progress information, and evaluate weekly progress. A copy of a draft manual (Greenwood & Hou, 1997) was provided to each teacher to complement the training. Teachers were trained individually or in groups during two 2-hour sessions. The CWPT-LMS software was installed on each teacher's computer. In the first 2-hour session, teachers received an overhead transparency–based explanation, followed by a hands-on demonstration of the program's tools. Thereafter, teachers used these tools to plan, implement CWPT sessions, and evaluate progress.

CWPT-LMS Consultation Procedures. After each teacher had successfully established CWPT and used the CWPT-LMS for 5 to 7 weeks, a 1-hour training session was provided individually with each teacher. The focus of this meeting was on how to use the data analysis tool to evaluate individual and class progress and how to link program improvements to these indicators of progress. During this meeting, the consultant and teacher used the computer to analyze and evaluate student and classroom progress. The consultant helped the teacher read the various charts provided by the data analysis tool. The consultant then presented and discussed data-linked suggestions for CWPT program changes designed to enhance students' performance. The consultant gave the teacher two documents with suggestions for progress scenarios and advice for CWPT modifications (Greenwood, Finney et al., 1993). Teacher and consultant plans were then made to implement these suggestions and review future weekly progress in similar fashion.

Every 2 weeks thereafter, the consultant reviewed the teacher's progress data and provided written and verbal consultation pertaining to CWPT implementation and students' performance. Consultation working sessions were scheduled at times convenient for the teacher and ranged in length from 20 to 45 minutes. During consultations, hard-copy printouts of the progress data were discussed, and the teacher and consultant used the available documentation to determine what changes were needed in the program. To build the teacher's capacity to connect progress data to changes in the CWPT program, these sessions sometimes included what-if troubleshooting cases, with feedback provided by the consultant. Consultation procedures started after Week 7 of the project and continued until the end of the academic year.

Sight Word Vocabulary and ELL Accommodations (Grade 1). The subject matter and peer-teaching procedures conformed to the guidelines described by Gersten and Jimenez (1994) and Arreaga-Mayer (1998b). Special attention was placed on components addressing students' active engagement in learning tasks, extended discourse in English, and respect for cultural diversity. Subject matter developed by teachers differed by grade level and focused on vocabulary and spelling.

First graders were taught sight words because they were not ready to read and needed a base in English vocabulary to support additional enrichment activities designed to foster their language and literacy skills. Prior to the week's session, the teacher introduced new sight vocabulary words, using bilingual flash cards and modeling procedures within a whole-class discussion format. First, the teacher pronounced each word in Spanish and the students repeated the word in Spanish. Second, the teacher pronounced each word in English and the students repeated the word in English. Third, the teacher verbally spelled each word in English and the students spelled the words in English. Throughout the process, the teacher used scaffolding strategies and mediation/feedback techniques to expand the students' understanding of the vocabulary words.

Flash cards were made, using sight words from the Dolch word lists and first-grade readers. Flash cards were placed in the center of an 8-by-11-inch place mat with a smiley face on the left side and a question mark on the right side. The teacher paired all the students, using the Program Support Tool. Considerations in paring students were level of English proficiency, concept development, and past progress. When the students were paired into tutor and tutee roles, the tutor was instructed to show the flash card to the tutee and ask the tutee to say the word. If the word was pronounced correctly, the tutor placed the flash card on the smiley face. For every correct response, the tutor awarded the tutee 2 points. If the tutee did not pronounce the word correctly, the tutor corrected the tutee by supplying the correct response. The tutee pronounced the word once. Following this response, the tutee was awarded 1 point. The flash card was then placed on the question mark. If the tutor and tutee did not know the word, the tutor raised his or her hand, requesting teacher assistance. Throughout, core CWPT procedures were used.

Spelling and ELL Accommodations (Grades 2 Through 5). Spelling of reading vocabulary words was selected as a prerequisite activity to enhance reading comprehension. Before each week's tutoring sessions, teachers used scaffolding, prompting, and modeling procedures to introduce new spelling words. Teachers presented new spelling words on posters and overhead transparencies. For each word the teacher showed a picture of the word and the word spelled in Spanish and English. The English version was divided into syllables of different colors; for example, prefixes were identified using the color red and suffixes the color blue.

Thirty-minute tutoring sessions were conducted three to four times per week, using the core procedures described previously (Greenwood et al., 1997). The same criteria for pairing ELL (i.e., level of English proficiency, concept development, past progress) were used. The teachers paired together (a) low- and average-achieving students, and (b) average- and high-achieving students. "Newcomer students" (students new to the U.S.) were paired with bilingual students to facilitate their understanding. Each pair of students was then randomly assigned to one of two competing teams.

Following core CWPT procedures, peer partner and team assignments changed weekly. Each student in the pair was a tutor and tutee for 10 minutes each. The tutor read the spelling word to the tutee, who spelled the word aloud while writing it. The tutor awarded the tutee 2 points for correct spelling and moved to the next word. If the tutee misspelled the word, the tutor told him or her how to spell the word. The tutee then practiced the misspelled word three times by saying it aloud. Words practiced correctly three times were worth 1 point, or 0 points if any of the three practiced words were spelled incorrectly.

RESULTS

The Overall and Individual Classroom Outcomes

Overall Outcomes. The mean spelling/vocabulary scores across all five classes and weeks in the program was 18.8% at pretest versus 78.6% at posttest after receiving CWPT, a gain of 59.8%.

Outcomes by Classroom. Individual class means over all weeks in the program were 17.1%, 15.5%, 21.6%, 15.5%, and 24.6%, at pretest. Following CWPT, the mean scores were higher at, 71.7%, 81.4%, 87.0%, 73.3%, and 77.3%, respectively, at posttest. Individual classroom gains after CWPT ranged from 51.7% to 66.5%. Weekly trends in pre- and posttest gains can be seen in the upper panels of Figures 1 through 5. With minor exceptions, these weekly data

reflect relatively consistent progress in mastering the material each week.

The Fidelity of CWPT Program Implementation

The average monthly CWPT fidelity rating was 97%. The individual teachers' fidelity scores were 98%, 97%, 99%, 98%, and 94%. The exceptions to the average occurred in one month, when Teacher 1 received 61% teacher fidelity and 57% student fidelity ratings.

The Effects of Consultation on Improvement in Student Outcomes

Across teachers and weeks in the program, there was a significant increase in the proportion of successful students before (35% successful) versus after consultation (58% successful), $\chi^2(3, N = 206) = 11.694, p = .009$ (see Table 1). Consultation appeared to reduce the number of children who were undermastering (45% to 28%), and to a much smaller extent, the number who were underchallenged (18% to 13 %) and both underchallenged/undermastering (2% to 1%).

In two classrooms (those of Teachers 4 and 1), students' posttest outcomes were markedly improved beginning Week 8, with the onset of consultation and advice with respect to changes to be made in CWPT for the week ahead (see the upper panels of Figures 4 and 1). These improvements were sustained over subsequent weeks. Graphs of these teachers' weekly outcome groups revealed the problems linked to lower student outcomes and subsequent changes addressed through consultation (see the lower panels of Figures 4 and 1). Most of Teacher 4's students fell in the challenged but undermastering group during Weeks 1 to 7, before consultation. However, during Weeks 8 to 15, more students fell into the success group because Teacher 4 had responded to the consultant's advice for improving the strength and fidelity of peer tutoring. The consultant's advice focused on increasing the weekly sessions and time in peer tutoring and reinforcing tutors for accurately using points and error-correction proce-

TABLE 1. Change in Student Outcome Groups Before and After Consultation

| Condition | Variable | Outcome group | | | | |
		Success	Underchallenged	Undermastery	Both	Total
Before	Frequency	34	18	44	2	98
	Percentage	35	18	45	2	100
After	Frequency	63	14	30	1	108
	Percentage	58	13	28	1	100
Total		97	32	74	3	206

[a]$\chi^2(3, N = 206) = 11.694, p = .009$.

Without Consultation   With Consultation

Teacher/Classroom 1
Sight Word Vocabulary

O Pretest Class Mean
● Posttest Class Mean

x Success Group
▣ Underchallenged/Mastery Group
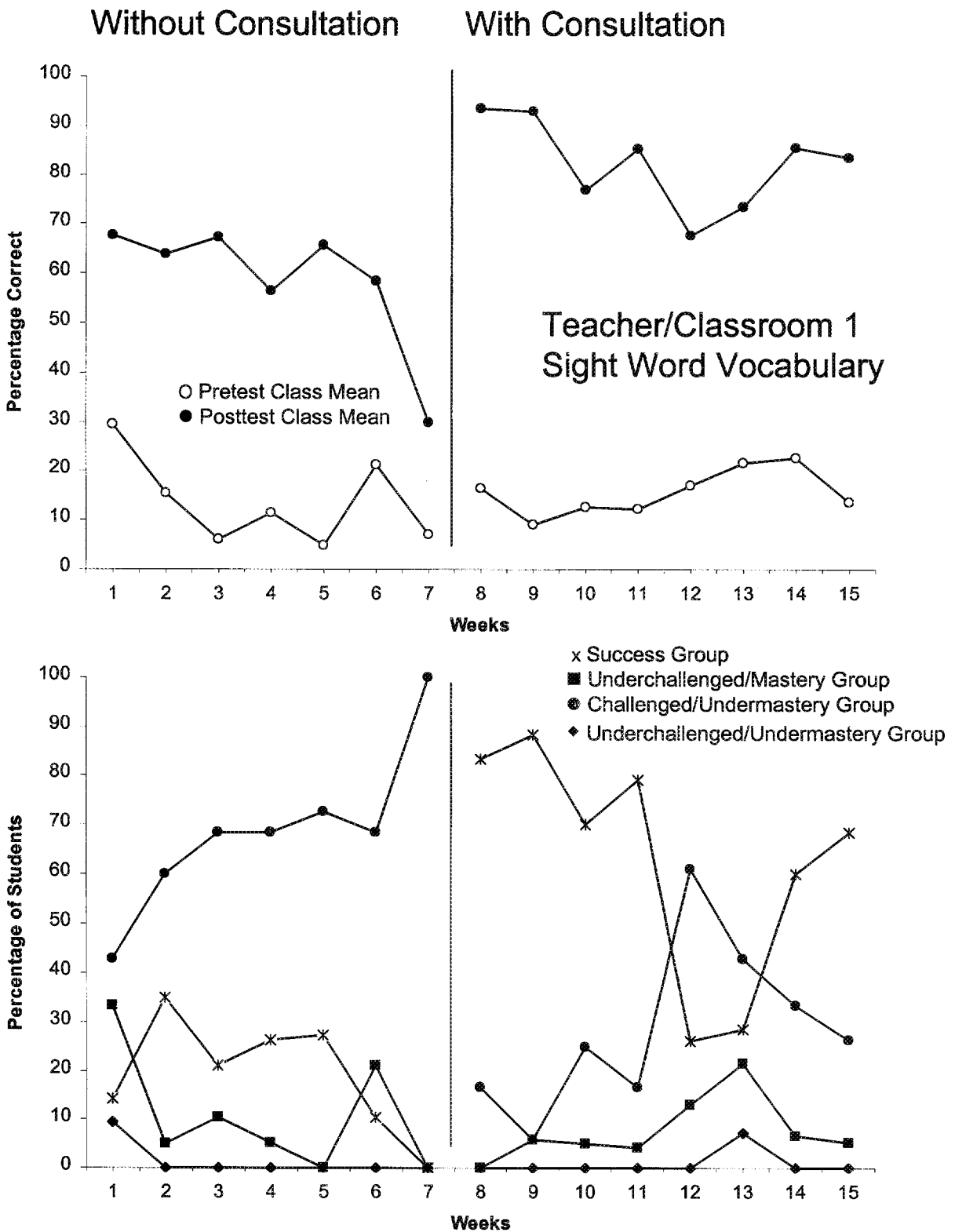◉ Challenged/Undermastery Group
◆ Underchallenged/Undermastery Group

FIGURE 1. Weekly pre- and posttest means (upper panel) and CWPT outcome group trends (lower panel) for Class 1.

Without Consultation

## With Consultation

Teacher/Classroom 2 Spelling

O Pretest Class Mean
● Posttest Class Mean

x Success Group
■ Underchallenged/Mastery Group
● Challenged/Undermastery Group
♦ Underchallenged/Undermastery Group
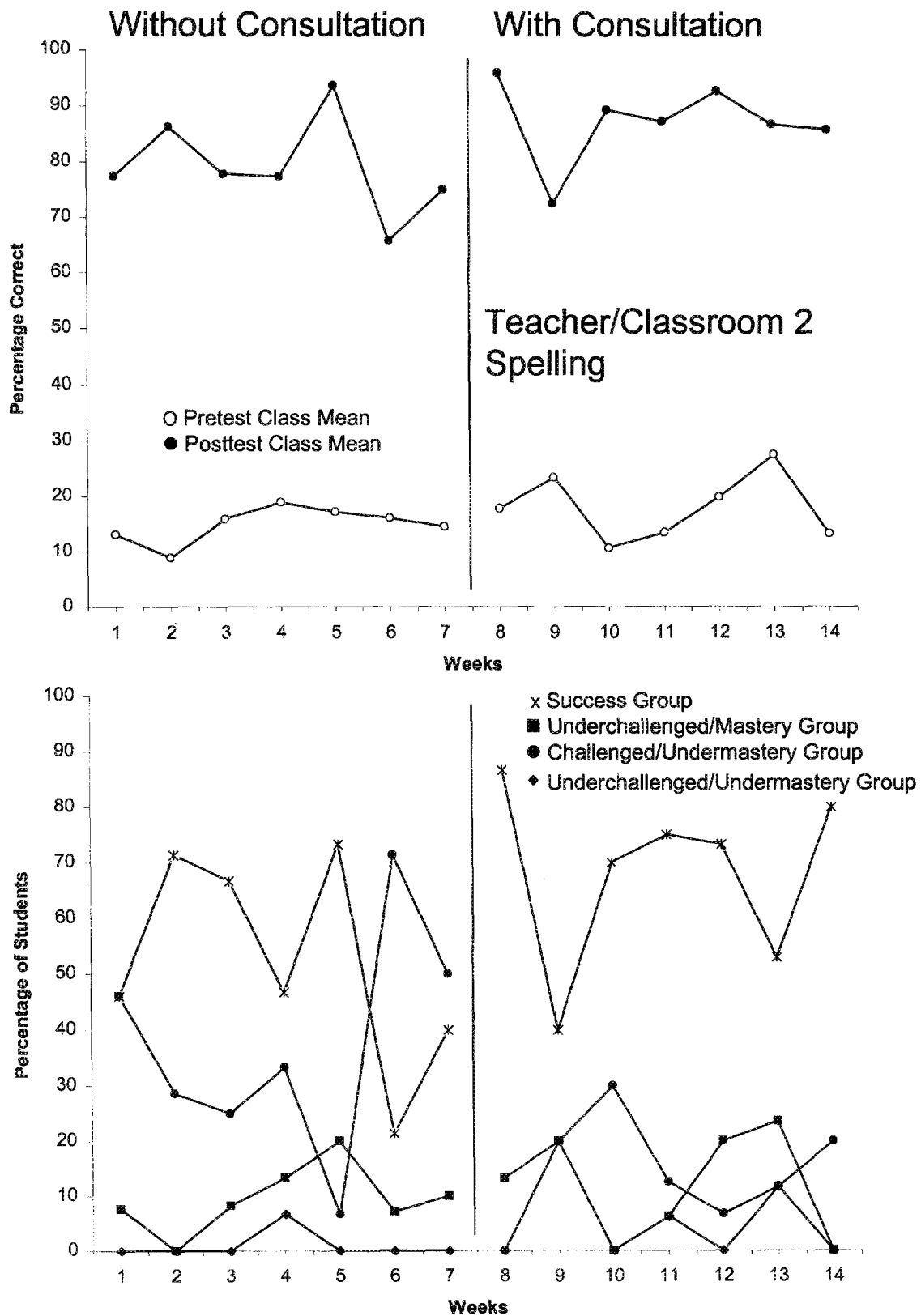
FIGURE 2. Weekly pre- and posttest means (upper panel) and CWPT outcome group trends (lower panel) for Class 2.
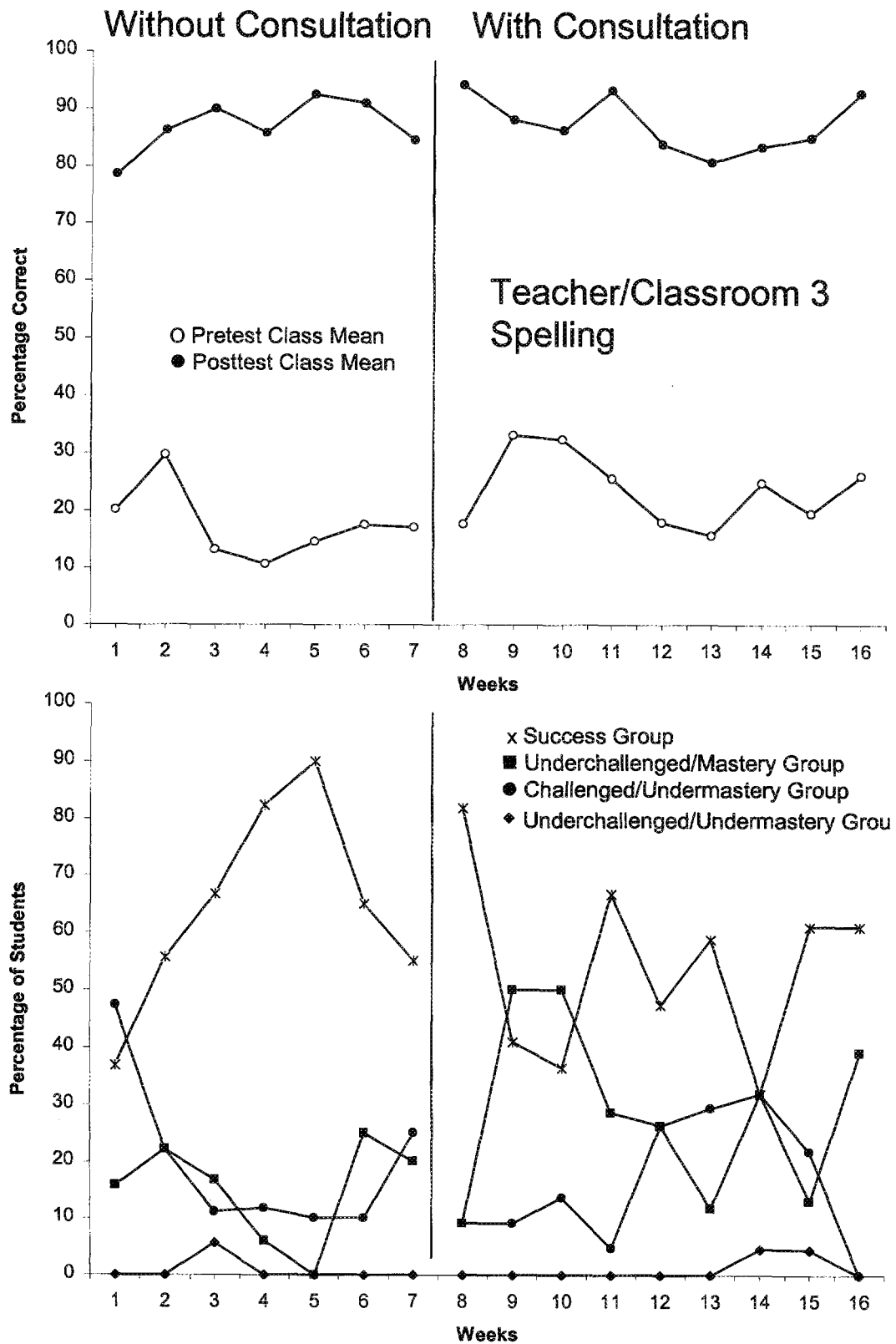
FIGURE 3. Weekly pre- and posttest means (upper panel) and CWPT outcome group trends (lower panel) for Class 3.
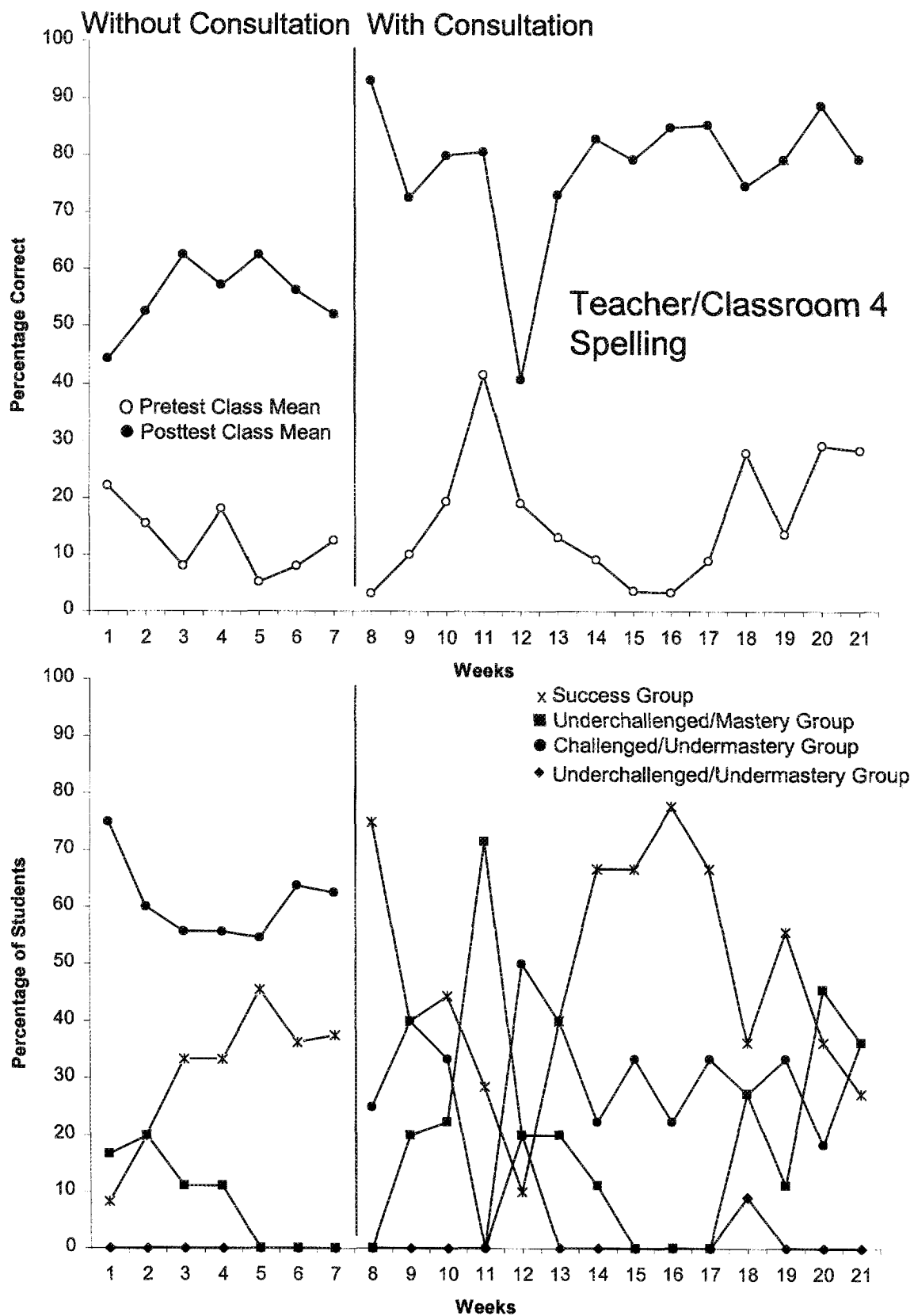
FIGURE 4. Weekly pre- and posttest means (upper panel) and CWPT outcome group trends (lower panel) for Class 4.
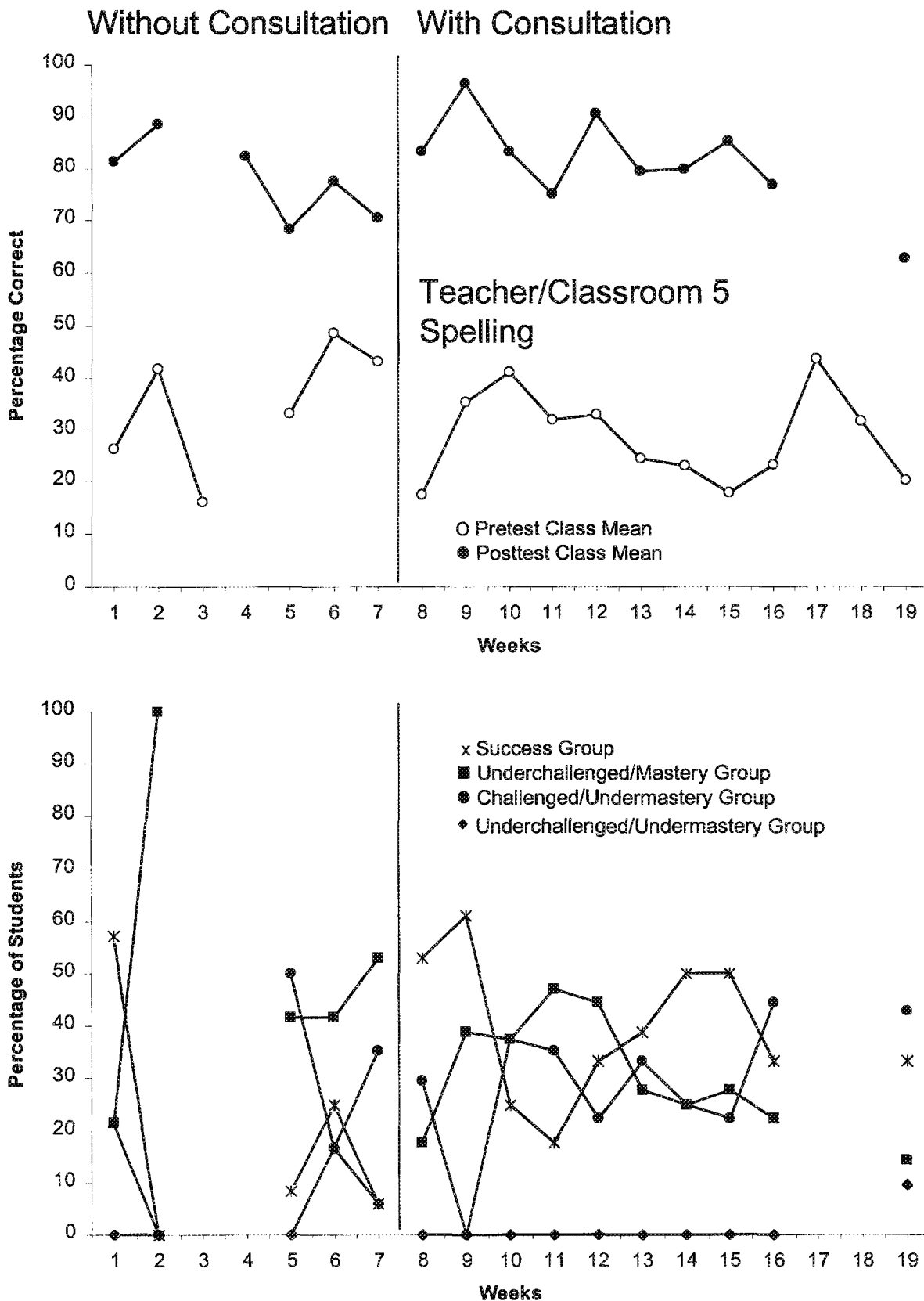
FIGURE 5. Weekly pre- and posttest means (upper panel) and CWPT outcome group trends (lower panel) for Class 5.

dures with their tutee. In Weeks 11, 12, and 13, an increasing number of students were either underchallenged or undermastering, but with consultation, more students were successful until Weeks 20 and 21, when another decline was noted. In Weeks 11 through 13, there was a high percentage of absenteeism and the teacher increased the number of spelling words to be learned. Students appeared to experience difficulty adjusting to this greater number of words. The primary advice given Teacher 4 was to reduce the number of words so students would be able to practice each word sufficiently to master it prior to posttesting. Teacher 1 experienced somewhat similar problems, and after consultation, more students were successful (with the exception of Weeks 11 and 12, when only 1 day of tutoring was conducted; see the lower panel of Figure 1). Of the five teachers, Teacher 3's students had the highest and most consistent gains and successes. As might be expected, consultation did not seem to lead to additional improvement (see the lower panel of Figure 3). After Week 9, however, an increased number of underchallenged students was noted. Teacher 5's students made consistently good progress in mastering the weekly material. However, her students continued to show unchanged numbers of under-challenged and undermastering groups, even with consultation (see the lower panel of Figure 5). This teacher made little effort to act on the advice, and consultation was therefore not effective.

The Extent of Participant Satisfaction

All five of the teachers indicated that CWPT was helpful for students of all ability levels, that academic gains were noted, that CWPT was easy to implement, that it was easy to train students to use the peer-tutoring procedures, and that their students appeared to like the program. Teacher 1 commented that her students are constantly improving with use of CWPT. The teachers also reported that CWPT-LMS was quite helpful. Teacher 3 commented that having computer-generated graphs of each student's progress was great for parent conferences and for setting goals with individual pupils. Areas of dislike included difficulty finding time to do CWPT even three times per week, difficulty fixing mistakes if the wrong score or name was entered into CWPT-LMS, and finding time to enter pre- and posttest scores.

Student satisfaction results were also favorable. However, because of the high attrition rate in this school, only 80% of the original students in these five classes completed a survey at the end of the study. The majority of the students indicated that they liked CWPT (70%), and an even greater percentage indicated that they felt that CWPT had helped them learn a variety of lessons (96%). During student interviews, a sample of students reported that they liked CWPT. One fourth grader said, "It's fun . . . You get to get points. You get to write. You get to read. " Another fourth grader said, "I think it's fun because it helps you learn more . . . It helps you spell your words easier and learn how to spell better."

During videotaped interviews several students noted was their lack of desire to work with a certain person or group of people (e.g., the boys) or an uncooperative tutor or tutee. One second grader stated that he did not like CWPT "because when you can't get [many points], people laugh at you." Other dissatisfactions included not having enough points, difficulty of the spelling/vocabulary words, and a lack of challenging material.

DISCUSSION

In this study, use of CWPT-LMS by five teachers of ELL in Grades 1 through 5 was investigated. A range of analyses of teachers and students overall and by individual classrooms over weeks indicated that students achieved and sustained a pattern of mastering new English sight vocabulary (the class of Teacher 5) and spelling words (the classes of Teachers 1–4). Teachers of ELL demonstrated high-fidelity implementation for up to 21 weeks, findings similar to past CWPT research reports (e.g., Greenwood, Delquadri, & Hall, 1989). The CWPT-LMS Data Analysis Tool provided teachers with a powerful means of continuously monitoring individual student and classwide mastery. It provided displays of CWPT growth for the entire class, for individual students, for outcome groups over weeks, and for individual students within each week. It was interesting to note that the program identified reasons for less successful weeks within classrooms and trends in implementation problems across teachers over weeks. Reflecting on these results, consultants and consultation helped teachers learn to interpret these displays of student progress and link them to changes in CWPT instruction. In only one case where implementation problems were evident (Teacher 5) was it clear that recommended program changes were not made and that student outcomes were not improved as a result. These results suggest that some teachers will resist adapting CWPT practice even in the face of specific suggestions concerning what to do and explanation of why not doing so may impede student progress.

In prior CWPT research with native speakers of English, the most common implementation problem encountered has been the too frequent use of unchallenging material (e.g., Greenwood et al., 1992). Other concerns have been reductions in weekly CWPT sessions, too much material to be learned per week, and low-quality peer teaching (e.g., use of core procedures, error correction, points). Why the quality of peer tutoring surfaced as a primary issue in these teachers' implementations is most likely explained by the limited English of these students; English literacy tasks were inherently difficult for ELL. Thus, with respect to ELL, maintaining sufficient daily and week practice and reviewing the material to be learned in CWPT appeared as key factors for improving and maintaining optimal results.

Several limitations apply and also suggest future research. First, in addition to improved academic learning, use

of the English language in the peer-tutoring interactions of students (discourse) is an expected unique benefit of CWPT used with ELL. However, measures of language were not employed in this research; thus, the extent to which this benefit actually occurred cannot be known, despite anecdotal teacher mentions of this outcome. Future research should employ observational language measures to investigate this issue.

The design of the current study did not allow comparisons between CWPT and teacher-mediated instruction of the same subject matter. The design also did not control for the onset of CWPT advice provided to teachers. Thus, it was not possible to determine the extent to which CWPT actually accelerated students' mastery compared to other reasonable forms of instruction, nor can we assert that the advice given teachers was causally related to the changes they made in program implementation. However, prior research has compared CWPT to forms of teacher-mediated instruction and repeatedly demonstrated superior findings for CWPT (e.g., Greenwood, 1996; Utley et al., 1997). The purpose of this research was not to make such comparisons, but to examine the benefits of data-based consultation in a design approximating that which would likely occur in most classroom settings. Because of both general and specific illustrations of replication in students' high levels of weekly mastery in each classroom with students of differing grade levels, ages, and subject matter taught, these findings appear trustworthy and representative of those attainable in other, similar settings with ELL. Another concern in this report may be the lack of data on individual students' progress over weeks in the program. These analyses were certainly readily available for each student in the study and, in the majority of cases, they indicated levels of growth similar to those in the group. However, in some cases these gains were short lived because students moved in and out of the district. In cases where consultation was very effective in improving outcomes, analyses of change in the student population were conducted to make sure these findings were not confounded by rate of student turnover. Because the focuses were the use of outcome group analyses, instructional decision making, and improving individual and group outcomes, turnover did not appear to be a confounding factor.

Unlike prior research on CWPT consultation that employed computerized forms of advice to teachers (Greenwood, Finney et al., 1993), project staff provided advice based on shared analyses of each teacher's weekly data. Although the ultimate goal with CWPT-LMS is to provide computerized advice, the current study sought to examine teachers' responses to advice and the effects on students' improvement. Future research is needed to compare the effect of similar advice provided by computer versus human consultants, and to determine differential effects on program changes made by teachers and improvement in student outcome. Current findings suggest that regardless of the mode of delivery, teachers may act on advice more reliably if such advice is shared among collaborating teacher partners in a building or with a facilitator responsible for monitoring CWPT programs (Greenwood, Delquadri, & Bulgren, 1993). In conclusion, for ELL and their teachers, CWPT-LMS appeared to be an effective, accessible, and sustainable alternative for operationalizing the principles of instruction described by Gersten and Jimenez (1994) and Arreaga-Mayer (1998b). ■

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AUTHORS' NOTES

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