LINKING RESEARCH TO PRACTICE WITHIN A SECONDARY TEACHER PREPARATION PROGRAM

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ABSTRACT

The purpose of this study was to investigate the willingness and ability of preservice interns to implement the Concept Anchoring Routine (Bulgren, Schumaker, & Deshler, 1994) and the Concept Comparison Routine (Bulgren, Lenz, Deshler, & Schumaker, 1995) after learning these research-based routines in a university general methods course. Additionally, the influence of these teaching routines on the learning of urban high school students was assessed. Interns' and high school students' opinions about the teaching routines also were measured. Findings from this investigation revealed that six out of 12 interns willingly implemented the teaching routines. These interns demonstrated an ability to use the routines with high rates of accuracy. High school
students performed similarly regardless of which routine was used. Interns' perceptions about both routines were favorable. High school students' perceptions of the Concept Comparison Routine were slightly more favorable than the Concept Anchoring Routine.

Over the past decade, much has been written about the importance of linking research to practice. The need to integrate empirically derived educational practices into teachers' instructional repertoires frequently is cited as a major concern among educational researchers (Foegen, Espin, Allinder, & Markell, 2001). Of particular concern is the lag time that frequently exists between the discovery of effective teaching practices and the actual implementation of the practices in public school classrooms (Abbott, Walton, Tapia, & Greenwood, 1999; Malouf & Schiller, 1995; Warby, Greene, Higgins, & Lovitt, 1999).

Concerns also have been expressed regarding the traditional workshop format used to teach teachers research-based practices. The implementation rate of methodology learned in in-service workshops is very low. According to the research of Showers and Joyce (1996), about 10% of workshop participants actually implement workshop information in their classrooms. Consequently, a variety of staff development processes have emerged to help improve the integration of research into practice. Included among these processes are peer coaching strategies (Gersten, Morvant, & Brengelman, 1995), teacher study groups (Sanacore, 1993), step-by-step procedures for obtaining research-based information and developing a related implementation plan (Warby et al.) and teacher workshops that include ongoing follow-up activities and/or implementation support (Eaker & Huffman, 1984; Lovitt & Higgins, 1996). For the most part, these staff development processes have focused on researchers working collaboratively with practicing teachers to improve the trustworthiness, accessibility, usability, and attractiveness of information related to research-based practices (Foegen et al., 2001, p. 226). These staff development efforts have been beneficial in terms of helping veteran teachers learn and use new instructional methodologies.

Perhaps another way to reinforce the integration of research into classroom practice is to offer research-to-practice opportunities during preservice teacher preparation programs rather than waiting until teachers have begun their careers as full-time teachers. Only a few
studies have been conducted relevant to the role of teacher educators in addressing the research-to-practice gap within preservice contexts (Foegen et al., 2001). Daly and Cooper (1993) conducted a study that involved preservice students who were enrolled in a methods course designed to teach a research-based instructional practice called precision teaching (i.e., 1-minute timings used to promote fluency of academic skills). A follow-up survey was administered to determine whether or not the students used the practice in their respective public school classrooms. Results revealed that approximately 50 percent of the university students actually implemented the practice. In another study, Speece, MacDonold, Kilsheimer, & Krist (1997) discussed the experiences that three undergraduate students had when implementing a research-based practice (i.e., reciprocal teaching) in their practicum field-placement assignment. Findings revealed that the preservice students needed time in the university class to discuss their implementation experiences and that weekly discussion groups were beneficial in terms of providing additional support. In another preservice research-to-practice study, Foegen, Espin, Allinder, and Markell (2001) investigated the beliefs of preservice students following two different videotaped presentations on curriculum-based measurement (another research-based instructional practice). One videotape used statistical information to promote use of the practice and the other videotape used anecdotal information to promote use of the practice. Results revealed no effects for presentation format. The two formats were equally effective.

Undoubtedly, teacher educators face several challenges related to the integration of research and practice within teacher preparation programs. First, limited opportunities exist for immediate implementation of the research-based methodology learned in university methods courses. Second, when opportunities for immediate implementation are provided, preservice students may or may not use the teaching method accurately. Third, preservice students must see a close match between the methodology taught in their university course work and the realities of public-school teaching settings. Without this close match, preservice students are likely to discredit what they learn in university courses and instead follow the models they see in their field experience placements.

To address these challenges, teacher education programs must be
designed to bring preservice students as close to the reality of practice as possible (Gerber, English, & Singer, 1999) while simultaneously focusing their instruction on research-based practices that can be implemented accurately. Consequently, teacher educators and school district personnel are forming partnerships to develop collaborative, field-based teacher preparation programs that integrate research-based practices within the context of today's public schools (Dadlez & Sandholtz, 2001; Sandholtz & Dadlez, 2000). While it is important for all preservice students to receive exposure to research-based instructional practices during their teacher preparation programs, it is critically important for those who are learning to teach in urban schools due to the extensive educational needs of students in these settings (Ellsworth, 1993). It is critically important for students in urban school settings to receive high quality instruction using practices that increase the likelihood for successful school experiences.

A large body of research supports the use of graphic organizers (e.g., charts, diagrams, semantic maps, visual displays) when teaching challenging content to students who experience difficulties with learning (Bergerud, Lovitt, & Horton, 1987; Darch & Carnine, 1986; Ellis & Lenz, 1990; Koran & Koran, 1980; Moyer, Sowder, Threadgill-Sowder, & Moyer, 1984). More recently, researchers at the University of Kansas have developed and validated a curriculum known as the Content Enhancement Series. This curriculum consists of a variety of teaching routines that incorporate the use of various graphic organizers to help students learn difficult content in general education classrooms (Bulgren, Deshler, & Schumaker, 1995; Bulgren, Deshler, & Schumaker, 1997; Bulgren, Lenz, Schumaker, & Deshler, 1995; Bulgren, Schumaker, & Deshler, 1994a; Bulgren, Schumaker, & Deshler, 1994b). (For more information on these Content Enhancement Series teaching routines and related training, contact the University of Kansas Center for Research on Learning at http://www.ku-crl.org or (785) 864-4780.)

Two of the teaching routines in the Content Enhancement Series (i.e., the Concept Anchoring Routine by Bulgren, Schumaker, & Deshler, 1994 and the Concept Comparison Routine by Bulgren, Lenz, Schumaker, & Deshler, 1994) are specifically designed to help students acquire conceptual knowledge and critical thinking skills during whole-group instruction in general education classrooms
The Concept Anchoring Routine involves teaching new conceptual information and linking (or anchoring) the new information to information the students already understand. The Concept Comparison Routine involves teaching conceptual information through comparing and contrasting two related concepts. Both routines involve the use of graphic organizers and a step-by-step process for teachers and students to use to fill in the graphic organizer during the concept lesson. These routines were researched in secondary science and social studies classes. Results revealed that low achieving, average achieving, and high achieving students all benefited from the routines. Low achieving students earned test scores that were, on average, 25% higher than test scores they earned prior to their teacher using the Concept Anchoring Routine. In another study, students with learning disabilities and other low-achieving students correctly answered an average of 71.2% and 86.4% of test questions when the Concept Comparison Routine was used compared to 56.7% and 62.6% of similar questions when the information was taught through traditional means (Bulgren, Schumaker, & Deshler as cited in Schumaker & Lenz, 1999).

The purpose of the study discussed in this article was to investigate the willingness and ability of preservice interns to implement the Concept Anchoring and Concept Comparison Teaching Routines after learning them in a university general methods course. This was a required course for preservice students who were enrolled in the Urban Teaching Partnership Program (UTP). In the subsequent sections of this article, a brief overview of the UTP is provided to give the reader with understanding of the context for this investigation. Next, the methodology for the study is discussed and results are shared. We conclude with a discussion of the findings and some suggestions for future research.

The Urban Teaching Partnership Program

The Urban Teaching Partnership Program (UTP) is a field-based, post-baccalaureate teacher education program designed to prepare individuals whose undergraduate degrees are in disciplines other than education to teach in urban school settings. University faculty and school district personnel created the program to help meet the critical need for elementary and secondary teachers in the fastest growing and sixth
largest school district in the United States. The UTP was designed to prepare teachers to work in the most challenging schools in the district: urban schools with large numbers of students with diverse learning needs. The rationale for this urban-school emphasis was that many novice teachers are hired locally to teach in these settings and, not surprisingly, many leave after a short period of time. The high turnover rate in urban schools coupled with the common practice of hiring the least experienced teachers to work in these schools contributes to the learning challenges of urban students. Thus, one of the premises for developing a teacher preparation program for urban settings was that teachers who receive specific preparation for teaching in urban schools will be better prepared to teach in those contexts, experience greater success as a novice teacher, and consequently continue to teach in urban schools rather than seeking alternative teaching assignments.

Rather than using the traditional model of first taking courses at a university and then being placed in a public school classroom for a culminating student teaching experience, the UTP program involves a year-long internship within an urban school coupled with university coursework offered at the public school site. Thus, the interns learn to teach within the context in which they will be hired. Course assignments are linked to the field-based teaching experience. The premise underlying this model is that the theoretical and research-based content offered through university courses must be blended with practical applications to be meaningful for novice teachers. An additional premise is that university instructors responsible for teaching methods courses should be aware of the demands involved in teaching in urban schools. They must recognize that diversity among students is greater now than ever, and that what worked when they were public school teachers may no longer be applicable. Field-based teacher preparation programs provide a forum for university faculty to update their knowledge and learn new ways to make their content relevant. For additional information describing the UTP see Perkins, Odell, McKinney, and Miller (2001).

**Methodology**

The purpose of this study was to investigate the willingness and ability of preservice interns to implement the Concept Anchoring Routine
(Bulgren, Schumaker, & Deshler, 1994) and the Concept Comparison Routine (Bulgren, Lenz, Deshler, & Schumaker, 1995) after learning these research-based routines in a university general methods course. Additionally, the influence of these teaching routines on the learning of urban high school students was assessed. Interns’ and high school students’ opinions about the teaching routines also were measured. Student learning as well as teacher and student opinions about the teaching routines were believed to be important because previous research has demonstrated that teachers are most likely to implement teaching practices they perceive to be beneficial to students (Whinnery, Fuchs, & Fuchs, 1991) and easy to implement (Schumm & Vaughn, 1991). Similarly, high school students are more committed to learning when they perceive they will be successful. Thus, social validity data (i.e., perceptions about ability to use with ease and benefits to the students) was worthy of study. Participation in the study was strictly voluntary and in no way affected interns’ course or internship grades. There was no incentive offered for participating in the study. Participation did, however, require additional time and effort from the interns.

**Subjects**

There were 14 secondary interns enrolled in the UTP program at the time of this study. Of these 14 interns, 12 attended both class sessions when the content enhancement teaching routines were taught. Thus, these 12 interns were eligible to participate in the study. Of these 12, six opted to participate in the study. There were four males and two females that ranged in age from 24 to 49 with a mean age of 37.66. There were four Caucasian participants, one African American participant, and one Hispanic participant. Their undergraduate grade point averages ranged from 2.5 to 3.8 with a mean of 2.96. Two of the six participants had earned masters degrees with grade point averages of 3.70 and 3.01 respectively. All six participants were working on the state licensure requirements to become secondary teachers; three were working on a science license, one was working on a math license, one was working on a social studies license, and one was working on a business education license. Prior to admission to the UTP program, applicants were interviewed using the Haberman Urban Teacher Selection Interview (Haberman, 1995b). Interview
scores played a significant role in determining whether or not an individual was accepted into the program. The interview involves an assessment of the applicants’ potential success as a teacher within urban school settings and specifically measures seven teacher dispositions: persistence, protecting learners and learning, application of generalizations, approach to at-risk students, professional versus personal orientation to students, professional burnout, and personal fallibility (Haberman, 1995a, 1993). Interview scores ranging from 40 to 45 are classified as star teachers. Scores ranging from 30 to 39 are classified as high; 15 to 29 as “high” average; and 14 as “low” average. The Haberman Interview scores for the six participants in this study ranged from 31 to 41.5 with a mean of 35.08.

The demographic data for the interns who chose not to participate in implementing the teaching routines were quite similar in terms of gender mix and ethnicity. The two groups also were similar in mean age (37.66 vs. 37.16), mean grade point average (2.96 vs. 3.00) and mean interview scores (35.08 vs. 36.30). Two of the six interns who chose to implement the teaching routines had previously earned masters degrees in fields other than education; whereas none of the interns who chose not to participate had masters degrees. Another difference between the two groups was noted with regard to subject areas they were preparing to teach. Both groups had one intern preparing to teach social studies and one intern preparing to teach business. Of the remaining four interns in the group who chose to participate, three were preparing to teach science and one was preparing to teach math. Of the remaining four interns in the group who chose not to participate, three were preparing to teach English and one was preparing to teach physical education. These demographic data are listed in Table 1.

In addition to the six UTP interns, 281 high school students (9th-12 grade) participated in this study. None of these students had identified disabilities of any type. All 281 students were enrolled in general education classrooms for their entire school day.

**SETTING**

The study took place in an urban high school that opened in 1973. Enrollment, at the time of this study, was approximately 2,160 stu-
students in grades 9 through 12. These students represented a diversity of ethnic backgrounds. The school is fully accredited by the Northwest Association of Secondary and Higher Education.

**INSTRUMENTATION**

A total of seven instruments were used to collect data in this study: Concept Anchoring Procedural Validity Form (CAPV), Concept Comparison Procedural Validity Form (CCPV), Intern-Constructed Content Quizzes (CQ), Concept Anchoring Intern Social Validity Form (CAISV), Concept Comparison Intern Social Validity Form (CCISV), Concept Anchoring Student Social Validity Form (CASSV), and Concept Comparison Student Social Validity Form (CCSSV).

**CONCEPT ANCHORING PROCEDURAL VALIDITY FORM (CAPV).** The researcher-constructed CAPV included a list of the seven teaching components used in the Concept Anchoring Routine (Bulgren, Schumaker, & Deshler, 1994): (a) visual device (anchoring table), (b) known concept, (c) known information, (d) characteristics of known...
concept, (e) characteristics of new concept, (f) characteristics shared by both concepts, and (g) definition/understanding of new concept. Next to each teaching component there were “yes” and “no” blank spaces for the observer to indicate whether or not the intern remembered to include the component while using the teaching routine. Additionally, the CAPV had a place for the observer to record three types of information: (a) overall impression of how the lesson went, (b) any unusual circumstances that took place during the lesson (e.g., fire drills, student acting out), and (c) other comments.

**Concept Comparison Procedural Validity Form (CCPV).** The researcher-constructed CCPV included a list of nine teaching components used in the Concept Comparison Routine (Bulgren, Lenz, Schumaker, & Deshler, 1995): (a) visual device (comparison table), (b) known concepts to be explored, (c) overall concept, (d) characteristics of concepts, (e) like characteristics, (f) like categories, (g) unlike characteristics, (h) unlike categories, and (i) summary of similarities and differences between concepts. Next to each teaching component there were “yes” and “no” blank spaces for the observer to indicate whether or not the intern remembered to include the component while using the teaching routine. Additionally, the CAPV had a place for the observer to record three types of information: (a) overall impression of how the lesson went, (b) any unusual circumstances that took place during the lesson (e.g., fire drills, student acting out), and (c) other comments.

**Intern-Constructed Content Quizzes (CQ).** CQ consisted of five multiple-choice questions to assess high school students’ immediate recall of information taught during a 30-minute lesson. Each question was worth 20 points for a possible total of 100.

**Intern Social Validity Forms.** The researcher-constructed Concept Anchoring Intern Social Validity Form (CAISV) and the researcher-constructed Concept Comparison Intern Social Validity Form (CCISV) each contained five statements to elicit interns’ opinions regarding the respective teaching routine. A 5-point Likert scale (i.e., 1 = strongly disagree, 2 = disagree, 3 = neither agree/disagree, 4 = agree, 5 = strongly agree) was provided for rating each of the five statements on both forms. The statements on both the CCISV and CAISV were identical with the exception of the teaching routine name inserted in the blank spaces (i.e., Concept Anchoring Routine vs. Concept
Comparison Routine). The statements were:
1. I will use the _______________ again in future teaching.
2. The _______________ is easy to integrate into class lessons.
3. The _______________ appeared to help me teach better.
4. The _______________ appeared to help the students learn the concept.
5. The _______________ appeared to help the students retain important information.

At the bottom of the form, space was provided for interns to discuss three items: (a) impression of how the lesson went, (b) strengths of the lesson, and (c) weaknesses of the lesson.

HIGH SCHOOL STUDENTS’ SOCIAL VALIDITY FORMS. The researcher-constructed Concept Anchoring Student Social Validity Form (CASSV) and the researcher-constructed Concept Comparison Student Social Validity Form (CCSSV) each contained three statements to elicit high school students’ opinions regarding the Concept Anchoring and Concept Comparison Routines. A 5-point Likert scale (i.e., 1 = strongly disagree, 2 = disagree, 3 = neither agree/disagree, 4 = agree, 5 = strongly agree) was provided for rating each of the three statements. The statements on both forms were identical with the exception of the name of the teaching routine (i.e., Concept Anchoring Routine vs. Concept Comparison Routine) inserted in the blanks. The statements were:
1. I hope my teacher uses the _______________ again in the future.
2. The _______________ helped me understand important information in the lesson.
3. The _______________ helped me remember important information in the lesson.

At the bottom of the form, space was provided for the high school students to write “Other Comments.”

PROCEDURES
There were two phases in this study. Phase One involved training and preparation. Phase Two involved implementation and assessment of the teaching routines.

PHASE ONE: TRAINING AND PREPARATION. The interns involved in this study attended a general methods course as part of their program, throughout the academic school year. This university course was
taught in a portable building located on the high school campus where the interns were teaching. One unit within this methods course involved research-based methodology for teaching important concepts to diverse groups of learners. During the fall semester, 12 UTP interns were taught the Concept Anchoring Routine (Bulgren, Schumaker, & Deshler, 1994) and Concept Comparison Routine (Bulgren, Lenz, Deshler, & Schumaker, 1995). These routines were taught during two 3-hour class sessions. The first session began with an overview of the Content Enhancement Series (i.e., a research-based curriculum developed at the University of Kansas Center for Research on Learning). The Content Enhancement Series consists of a variety of teaching routines including Concept Anchoring and Concept Comparison. Next, the interns were taught the Concept Anchoring Routine (i.e., a routine designed to help students understand new concepts by linking or anchoring characteristics of the new concept to characteristics of an already-known concept). The routine was described and modeled. Then interns worked in small groups according to subject matter interests (e.g., science, social studies, business) to create graphic organizers that could be used in the routine. Each group then shared their graphic organizer with the class. Interns were given an assignment to create a graphic organizer that could be used for teaching an important concept to their high school students.

The second session began with a review of the rationale for using content enhancement routines. Next, the interns were taught the Concept Comparison Routine (i.e., a routine designed to help students understand two related concepts by analyzing similarities and differences among them). The routine was described and modeled. Next, the interns worked in small groups according to subject matter interests to create graphic organizers that could be used in the routine. Interns then shared their graphic organizers with the class. Interns were given an assignment to create a graphic organizer that could be used for teaching an important concept to their high school students. Interns were then invited to participate in a research study that would involve teaching concepts using the Concept Anchoring Routine, the Concept Comparison Routine, and traditional lecture formats. Interns understood that participation in the study was voluntary and that neither their course grade nor their internship grade would be affected positively or negatively for participating in the study. They also under-
stood that participation in the study would require extra time and effort (e.g., obtaining parental permissions, completing social validity forms, implementing the routines in their classes, and obtaining feedback from the students). Finally, the interns understood that participation in the study meant UTP program coordinators would observe them while teaching the routines.

The interns identified three class periods in which they taught the same subject matter. Three treatment conditions (i.e., Concept Anchoring, Concept Comparison, and Traditional Lecture) were randomly assigned to the three intact classes of each intern participating in the study. Each intern identified an important concept to teach to his or her three participating classes. The interns then developed three lesson plans for teaching the concept; one using the Concept Anchoring Routine, one using the Concept Comparison Routine, and one using a traditional lecture format. Additionally, the interns developed five multiple-choice questions related to the concept they planned to teach.

A group of three UTP faculty coordinators jointly reviewed each intern’s lesson plans and multiple-choice questions. The three faculty coordinators brainstormed ways to improve the lessons and ensured that the multiple-choice questions matched the content in the lesson. Ideas for improving the construction of the questions also were generated. Specific feedback was provided to each intern and they were given time to improve their lessons and related questions.

**Phase Two: Implementation and Assessment of Teaching Routines.**

Each intern taught his or her three 30-minute lessons to three different classes (according to the random assignment) on the same day. In one class, the Concept Anchoring Routine (Bulgrren et al., 1994) was used to help students understand a new concept by linking or anchoring characteristics of the new concept to characteristics of an already-known concept. Each high school student was given a blank graphic organizer and the intern teacher put a copy of the organizer on the overhead projector. As the lesson progressed, both the intern teacher and the students wrote important information on their graphic organizers. The organizer was used to facilitate discussion and illustrate relationships between the new and already-known concept. The specific steps used in this teaching routine were:
1. Identify the new concept
2. Identify a familiar or already-known concept that is similar in critical ways to the new concept (e.g., solving a mystery and solving a math word problem).
3. Explore important characteristics of the already-known concept that are similar to the characteristics of the new concept.
4. Identify characteristics of the new concept that are analogous to characteristics of the already-known concept.
5. Describe how each characteristic of the already-known concept and each characteristic of the new concept are related.
6. Create a summary statement about the new concept.

The above information was recorded on the graphic organizers.

In another class, the Concept Comparison Routine (Bulgren et al., 1995) was used to help students understand two related concepts by analyzing similarities and differences among them. Again, each high school student was given a blank graphic organizer and the intern teacher put a copy of the organizer on the overhead projector. As the lesson progressed, both the intern teacher and students wrote important information on the graphic organizer. The graphic organizer was used to facilitate discussion and illustrate relationships between the two concepts. The specific steps used in this teaching routine were:

1. Identify the concepts to be compared (e.g., train travel and airline travel).
2. Identify the overall concept group within which both concepts fit (e.g., the overall concept for train travel and airline travel could be modes of transportation).
3. Review major characteristics of each concept.
4. Identify characteristics that both concepts share.
5. Identify characteristics that are unique to each concept.
6. Create categories that describe the shared or like characteristics (e.g., predetermined routes)
7. Create categories that describe unique or unlike characteristics (e.g., speed of travel)
8. Create a summary statement describing how the concepts are similar and different from each other.
9. Extend understanding of concepts in some way (e.g., research one characteristic further)
The above information was recorded on the graphic organizers. In the control group class, the intern taught the same concept using traditional lecture format. Traditional lectures involved the teacher discussing the information and having students take notes as they listened. No graphic organizers or analogies were used during these traditional lectures.

UTP faculty coordinators observed the interns teaching their lessons to establish procedural reliability. Specifically, the interns’ use of the graphic organizers and implementation of each teaching routine step was assessed. These assessment data were recorded on the Concept Anchoring Procedural Validity (CAPV) forms and the Concept Comparison Procedural Validity (CCPV) forms.

Immediately following the lesson, the high school students in all three classes completed the intern-constructed content quiz (CQ) (i.e., five multiple-choice questions about the concept). They were given 10 minutes to answer the questions. During the last 5 minutes of the class period, the students in the Concept Anchoring and Concept Comparison treatment groups completed the three-question social validity form (i.e., CASSV or CCSSV) to assess their beliefs about the new teaching routines.

**RESULTS**

Descriptive and inferential statistical methods were used to determine outcomes in this study. Specifically, data were evaluated to assess interns’ willingness to implement research-based teaching routines in their classrooms, interns’ implementation accuracy, social validity of the teaching routines per interns’ and high school students’ opinions, and high school students’ learning of the new content.

**INTERNS’ WILLINGNESS TO IMPLEMENT RESEARCH-BASED TEACHING ROUTINES**

Descriptive analyses were used to assess interns’ willingness to integrate research-based teaching routines into their classroom practice within an urban high school setting. A total of 12 interns attended 6-hours of instruction on two research-based, validated teaching routines. Of these 12 interns, six voluntarily implemented the routines in their classrooms. In other words, without any incentives, 50% of the interns integrated what they learned in a university methods course
into their classroom practice even though this required additional planning time, additional paperwork, and being observed by university faculty. These interns taught Science (N=3), American History (N=1), Math (N=1), and Business (N=1). The six interns who chose not to participate taught English (N=3), Physical Education (N=1), American History (N=1), and Business Education (N=1).

Interns’ Abilities to Implement the Teaching Routines Accurately

Observations of the interns using the Concept Anchoring Routine and Concept Comparison Routine revealed high levels of procedural validity indicating the interns were able to implement the routines accurately.

Concept Anchoring Routine. Three interns implemented the teaching routine steps with 100% accuracy (7/7 steps), two implemented with 86% accuracy (6/7 steps), and there was disagreement between the two observers regarding the performance of the last intern (one rated the intern with 100% accuracy (7/7 steps) and the other rated the intern with 86% accuracy (6/7 steps) and wrote next to the step in question “not quite”). To establish inter-observer agreement, two UTP faculty coordinators conducted 4 out of 6 concurrent observations (67%). The two observers’ scores were compared item by item, and the percentage of agreement was calculated using the point-by-point method (i.e., [Agreements ÷ Agreements + Disagreements] X 100 = Percent of Agreement) (Tawney & Gast, 1984). The inter-observer agreement was 98%.

Concept Comparison Routine. Four interns implemented the teaching routine steps with 100% accuracy (9/9 steps) and one intern implemented with 89% accuracy (8/9 steps). The remaining intern did not implement the Concept Comparison Routine because he only had two intact classes that were the same (Business Education). To establish inter-observer agreement, two UTP faculty coordinators conducted 2 out of 5 concurrent observations (40%). The two observers’ scores were compared item by item, and the percentage of agreement was calculated using the point-by-point method (i.e., [Agreements ÷ Agreements + Disagreements] X 100 = Percent of Agreement) (Tawney & Gast, 1984). The inter-observer agreement was 100%.

Thus, the interns’ abilities to implement information, learned in a university course, into classroom teaching was very high (86%-100%
accuracy with a majority scoring 100%). This ability was achieved after the 6 hours of training and specific feedback regarding lesson plan development and multiple-choice quiz construction.

**Social Validity of Teaching Routines**

Opinions regarding the Concept Anchoring and Concept Comparison Routines were elicited from both the interns and the high school students. Questionnaires were used to gather these data.

**Interns’ Opinions.** All six interns who taught a lesson using the Concept Anchoring Routine returned their CAISV questionnaires, representing 100% return rate. Five of the six interns (83%) “agree” or “strongly agree” that the Concept Anchoring Routine helped the high school students learn the concept and five of six interns (83%) “agree” or “strongly agree” that they would use the routine again in the future. Three of the six interns (50%) “agree” or “strongly agree” that the routine was easy to integrate into class lessons, helped them teach better, and appeared to help the students retain important information as shown in Table 2. Narrative comments regarding the lessons focused on the amount of student involvement and interest. Sample comments included “Students can directly relate to lesson.” “It was easy for students to take notes.” and “The content was interesting for the students. They were eager to talk about the known concept.”

All five interns who taught a lesson using the Concept Comparison Routine returned their CCISV questionnaires, representing 100% return rate. Four of the five interns (80%) agreed that the Concept Comparison Routine helped students learn the concept and the same number agreed that the routine helped students retain important information. Three of the five interns (60%) agreed that they would use the routine again in the future, the routine was easy to integrate into class lessons, and the routine helped them teach better (see Table 2). Narrative comments regarding the lessons focused on the amount of student involvement and explicitness of the instruction. Sample comments included “Students asked and answered more questions about content.” “Most of the students participated as well as asked questions and offered solutions to my questions. Immediate results of the quiz, overall, were favorable.” and “The lesson was organized...yet allowed students to interject questions.”
High school students' opinions. The high school students who participated in this study answered three questions about the teaching routine used in their class. The student responses related to the Concept Comparison Routine were slightly more positive than student responses related to the Concept Anchoring Routine. Forty-one percent of the students who were taught a lesson using the Concept Anchoring Routine agreed or strongly agreed that they'd like the teacher to use the routine again; whereas 53% of the Concept

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<td>50</td>
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</tr>
<tr>
<td>4. The Concept Anchoring Routine appeared to help the students learn the concept.</td>
<td>0</td>
<td>0</td>
<td>17</td>
<td>83</td>
<td>0</td>
<td>3.83</td>
</tr>
<tr>
<td>5. The Concept Anchoring Routine appeared to help the students retain important information.</td>
<td>0</td>
<td>0</td>
<td>50</td>
<td>33</td>
<td>17</td>
<td>3.67</td>
</tr>
</tbody>
</table>

| **Concept Comparison Routine**                                        |    |   |   |   |    |      |
|----------------------------------------------------------------------|    |   |   |   |    |      |
| 1. I will use the Concept Comparison Routine again in future teaching. | 0  | 0 | 40| 60| 0  | 3.6  |
| 2. The Concept Comparison Routine is easy to integrate into class lessons. | 0  | 0 | 40| 60| 0  | 3.6  |
| 3. The Concept Comparison Routine appeared to help me teach better.    | 0  | 0 | 40| 60| 0  | 3.6  |
| 4. The Concept Comparison Routine appeared to help the students learn the concept. | 0  | 0 | 20| 80| 0  | 3.8  |
| 5. The Concept Comparison Routine appeared to help the students retain important information. | 0  | 0 | 20| 80| 0  | 3.8  |

Note: SD=strongly disagree; D=disagree; N=neither agree nor disagree; A=agree; SA=strongly agree. Mean=mean rating by question.
Comparison students “agree” or “strongly agree” that they’d like the teacher to use the routine again. Forty-nine percent of the Concept Anchoring students and 61% of the Concept Comparison students “agree” or “strongly agree” that the respective routines helped them understand the concept being taught. Finally, 47% of the Concept Anchoring students and 53% of the Concept Comparison students “agree” or “strongly agree” that the respective routines helped them remember important information (see Table 3).

**High School Students’ Learning**

High school student learning was assessed using intern-constructed content quizzes. These data were analyzed using a one-way analysis

<table>
<thead>
<tr>
<th>Table 3 High School Students’ Social Validity Questionnaires (Percentage of Respondents By Category)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Item</strong></td>
</tr>
<tr>
<td>Concept Anchoring Routine 1. I hope my teacher uses The Concept Anchoring Routine again in the future.</td>
</tr>
<tr>
<td>2. The Concept Anchoring Routine helped me understand important information in the lesson.</td>
</tr>
<tr>
<td>3. The Concept Anchoring Routine helped me remember important information in the lesson</td>
</tr>
<tr>
<td>Concept Comparison Routine 1. I hope my teacher uses The Concept Comparison Routine again in the future.</td>
</tr>
<tr>
<td>2. The Concept Comparison Routine helped me understand important information in the lesson.</td>
</tr>
<tr>
<td>3. The Concept Comparison Routine helped me remember important information in the lesson</td>
</tr>
</tbody>
</table>

*Note: SD = strongly disagree; D = disagree; N = neither agree nor disagree; A = agree; SA = strongly agree. Mean=mean rating by question.*
of variance (ANOVA). There was no significant difference at the .05 level between the three treatment conditions \( F(2, 278) = 2.44, p = .089. \) Although not statistically significant, and therefore cautiously stated, the mean scores of each group may reveal pragmatic differences related to student grades. The overall mean score for the quizzes of students who received instruction using the Concept Anchoring Routine was 74.11, which translated to a “C” grade. The overall mean score for the quizzes of students who received instruction using the Concept Comparison Routine was 75.32, which translated to a “C” grade. The overall mean score for the quizzes of students who received instruction using the traditional lecture format was 67.17, which translated to a “D” grade (See Table 4). A “C” grade (considered average) is viewed more positively than a “D” grade (considered below average) and may have practical implications for the students (e.g., grade point average, eligibility to participate in athletic programs).

**DISCUSSION**

The findings in this study indicate that one way to promote the linkage between research and practice is to provide opportunities for preservice students to learn about validated instructional strategies in university coursework and then immediately implement the strategies in field-based teaching contexts. In the current study, six out of twelve interns voluntarily implemented what they were taught in their general methods course. This finding was consistent with the work of Daly and Cooper (1993). It is interesting to note that, in both studies, the

<p>| Table 4 |
| High School Students’ Quiz Scores by Treatment Group |</p>
<table>
<thead>
<tr>
<th>Treatment Group</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concept Anchoring</td>
<td>95</td>
<td>74.11</td>
<td>27.03</td>
</tr>
<tr>
<td>Concept Comparison</td>
<td>94</td>
<td>75.32</td>
<td>27.42</td>
</tr>
<tr>
<td>Traditional Lecture</td>
<td>92</td>
<td>67.17</td>
<td>26.78</td>
</tr>
<tr>
<td>Total</td>
<td>281</td>
<td>72.24</td>
<td>27.22</td>
</tr>
</tbody>
</table>
implementation rate of a research-based practice that was learned during university course work was 50 percent. Although teacher educators would like to see an even higher implementation rate, the 50 percent obtained in these studies is higher than the 10 percent implementation rate reported in studies involving veteran teachers (i.e., Showers and Joyce, 1996). In the current study, the amount of available support may have been helpful. Interns learned the strategies during class time and were given quality feedback on their plans for implementation and their method for measuring student success.

Perhaps another contributing factor to this higher implementation rate relates to preservice interns being less set in their ways than veteran teachers. It may be more effective to introduce research-based strategies when individuals are first formulating their repertoire of teaching practices. Finally, it should be recognized that these participants may have assumed that their participation in the study would please the UTP faculty coordinators even though there were no grade incentives attached. Pleasing these coordinators may have influenced some of the interns’ decisions to participate. The course instructor noted that the six interns who chose to implement the teaching routines made comments in class that indicated a genuine interest in trying something new that might help their students. The six interns who chose not to participate offered several different reasons for their decision. Included among them were: (a) I don’t see how to apply this to my content, (b) I’m not teaching the same concepts in any three of my classes, and (c) It doesn’t fit with what I’m teaching right now. I’ll try it later. When the interns shared these concerns, the course instructor provided suggestions to address the concern, but in each case the interns still decided not to participate.

When comparing the demographic data of the interns who chose to participate to those who chose not to participate, it was interesting to note that gender, ethnicity, age, undergraduate grade point averages, and Haberman interview scores were quite similar. It was noted, however, that two of the participating interns had masters degrees; whereas none of the non-participating interns had graduate degrees. Perhaps previous graduate work resulted in higher interest in participating in a research study and/or in implementing teaching routines that have research support. Perhaps some of the same characteristics that motivate individuals to pursue graduate study also motivate indi-
Individuals to take on the additional responsibility of trying a new teaching routine. It was also interesting to note that all three of the interns who were preparing to teach science elected to implement the teaching routines; whereas none of the three interns who were preparing to teach English opted to participate. This raises questions as to whether the content (science vs. English) was perceived as more appropriate for the teaching routines or whether there are inherent differences between individuals who are interested in teaching science and individuals who are interested in teaching English. Clearly, additional research is needed to further evaluate the potential factors that influence interns’ willingness to implement specific teaching routines.

The interns who chose to implement the two teaching routines were highly accurate in doing so. Thus, six hours of training extended over two class sessions was adequate preparation for implementing the Concept Anchoring and Concept Comparison Routines. Additional use of the routines over a longer period of time may have resulted in even stronger teaching performance.

Several limitations with this study also should be addressed in future research. For example, it cannot be assumed that the pre-service students who opted to implement the teaching routines in this study will continue to use the routines after being hired as full time teachers. It would be interesting and beneficial to add a longitudinal component to this type of research to determine how many interns continue to use research-based practices that were learned in their preservice teacher preparation program during their induction year of teaching and beyond. This would provide information related to the maintenance of practices and provide insight into the type of support needed during the initial years of individuals’ teaching careers. It also would be interesting to compare traditionally prepared teachers to teachers who were prepared in field-based programs such as UTP with regard to their long-term implementation rate of research-based practices.

Future research on this topic also should engage interns in implementing the research-based practices over time rather than just an isolated lesson. It is likely their skills in developing and implementing the strategies would improve and possibly result in better performance from the high school students.
Finally, future research should involve multiple assessments of the high school students rather than only assessing immediate recall. It is important to know whether teaching strategies such as Concept Anchoring and Concept Comparison result in long term retention of the concepts taught.

REFERENCES


Daly, P. M., & Cooper, J. O. (1993). Persuading student teachers and in-service teachers to use Precision Teaching after the course is over. Education and Treatment of Children, 16, 316-325.


Ellsworth, N. J. (1993). Trainees’ perceptions of types of instructional practices mod-
eled in an urban teacher education program. Teacher Education and Special Education, 16, 34-41.


