

THE RELATIONSHIP BETWEEN COOPERATING TEACHERS' AND STUDENT TEACHERS' USE OF THE PROBLEM-SOLVING APPROACH TO TEACHING

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Abstract

The purpose of the study was to describe the extent to which cooperating and student teachers used the problem-solving approach to teaching. A hypothesis was employed to test the relationship between cooperating teachers' use and the student teachers' use of the approach. The sample consisted of 15 student teachers and their cooperating teachers. Videotapes of the student and cooperating teachers' classroom teaching were collected and analyzed using an instrument developed by the researchers. Student teachers and cooperating teachers spent less than 20% of their instructional time using the problem-solving approach to teaching. Student teachers spent the most time guiding students in seeking data and information to solve the problem. Cooperating teachers spent the most time gaining and maintaining the interest of students in learning the subject matter. A positive relationship was found between the cooperating teachers' use and the student teachers' use of the problem-solving approach to teaching. It was concluded that a student teacher's use of the problem-solving approach to teaching could be enhanced if cooperating teachers modeled the approach. It was recommended that priority be given to selecting cooperating teachers who model the desired teaching behaviors expected of student teachers.

The agricultural education profession has placed an emphasis on teaching secondary agriculture students decision making skills through problem-solving (American Association for Agricultural Education, Preparation of Professionals for Agricultural Education, 1991). Teacher educators (Association of Teacher Educators, Commission on the Education of Teachers, 1991), across subject matter disciplines, have also supported teaching teachers how to use problem-solving as a teaching methodology. Crunkilton (1988), in his address to the American Association for Agricultural Education, stated that "... problem solving, both as a method of teaching and as a skill that students need, is more critical today than it was years ago" (p. 8). However, to what extent have teachers of agriculture been utilizing the problem-solving approach to teaching?

Research (Boone, 1988; Osborne & Hamzah, 1989) found that teachers of agriculture organized their lessons on a problem-solving basis, but did not follow through with actual problem-solving teaching in the classroom. Boone and Newcomb (1990) concluded that teachers who were utilizing the problem-solving approach to teaching were not fully employing all essential elements of the problem-solving approach to teaching.

With regard to student teachers' use of the problem-solving approach to teaching, McKee and Warmbrod (1992) found that student teachers perceived they were using the approach; however, an analysis of teaching audiotapes revealed that they were not using the problem-solving approach in their teaching. Additional research (Osborne & Hamzah, 1989) found that teachers used problem-

solving more in their teaching if it was encouraged throughout the teacher preparation program and utilized during the student teaching practicum. But the question remains, who has had the greatest impact upon the teaching behaviors of preservice teachers? The cooperating teacher?

The cooperating teacher has been found to be one of the most significant persons in the professional development of the preservice teacher (Karmos & Jacko, 1977; McIntyre, 1984; Brodbelt & Wall, 1985). Research (Copeland, 1975) has found that students' failure to exhibit the teaching skills learned in campus laboratory teaching experiences was not simply a matter of forgetting how to perform the skill once they began student teaching, rather the key factor was the influence of the cooperating teachers. In a series of studies, Copeland (1982) found "... that student teachers who taught with cooperating teachers who consistently used the targeted skills were significantly more likely to use the skills themselves" (p.1010).

Costa and Garmston (1987) and Grippin (1989) supported the importance of the cooperating teacher by concluding that the modeling of teaching skills by cooperating teachers was one of the major factors contributing to the teaching behaviors of student teachers. Further research (Zeichner, 1980; Glassberg & Sprinthall, 1980; Zimpher, de Voss, & Nott, 1980; Zeichner & Tabachnick, 1981; Joyce, 1988; Henry & Beasley, 1989) has found that student teachers continuously study the teaching behaviors of cooperating teachers and tend to emulate cooperating teachers' teaching behaviors. But what has been the influence of the cooperating teacher with regard to the use of the problem-solving approach to teaching?

In a study of agriculture preservice teachers, McKee and Warmbrod (1992) reported that cooperating teachers provided little instruction or supervision in developing student teachers' knowledge and skill with regard to using the

problem-solving approach to teaching. Furthermore, there was no agreement between cooperating teachers and student teachers regarding their perception as to the extent the cooperating teachers used the problem-solving approach to teaching (McKee & Warmbrod, 1992). Therefore, the question remains: Will student teachers be more inclined to use the problem-solving approach to teaching during the student teaching practicum if their cooperating teachers model the problem-solving approach to teaching?

Purpose and Hypothesis

The purpose of the study was to describe the extent cooperating and student teachers used the problem-solving approach to teaching during the student teaching practicum. In addition, the study sought to test the hypothesized relationship between the extent cooperating teachers and student teachers utilized the problem-solving approach to teaching during the student teaching practicum. The study was guided by the following research hypothesis:

H₁: The greater the extent cooperating teachers utilized the problem-solving approach to teaching, the greater the extent student teachers utilized the problem-solving approach to teaching during the student teaching practicum.

Procedures

Population and Sample

The student teacher target population for the study was preservice teachers majoring in agricultural education at The Ohio State University. The accessible sample consisted of student teachers enrolled in the student teaching practicum at the university during the autumn of 1992 (n = 15). Prior to the student teaching practicum student teachers completed the "Methods of Teaching Agriculture" course, a course emphasizing the

problem-solving approach to teaching. During the course, student teachers were required to apply the problem-solving approach to teaching in eight clinical laboratory teaching experiences.

The cooperating teacher target population was secondary agriculture teachers in the state of Ohio who were approved by the university to serve as cooperating teachers. The accessible sample consisted of the cooperating teachers selected to serve during the autumn of 1992 ($n = 10$). The cooperating teachers participated in a cooperating teacher seminar prior to the student teaching practicum. Caution should be exercised when generalizing the results beyond the accessible samples.

Instrumentation

The Extent of Use of the Problem-Solving Approach to Teaching and the Utilization of Teaching Methods Inventory, an instrument developed by the researchers, was used to describe the extent that teachers utilized the problem-solving approach to teaching. The instrument consisted of 10 procedures that represented a teacher's extent of use of the problem-solving approach to teaching. The 10 problem-solving procedures were identified from Boone's (1988) list of 10 essential elements of the problem-solving approach to teaching and a review of the literature on the problem-solving approach to teaching.

The instrument was assessed for validity by a panel of teacher educators from four universities considered to be knowledgeable on the problem-solving approach to teaching. Reliability of the instrument was established by assessing the intra-rater reliability. The resulting coefficients of stability for the 10 problem-solving approach to teaching procedures ranged from .90 to .99 with a coefficient of stability of .99 for the total score.

Student teachers and cooperating teachers were requested to videotape three periods of their "classroom" teaching on specified dates. Student teachers were requested to complete one videotape during the third, sixth, and ninth weeks and cooperating teachers during the first, second, and third weeks of the student teaching practicum.

Data Analysis

Videotapes were analyzed at the conclusion of the student teaching practicum. All data were analyzed utilizing the SPSS/PC⁺ computer program. The magnitude of the relationship was interpreted using one of Davis' (1971) descriptors. The alpha level was established a priori at .05.

The null hypothesis tested was: $H_0: \rho = 0$

The research hypothesis was: $H_1: \rho > 0$

Results

Student teachers spent, on the average, 18 percent of their instructional time utilizing the problem-solving approach to teaching during the three observations of "classroom" teaching (Table 1). The extent student teachers utilized the problem-solving approach to teaching ranged from zero to 75 percent, with a standard deviation of 20.9.

With regard to the 10 problem-solving approach to teaching procedures, student teachers spent the greatest amount of time in "guiding students in seeking data and information needed to analyze potential solutions to the problem" (mean = 7.4) and "assisting students in analyzing the data and information to determine a solution to the problem" (mean = 4.0). Student teachers spent no time utilizing the procedures "organizing instruction around solvable problem statements" and "guiding students in applying the solutions and/or recommendations to the problem."

An average of 18 percent of the cooperating teachers' instructional time, during the three observations of "classroom" teaching, was spent utilizing the problem-solving approach to teaching (Table 2). Cooperating teachers' percentage of time utilizing the problem-solving approach to teaching ranged from zero to 79 percent, with a standard deviation of 25.3.

With regard to the 10 problem-solving approach to teaching procedures, cooperating teachers spent the greatest amount of time using the

problem-solving approach to teaching procedure "gaining and maintaining the interest of the students in learning the subject matter" (mean = 11.0). Cooperating teachers spent no time utilizing the problem-solving approach to teaching procedures "organizing instruction around solvable problem statements" and "drawing possible solutions to the problem from the students."

A Pearson product-moment correlation coefficient was calculated between the cooperating teachers' total score and the student teachers' total

Table 1. Percentage of Instructional Time Student Teachers Spent Using the Problem-Solving Approach To Teaching (n=15)

Problem-Solving Procedures		Mean	Std. dev.	Range
1.	Teacher was gaining and maintaining the interest of the students in learning the subject matter.	2.9	4.7	0-15.6
2.	Teacher and students were organizing instruction around solvable problem statements.	.0	.0	0- .0
3.	Teacher was leading students in defining a clear statement of the problem.	1.0	1.5	0- 4.7
4.	Teacher was drawing possible solutions to the problem from the students.	.6	1.6	0- 5.5
5.	Teacher was leading students in discovering the factors needed to be considered in exploring a possible solution to the problem.	.8	1.4	0- 4.7
6.	Teacher was guiding students in seeking data and information needed to analyze potential solutions to the problem.	7.4	9.3	0- 26.6
7.	Teacher was assisting students in analyzing the data and information to determine a solution to the problem.	4.0	7.9	0- 26.6
8.	Teacher was leading students in arriving at a tentative conclusion and/or recommendation to the problem.	.4	1.2	0- 4.5
9.	Teacher was guiding students in applying the solutions and/or recommendations to the problem.	.0	.0	0- .0
10.	Teacher was leading students in evaluating the results of the solution to the problem.	.6	2.0	0- 7.8
Total score for utilizing the problem-solving approach		17.6	20.9	0- 75.0

Table 2. Percentage of Instructional Time Cooperating Teachers Spent Using the Problem-Solving Approach To Teaching (n=10)

Problem-Solving Procedures		Mean	Std. dev.	Range
1.	Teacher was gaining and maintaining the interest of the students in learning the subject matter.	11.0	12.0	0- 33.8
2.	Teacher and students were organizing instruction around solvable problem statements.	.0	.0	0- .0
3.	Teacher was leading students in defining a clear statement of the problem.	.5	1.1	0- 3.3
4.	Teacher was drawing possible solutions to the problem from the students.	.0	.0	0- .0
5.	Teacher was leading students in discovering the factors needed to be considered in exploring a possible solution to the problem.	.5	1.6	0- 5.0
6.	Teacher was guiding students in seeking data and information needed to analyze potential solutions to the problem.	2.2	7.1	0- 22.3
7.	Teacher was assisting students in analyzing the data and information to determine a solution to the problem.	1.9	6.0	0- 19.0
8.	Teacher was leading students in arriving at a tentative conclusion and/or recommendation to the problem.	1.1	2.4	0- 7.4
9.	Teacher was guiding students in applying the solutions and/or recommendations to the problem.	.2	.8	0- 2.4
10.	Teacher was leading students in evaluating the results of the solution to the problem.	.7	1.6	0- 4.1
Total score for utilizing the problem-solving approach		18.2	25.3	0- 79.3

score on the problem-solving approach to teaching for the three observations. A substantial positive, significant correlation ($r = .66, p < .05$) was found between the extent cooperating teachers and the extent student teachers utilized the problem-solving approach to teaching during the student teaching practicum. Therefore, the null hypothesis was rejected and the research hypothesis was accepted as being tenable; that, in the population, the relationship between the extent cooperating teachers and the extent student teachers utilized the problem-solving approach to teaching was greater than zero.

Conclusions

In preparation for the student teaching practicum, the student teachers had completed a teaching methods course which emphasized the problem-solving approach to teaching. The student teachers were also required to apply the problem-solving approach to teaching in eight clinical laboratory experiences prior to student teaching. However, during the student teaching practicum the student teachers spent less than one fifth of their instructional time utilizing the problem-solving approach to teaching.

While utilizing the problem-solving approach to teaching, student teachers spent the greatest amount of time guiding students in seeking data and information and analyzing the data and information. However, the student teachers did not teach students how to apply solutions and/or recommendations to the problems solved. Therefore, it can be concluded that the student teachers were not implementing all of the problem-solving approach to teaching procedures in their classroom teaching.

Cooperating teachers, on the average, spent less than one fifth of their instructional time utilizing the problem-solving approach to teaching during the student teaching practicum. Some cooperating teachers did not utilize the problem-solving approach to teaching while others utilized the approach considerably. Furthermore, it can be concluded that all of the problem-solving approach to teaching procedures were not being implemented by the cooperating teachers in their classroom teaching.

Based on the acceptance of the research hypothesis as being tenable, when cooperating teachers were utilizing the problem-solving approach to teaching, their student teachers were more likely to utilize the problem-solving approach to teaching. Therefore, based on previous research (Copeland, 1975, 1982; Zimpher, de Voss, & Nott, 1980; Zeichner, 1980; Costa & Garmston, 1987; Henry & Beasley, 1989) and the findings of the current study, the extent that student teachers utilize the problem-solving approach to teaching could be enhanced by cooperating teachers modeling the approach during the student teaching practicum.

Recommendations

Priority should be given to selecting cooperating teachers who model the desired teaching behaviors expected of student teachers. If

teacher educators expect student teachers to utilize the problem-solving approach to teaching during the student teaching practicum, then cooperating teachers must be selected who utilize and model the problem-solving approach to teaching. Cooperating teachers must understand and reinforce the expectations of student teachers with regard to the problem-solving approach to teaching during the student teaching practicum.

The cooperating teachers' conceptualization of the problem-solving approach to teaching and that of the preservice teacher preparation program may be different. Therefore, cooperating teachers must have knowledge of the problem-solving approach to teaching as taught to preservice teachers. Individuals selected as cooperating teachers should be required to complete an inservice education course on the use of the problem-solving approach to teaching prior to serving as a cooperating teacher.

The agricultural education profession should assess the extent teachers of agriculture utilize the problem-solving approach to teaching on a continual basis. A longitudinal study with student teachers on the extent of use of the problem-solving approach to teaching should be undertaken. The findings of a longitudinal study could be utilized to strengthen the current study and increase the external validity.

An additional longitudinal study should be conducted that follows teachers from their student teaching practicum through the first five years of teaching with regard to the extent of use of the problem-solving approach to teaching. In addition, future research should be conducted to identify what other factors, besides the cooperating teachers modeling of the problem-solving, approach to teaching, influence student teachers use of the problem-solving approach to teaching.

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