PEER MODELING AND TEACHING EFFICACY: THE INFLUENCE OF TWO STUDENT TEACHERS AT THE SAME TIME

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Abstract

The purpose of this study was to determine if placing two teachers at the same school had an influence on teaching efficacy. Bandura's Model of Triadic Reciprocality and self-efficacy theory guided the inquiry. The population of interest was all student teachers at Texas A&M University. This study was conducted using data collected from a sample of student teachers during a two-year (four-semester) period from 2004 to 2006. The typical student teacher was a white female pursuing certification as part of an undergraduate degree. Student teachers began the field experience efficacious about their teaching ability, then were less efficacious during the middle of the experience, and finally rebounded to higher levels of efficacy at the end of the experience. It was concluded that there is no difference in teaching efficacy between student teachers placed alone and those placed in pairs. Therefore, this sample was not consistent with Bandura's theory of the positive influence of peer models.

Introduction

The student teaching experience is an incredibly important part of preservice teacher education programs for agricultural science (Borne & Moss, 1990; Deeds, Flowers, & Arrington, 1991; Edwards & Briers, 2001; Harlin, Edwards, & Briers, 2002; Norris, Larke, & Briers, 1990). It is reasonable to expect that teacher educators routinely adjust the student teaching experience to create a better learning opportunity for their students. One innovation could be placing two student teachers at the same school, provided the school has two suitable agricultural science teachers. From a pragmatic perspective, this arrangement would provide a more efficient use of teacher educators' time by allowing supervision of two student teachers per school visit. However, would this arrangement be more conducive to the development of teaching efficacy for student teachers?

Theoretical Framework

The theoretical framework for this study lies within Social Learning Theory (Bandura 1977, 1997; Vygotsky, 1978). Vygotsky, the noted Russian psychologist, surmised that learning and development is a complex process that can occur only when the student "is interacting with people in his environment and in cooperation with his peers" (1978, p. 90). Bandura (1977, 1997) proposed that the learning environment is characterized by interactions between the student, their behavior, and the environment. Termed *reciprocal interaction*, Bandura (1997) presented the *Model of Triadic Reciprocality* to explain his theory (Figure 1). More specifically, Bandura (1997) articulated that reciprocal causations occur between the person (P), which includes cognitive, affective, and biological factors; the environment (E), which includes all external factors; and behavior (B).

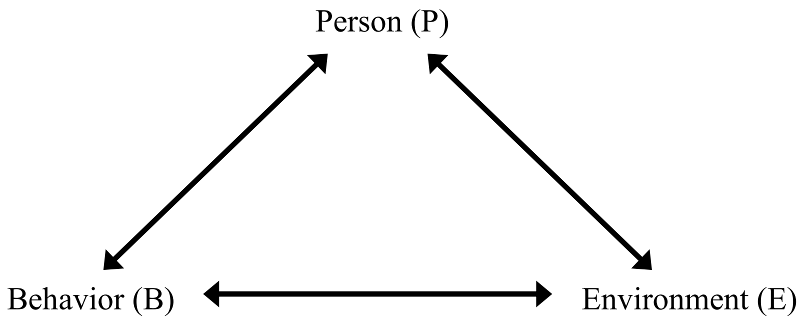

Figure 1. Model of triadic reciprocality (Bandura, 1997).

A cognitive personal (P) factor proposed by Bandura (1977, 1997) was self-efficacy, which "refers to beliefs in one's capabilities to organize and execute the courses of action required to produce given attainments" (1997, p. 3). Bandura (1997) posited that the environment (E) can influence self-efficacy (P), which in turn can influence behavior (B).

When discussing environmental (E) factors that influence self-efficacy (P), Bandura (1977, 1997) posited that students can learn vicariously through models. Specifically, he noted that by observing peers (peer modeling), self-efficacy was socially constructed and validated through comparative analysis of performance. He further articulated that peers can influence self-efficacy through an instructive function (i.e., learning from each other).

Self-efficacy is domain specific, thus a person can exhibit high efficacy in one domain and exhibit low efficacy in another (Bandura, 1997). In teacher education, the domain of interest is often teaching efficacy, or beliefs about one's ability to effectively create a learning environment conducive to learning. Building off Bandura's work, Tschannen-Moran and Woolfolk Hoy (2001) proposed that teaching efficacy actually has three sub-constructs: efficacy in student engagement, instructional strategies, and classroom management.

Synthesizing the above-mentioned theories leads to the hypothesis that the presence of peer models (environmental factor) has an influence on self-efficacy (personal factor). Applying this hypothesis to the current study implies that the presence of multiple student teachers at one school (peer models) influences teaching efficacy. The conceptual model in Figure 2 was used to guide this inquiry.

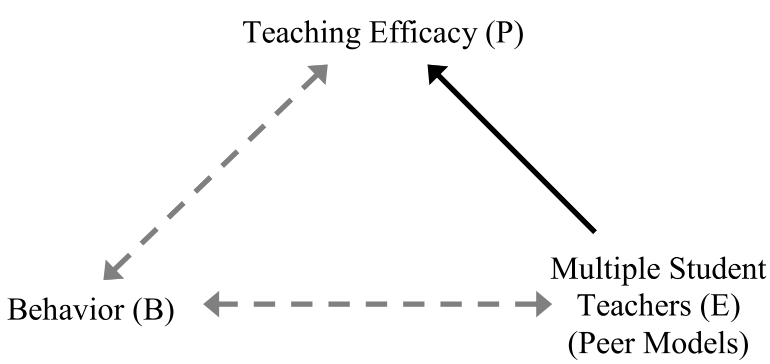

Figure 2. Conceptual model of the relationship between peer models and teaching efficacy.

A review of the literature in agricultural education yielded no research that examined the effect or influence of multiple student teachers at the same school (peer models) on teaching efficacy. Apparently, this topic has not received much attention in the broader educational journals either, as Hawkey (1995) noted a deficiency in this area. Hawkey identified several key questions that should be investigated, including, "what and how do peers learn from each other?" (p. 182).

Bullough et al. (2002) began answering this question by examining partner-placements (two student teachers with the same cooperating teacher) of elementary school student teachers. Under this protocol, the cooperating teacher and the two student teachers alternated roles in the classroom. When one taught, the other two observed and provided feedback. Student teachers reported feeling better supported and able to take more instructional risks in the classroom.

Roberts, Harlin, and Ricketts (2006) reported that teaching efficacy of agricultural science student teachers at Texas A&M University changed throughout the student teaching experience. Specifically, they found that efficacy in instructional strategies and efficacy in student engagement were at the lowest during the middle of the 11-week field experience and highest at the end of the 11-week field experience, whereas efficacy in classroom management did not change. Knobloch (2006) examined teaching efficacy before and after the student teaching experience with student teachers from The Ohio State University and the University of Illinois and reported an increase in teaching efficacy over that time period. In an earlier study, Knobloch (2001) investigated the effects of early field experience and micro-teaching (teaching lessons to peers) on teaching efficacy of two groups of preservice teachers at The Ohio State University. He reported no changes in teaching efficacy after the early field experience. His results for micro-teaching were mixed. One group showed an increase in personal teaching efficacy; the other did not.

In summary, the research consulted showed that in other educational fields, placing multiple student teachers together produced a more supportive environment and that the student teaching experience influences teaching efficacy of agricultural science student teachers. Although theory asserts that the presence of multiple student teachers (peer models) should influence teaching efficacy, research could not be found to corroborate or contradict that theory. The current study sought to examine this theory as applied in the student teaching experience.

Purpose

The purpose of this study was to determine if placing two student teachers at the same school (with two cooperating teachers) had an influence on their teaching efficacy as theory would suggest. Accordingly, one null hypothesis was used to guide this inquiry.

> H_o: There is no difference in teaching efficacy of students teachers based on placement.

Methods

The population of interest was all student teachers (past, present, and future) at Texas A&M University. This quasi-experimental study was conducted *ex post facto* using data collected from a sample that included all student teachers during a two-year (four-semester) period from 2004 to 2006 (n = 150). Although not randomly drawn from the population, the researchers deem the sample to be representative and thus employed inferential statistics (Oliver & Hinkle, 1982).

This research was part of a larger project and portions of these data were used to answer other research questions. Data were collected face-to-face by the researchers at three points: 1) immediately prior to the eleven-week field experience; 2) during the middle of the field experience at a mid-semester student teacher conference; and 3) immediately following the eleven-week field experience at the final student teacher meeting. Data were collected from all 150

student teachers. However, complete data were collected from only 138 student teachers (92%). Given the dynamic nature of teaching efficacy, it was decided *a priori* to not collect data from participants who missed one of the face-to-face sessions. It was reasoned that collected data at another time would not be comparable. Participants with missing data were included in descriptive analysis, but excluded from inferential analysis.

Student teacher placements were made by a panel of teacher-educators at Texas A&M University based on the individual needs of each student teacher. Placement criteria included (but were not limited to): technical competence of the student teacher; course offerings at the placement center; deficiencies in student teacher prior experiences (SAE, FFA, etc.); school size (enrollment); compatibility of student teacher and cooperating teacher personalities; and proximity to pre-existing lodging. Additionally, two student teachers could be placed at the same school if the school had two or more agricultural science teachers deemed to be suitable cooperating teachers. If two student teachers were sent to the same school, personalities of the student teachers were considered. Operationally, two student teachers placed at the same school have a different experience than a student teacher placed alone. First, they typically share a common office space and thus have substantially more opportunities to discuss their experiences. Second, their teaching assignments typically involve the same teachers. For example, student teacher #1 may teach four classes from teacher #1 and two classes from teacher #2, while student teacher #2 may teach two classes from teacher #1 and four classes from teacher #2. This provides opportunities for student teachers to compare feedback from the same teacher. Third, they do not typically have the same conference/planning period. Thus, they have opportunities to actually see each other teach. Although the above-mentioned differences are typical, the extent that they actually occurred at each school during this study is unknown and thus a limitation of this study.

Placement of each student teacher was intentional and far from random. Thus, generalizing the findings of this study to a broader population of student teachers is problematic and users of this research are encouraged to examine the findings carefully and make their own determinations. Regardless, the results of this study will begin to examine theory and can serve as a basis for further inquiry with other samples of student teachers.

Teaching efficacy was measured using the *Teachers' Sense of Efficacy Scale* (Tschannen-Moran & Woolfolk Hoy, 2001). This instrument captures efficacy in student engagement, instructional strategies, and classroom management using 24 summated rating scale items (eight items for each summated scale). The anchor for each item was: "How much can you do?" and was accompanied by a nine-point Likert-type scale from 1 = "nothing" to 9 = "a great deal." All 24 items can be used to determine overall teaching efficacy. Tschannen-Moran and Woolfolk Hoy established content and construct validity for the instrument. Their work also reported reliability coefficients of .87 for student engagement, .91 for instructional strategies, .90 for classroom management, and .94 for overall teaching efficacy. This same instrument has been used in agricultural education previously by Knobloch (2006) and Roberts et al. (2006).

Results

During the four-semester period in which data were collected (Table 1), Texas A&M University had 150 student teachers: 88 (58.7%) placed in pairs (44 pairs) and 62 (41.3%) placed alone. Student teachers were predominantly female (62%). Chi-square analysis revealed no associations between student teacher placement and gender (X^2 = .70, p = .41). Student teachers were predominantly white (n = 138, 92%) students pursuing certification as part of an undergraduate degree (n = 117, 78%), the majority of which had completed 7 to 8 semesters of high school agricultural science courses (n = 77, 51.3%).

Table 1
Student Teacher Placement by Gender

	Male	Female	Total
Paired	31	57	88
Alone	26	36	62
Total	57	93	150

Note. $X^2 = .70$, $p = .41$

Descriptive summaries of overall teaching efficacy are presented in Table 2 and Figures 3 and 4. In Semester 1, student teachers placed alone and those placed in pairs began the field experience with nearly equal teaching efficacy ($M = 7.42$, $SD = .96$ and $M = 7.41$, $SD = .93$, respectively). Both groups declined during the middle of the field experience, with paired student teachers ($M = 6.87$, $SD = 1.00$) displaying slightly lower efficacy that those placed alone ($M = 6.97$, $SD = 1.10$). At the end of the experience, paired student teachers rebounded to reach their highest levels of efficacy ($M = 7.59$, $SD = .86$). Student teachers placed alone rebounded, but not to the same levels of efficacy as before the experience began ($M = 7.09$, $SD = 1.18$).

Table 2
Teaching Efficacy Throughout the Student Teaching Experience

			Point During the 11-week Field Experience		
	Placement	*n*	Beginning *M(SD)*	Middle *M(SD)*	End *M(SD)*
Semester 1					
	Alone	13	7.42(.96)	6.97(1.10)	7.09(1.18)
	Paired	19	7.41(.93)	6.87(1.00)	7.59(.86)
Semester 2					
	Alone	15	6.95(.63)	7.18(.68)	7.58(.42)
	Paired	28	7.62(.58)	6.95(.95)	7.49(.94)
Semester 3					
	Alone	10	6.77(.79)	6.71(1.02)	7.50(.50)
	Paired	15	7.07(.68)	6.87(.52)	7.54(.49)
Semester 4					
	Alone	18	7.52(.73)	7.12(.88)	7.59(.85)
	Paired	20	7.45(.91)	6.93(.93)	6.74(1.06)
Total					
	Alone	56	7.21(.82)	7.03(.91)	7.45(.81)
	Paired	82	7.42(.78)	6.91(.88)	7.34(.94)

Note. Scale anchor was "How much can you do?" Scale ranged from 1 = Nothing to 9 = A Great Deal.

During Semester 2, student teachers placed in pairs began the field experience more efficacious than those placed alone (*M* = 7.62, *SD* = .58 and *M* = 6.95, *SD* = .63, respectively). By the middle of the field experience, teaching efficacy of student teachers placed in pairs had decreased (*M* = 6.95, *SD* = .95). In contrast, teaching efficacy of those placed alone increased (*M* = 7.18, *SD* = .68) and was higher than those placed in pairs. By the end of the field experience, teaching efficacy of student teachers placed in pairs had rebounded (*M* = 7.49, *SD* = .94) but did not reach the same levels displayed before the experience began. Student teachers placed alone continued to increase and exhibited their highest levels of efficacy (*M* = 7.58, *SD* = .42), the highest efficacy levels displayed by either group during this semester.

Student teachers in Semester 3 placed alone (*M* = 6.77, *SD* = .79) began the field experience less efficacious than those placed in pairs (*M* = 7.07, *SD* = .68). By the middle of the field experience, both groups exhibited lower teaching efficacy; those placed alone (*M* = 6.71, *SD* = 1.02) were slightly lower than those placed in pairs (*M* = 6.87, *SD* =.52). By the end of the field experience, both groups had rebounded to their highest levels of teaching efficacy (*M* = 7.54, *SD* = .49 for pairs and *M* = 7.50, *SD* = .50 for alone).

During Semester 4, student teachers placed alone (*M* = 7.52, *SD* = .73) exhibited slightly higher teaching efficacy than those placed in pairs (*M* = 7.45, *SD* = .91). By the middle of the field experience, both groups were less efficacious; pairs (*M* = 6.93, *SD* = .93) were lower than those placed alone (*M* = 7.12, *SD* = .88). By the end of the field experience, student teachers placed alone had rebounded to their highest levels (*M* = 7.59, *SD* = .85); in stark contrast, those placed in pairs displayed their lowest levels of efficacy (*M* = 6.74, *SD* = 1.06).

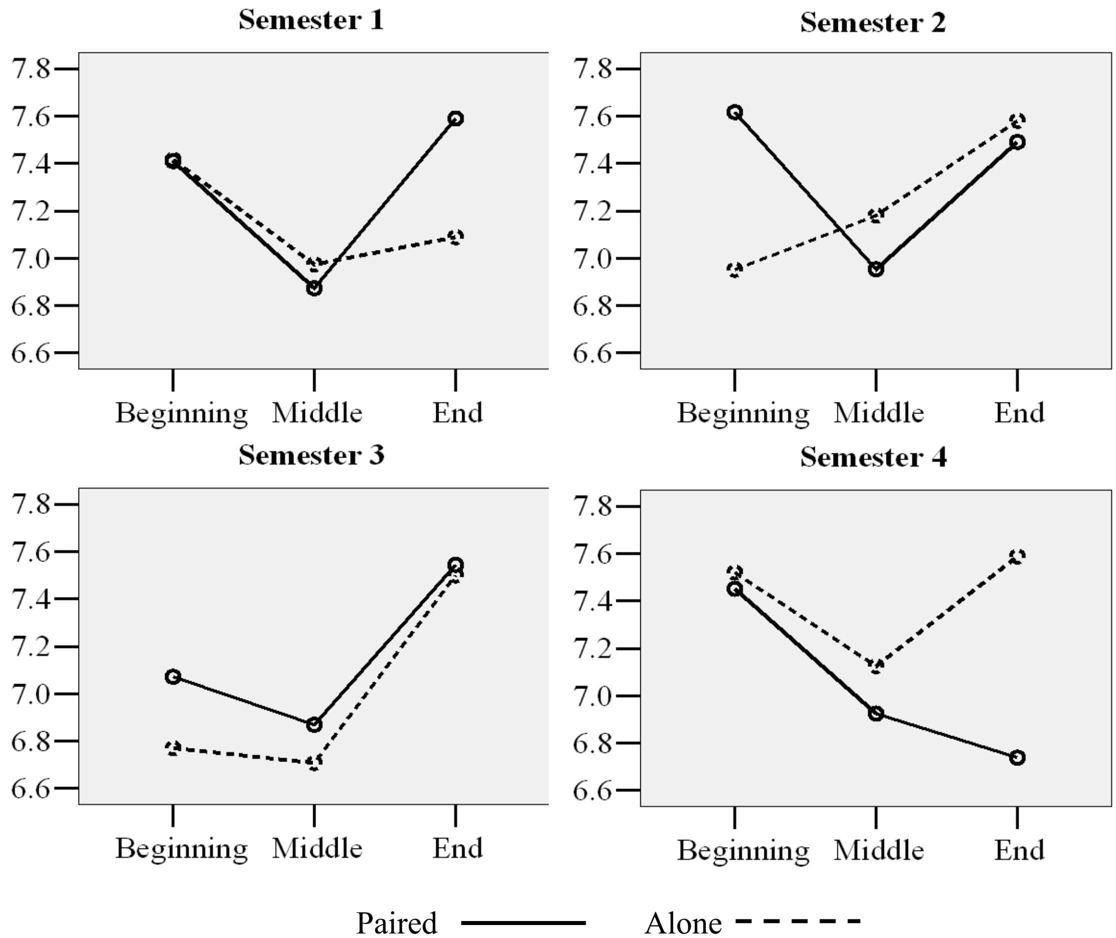

Figure 3. Teaching efficacy changes during student teaching for each semester.

Examining all four semesters concurrently (Table 2 and Figure 4) revealed that student teachers placed alone (M = 7.21, SD = .82) began the field experience slightly less efficacious than those placed in pairs (M = 7.42, SD = .78). By the middle of the field experience, both groups exhibited less teaching efficacy, with those placed in pairs (M = 6.91, SD = .88) slightly lower than those placed alone (M = 7.03, SD = .91). By the end of the experience, both groups rebounded; those placed alone (M = 7.45, SD = .81) were slightly higher that those placed in pairs (M = 7.34, SD = .94). Student teachers placed alone exhibited their highest levels of efficacy at the end of the experience, while those placed in pairs were most efficacious at the beginning of the field experience.

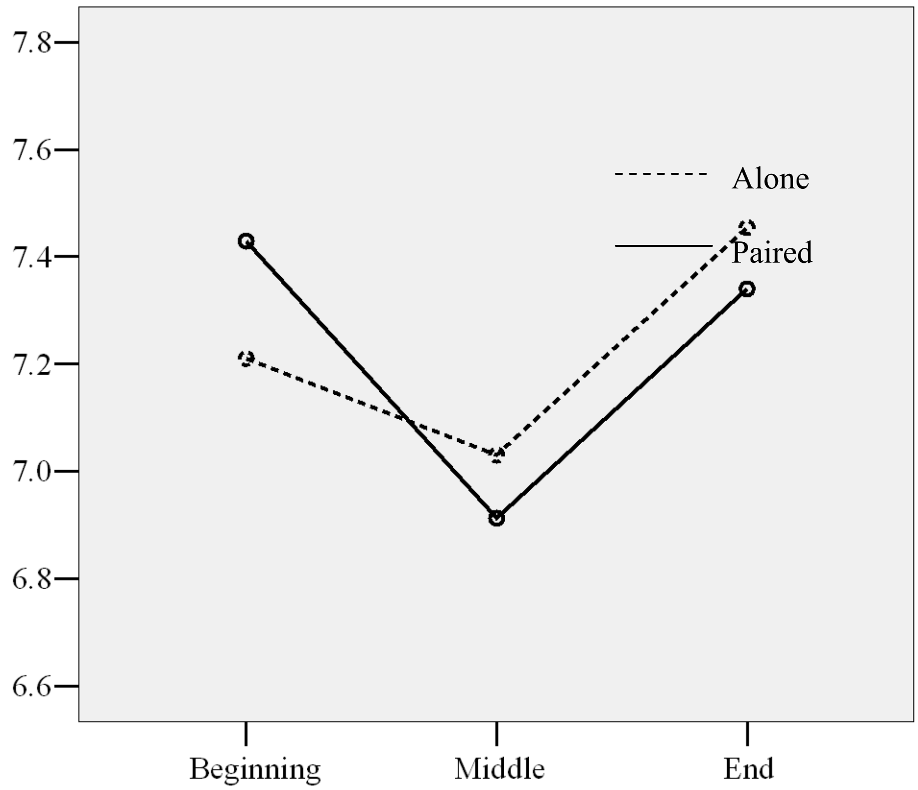

Figure 4. Overall teaching efficacy from all semesters.

The null hypothesis tested in this study was that there is no difference in teaching efficacy of students teachers based on placement. This was accomplished using repeated measures analysis of variance (ANOVA). Assumptions for repeated measures ANOVA are: random samples, normal distributions, equal population variances, and equal correlation coefficients between test scores (Hinkle, Wiersma, & Jurs, 2003). ANOVA is robust to violations to the first two mentioned assumptions, but if the last two are violated, an adjustment must be made to the degrees of freedom to compensate (Field, 2005; Hinkle et al.). For this test, assumptions of spherecity were not met (Mauchly's W = .95, p = .04), so Greenhouse-Geisser adjustments were used for the within subjects tests. Given the differences observed when examining semesters individually, semester and the interaction between semester and placement were included in the model. As depicted in Table 3, the manner in which a student teacher was placed (alone or paired) did not make a statistically significant difference in teaching efficacy ($F_{1,130}$ = .01, p = .93). The analysis revealed that neither semester ($F_{3,130}$ = .50, p = .68) nor the interaction between placement and semester ($F_{3,130}$ = 1.23, p = .30) were statistically significant.

Table 3
Repeated Measures ANOVA Test for Differences in Teaching Efficacy Based on Placement

Source	df	*F*	*p*	η^2	Power
Between subjects					
Placement	1	.01	.93	.00	.05
Semester	3	.50	.68	.01	.15
Placement * Semester	3	1.23	.30	.03	.32
Error	130				
Within subjects					
Teaching Efficacy (TE)	1.9	17.92	.00	.12	1.00
TE * Placement	1.9	2.90	.06	.02	.55
TE * Semester	5.71	3.44	.00	.07	.93
TE * Placement * Semester	5.71	3.04	.01	.07	.90
Error	247.57				

Conclusions, Implications, and Recommendations

Based on the findings of this study, several conclusions were made. The typical student teacher at Texas A&M University is a white female pursuing certification as part of an undergraduate degree that had completed 7 to 8 semesters of high school agricultural science courses. This "typical" student teacher is demographically comparable to national trends with the exception of gender (Camp, Broyles, & Skelton, 2002). At Texas A&M University, female students have been a majority for several years. Anecdotal evidence suggests that other universities have experienced a growth in female enrollments. It will be interesting to examine the next *Supply and Demand* study to see if national trends have changed. The continued under-representation of students of color is of concern and has implications for the long-term diversity of school-based agricultural science education.

The results of this study led the researchers to conclude that student teachers typically begin the field-experience efficacious about their teaching ability, then are less efficacious by the middle of the experience, and finally rebound to higher levels of efficacy by the end of the experience. Roberts et al. (2006) had already reported this phenomenon for a subset of these data, and the larger data set is congruent. Although beyond the scope of this research, it seems reasonable that student teachers may begin the field-experience with an artificial high estimation of their teaching effectiveness caused by their successes in "micro-teaching" and other limited teaching experiences. By the middle of the field experience (five or six weeks later), student teachers have "real-world" experiences in which to self-assess their teaching effectiveness. Given the incredibly complex nature of teaching

(Darling-Hammond & Bransford, 2005), it is reasonable that by this point of the field experience, student teachers may be somewhat overwhelmed about the intricacies of teaching effectively. It is also possible that the lowest levels of teaching efficacy do not occur during the middle of the experience, but rather during the first few weeks of the experience, and that by the middle, efficacy levels are actually increasing. The current study cannot determine if this is correct, so further research is needed to identify when teaching efficacy is lowest. This knowledge will allow for carefully planned interventions to help student teachers develop as effective teachers.

The general trend for the dip in teaching efficacy by the middle of the field experience, followed by a rebound at the end held true for all but two sub-groups of student teachers—those placed alone in semester 2 and those placed in pairs in semester 4. In semester 2, student teachers placed alone were less efficacious at the beginning and more efficacious each time data were collected. This upward trend seems consistent with learning and development from experience (Roberts, 2006). The data collected by the middle and end of the experience for student teachers placed alone was consistent with those placed in pairs. Only the data collected at the beginning of the field experience appeared different. Perhaps this group of student teachers had less favorable experiences during "micro-teaching" and accordingly had a lower opinion about their teaching effectiveness. Although possible, this contradicts the findings of Knobloch (2001), who reported either no difference or an increase in teaching efficacy. Accordingly, the aforementioned theory is beyond the scope of the research presented in this manuscript and inconsistent with other research, so further research should be conducted to determine how "micro-teaching" and other pre-student teaching experiences affect teaching efficacy of student teachers at the beginning of the field experience.

The more puzzling data came from student teachers placed in pairs during semester 4. At the beginning and by the middle of the experience, student teachers placed in pairs were very similar to those placed alone. However, unlike every other subset of student teachers in this study, student teachers placed in pairs fell to even lower levels of efficacy by the end of the experience, thus displaying a continual downward trend throughout the field experience. This phenomenon is inconsistent with the goals and expectations of the student teaching experience – that is the growth and development of effective teachers. For some reason, this group of student teachers believed themselves to be less effective following eleven weeks of "real-world" experience than they did before. Explaining this observation is beyond the data collected, but provided the researchers generous opportunity to theorize. By examining student teachers placed in pairs, the researchers eliminated the explanation that this was just a "below average" group of student teachers, although a few of the student teachers in the group did experience some difficulty during their field experience. Bandura (1997) theorized that vicarious modes of influence, such as peer modeling, symbolic modeling, self-modeling, and cognitive modeling can all influence self efficacy. During the student teaching experience, this group likely made extensive use of peer modeling and cognitive modeling. Perhaps this group of teachers paid considerable attention to some of the struggles from the other student teacher placed with them (peer modeling), and therefore questioned their own abilities based on their own observations. Bandura (1997) noted that it is difficult to gain cognitively complex skills through modeling if the model does not verbalize thought processes. So, observing a peer's difficulties without fully understanding the complex process that led to the problem may have further exacerbated the situation. Bandura proposed that cognitive self modeling contributes to self efficacy, thus, a person can visualize facing and overcoming challenging situations, or facing and struggling in the presence of the same challenging situations. Of course, this discussion is purely academic without supporting data. Accordingly, it is recommended that additional research be

conducted with this particular group of student teachers to explain the decrease in efficacy.

Despite the unique observations from the group of student teachers mentioned above, based on the entire data set, it was concluded that there is no difference in teaching efficacy between student teachers placed alone and those placed in pairs. Therefore, for this sample of student teachers, Bandura's (1997) theory of the positive influence of peer models was not supported, nor was the work of Bullough et al. (2002), who found positive benefits of placing student teachers in pairs. However, as noted earlier, the extent to which peer modeling actually occurred with student teachers placed alone is not known, and thus a limitation of this study.

Perhaps several factors contributed to finding no difference. The premise of the study was that student teachers placed in pairs could use each other as a peer model to gauge performance and effectiveness. Obviously, the two student teachers placed at the same school had extensive opportunities for interaction, but the interaction that actually occurred is unknown. Further, the interaction between student teachers placed at different schools in unknown. Anecdotal evidence suggests that extensive relationships between groups of student teachers are developed during the intensive four-week "block" that immediately precedes the eleven-week field experience. It is reasonable to expect that student teachers self-select peer groups that they communicate with extensively throughout the experience using a variety of interfaces including (but not limited to) email, telephone, instant-messaging, and face-to-face. Therefore, all student teachers may have multiple peer models, whether placed alone or in pairs. Given the plethora of available communication media, it is recommended that further research be conducted to gain a better understanding of interactions between student teachers. Do two student teachers at the same school serve as peer models for each other? Do they interact with each other more than with their peers at other schools? Further research is also warranted to determine how student teachers select and use peer models throughout the field experience, regardless of placement.

Because no differences were found between student teachers placed alone and those placed in pairs, it can be assumed that placing student teachers in pairs is an equitable option. This implies that Texas A&M University should continue its current practices and that other universities may consider adopting the practice, particularly given the fiscal time-saving benefits associated with visiting two student teachers at a time instead of one.

This study adds to the knowledge by beginning to examine how different methods of student teacher placement can influence teaching efficacy. As with other research, replicating this study with other samples will greatly expand understanding of this phenomenon. Further, replicating with some degree of randomization of assignment will help the generalizability of the results, providing researchers can do so without intentionally placing an individual in a setting less conducive for educational development.

References

Bandura, A. (1977). *Social Learning Theory*. Upper Saddle River, NJ: Prentice Hall.

Bandura, A. (1997). *Self-efficacy: The Exercise of Control*. New York: W. H. Freeman and Company.

Borne, C., & Moss, J. W. (1990). Satisfaction with agricultural education student teaching. *Journal of Agricultural Education, 31*(2), 29-34.

Bullough, R. V., Jr., Young, J., Erickson, L., Birrell, J. R., Clark, D. C., Egan, M. W., et al. (2002). Rethinking field experience: Partnership teaching versus single-placement teaching. *Journal of Teacher Education, 53*(1), 68-80.

Camp, W. G., Broyles, T., & Skelton, N. S. (2002). *A National Study of the Supply and Demand for Teachers of Agricultural Education in 1999-2001*. Blacksburg, VA:

Virginia Polytechnic Institute and State University.

Darling-Hammond, L., & Bransford, J. (Eds.). (2005). *Preparing Teachers for a Changing World: What Teachers Should Learn and Be Able to Do.* San Francisco: Jossey-Bass.

Deeds, J. P., Flowers, J., & Arrington, L. A. (1991). Cooperating teacher attitudes and opinions regarding agricultural education student teaching expectations and policies. *Journal of Agricultural Education, 32*(2), 2-9.

Edwards, M. C., & Briers, G. E. (2001). Cooperating teachers' perceptions of important elements of the student teaching experience: A focus group approach with quantitative follow-up. *Journal of Agricultural Education, 42*(3), 30-41.

Field, A. (2005). *Discovering Statistics Using SPSS* (2nd ed.). London: Sage.

Harlin, J. F., Edwards, M. C., & Briers, G. E. (2002). A comparison of student teachers' perceptions of important elements of the student teaching experience before and after an 11-week field experience. *Journal of Agricultural Education, 43*(3), 72-83.

Hawkey, K. (1995). Learning from peers: The experience of student teachers in school-based teacher education. *Journal of Teacher Education, 46*(3), 175-183.

Hinkle, D. E., Wiersma, W., & Jurs, S. G. (2003). *Applied Statistics for the Behavioral Sciences* (5th ed.). Boston: Houghton Mifflin Company.

Knobloch, N. A. (2001). The influence of peer teaching and early field experience on teaching efficacy beliefs of preservice educators in agriculture. *Proceedings of the 28th Annual National Agricultural Education Research Conference, 28*, 119-131.

Knobloch, N. A. (2006). Exploring relationships of teachers' sense of efficacy in two student teaching programs. *Journal of Agricultural Education, 47*(2), 36-47.

Norris, R. J., Larke, A., Jr., & Briers, G. E. (1990). Selection of student teaching centers and cooperating teachers in agriculture and expectations of teacher educators regarding these components of a teacher education program: A national study. *Journal of Agricultural Education, 31*(1), 58-63.

Oliver, J. D., & Hinkle, D. E. (1982). Occupational education research: Selecting statistical procedures. *Journal of Studies in Technical Careers, 4*(3), 199-208.

Roberts, T. G. (2006). A philosophical examination of experiential learning theory for agricultural educators. *Journal of Agricultural Education*, *47*(1), 17-29.

Roberts. T. G., Harlin, J. F., & Ricketts, J. C. (2006). A longitudinal examination of teaching efficacy of agricultural science student teachers. *Journal of Agricultural Education, 47*(2), 80-91.

Tschannen-Moran, M., & Woolfolk Hoy, A. (2001). Teacher efficacy: Capturing an elusive construct. *Teaching and Teacher Education, 17*, 783-805.

Vygotsky, L. S. (1978). *Mind in Society: The Development of Higher Psychological Processes.* Cambridge, MA: Harvard University Press.

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