2012 Hawaii University International Conferences
Education, Math & Engineering Technology
July 31st to August 2nd
Waikiki Beach Marriot Resort & Spa
Honolulu, Hawaii

Teaching Efficacy: A Comparison of Traditionally and Alternatively Certified CTE Teachers in [State]

Dennis Duncan, Ph.D.

Agricultural Leadership, Education, and Communication

College of Agricultural and Environmental Sciences

University of Georgia

dwd@uga.edu

John Cannon, Ph. D.

College of Education

University of Idaho

johnc@uidaho.edu

Allen Kitchel, Ph. D

College of Education

University of Idaho

akitchel@uidaho.edu

Teaching Efficacy: A Comparison of Traditionally and Alternatively Certified CTE Teachers in Idaho

Abstract

The purpose of this study was to examine Idaho career and technical education (CTE) teachers' perceived levels of efficacy as related to the domain of teaching and learning, both for traditionally and alternatively certified teachers with 10 or less years of teaching experience. Efficacy was examined for early to mid-career CTE teachers across two groups, those who completed a traditional teacher preparation program (T-prep, $n_1 = 159$), and those who completed an occupational teacher preparation program (O-prep, $n_2 = 67$). T-prep teachers were most efficacious "Utilizing productivity software" and least efficacious in "Utilizing website development software". O-prep teachers were most efficacious in "Use of non-computer technology" and least efficacious in "Utilizing website development software".

Introduction

The pedagogical means of educating students in career and technical education (CTE) programs has drastically changed during the last century. With this change in CTE comes the need to continually examine the extent to which teachers are meeting the needs (academic and personal) of their students (Duncan & Ricketts, 2008). One may argue that if teachers are meeting the needs of their students, they are effective educators, well versed in facets of teaching and learning.

Roberts and Dyer (2003) identified characteristics of effective teachers in the CTE content area of agriculture. Participants in Roberts and Dyers (2003) study agreed with the importance of the following teaching attributes: skills and knowledge; care for students; instructional planning; student evaluation; honest, moral, and ethical character; knowledge of Career and Technical Student Organizations (CTSO); student preparation for CTSO activities; communication skills; and laboratory management and improvement.

The CTE teaching profession requires competent and effective CTE teachers, yet it continues to face an annual shortage of qualified teachers (McCandless & Sauer, 2010). This shortage has led to an increase in the number of states that have developed alternative teacher

certification programs to help remedy teacher shortages. The number of states with an alternative route to certification has grown significantly from eight 30 years ago to 46 in 2003, and 48 in 2008 (National Center for Education Information, 2003 & 2010). It should be further noted, NCEI (2010) estimated that approximately 59,000 individuals were issued teaching certificates through alternative routes in 2008-09.

According to Wise (1994), alternative certification is a process in which a state licenses a person who has not completed a post-secondary teacher education program. The NCEI (2010) identified the following minimum requirements for alternative certification: applicants have at least a bachelor's degree; pass a screening process which may include tests; begin full-time teaching without any formal teacher preparation training (on-the-job training); complete coursework; work with mentor teachers; and meet high performance standards.

With the shortage of teachers and the need to be versed in the latest technology and pedagogical techniques, it is essential that research be conducted to investigate whether alternatively certified CTE teachers are as successful and capable as those who trained in traditional programs of teacher education. One could argue that teaching capability may be positively associated with a teacher's self-efficacy, that is, their belief in their ability to competently engage in the teaching process. The research literature is far from definitive and provides mixed findings concerning alternatively certified teachers' perceived competence or efficacy in fields of education, and particularly within the field of CTE (Duncan & Ricketts, 2008; Rocca & Washburn, 2005; Wash, Lovedahl, & Paige, 2000).

Researchers have sought to identify characteristics of effective teachers. Wenglinsky (2002) examined math and science achievement of over 7,100 eighth graders as related to measures of teaching quality and teacher characteristics. He found that student achievement was influenced by both teacher content background (major or minor in math education) and professional development coursework. Furthermore, students performed better when teachers provided hands-on learning and focused on higher-order thinking skills (Wenglinsky, 2002).

Goldhaber and Brewer (2000) found students whose teachers had bachelor's degrees in mathematics or science achieved at higher levels on math and science examinations than their peers who had teachers who taught math and science without bachelor's degrees in those academic fields. Ross (1992) considered relationships between student achievement (knowledge and cognitive skill), teacher efficacy, and interactions with assigned coaches (mentor teachers) in

a study that examined 18 history teachers working with 7th and 8th grade pupils. Ross (1992) found that… "Student achievement was higher in classrooms of teachers who had more contact with their coaches (mentor teachers) and in classrooms of teachers with greater confidence in the effectiveness of education" (p. 51). Additionally, Darling-Hammond and Sykes (2003) argued that many characteristics, those beyond subject matter knowledge, are important for good teaching. Examples include enthusiasm, flexibility, perseverance, and concern for students.

Engaging in professional development opportunities contributes to the effectiveness of a teacher, and is particularly relevant for CTE teachers due to the fact that technology is constantly changing and evolving. Wash, Lovedahl, and Paige (2000) found insufficient evidence to conclude that there was a difference in participation in professional development activities (participate in curriculum development, membership in state professional association, and completion of graduate coursework between traditionally and alternatively certified teachers. Furthermore, these researchers found no difference in the receptivity to change between traditionally and alternatively certified technology education teachers (Wash et al., 2000).

The research literature is limited but expanding concerning CTE and the debate over whether traditionally certified teachers are more effective than those certified through alternative routes. Much of the research that does exist has been conducted in the CTE content area of agricultural education. Rocca and Washburn (2005) compared traditionally and alternatively certified agriculture teachers' perceptions of self-efficacy as it relates to teaching, and found non-distinguishable results between the two groups. Duncan and Ricketts (2008) determined that traditionally certified agriculture teachers were significantly more efficacious than alternatively certified teachers concerning the following constructs: technical content knowledge, conducting leadership development activities, and program management. It should be noted that no significant difference existed between the two groups' teaching and learning efficacy perceptions.

Theoretical Framework

Bandura's (1977) self-efficacy theory provides a theoretical lens that frames this study. Bandura purported that self-efficacy refers to personal beliefs about one's capabilities to perform actions, such as teaching, at specific levels. Self-efficacy is clearly important for teachers; a positive belief in one's abilities as a teacher is associated with teachers who are more willing to try new things, prone to less stress, and more likely to stay in the teaching field (Glickman &

Tamashiro, 1982; Parkay, Greenwood, Olejnik, & Proller, 1988; Smylie, 1998; Tschannen-Moran, Hoy, & Hoy, 1998). Perhaps even more important, efficacious teachers have more successful students (Ashton & Webb, 1986). According to Tschannen-Moran, Hoy, and Joy (1998), "teachers with a high level of efficacy believed that they could control, or at least strongly influence, student achievement and motivation" (p. 2).

Purpose and Objectives

The purpose of this study was to examine Idaho CTE teachers' perceived levels of efficacy as related to the domain of teaching and learning, both for traditionally and alternatively certified teachers with 10 or less years of teaching experience. More specifically, the following objectives guided this study:

1. Describe selected characteristics of traditionally and alternatively certified Idaho CTE teachers and their CTE programs; and
2. Compare traditionally and alternatively certified teachers' perceived level of efficacy for competencies related to teaching and learning.

Procedures

This study used a descriptive research design with the online survey method. The online survey method came about due to the time, cost, accuracy, and efficiency advantages over other methods (Puig, 2002; Shannon, 2002; Topp & Pawloski, 2002; University of Texas at Austin, 2009; Wright, 2005). The target population for this study consisted of Idaho secondary CTE teachers with 10 or less years of teaching experience. The frame of CTE teachers was provided by the Idaho CTE state division. The frame did not include number of years of teaching experience, thus, all teachers within the listing were contacted and participants who met the criteria for this study were subsequently identified through their responses to the survey. Because of the use of a census approach, no sampling methods were utilized and consequently, generalizability of the findings may be limited to the population of this study. The survey instrument was based on the Borich Needs Assessment Model (Borich, 1980) and adapted to fit the purpose of this study through a review of previous research (Peake, Duncan, and Ricketts, 2007; Joerger 2002; Garton & Chung, 1997).

Important influences that shaped the conceptualization of the survey items included the ISTE National Educational Technology Standards for Teachers (International Society for Technology in Education, 2009), national career and technical education trends (e.g., clusters,

accountability, and standards), emerging technology applications (e.g., blended learning and course management systems), and topics of current focus within the CTE literature. The instrument design allowed teachers to rate their perceived level of competence for each of 32 items related to the teaching and learning domain. The 5-point response scale for each item was 1 = Not Competent; 2 = Little Competence, 3 = Somewhat Competent, 4 = Competent, 5 = Very Competent. Examples of these items included classroom management, teaching problem solving skills, motivating students to learn, developing performance based assessments, teaching students to think critically and creatively, integrating science standards into the CTE curriculum, utilization of website development tools, using digital tools to facilitate learning, and assessing and evaluating student performance. The survey also included a section for collecting demographic data.

A panel of experts consisting of four university faculty, a CTE teacher, and four pre-service CTE teachers reviewed the instrument to ensure content and face validity. The usability and reliability of the instrument was assessed through an analysis of the results of a pilot survey using a small group (n = 4) of pre-service business teachers. The data collected from this process, along with further review and analysis by the panel of experts, informed the refinement of the instrument into final form.

Teachers were contacted by email and asked to participate in the study by completing the web-based survey. Online survey procedures suggested by Dillman (2007) were followed. In all, 446 CTE teachers within the frame of 698 participated in the survey (response rate = 61.1%), of these 226 were early to mid-career CTE teachers with 10 or less years of teaching experience. Early to mid-career CTE participants included approximately 29% business teachers (n = 65); 2% marketing teachers (n = 5); 16% FACS teachers (n = 37); 16% health professions teachers (n = 36); 7% technology education teachers (n = 16); and 26% trade and industry teachers (n = 60).

Analysis of non-response bias is important in determining a sample's representativeness of the population from which it was drawn. Miller and Smith (1983) determined that non-respondents are similar to late respondents when responding to surveys. In a review of research literature spanning ten years; Lindner, Murphy, and Briers (2001) concluded that "both early/late comparison and follow-up with non-respondents are defensible and generally accepted procedures for handling non-response error as a threat to external validity of research findings" (p. 51). Radhakrishna and Doamekpor (2008) indicated that if no significant difference is found

between early and late respondents, then the findings from the sample may be representative of the population. For this study, non-response bias was evaluated through the use of a two-independent samples *t* test. The *t* test was conducted comparing the mean efficacy score across all items within the teaching and learning domain between participants who were early responders to those who were late responders. No statistically significant differences were found between early respondents and late respondents (t (59) = 0.709, p>.05). The mean of the early responders (M = 3.87, SD = .66) was not significantly different from the late responders (M = 3.74, SD = .68). Therefore, based on both statistical and practical differences, the sample data was determined to be representative of the population from which it was drawn.

SPSS and MS Excel™ were used to analyze the data. Mean and standard deviation were calculated for each of the items for both traditionally and alternatively certified teachers to determine their perceived level of efficacy. Discrepancy scores were calculated to describe the differences between item efficacy levels. An independent sample *t* test procedure was used to compare mean scores for teaching efficacy across groups. Cohen's *d* was chosen as the most appropriate effect size calculation to complement the *t* test procedure (Cohen, 1977).

Findings

Objective One: *Descriptive Characteristics of Traditionally and Alternatively Certified CTE Teachers*

Respondents represented two groups of teachers, those who completed a traditional university teacher preparation program (T-prep) and those who completed an occupational teacher preparation program (O-prep). In order to meet the qualifications for an occupational certification, a candidate's work and content area education are evaluated. Seventy percent of respondents (n_1 = 159) certified as a teacher through T-prep and 30% (n_2 = 67) through O-prep. Gender diversity was represented within both groups (T-prep (F = 65%, M = 35%) and O-prep (F = 54%, M = 46%)). Sixty percent (n = 96) of traditionally certified teachers had earned a bachelor's degree and 38% (n = 60) had earned a graduate degree, three did not respond to the survey question. O-prep included participants with various levels of degrees (O-prep (High School Diploma = 8% (n=5), 2yr = 21% (n=14), bachelor's = 49% (n=33), & graduate = 22% (n=15)). Most CTE content areas were represented across both teacher preparation groups. Although, when compared with T-prep there was a larger percentage of trade and industry teachers within O-prep (T-prep = 16%, O-prep = 51).

Objective Two: Compare Traditionally and Alternatively Certified Teachers' Perceived Level of Efficacy for Competencies Related to Teaching and Learning

The top three items that T-prep teachers felt most competent in were: Utilizing productivity software (M=4.37), Teaching proper safety practices in the lab (M=4.21), and Classroom management (M=4.19). The O-prep teachers top three items of greatest competency were: Use of non-computer technology in teaching (M=4.12), Teaching proper safety attitudes in the classroom. (M=4.07), and Teaching problem-solving & decision-making skills (M=4.02). The largest discrepancy scores between groups was Utilize graphic design & publishing software (MeanDiff=.82), followed by Utilize productivity software (Mean Diff=.70) and Integration of technology standards into the PTE curriculum (Mean Diff=.56) (see Table 1).

Table 1

Efficacy for Competencies Related to Teaching and Learning

	E: T-prep	SD: T-prep	E: O-prep	SD: O-prep	Mean Diff. (T - O)
Utilize productivity software (word processing, spreadsheets, presentation software).	4.37	0.84	3.67	1.17	0.70
Teaching proper safety practices in the lab.	4.21	0.89	3.99	1.05	0.22
Classroom management.	4.19	0.81	3.84	0.96	0.35
Integrating life skills into the curriculum.	4.15	0.87	3.88	0.99	0.27
Teaching proper safety attitudes in the classroom.	4.15	0.79	4.07	0.93	0.08
Use multimedia equipment in teaching.	4.14	0.85	3.96	0.96	0.18
Teaching problem-solving & decision-making skills.	4.11	0.85	4.02	1.02	0.09
Assessing and evaluating student performance.	4.1	0.82	3.80	0.83	0.30
Organizing and supervising teaching laboratories.	4.05	0.97	3.71	1.19	0.34
Use digital tools for face-to-face instruction.	3.93	0.96	3.54	0.99	0.39
Developing performance based assessment instruments.	3.92	0.91	3.53	0.98	0.39
Motivating students to learn.	3.92	0.75	3.78	0.98	0.14
Integration of technology standards into the CTE curriculum.	3.91	0.98	3.35	1.07	0.56
Use digital tools to facilitate student learning, creativity, and innovation.	3.89	0.95	3.45	1.00	0.44
Teaching students to think critically and creatively.	3.89	0.84	3.82	0.92	0.07
Use of non-computer technology in teaching.	3.84	1.06	4.12	0.88	-0.28

Integration of reading standards into the CTE curriculum.	3.63	0.97	3.45	1.05	0.18
Integration of writing standards into the CTE curriculum.	3.59	0.96	3.33	1.06	0.26
Promote and model digital citizenship and responsibility.	3.59	1.19	3.32	1.19	0.27
Teaching gifted and talented students.	3.59	0.88	3.47	1.07	0.12
Use digital tools for blended instruction.	3.57	1.08	3.09	1.12	0.48
Embedding graduation standards into the CTE curriculum.	3.52	0.97	3.52	1.02	0.00
Integration of math standards into the CTE curriculum.	3.50	1.02	3.19	1.16	0.31
Teaching using experiments.	3.49	1.15	3.48	1.18	0.01
Teaching learning disabled students.	3.47	0.97	2.99	1.12	0.48
Utilize graphic design & publishing software.	3.42	1.22	2.60	1.26	0.82
Design & develop digital-age learning experiences.	3.42	1.07	3.10	1.14	0.32
Use digital tools for on-line instruction.	3.31	1.19	2.85	1.26	0.46
Design & develop digital-age learning assessments.	3.26	1.13	2.90	1.26	0.36
Integration of science standards into the CTE curriculum.	3.20	1.12	3.33	1.09	-0.13
Utilize database software (e.g., MS Access).	3.15	1.20	2.69	1.26	0.46
Utilize website development software.	2.89	1.29	2.34	1.29	0.55

Note. Not Competent (M = 1.0-1.49), Little Competence (M = 1.5-2.49), Somewhat Competent (M = 2.5-3.49), Competent (M = 3.5-4.49), and Very Competent (M = 4.5-5.0).

Table 2 contains the results from an independent samples t test on all individual teaching and learning items compared across the groups of T-prep and O-prep. Only items where a statistical difference was found are reported. Each item was tested for equal variances between T-prep and O-prep using the Levene's test for equality of variance. Of the items where a significance difference between group means was found, only one was found to have variances that were not equivalent. For this one item, the *t* test procedure that does not rely upon the assumption of equality of variances was used. For all the items where a significant difference was found between teacher preparation methods and the assumption of equality of variances, the degrees of freedom varied from 219-224 and were dependent upon the number of missing data points. For the one item that didn't meet the assumption of equality of variance, the degrees of freedom were 96. Effect size is reported as Cohen's *d*, and for each item the effect size of the

significant differences are interpreted as “medium” (Cohen, 1977). Table 2 contains a summary of the analysis and is sorted by the Cohen’s *d* value (see Table 2).

Table 2

Statistically Significant Independent t Test Results: Comparison in Competence Levels Between Teacher Groups

Item	df	t	Sig.	T-prep	O-prep	*d*
Utilize productivity software (word processing, spreadsheets, presentation software).	96	4.43	0.000	4.37	3.67	0.74
Utilize graphic design & publishing software.	224	4.57	0.000	3.42	2.60	0.67
Integration of technology standards into the PTE curriculum.	223	3.81	0.000	3.91	3.35	0.55
Teaching learning disabled students.	224	3.29	0.001	3.47	2.99	0.47
Use digital tools to facilitate student learning, creativity, and innovation.	222	3.11	0.002	3.89	3.45	0.46
Use digital tools for blended instruction.	220	2.99	0.003	3.57	3.09	0.44
Utilize website development software.	223	2.88	0.004	2.89	2.34	0.43
Developing performance based assessment instruments.	223	2.89	0.004	3.92	3.53	0.42
Classroom management.	224	2.88	0.004	4.19	3.84	0.41
Use digital tools for face-to-face instruction.	223	2.79	0.006	3.93	3.54	0.40
Use digital tools for on-line instruction.	221	2.60	0.010	3.31	2.85	0.38
Utilize database software (e.g., MS Access).	221	2.52	0.012	3.15	2.69	0.38
Assessing and evaluating student performance.	221	2.42	0.016	4.1	3.80	0.36
Organizing and supervising teaching laboratories.	219	2.18	0.030	4.05	3.71	0.33
Design & develop digital-age learning assessments.	224	2.16	0.032	3.26	2.90	0.31
Integrating life skills into the curriculum.	222	2.06	0.041	4.15	3.88	0.30

Conclusions

As previously stated, participants included approximately 29% business teachers (*n* = 131); 3% marketing teachers (*n* = 15); 19% family and consumer science teachers (*n* = 86); 10% health professions teachers (*n* = 43); 10% technology education teachers (*n* = 46); and 24% trade and industry teachers (*n* = 46). Respondents represented two groups: traditional teacher preparation program (T-prep) and occupational teacher preparation program (O-prep). T-prep teachers reported being most efficacious in their ability to utilize productivity software (M=4.37), followed by teaching proper safety practices in the lab (M=4.21) and classroom management (M=4.19). O-prep teachers reported being most efficacious in their use of non-

computer technology in teaching (M=4.12), followed by teaching proper safety attitudes in the classroom (M=4.07) and teaching problem-solving and decision making skills (M=4.02). It is interesting to note that O-prep teachers were more efficacious than T-prep teachers regarding using non-computer technology in the classroom and teaching problem-solving skills and decision making skills. One may conclude that this difference is due to the fact that O-prep teachers feel more efficacious because they have industry experience and have worked extensively with non-computer technology.

Overall, the T-prep teachers reported being competent for 23 of the 32 items compared to O-prep teachers who reported being competent in 14 of the 32 items. T-prep and O-prep teachers indicated little self-efficacy towards utilizing website development software and utilizing database software.

Discussion/Implications

The overriding objective of this study was to compare the teaching self-efficacy of traditionally certified CTE teachers to colleagues who obtained certification through alternative routes. Student achievement is influenced by the quality of the teacher (Wenglinsky, 2002; Ashton & Webb, 1986). Looking at the bigger picture, the findings will add to the scholarship of teacher preparation in workforce development education, with the ultimate goal to improve student achievement through CTE learning experiences. This research is timely with the significant growth in the number of teachers being certified through alternative pathways, while at the same time those entering the profession through the traditional process is declining (NCEI, 2010; NCEI, 2003).

Another outcome of this research is an evaluation instrument, based on previous research, which will serve as a model for other CTE teacher preparation programs. Continuous improvement is vital to teacher preparation programs for accreditation. The institution for which the researchers conducted this study will add the findings to its collection of evidence for accreditation. The faculty members in turn should use the results in reviewing and revising curriculum for both traditional and alternative teacher preparation.

Not only will the findings of this study influence curriculum decisions for teacher preparation programs, but also serve as a component of professional development planning for in-service teachers. University faculty members, state CTE administrators, and school district leadership should consider the findings when developing in-service training activities. These

stakeholders should not rely solely on this or similar research, but use as a component in the planning process.

The level of self-efficacy of traditionally certified teachers versus alternatively certified teachers for the aforementioned domain can be explained by the theories espoused by Bandura (1977) and Tschannen-Moran et al. (1998) – multiple learning experiences can shape an individual's perceptions of self-efficacy. Traditionally certified teachers typically gain more pedagogical experiences related to CTE content area through teacher education courses, early field-based experiences, and student internship programs. One may argue that traditionally certified teachers have been exposed to more pedagogical and learning theories and experiences than alternatively certified teachers that will increase their self-efficacy as it relates to the items within the teaching and learning domain (i.e. locating and selecting student resources, determining course content, embedding standards into the curriculum, and evaluating the CTE program).

The results of this study showed that traditionally certified teachers had higher perceived levels of self-efficacy for all items except "use of non-computer technology in teaching". A possible explanation is that occupationally certified teachers have more industry and career experience. With this industry and career experience, teachers who have been certified through the occupational route may have more opportunities to use this type of technology. In comparison, traditionally certified teachers do not have similar exposure time to non-computer technology. Also, budget cutbacks could also be a contributing factor. Traditional programs may not have the resources to provide learning experiences with cutting edge non-computer technology.

Recommendations

The researchers have made the following recommendations based on the findings of this study. This study should be replicated to further develop and validate the instrument. A body of scholarship is emerging related to teaching self-efficacy of CTE teachers. Scholarship in this area is important and will lead to the comparison of research across states, regions, and CTE content areas. Future researchers should seek to correlate teaching self-efficacy to the learning and achievement of CTE students. [State] is developing a student database which may provide a means to effectively and efficiently determine correlations between levels of CTE teacher self-efficacy and student learning.

References

Ashton, P. T., & Webb, R. B. (1986). *Making a difference: Teachers' sense of efficacy and student achievement*. New York: Longman.

Bandura, A. (1977). Toward a unifying theory of behavioral change. *Psychological Review, 84*(2), 191-215.

Borich, G. D. (1980). A needs assessment model for conducting follow-up studies. *Journal of Teacher Education, 31*(1), 39-42.

Cohen, J. (1977). *Statistical power analysis for the behavioral sciences.* Hillsdale, NJ: Lawrence Erlbaum Associates.

Darling-Hammond, L., & Sykes, G. (2003). Wanted: A national teacher supply policy for education: The right way to meet the "Highly Qualified Teacher" challenge? *Education Policy Analysis Archives, 11*(33).

Dillman, D. A. (2007). *Mail and Internet Surveys: The Tailored Design, Second Edition - 2007 update.* Hoboken, NJ.: John Wiley.

Duncan, D. W., & Ricketts, J. C. (2008). Total program efficacy: A comparison of traditionally and alternatively certified agriculture teachers. *Journal of Agricultural Education, 49*(4), 38-46.

Garton, B. L., & Chung, N. (1997). An assessment of the in-service needs of beginning teachers of agriculture using two assessment models. *Journal of Agricultural Education, 38*(3), 51-58.

Glickman, C., & Tamashiro, R. (1982). A comparison of first-year, fifth-year, and former teachers on efficacy, ego development, and problem solving. *Psychology in Schools, 19*(4), 558-562.

Goldhaber, D. D., & Brewer, D. J. (2000). Does teacher certification matter? High school certification status and student achievement. *Educational Evaluation and Policy Analysis, 22*(2), 129-145.

Joerger, R. M. (2002). A comparison of the in-service education needs of two cohorts of beginning Minnesota agricultural education teachers. *Journal of Agricultural Education, 43*(3), 11-24.

Lindner, J. R., Murphy, T. H., & Briers, G. E. (2001). Handling nonresponse in social science research. *Journal of Agricultural Education, 42*(4), 43-53.

McCandless, D., & Sauer, A. (2010). Retention of construction teachers engaged in Missouri's secondary school system. *Journal of Career and Technical Education, 25*(2), 63-77.

Miller, L. E., & Smith, K. (1983). Handling non-response issues. *Journal of Extension, 21*(5), 45-50.

National Center for Education Information. (2003). *Alternative teacher certification: A state-by-state analysis 2003*. Retrieved February 1, 2012, from http://www.ncei.com/2003/executive_summary.htm

National Center for Education Information. (2010). *Alternative teacher certification: A state-by-state analysis 2010*. Retrieved January 1, 2012, from http://www.teach-now.org/intro.cfm

Parkay, F. W., Greenwood, G., Olejnik, S., & Proller, N. (1988). A study of the relationship among teacher efficacy, locus of control, and stress. *Journal of Research and Development in Education, 21*(4), 13-22.

Peake, J. B., Duncan, D. W., & Ricketts, J. C. (2007). Identifying technical content training needs of Georgia agriculture teachers. *Journal of Career and Technical Education, 23*(1), 44-54.

Puig, M. (2002). *Advantages and disadvantages of online research*. Retrieved May 8, 2009, from http://www.sysurvey.com/tips/goodbadugly.htm

Radhakrishna, R., & Doamekpor, P. (2008). Strategies for generalizing findings in survey research. *Journal of Extension, 46*(2).

Roberts, T. G., & Dyer, J. E. (2004a). Characteristics of effective agriculture teachers. *Journal of Agricultural Education, 45*(4), 82-95.

Rocca, S. J., & Washburn, S. G. (2005). *A comparison of teacher efficacy of traditionally and alternatively certified agriculture teachers.* Paper presented at the American Association for Agricultural Education Southern Region Conference, Little Rock, AK.

Ross, John, A. (1992). Teacher efficacy and the effects of coaching on student achievement**.** *Canadian Journal of Education***,** 17*(*1*), 5*1-65.

Shannon, D. M. (2002). Using electronic surveys: Advice from survey professionals. *Practical Assessment, Research and Evaluation, 8*(1).

Smylie, M. A. (1998). The enhancement function of staff development: organizational and psychological antecedents to individual teacher change. *American Educational Research Journal, 25*(1), 1-30.

Topp, N. W., & Pawloski, B. (2002). Online Data Collection. *Journal of Science Education and Technology, 11*(2).

Tschannen-Moran, M., Hoy, A. W., & Hoy, W. K. (1998). Teacher efficacy: Its meaning and measure. *Review of Educational Research, 68*(2), 202-248.

University of Texas at Austin. (2009). *Online surveys: Advantages of online surveys*. Retrieved April 5, 2009, from http://www.utexas.edu/learn/surveys/advantages.html

Wash, S., Lovedahl, B., & Paige, W. (2000). A comparison of traditionally and alternatively certified technology education teachers' professional development and receptivity to change. *Journal of Industrial Teacher Education, 37*(2), 31-46.

Wenglinsky, H. (2002). The link between teacher classroom practices and student academic performance. *Education Policy Analysis Archives, 10*.

Wise, A. E. (1994). Choosing between professionalism and amateurism. *The Educational Forum, 58*(2), 139-145.

Wright, K. B. (2005). Researching internet-based populations: Advantages and disadvantages of online survey research, online questionnaire authoring software packages, and web survey services. *Journal of Computer-Mediated Communication, 10*(3).