The Contribution of Selected Instructional Methods Toward Graduate Student Understanding of Crisis Communication

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Abstract

Providing quality instruction that meets students' learning needs is an issue facing teachers of agriculture in higher education. A considerable amount of research has been devoted to assessing the effectiveness of various instructional methods, but the research is inconclusive in identifying a singular method of instruction that works well with all individuals. The purpose of this study was to examine students' perceived value of instructional methods in contribution towards their understanding of and confidence in risk and crisis communication content and practices. This study also compared students (N = 30) from two semesters to determine if new instructional methods incorporating new technology (i.e., Second Life) impacted the knowledge, comprehension, and self-confidence of students. In this descriptive survey research, the data revealed that students did not identify one singular instructional method as being most beneficial and influential, but found a combination of instructional methods influenced their self-confidence. No significant differences were found in changes in students' content knowledge scores or end-of-course degree of confidence scores.

Keywords

Second Life, crisis communication, instructional methods, effectiveness

Introduction and Framework

"An issue facing teachers of agriculture in higher education is providing quality instruction that meets the learning needs of students" (Garton, Spain, Lamberson, & Spiers, 1999, p. 11). One desire of every educator is to use instructional methods that meet the needs and learning styles of their students. However, many teachers struggle with choosing the methods that would be most effective. Rollins and Scalon (1991) discussed that "the educational community has devoted considerable effort to assessing the effectiveness of various instructional methods and teaching strategies. Research on teaching effectiveness has been *inconclusive in identifying a singular method of instruction* [emphasis added] that works well with all individuals" (p. 48).

This challenge might be explained by the findings of Rosenshine and Furst (1971) who reviewed 50 studies to identify the variables associated with the relationship between teacher behavior and student achievement. The authors determined that eleven teacher behaviors were associated with student achievement. Of the eleven teacher behaviors, the first five variables were considered to

provide the greatest opportunity to influence student achievement (Garton, Miller, & Torres, 1992; Rosenshine & Furst, 1971). Those five teacher behaviors include: clarity, variability, enthusiasm, task-oriented and/or businesslike behavior, and student opportunity to learn criterion material.

One teacher behavior, variability (Garton et al., 1992; Rosenshine & Furst, 1971), should be taken into consideration when examining effective instructional methods. By incorporating variability, teachers focus on a variety of teaching methods and techniques instead of on a singular method of instruction. "Both high-inference and low-inference correlational studies have indicated that student achievement is positively related to classrooms where a variety of instructional procedures and materials is provided, and where the teacher varies the cognitive level of discourse and of student task" (Rosenshine & Furst, 1971, p. 45). Teachers should consider students' different learning styles and incorporate various (e.g., written, audio, and visual) instructional materials. Garton et al. (1992) also suggested that teachers should vary the cognition level of instruction, student questioning, and evaluation.

Theoretical Framework

The framework for this study was based on the classroom teaching model that was developed by Mitzel (1960) and expanded by the theoretical works of Dunkin and Biddle (1974). Mitzel (1960) originally proposed that teaching effectiveness criteria should incorporate a distinction between the products of learning and the process of learning. With this in mind, he proposed the criteria be classified as such: product criteria, process criteria, and presage criteria, which puts an emphasis on a "behavior conception of teacher effects on students" (p. 1483).

Dunkin and Biddle (1974) focused on what had been found about teaching in empirical research, taking "a long, hard, cold look at teaching from the viewpoint of those who have studied the actual behaviors of teachers and pupils" (p. 31). The authors suggested a model containing thirteen variables that were classified into four larger constructs following the terminology of Mitzel (1960): presage, context, process, and product. A simplified version of this model can be seen in Figure 1.

Presage variables include the characteristics of teachers that may be examined for their effects on the teaching process (Dunkin & Biddle, 1974), or variables that influence teachers and their teach-
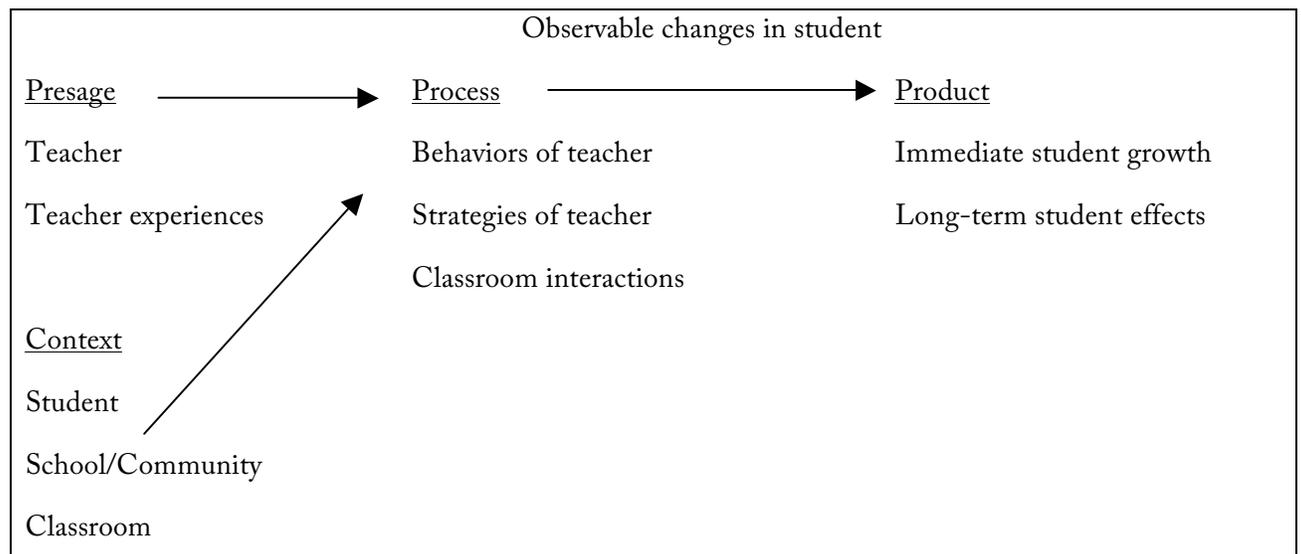

Figure 1. An illustration of the model for the study of classroom teaching. Adapted from *The Study of Study of Teaching* (p.38), by M.J. Dunkin & B.J. Biddle, 1974, New York: Holt, Rinehart, and Winston. Copyright 1974 by Cengage Learning. Printed with permission.

ing behavior (Cruickshank, 1990). Mitzel (1960) originally identified four presage variables, which include: teacher personality attributes, characteristics of teachers in training, teacher knowledge and achievement, and in-service teacher status characteristics. Dunkin and Biddle (1974) named three presage variables: teacher formative experiences, teacher-training experiences, and teacher properties. In the simplified version of this model, all of these variables are considered part of the factors associated with the teacher and their experiences.

"Context variables concern the conditions to which the teacher must adjust—characteristics of the environment about which teacher, school administrators, and teacher-educators can do very little" (Dunkin & Biddle, 1974, p. 41). The variables associated with context, as defined by Dunkin and Biddle (1974), include school and community contexts, classroom contexts, and students' formative experiences and student properties, which are considered part of the student factors.

Process variables are comprised of the activities of classroom teaching, including all of the observable behaviors of teachers and students (Dunkin & Biddle, 1974), or behaviors displayed in the classroom as teachers and students interact (Cruickshank, 1990). These variables incorporate "aspects of teacher and student behavior which are believed to be worthwhile in their own right" (Mitzel, 1960, p. 1483). According to Dunkin and Biddle (1974), the process variables are set within the classroom and include: teacher classroom behavior and student classroom behavior, which are shown interacting on the model. Within this construct is the variable "strategies of teachers." This variable is commonly under the singular control of the teacher and served as the primary focus of this study.

Completing the overview of the model, there are observable changes in the student from process to product. Product variables include the types of changes in student behavior that result from the process variables (Cruickshank, 1990). Mitzel (1960) defined product variables in terms of measurements of change in student behavior, such as student gains, student growth, or student changes. Dunkin and Biddle (1974) focused changes that come about in students as a result of their involvement in classroom activities with teachers and other students, incorporating the variables of immediate student growth and long-term student effects, which are similar to the variables in Figure 1.

The arrows that appear throughout the model each presume a causative relationship and serve as a source of hypotheses. For example, the formative experiences of the teacher (i.e., presage) tend to have an effect on classroom events in the form of the teacher behaviors and strategies (i.e., process) which lead to observable changes in the student behavior and in turn, immediate student growth and long-term student effects (i.e., product).

Conceptual Framework

Building on the process variable of teacher strategies, the literature included studies that examined potential instructional methods individually and in comparison with other methods. Schroeder (1993) examined the characteristics and learning preferences of post-secondary students in comparison to the mindsets and techniques maintained by university campuses. He concluded with a plea to fellow professors: "If we can expand the repertoire of learning activities open to us, perhaps we can greatly increase both our own satisfaction and our students' learning" (Schroeder, 1993, p. 26). When investigating effective methods and materials for teaching law to preservice teachers, Bruner and Bartlett (2008) found professors were using "a multiplicity of teaching methods that accommodate different learning styles" and concluded that "a variety of classroom activities—in the form of games, simulations, and role-playing—are important to make the learning real for students" (p. 43-44).

Bruner and Bartlett (2008) examined the aforementioned teaching methods in greater depth

highlighting the pros and cons of each method. They began with lecture, the most often used method of teaching. They noted that lecture is appropriate for conveying information because instructors can disseminate vast amounts of knowledge in short periods. However, two disadvantages of this method discussed by Bruner and Bartlett (2008) are that higher-order critical thinking may not be addressed without opportunity to practice the skills and transfer of knowledge for long-term retention is difficult for most learners without application. "Many believe that students learn when lecture is used in combination with several other forms of teaching" (Bruner & Bartlett, 2008, p. 39).

Class discussions, as discussed by Bruner and Bartlett (2008), represent dialogue among participants where the instructor leads and facilitates discussion. For good discussion, it is important to create atmospheres of trust and clarify points of confusion that arise. Methods involving case studies "require students to identify the issues, find and consider applicable information, analyze their findings and draw conclusions" (Burner & Bartlett, 2008, p. 42). Case study methods also enable students to connect the practice to theory and the experiential to theoretical, as well as, allow students to discuss and analyze cases in a relatively non-threatening supportive peer environment (Schroeder, 1993).

Simulations and role-playing, which are methods where students can apply and extend their learning, were also discussed by Bruner and Bartlett (2008). These methods can be motivating and build confidence in students' communication skills. However, not all adults are comfortable with these methods, and it is important to debrief and evaluate learning to help integrate theory and practice (Bruner & Bartlett, 2008). The final method discussed was the use of technology, which can enhance the learning process for students. Most technology can be used by students on their own time 24/7; however, this can create a false expectation that instructors will also be accessible 24/7 (Bruner & Bartlett, 2008). The use of technology is also usually associated with a need for increased technical skills which can be a challenge for teachers and students.

This study, part of a larger United States Department of Agriculture Challenge grant, utilized a combination of these last two methods, simulation and technology, to provide a unique educational opportunity for graduate students enrolled in a *Risk & Crisis Communications in Agriculture and Natural Resources* course at Texas Tech University. "The use of computer-based simulations for supporting classroom teaching has interested educators in many fields of study…because of the opportunities it provides for students to apply knowledge they have acquired in the class" (Shifflet & Brown, 2006, p. 377-378). Simulations for this course were created through the use of Second Life (SL). Second Life was created by Linden Labs, a San Francisco-based corporation defined by its creators as "an online society within a 3-D virtual world entirely built and owned by its residents, where they can explore, build, socialize, and participate in their own economy" (Atkinson, 2008, p. 16).

"While Second Life wasn't developed specifically with education in mind, its open-ended possibilities have caught the attention of post-secondary educators across a wide array of disciplines" (Bowers, Ragas, & Neely, 2009, p. 40). Over 100 colleges, universities and other learning institutions have established an environment with instructional activities in SL. While it is not the only virtual world available, SL is "presently the best venue for learning how to teach in virtual space" (Pence, 2007, p. 177).

Hewitt, Spencer, Mirliss, and Twal (2009) discussed that virtual worlds have shown promise for delivering immersive experiences that allows for discovery, critical thinking, and analytical skills to a wide variety of learners. Bowers, Ragas, and Neely (2009) argued that virtual worlds may also help improve traditional distance learning, which is often rich in content, but low in interaction among instructor and learners.

Virtual worlds can also provide a high degree of apparent realism while minimizing the actual risk involved. SL allows for some manipulation of space and time, which "offers a new way to approach those parts of the world that were difficult to imagine,…[such as] visiting glaciers, or hot springs, or volcanoes, or a comet in outer space without leaving the classroom" (Pence, 2007, p. 174). "While virtual worlds are not new, development of teaching and learning within those environments may provide innovative opportunities to engage learners in highly social and interactive online experiences" (Atkinson, 2008, p. 17).

Purpose and Objectives

This purpose of this study was to examine students' perceived value of the instructional methods contribution towards their understanding of and confidence in risk and crisis communication-related content and practices. The following research objectives were used to address this purpose:

1. Determine students' content knowledge growth throughout the course using data from pre- and post-assessments for each semester.
2. Determine students' perceived degree of confidence for completing tasks associated with risk and crisis communication for each semester.
3. Determine students' perceived benefits and influence of different instructional methods used for each semester.
4. Compare student data from the fall 2009 and fall 2010 semesters to determine the impact of new instructional methods (i.e., Second Life crisis simulation).

Methods and Procedures

Population and Environment

The population for this quantitative study was graduate students enrolled in *Risk & Crisis Communications in Agriculture and Natural Resources* at Texas Tech University during the fall 2009 and fall 2010 semesters (*N*=30). This is a graduate-level course designed for master's students but open to doctoral students. This course was designed for both resident and asynchronous distance student enrollment. The course is taught annually every fall during a three-hour, once-a-week period for 15 weeks.

During the course, students were taught using a variety of instructional methods selected by the course instructor. Methods used in the fall 2009 included lecture/discussion, weekly personal journal entries, online case study discussions, in-class role play, and team-developed case studies of a previous agriculture-related crisis event. Methods used in the fall 2010 were slightly modified to incorporate new technology and thus included lecture/discussion, weekly journal entries, online case study discussions, a Second Life crisis simulation, and individually developed crisis management plans.

Instrumentation

Pre- and post-assessment instruments were designed based on risk and crisis competencies and the objectives of the course to determine the students' content knowledge before and after the course. Pre-assessments were administered at the beginning of the course each semester to measure students' prior knowledge of the content and related practices. Post-assessments were administered at the end of each unit to determine changes in student understanding. The difference between the pre- and post-assessments scores were used to determine the students' change in understanding during the course each semester. In terms of threats to internal validity, testing effect could be seen as a weak-

ness. However, this was controlled by large intervals between tests, which make the pretesting effects less threatening (Ary, Jacobs, Razavieh, & Sorensen, 2006).

The study also utilized a 76-item end-of-term questionnaire to examine the students' perceived value of instructional methods in contributing towards their understanding of and degree of confidence in being able to perform each of crisis management competencies. Items were measured using a degree of confidence scale and Likert-type scales. The degree of confidence scale ranged from zero to ten where 0 = *Cannot do at all* to 10 = *Highly certain that I can do*.

For each of the instructional methods, twelve statements were provided to determine the perceived value of instructional methods. These statements were (a) Made the content more realistic, (b) Made the class interactive, (c) Helped the class to be fun, (d) Aroused my interest in the course content, (e) Was effective in increasing my knowledge, (f) Kept me current with related risk and crisis communication activity, (g) Improved my discussion and collaboration skills, (h) Improved my teamwork & cooperation with class participants, (i) Improved communication skills about risk and crises, (j) Improved my decision making and critical thinking skills, (k) Improved my problem solving skills, and (l) Increased my self-confidence as a potential crisis communications professional. The students were asked to respond to each of these statements for each of the instructional methods used by indicating their level of agreement using a Likert-type scale of one to seven where 1 = Strongly Disagree (SD), 2 = Disagree (D), 3 = Slightly Disagree (SID), 4 = Neither Agree nor Disagree (N), 5 = Slightly Agree (SIA), 6 = Agree (A), 7 = Strongly Agree (SA). The students were also provided a Not Applicable option (N/A, scored as a 0) if they did not feel the statement was relevant to their learning. The instrument was slightly modified from fall 2009 to fall 2010 to reflect the changes in instructional methods made by the instructor, which included adding the Second Life simulations in place of the in-class role play and replacing the team-developed case study with the individually-developed crisis management plan.

A panel of faculty and agriculture industry experts reviewed both instruments for face and content validity. Cronbach's alpha coefficients were used to measure internal consistency in order to establish reliability. The reliability coefficient for the scales used in these instruments produced Cronbach's alpha scores ranging from .869–.987.

Data Collection and Analysis

The pre- and post-assessment instruments were administered using the Blackboard course management system located at the instructor's university. The 76-item instructional methods questionnaire was administered to resident students in paper format and emailed to distance students as a Word document that the students completed and returned to the researcher, which were then printed and added to the others without recognition of the participants' names.

Descriptive statistics were used to analyze the numerical data for the first three research objectives. Class means and standard deviations were calculated for the student assessments. The difference between the pre- and post-assessment scores was calculated to determine mean changes in students' content knowledge scores. Students' perceived benefits of each instructional method were averaged and summed to determine which instructional method students thought was the most beneficial. For each instructional method, the summated score could range from 0–84. A t-test score was calculated to determine if there was a significant difference between the mean changes in students' content knowledge scores.

Results and Findings

The first objective addressed by this study was to determine students' content knowledge growth throughout the course using data from pre- and post-assessments for each semester. As displayed in Table 1, the mean score for students from the fall 2009 were pre-assessment 67.38% (*SD* = 9.51) and post-assessment 90.24% (*SD* = 7.20) with a mean change in students' content knowledge scores of 22.30% (*SD* = 8.90). The mean scores for students from the fall 2010 were pre-assessment 70.28% (*SD* = 6.10) and post-assessment 88.94% (*SD* = 8.68) with a mean change in students' content knowledge scores of 18.66% (*SD* = 9.55).

Table 1
Class Means on Assessments & Mean Change in Students' Content Knowledge (N = 30)

	Pre-assessment		Post-assessment		Change in
Semester	M	SD	M	SD	scores
Fall 2009 (n = 17)	67.38	9.51	90.24	7.20	22.30
Fall 2010 (n = 13)	70.28	6.10	88.94	8.68	18.66

Objective two sought to determine students' perceived degree of confidence for completing tasks associated with risk and crisis communication for each semester. Students were also asked to determine which instructional methods had the greatest influence on their self-confidence as a future crisis communicator. Of the fall 2009 students, 47.1% (*n* = 8) perceived team-developed case studies as having the greatest influence. Among the fall 2010 students, there was a little more variability as to what they identified as having the greatest influence: 38.5% (*n* = 5) identified the Second Life crisis simulations and 38.5% (*n* = 5) identified the crisis management plans. Students were also asked to rate their degree of confidence in completing a variety of risk and crisis communication-related tasks. The mean score of the students' confidence to complete those items in fall 2009 was 7.39 out of 10 (*SD* = 1.23) and in fall 2010 was 7.51 out of 10 (*SD* = 1.06).

The third objective addressed by this study was to determine students' perceived benefits and influence of different instructional methods used for each semester. As displayed in Table 2, students' perceived benefits of each instructional method were averaged and summed to determine which instructional method students thought was the most beneficial. For fall 2009, students found team-developed case studies (Σ = 69.77) and lecture/discussion (Σ = 69.52) to be most beneficial instructional methods. For fall 2010, students found four instructional methods to be almost equally beneficial: online case discussions (Σ = 70.93), lecture/discussion (Σ = 69.69), Second Life crisis simulation (Σ = 67.38), and crisis management plans (Σ = 66.32).

Students were also asked to mark which instructional method they perceived as having the greatest influence on their abilities. The results were as follows: 64.7% (*n* = 11) of students from fall 2009 perceived lecture/discussion as having the greatest influence on their ability to understand and discuss crisis management and risk communication; whereas, students from fall 2010 perceived both lecture/discussion (38.5%, *n* = 5) and crisis management plans (30.5%, *n* = 4) as having the greatest influence on their ability to understand discuss crisis management and risk communication. When students were asked which method had the greatest influence on their ability to increase their critical

thinking skills as related to course content: 41.2% (*n* = 7) of students from fall 2009 perceived team-developed case studies as having the greatest influence; whereas, students from fall 2010 perceived both crisis management plans (38.5%, *n* = 5) and the Second Life crisis simulation (30.8%, *n* = 4) as having the greatest influence.

Table 2
Summed Means of Students' Perceived Benefits & Influence of Instructional Methods (N = 30)

	Summed Means	
Instructional Method	Fall 2009 (n = 17)	Fall 2010 (n = 13)
Lecture/discussion	69.52	69.69
Weekly personal journal entry	56.17	49.52
Online case study discussion	62.55	70.93
In-class role play	60.23	N/A
Second Life crisis simulation	N/A	67.38
Team-developed case study	69.77	N/A
Crisis management plan	N/A	66.32

Note. Summated scores were calculated using the responses from the 12 statements associated w~~ith~~ each instructional method. Individual scores and summed means results could range from 0–84~~.~~

Objective four sought to compare student data from the fall 2009 and fall 2010 semesters to determine the impact of new instructional methods (i.e., Second Life crisis simulation). To compare the mean change in students' content knowledge scores for each semester, as displayed in Table 3, the mean differences between pre- and post-assessment scores was calculated. As reported in Table 1, the mean change in students' content knowledge scores for fall 2009 was 22.30% (*SD* = 8.90) and the mean change in students' content knowledge scores for fall 2010 was 18.66% (*SD* = 9.55). The alpha level for this research was set at .05 *a priori*. A t-test indicated there was no statistical significant difference between the mean changes in students' content knowledge scores from each semester with a test value of 1.08 (*p* = .29).

A comparison of students' end-of-course mean confidence level scores is displayed in Table 4. As reported above, the mean confidence level score was 7.39 (*SD* = 1.23) for fall 2009 students and 7.51 (*SD* = 1.06) for fall 2010 students. The alpha level for this research was set at .05 *a priori*. A

Table 3
Comparison of Mean Change in Students' Content Knowledge Scores (*N* = 30)

Semester	*M*	*SD*	*t*	*p*
Fall 2009 (*n* = 14)	22.30	8.90	1.08	.29
Fall 2010 (*n* = 16)	18.66	9.55		

Table 4
Comparison of Students' End-of-Course Mean Confidence Level Scores (*N* = 29)

Semester	*M*	*SD*	*t*	*p*
Fall 2009 (*n* = 16)	7.39	1.23	-.29	.77
Fall 2010 (*n* = 13)	7.51	1.06		

t-test indicated there was no statistical significant difference between the mean changes in students' content knowledge scores from one semester to the other with a test value of -.29 (*p* = .77).

Discussion and Conclusions

Upon examination of pre- and post-assessment scores for each semester, it was found that students from both semesters experienced a positive change in their mean content knowledge score, which consisted of a 22.30% mean change in fall 2009 and an 18.66% mean change in fall 2010. However, upon further investigation of the change in students' content knowledge scores and the use of an independent t-test, there was no significant difference (*p* = .29) found between the fall 2009 students and fall 2010 students.

It was also found that upon completion of the course, students' perceived their degree of confidence to complete a variety of risk and crisis communication-related tasks on average between "moderately certain that I can do" and "highly certain I can do" with the fall 2009 students rating themselves an average 7.39 out of 10 and the fall 2010 students rating themselves an average 7.51 out of 10. Although many students perceived the end-of-course projects (i.e., team-developed case studies in fall 2009 and crisis management plans in fall 2010) and the Second Life crisis simulation (only in fall 2010) as having the greatest influence on their self-confidence as a future crisis communicator, all five methods were identified by some students as having the greatest influence on their self-confidence as a future crisis communicator.

Within this course, students perceived a variety of instructional methods as being beneficial to their learning. Students from both semesters identified lecture/discussion and the end-of-course projects (i.e. team-developed case studies in fall 2009 and crisis management plans in fall 2010) as beneficial and influential with fall 2010 students also identifying online case discussions and Second Life crisis simulation as highly beneficial. This could possibly be explained by the findings of Bruner and Bartlett (2008), who concluded "Good practice encourages interaction…Interactions in the form of lecture and class discussions can create interest and motivation and so build self-efficacy in students. Lecture and discussions can lend themselves to didactic and constructivist instruction" (p. 43).

Students identifying methods that had the greatest influence on their abilities to understand and discuss crisis management responded by naming lecture/discussion in both semesters and the end-of course project in fall 2010. Finally, students identifying methods that had the greatest influence on increasing their critical thinking skills as related to course content responded by naming end-of-course projects (i.e., team-developed case studies in fall 2009 and crisis management plans in fall 2010) and the Second Life crisis simulation (only in fall 2010). These findings support the discussion presented by Osborne and Hamzah (1989) who while investigating teaching methods stated "Generally accepted components of problem solving teaching are being used by agriculture teachers.

However, lecture-discussion is also often used by teachers to present problem solutions or answers to students" (p. 35).

Overall, the results of this study revealed that students did not identify one singular instructional method as being most beneficial and influential, but found a combination of instructional methods influenced their self-confidence. This is similar to the research of Clayton, Blumberg, and Auld (2010) who concluded "learners want engaging learning environments that promote 'direct inter-action with professor(s) and students,' 'spontaneity,' 'immediate feedback,' and 'relationships with faculty and students,'" which are achieved in the classroom settings through a variety of instructional method (p. 362).

This study raised a number of questions needing further investigation. First, this study should be replicated with a larger population to increase the confidence and subsequent generalizability of findings. Second, this study should be replicated in different settings, at different universities, and with various subjects to further determine if type of instruction effects student success. Third, as with any study of methods, student factors such as internal motivation, interest in topics, prior ex-periences with instructional methods, and personal learning styles should also be considered to fully understand how these factors influence students' knowledge acquisition. Finally, further study is encouraged to better understand the connection between instructional methods and students' degree of confidence and additional studies should consider looking directly at students' perception of the benefits and influence of specific combinations of instructional methods.

While this study provided support for Dunkin and Biddle's (1974) model for the study of class-room teaching by highlighting the observable changes in students from process to product, a key component that should be considered is the use of a variety and/or combination of instructional methods in creating those changes.

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