Elementary Teachers' Attitudes and Stages of Concern About an Agricultural Literacy Curriculum

The purpose of this study was to describe elementary teachers' attitudes and perceptions toward agriculture and its use as a context for teaching across the grade level content area standards. Further, this study sought to probe more deeply the stages of concern possessed by kindergarten through eighth grade teachers with respect to their use of the California Curriculum Guidelines for Agricultural Literacy Awareness (CCGALA), which is aligned to content area state standards. Results indicated that elementary teachers generally hold favorable attitudes toward agriculture as a viable integrating tool to teach across disciplines. Elementary teachers who reported using CCGALA were unique in their highest stage of concern, but all of the sample members recorded first or second highest stages of concern at the informational stage, thereby indicating a desire to continue gathering information related to the educational innovation. Users of CCGALA recorded the highest relative intensity in the Informational and Personal stages of concern and lowest intensities in the Refocusing and Consequence stages. Non-users recorded the highest relative intensities in the Awareness and Informational stages, with lowest relative intensities in the Refocusing, Consequence, and Collaboration stages. Recommendations for focused delivery of professional development activities were made.

Introduction

Beginning teachers are faced with many responsibilities and challenges. Not only do they face the pressures of standards-based educational accountability, but they also have specific concerns unique to beginning educational professionals. The Moir Model (Joerger, 2002) conceptualized specific stages through which a teacher progresses during the first year of teaching. From anticipation to survival to disillusionment, new teachers experience a seemingly downward spiral during the first few months of teaching. After a period of rejuvenation, teachers then move through a reflection period until they cycle back in anticipation of the next year. According to Darling-Hammond (2002), there are many contributors to this period of uncertainty, all of which affect teacher retention rates. Alarmingly, the average teacher attrition rates during the first three years can range from 30% to 60% (Darling-Hammond, 2002).

Educational accountability demands are also factors contributing to the pressures placed on teachers at all stages of their careers, but these demands may be particularly concerning to a new teacher seeking tenure. Student performance on standardized achievement tests often determines levels of school funding, as well as whether or not administrators retain teachers. In addition, state performance standards often guide teachers in selecting curricula that best prepares students for success on standards-based achievement tests. To that end, beginning teachers are concerned with both *how* and *what* to teach in order to meet standards. As such, teachers assume positions as gatekeepers in selecting and delivering subject matter to students (Barab & Luehmann, 2003).

In an age of educational accountability, school systems often struggle to meet performance expectations, and to find the ever-elusive "one size fits all" curricular approach to teaching and learning. With *No Child Left Behind* as the educational norm *du jour,* state departments of education are often busy ensuring that (1) students are learning from only highly qualified teachers, (2) math and science education is strengthened, and (3) student achievement gaps are closed (Educational Research Service, 2001). All of these demands must be met for schools to successfully compete for reward money, or risk sanctions if expectations are not met.

To assist in meeting these expectations, teachers are encouraged to utilize curriculum resources that allow students to *construct* knowledge (Dewey, 1938). Constructivists view learning as a building process. Rather than presenting abstract concepts for students to ponder and process, constructivism places the learner as the active erector of knowledge and understanding via interaction, discovery, and exploration (Santrock, 2001). Constructivist pioneer Lev Vygotsky's analysis of practical intelligence in children and animals lends credence to learning in a context such as agriculture (1978).

Many agricultural education students, parents, agriculture teachers, and industry leaders believe that agricultural education provides a context rich environment that "engages students and fosters interest to promote further education" (Dailey, Conroy, & Shelley-Tolbert, 2001, p. 18). In further support of agricultural education as an integrating context, Balschweid and Thompson noted that "integration of academic principles into agricultural and natural resources can provide a context necessary for students in the 21st century to understand the world they live in" (2000, p. 36). As such, agricultural education leaders and supporters have begun to explore potential success of this formula at the elementary and middle school levels.

Since the 1988 report from the National Research Council (NRC) calling for student education in and about agriculture at all levels of education (Committee on Agricultural Education in Secondary Schools), numerous agriculturally based curriculum materials have been produced and distributed to elementary teachers. Curriculum packages developed from projects such as Ag in the Classroom; Project WET (2005); Project WILD (2005); Project Food, Land, and People (1998); and Project Learning Tree (2002) have assisted teachers in integrating agricultural concepts and providing contextual experiences for students. Therefore, the challenge facing teachers is *not* a lack of available curriculum resources, but rather *how* to mold these components into a deliverable, student-centered package.

Historically, agricultural literacy studies in the agricultural education genre have focused on assessing teacher and student knowledge and attitudes (Connors & Elliot, 1995; Knobloch & Martin, 2000; Leising, Pense, & Igo, 2001; Meischen & Trexler, 2003), teacher preparation and professional development (Elliot, 1999; Miller & Gliem, 1994; Portillo & Leising, 2003; Terry, Herring, & Larke, 1992; Wilhelm, Terry, & Weeks, 1999), and identifying barriers to curriculum implementation (Balschweid & Thompson, 2002; Conroy, 1999).

Theoretical Framework

The theoretical framework for this study lies in Hall and Hord's (2001) *Concerns Based Adoption Model* (CBAM). Originally developed in 1973, the model is primarily concerned with describing, measuring, and explaining the process of change experienced by teachers attempting to implement new curriculum materials and instructional practices (Anderson, 1997). Moreover, CBAM allows change facilitators – those who provide assistance in the adoption process – to probe the innovation users and non-users using three key diagnostic tools. Those tools relate to user Stages of Concern, Levels of Use, and Innovation Configurations as measures to match resources with the needs of the users (Hall & Hord, 2001). Although studies may be carried out using all of the diagnostic tools together, they may also be used individually or in various combinations (Anderson, 1997).

Figure 1 conceptualizes how CBAM allows change facilitators to probe the innovation users and non-users by utilizing three key diagnostic tools related to Stages of Concern, Levels of Use, and Innovation Configurations as measures to match resources with the needs of the users (Hall & Hord, 2001). The Concerns Based Adoption Model (Hall & Hord, 2001) is primarily concerned with describing, measuring, and explaining the process of change experienced by teachers attempting to implement new curriculum materials and instructional practices (Anderson, 1997).

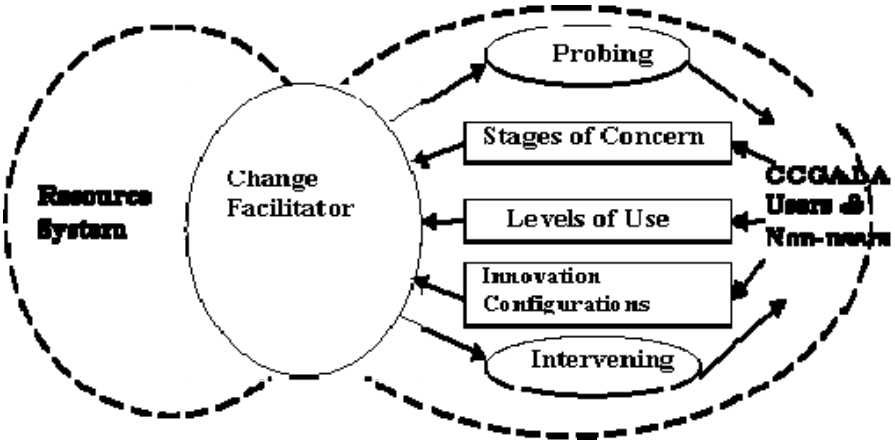

Figure 1. Concerns Based Adoption Model (Hall & Hord, 2001)

Hall and Hord (1987) characterized principals, teachers, and other district personnel in an educational system, as *change facilitators* serving as key factors in the success or failure of an educational innovation. Specifically, these individuals are those who, "for brief or extended periods, assist various individuals and groups in developing the competence and confidence needed to use a particular innovation" (p. 11). Bearing this definition in mind, a *change facilitator* might also be a developer or trainer involved in introducing a particular educational innovation. In the CBAM model, however, the change facilitator is most effective when he or she utilizes the three dimensions of the CBAM model to probe individuals and groups in an effort to understand and guide their experiences during the adoption process.

Hall and Hord (2001) overtly point to the inequality of investment in people, time, and resources as they pertain to development and implementation of educational innovations. Inasmuch as policy makers and curriculum developers are eager to get an innovation into the hands of teachers, most resources are heavily allocated to development (Marsh, 1987). Conversely, disproportionately fewer resources and care are provided to monitoring the implementation of the innovation, often relegating the innovation to failure status when evaluations are performed and teachers report non-use of the innovation. While other adoption models treat change as an event, CBAM presents change as a process (Hall & Hord, 2001). According to Loucks-Horsley (1996), without ongoing resource and facilitator support, sustained use of the innovation is difficult to achieve.

The *Stages of Concern* component of CBAM relates directly to how teachers perceive the educational innovation they are asked to implement (Willis, 1992). CBAM's seven stages of concern include "awareness," "informational," "personal," "management," "consequence," "collaboration," and "refocusing." These stages span the areas of little concern, knowledge, or

involvement in an innovation, to a teacher's focus on further exploration of more universal benefits or alternative forms of the innovation (Hall & Hord, 2001). Contrary to other, more linear views of change concerns, CBAM recognizes that while a person's focus of concern may shift from one stage to another, it does not indicate that the previous stage of concern is alleviated (Willis, 1992).

The *Levels of Use* component of the model corresponds to teachers' behavior in relation to the educational innovation in question (Willis, 1992). Hall and Hord (2001) demarcate eight levels into which a person can be classified in terms of the extent the innovation is used: *nonuse* (0), *orientation* (I), *preparation* (II), *mechanical use* (III), *routine* (IV A), *refinement* (IV B), *integration* (V), and *renewal* (VI). Essentially, these levels are the sequence through which a user passes during the change process as he or she gains confidence and skill in using the educational innovation (Newhouse, 2001). Equally, a person may remain invariant during the change process (2001). McKinnon and Nolan (1989) suggested that 75% or more of the individuals involved in an educational innovation adoption must operate at Level IVA or higher to sustain innovation adoption and use.

There are psychological factors to consider when an educational innovation is introduced to teachers, specifically, the effects of learning to use the innovation (Hope, 1997). As such, assessing widespread adoption of the innovation is not something that occurs instantaneously. Rather, an individual's progression through change may take 2-4 years to confidently and skillfully use the innovation as intended (Mitchell, 1988). Additionally, teachers face the expectation of having to implement innovations with limited usage instruction, and without a clear understanding of the innovation's purpose or their role in what they are asked to do (Hall & Hord, 2001). As a result, teachers motivated to move from an *awareness* stage of concern and *orientation* level of use may return to the classroom and implement the innovation in a manner not in line with what the developers of the change originally envisioned (Hall & Hord, 2001).

Only a few studies in agricultural education have used CBAM as a conceptual model for the study of curriculum innovations. Petrea (1994) reported that agriculture teachers in Illinois expressed intense concerns about the relevance of an agriscience curriculum for students and how the innovation would affect student outcomes (impact concerns). Teachers' second highest level of concern dealt with the demands of the innovation and the instructor's role with the innovation (personal concerns). Ohene-Adjei (1995) reported similar concerns from Illinois teachers using new agriscience curricula, indicating that those concerns may have long-term implications for teacher inservice.

In studies completed using the CBAM model outside the field of agriculture, Ward, West, and Isaak (2002) reported that both mentors and protégés demonstrated decreased concerns at the *awareness* and *management* stages, as well as increased concerns related to impact on students and collaboration with others. McKinnon and Nolan (1989) reported that participant concerns shifted from *personal* to *information* concerns in a computer hardware/software curriculum innovation.

In a study of science teachers' concerns in using a constructivist approach to teaching science using real-life experiences as the context for teaching, Dass (1997) identified concerns ranging from initiation to the terms "constructivist" and "module" (*awareness* and *informational* stages) to concerns about the reward structure matching the level of work required (*personal*) to deviating from the standard sequence of the grade level team approach (*management*). Further, some teachers moved into the *consequence* and *collaboration* stages, specifically noting the tense

feelings of the innovation's effects on student SAT scores. Dass provided critical research analyses by reinforcing the notion that "fundamental reform at the classroom level is intimately connected to reform of professional development at broader levels" (1997, p. 19).

Kember and Mezger (1990) referred to the instructional designer as a change *agent*. As defined by Rogers (2003), a change agent serves as a support mechanism in hopes that a person will subsequently adopt a given innovation. Data from Kember and Mezger's study indicated that instructional designers played a significant and ever-changing role as each writer moved through his or her stages of concern.

Educational innovation developers frequently place significant emphasis and resources on the *development* of an educational innovation (Hall & Hord, 2001). Conversely, resources for introduction, implementation, and sustained adoption of such innovations are disproportionately out of balance. As such, teachers frequently find themselves struggling on their own to understand and use newly introduced educational innovations. Evaluative measures, when performed, serve simply to assess *if* a teacher is using an innovation. If data demonstrate non-use, the innovation is deemed a failure. If data indicate teacher use, the innovation is reasoned a success.

The problem with traditional educational evaluative measures is that teacher concerns, levels of innovation use, and innovation configurations employed by the teacher are rarely considered in agricultural education curricular evaluation assessments. This leaves a gap in the body of knowledge as to the depth and breadth of true, sustained use of educational programming.

Purpose and Objectives

The purpose of this study was to explore the experiences of elementary teachers in their adoption or rejection of the *California Curriculum Guidelines for Agricultural Literacy Awareness* (Bitto, Casey, & Casey, 2005). The three objectives that guided this study were to:

1) Describe the demographic and psychographic characteristics of the target population (gender, age, teaching experience, school type and location, agricultural background, and use of curriculum guidelines).
2) Describe elementary teachers' attitudes and perceptions of agriculture as a context for teaching elementary students.
3) Describe elementary teachers' current Stages of Concern with respect to implementing an agricultural literacy curriculum.

Methods and Procedures

The target population for this study was elementary teachers who participated in a five-week preservice course, *Organizing and Teaching K-6 Standards and Awareness in Agricultural Literacy*, introducing instructional activities for integrating agriculture into elementary curriculum at California Polytechnic University – San Luis Obispo (N=48). Twenty-five students were enrolled in the course in 2002, with an additional 23 students enrolled in the summer of 2003. The students were contacted during the spring of 2005 and asked to complete a mailed questionnaire. The researcher could not obtain contact information for six of the original course completers; therefore, the accessible population was reduced to 42 members. Based on the self-reported number of days using agriculture as a teaching context, a purposive sample of participants (n=10)

was selected for follow-up study regarding their stages of concern with the agricultural literacy curriculum. The sample consisted of four participants who reported using the *California Curriculum Guidelines for Agricultural Literacy Awareness (CCGALA)* aligned with state standards the greatest number of days, and six who did not use the curriculum guidelines package at all.

All members of the population were mailed a researcher-designed questionnaire to solicit attitudes toward, and perceptions of, agriculture as a context for teaching elementary students. Descriptive statistics were used to analyze this preliminary survey data. The researcher field-tested a similar questionnaire with 130 elementary teachers from another state to assess attitudes toward agriculture as a context for teaching. Minor changes were made pertaining to the appropriate curriculum innovation name references; otherwise, the instrument was administered intact. Content and face validity were established through use of a panel of experts in agricultural literacy curriculum development. The initial instrument yielded a Cronbach's alpha reliability rating of .87 for the construct "Attitudes Toward Agriculture as a Context for Teaching Elementary Students" and .70 for the construct "Attitudes Toward Agriculture."

From the accessible population, 36 of the initial instruments were returned for an 85.7% response rate. Lindner, Murphy, and Briers (2001) concluded that non-response error control measures are not necessary for studies that yield 85% or greater response rates. All of the returned instruments were deemed usable for assessing the demographic and psychographic characteristics of the target population.

The Stages of Concern Questionnaire (SoCQ) was comprised of 35 questions related to teachers' perceptions about an educational innovation. This study modified the questions to fit elementary teachers' use of agriculture as a context for teaching, with specific reference to the comprehensive agricultural literacy curriculum guidelines package. The theoretical test/retest reliability ratings for the Stages of Concern Questionnaire range from .65 to .86 and internal consistency alpha-coefficients ranged from .64 to .83 (Hall & Hord, 2001). Hall and Hord's *SoCQ Quick Scoring Device* was used to assess participants' current stage of concern relative to *CCGALA*. Similar to Hope (1997), this study used non-parametric, descriptive statistics (percentages and frequencies), with respect to teachers' first and second highest stage scores, as the simplest means to interpret overall teacher stage of concern.

Results

Objective 1: Describe the demographic and psychographic characteristics of the target population

Although the sample in this study was purposively selected from the target population, analyses indicated that the demographic and psychographic characteristics of the sample mirrored the target population. Gender, average age, and teaching experience demographics of the purposively selected sample parallel those of the target population (see Table 1). The population and sample characteristics were nearly identical in terms of gender (μ=88.9% female, X=90% female), age (μ=25 years, X=25 years), and teaching experience (μ=1.3 years, X=1.2 years), indicating a purposive sample very closely resembling the target population.

Table 1

Summary Means of Sample and Target Population Demographic Characteristics

Characteristic	*X*	*μ*
Gender	90% female	88.9% female
Age	25 years	25 years
Teaching experience	1.2 years	1.3 years
School type	90% public	90.3% public
School location	60% suburban	51.6% suburban

Female respondents comprised 88.9% (n=32) of returned instruments. The mean age of respondents was 25 years old. Respondents ranged in age from 22 to 53 years old. Nearly 70% of respondents reported being either 23 (n=12) or 24 (n=11) years old. Of those respondents who indicated they were currently teaching (n=31), the mean number of years of teaching experience reported was 1.3 years. Notably, population characteristics indicated that not all of the respondents currently held teaching positions, but that did not preclude their participation in the initial stage of the study to gather attitudinal data related to teaching elementary students using agriculture as an integrating context (see Table 2).

Table 2

Participants Use of California Curriculum Guidelines for Agricultural Literacy Awareness (n=36)

Statement	*f*	*%*
Yes, I am teaching agriculture using the agricultural literacy curriculum package	8	22.2
No, I do not use the agricultural literacy curriculum package, but I infuse agriculture in other ways	9	25.0
No, I am not teaching any agriculture in my classroom	14	38.9
I am not currently teaching	5	13.9

Whereas 14 respondents (38.9%) reported not teaching any agricultural concepts in their elementary classes, 17 (47.2%) indicated they were teaching agricultural concepts. This teaching was accomplished either through use of the comprehensive agricultural literacy curriculum guidelines package or was infused via other preparation means. Of the 31 respondents who were currently teaching, 90.3% (*n*=28) reported teaching in a public school setting. Two of the remaining three respondents (5.6%) reported teaching in a private school setting, while the remaining participant taught at a charter school.

With respect to the geographic location in which each respondent was teaching, 51.6% reported teaching in a suburban area (*n*=16), and another 35.5% specified teaching in a rural area (*n*=11). Only five respondents reported teaching in an urban setting.

The initial instrument asked population respondents to indicate previous agricultural experiences. Multiple selections were appropriate as statements related to production agricultural experiences and collegiate agricultural coursework taken (see Table 3).

Only 27.8% of respondents (*n*=10) indicated any previous experience related to production agriculture; involvement in a youth agricultural organization, such as 4-H or FFA; or a paid agriculturally-related work experience. Although more than 80% of respondents (*n*=29) selected "completed some agricultural coursework in college," 20 respondents anecdotally noted on the

instrument that the only agriculturally related coursework completed was *Organizing and Teaching K-6 Standards and Awareness in Agricultural Literacy*. This is the course from which this study's population was comprised.

Table 3

Previous Agricultural Experience of Participants

Previous agricultural experience	*f*
None	4
Raised in a rural/agricultural family	9
Participated in production agriculture	3
Participated in youth agricultural/FFA/4-H experience	4
Participated in paid work experience in agriculture	3
Majored in agriculture in college	1
Completed some agricultural coursework in college	29[a]

[a]Of those who indicated completing some agricultural coursework in college, 20 indicated the only agricultural class completed was *Organizing and Teaching K-6 Standards and Awareness in Agricultural Literacy*.

Objective 2: Describe elementary teachers' attitudes and perceptions of agriculture as a context for teaching elementary students.

Attitude toward agriculture scores were determined by summing the individual values for the seven items that encompassed the agricultural attitudes construct of the initial population instrument (see Figure 2). Data were collected from 36 individuals (85.7%) within the population. Scores ranged from 18 to 30, with a mean score of 23.92 (*SD* = 2.53). Participant scores of attitude toward using agriculture as a context for teaching content grade level standards at the elementary level were calculated by summing the individual scores across the 21 items comprising the construct (see Figure 3). Valid data were collected from 36 respondents with scores ranging from 62 to 96. The mean score was 82.67 (*SD*=7.89).

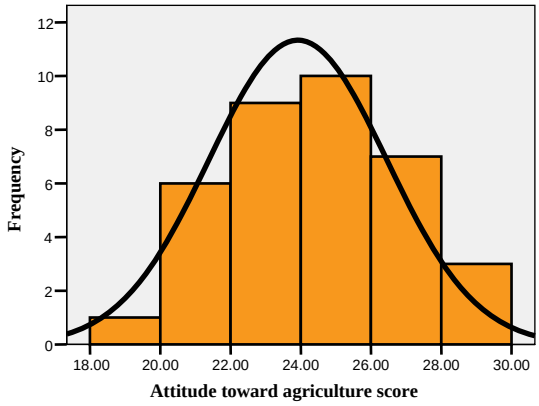

Figure 2. Distribution of participant attitude toward agriculture scores

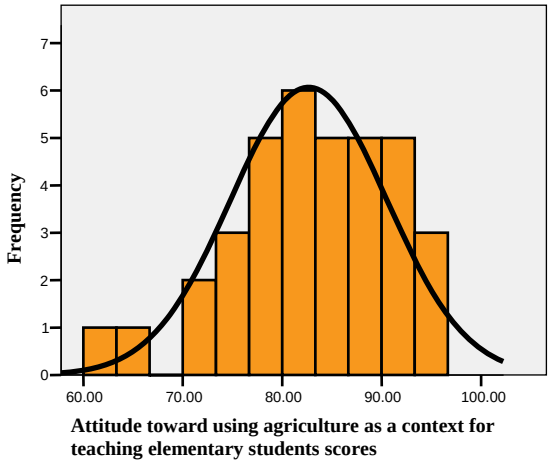

Figure 3. Distribution of participant attitudes toward agriculture as a context for teaching elementary students scores

Objective 3: Describe elementary teachers' current Stages of Concern with respect to implementing an agricultural literacy curriculum

Subsequent to the selection of the purposive sample for interviews and further analyses of teacher concerns related to the adoption and sustained use of the new curriculum, each interviewee was asked to complete a Stages of Concern Questionnaire. Individual peak Stages of Concern were identified for each participant in the sample. Figures 4 and 5 illustrate the relative intensity of the participants for each respective Stage of Concern. According to Hall, George, and Rutherford (1998), the greater the score in a Stage of Concern, the more intense the concerns are at that stage.

Figure 4 illustrates the mean relative intensity of participant Stages of Concern for users of the curriculum innovation as a context for teaching across the elementary grade level content standards. The highest stage of concern, with a mean relative intensity score of 76.7 was *Informational*. The second highest Stage of Concern was *Personal*, with a mean of 72.0. The lowest relative intensity of participant Stages of Concern for users were *Refocusing* (*m*=41.5) and *Consequence* (*m*=41.7).

Figure 5 illustrates the mean relative intensity of participant Stages of Concern for non-users of the curriculum innovation as a context for teaching across the elementary grade level content standards. The highest stage of concern, with a mean relative intensity score of 89.3 was *Awareness*. The second highest Stage of Concern was *Informational*, with a mean of 76.3. The lowest relative intensities of the Stages of Concern were *Refocusing* (*m*=25.0), *Consequence* (*m*=27.2), and *Collaboration* (*m*=27.7).

Each reported curriculum user in the sample had a unique high stage of concern in the stages of *Awareness*, *Informational*, *Personal*, or *Collaboration*. No highest relative frequency concerns were recorded for management, consequence, or refocusing stages. By contrast, all self-reported non-users of the curriculum reported a highest relative frequency concern as either *Awareness* or *Informational*.

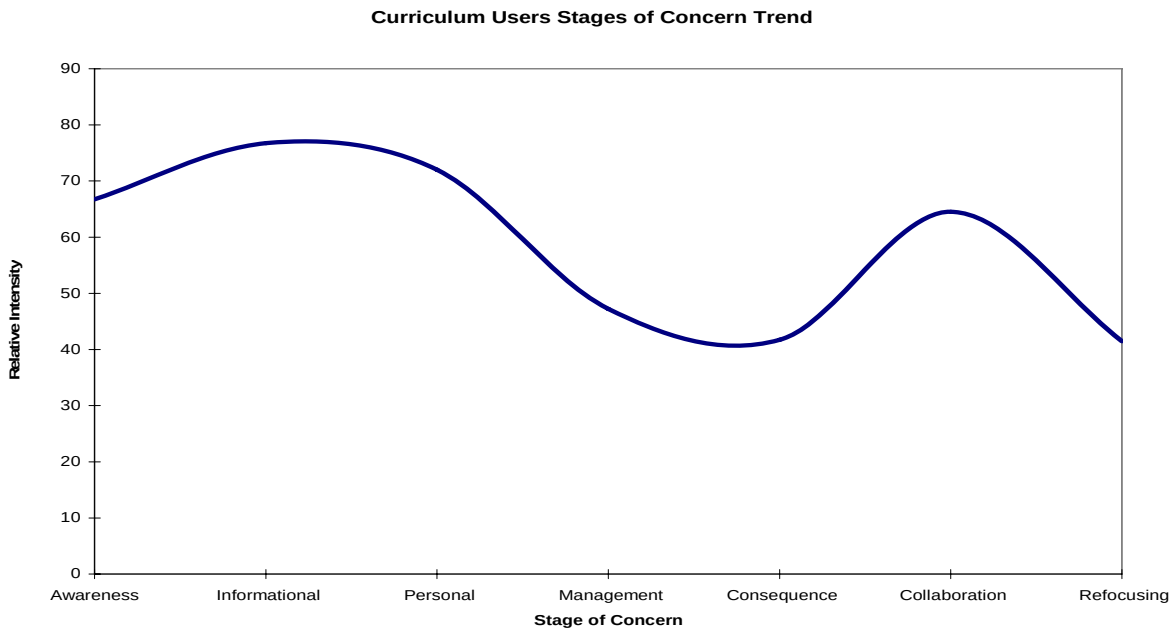

Figure 4. Distribution of Stages of Concern for curriculum users (*n*=4)

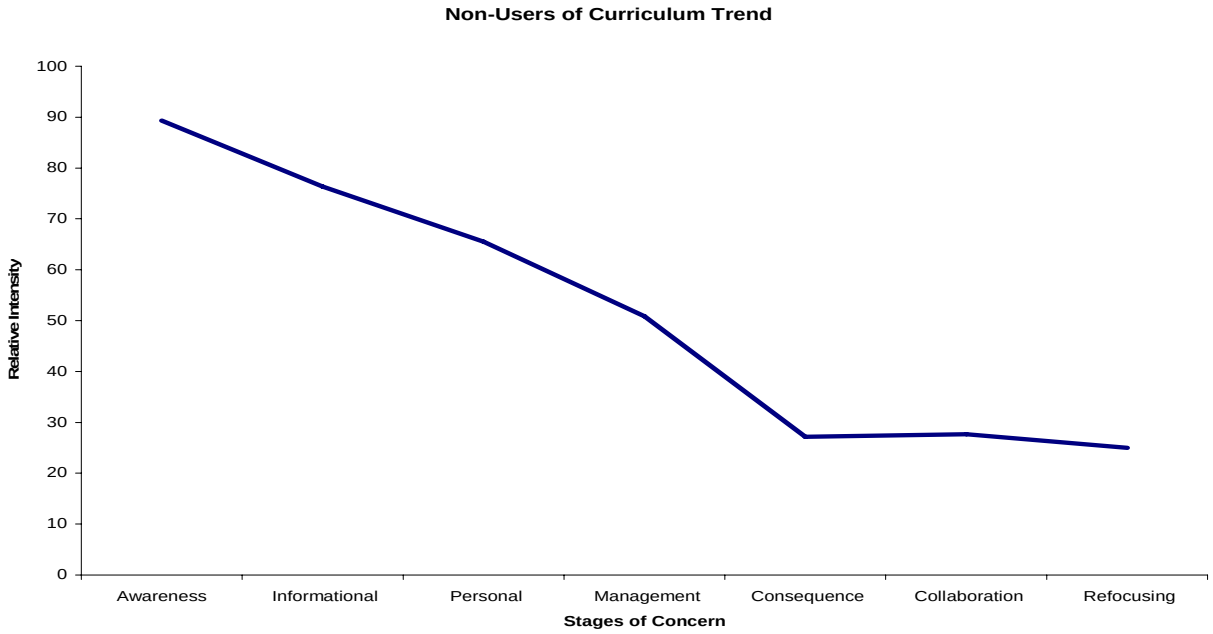

Figure 5. Distribution of stages of concern for curriculum non-users (*n*=6)

Conclusions, Implications, and Recommendations

Elementary teachers in this study expressed generally favorable attitudes and perceptions about agriculture and about agriculture's use as an integrating context to teach across the content area standards. Historically, attitudinal studies have shown that elementary teachers perceive agriculture as a positive means for teaching students abstract concepts via a common context (Balschweid, Thompson, & Cole, 1998; Harris & Birkenholz, 1996; Humphrey, Stewart, & Linhardt 1994; Knobloch & Martin, 2000; Swortzel, 1997; Trexler & Suvedi, 1998). Moreover, members of the target population in this study elected to take the course that contributed to initial exposure to the intended comprehensive agricultural literacy curriculum guidelines in lieu of another required course for their major. To that end, it was expected that the target population of elementary teachers in this study would have generally favorable attitudes toward agriculture and its use as an integrating context in kindergarten through eighth grade classes.

The concern with this and previous studies was in the disparity between the positive attitudes and the reported use of each respective agricultural literacy curriculum program. Swortzel (1997) reported lack of time, interest, and knowledge as primary reasons noted for not using an agricultural context, even though teacher attitudes and perceptions were favorable. Similarly, Balschweid, Thompson, & Cole (1998) found professional development program participants integrated agricultural lessons into existing coursework less than 20 times in an academic year. Consistent with these and other studies, this study revealed that 52.8% of the target population was not using agriculture as an integrating context despite having favorable attitudes toward agriculture.

A third conclusion that emerged from this study indicated that elementary teachers who were initially exposed to an agricultural literacy program, but who lacked preservice and in-service practice and experience with that program, either exhibited little concern or involvement with the innovation, or had a general awareness of and interest in learning more about the innovation. In contrast, elementary teachers who had preservice and in-service experience and practice with an agricultural literacy curriculum innovation were less homogeneous in their individual highest stages of concern, and demonstrated a propensity to move into more substantive stages of concern.

The results of the non-user Stage of Concern analyses were not surprising. Hall and Hord (1987) clearly indicated that a typical non-user's relative intensity scores are highest at the *awareness* and *informational* stages. Specifically, teachers who are not using an innovation may have little or no knowledge about it, and exhibit little concern about learning more. They are typically disengaged from the innovation. This study supported Hall and Hord's assertions.

Hall and Hord (1987, 2001) outlined typical profiles for both inexperienced and experienced users of an innovation. Those profiles reflected inexperienced users' concerns as a bell shape centered on the management stage. The experienced user, however, is less egocentric in his or her concerns and more focused on the impact of the innovation on the students and on the goal of collaboration for a more comprehensive delivery of the innovation.

This study revealed a potential hybrid of those two profiles with the trend line indicating highest stages at *informational* and *personal*, whereas the lowest points of the curves were in opposition to the typical inexperienced user profile. Interestingly, the trend moves back in a favorable direction toward *collaboration.* The question that logically follows is: *why* are inexperienced users not

concerned with *management*, and *why* are they actively seeking more information and collaborative opportunities?

Because these were beginning teachers choosing to use a new innovation, they may have, logically, been seeking more information about the innovation, while also examining their background knowledge to ensure confidence in their ability to deliver the subject matter. Also, preservice exposure to the curriculum guidelines in a collegiate course may have contributed to their willingness to use it in the classroom and move more toward the collaborative stages.

Further research recommendations include conducting longitudinal studies to track how these new teachers progress through the stages of concern. Also, quantitative analyses should be conducted to determine if significant differences exist between users and non-users contingent upon the amount of time that lapsed between first exposure to the curriculum guidelines and opportunity for first use in the classroom. Focusing on the Concerns Based Adoption Model as a means to gauge educator continued use and/or non-use of educational innovations will serve the agricultural education profession well as a means to provide continuity in assessing successful implementation regardless of innovation type.

References

Anderson, S. E. (1997). Understanding teacher change: Revisiting the concerns based adoption model [Electronic version]. *Curriculum Inquiry, 27*(3), 331-367.

Balschweid, M. A., & Thompson, G. W. (2000). Agricultural and science integration: A pre-service prescription for contextual learning. *Journal of Agricultural Education, 41*(2), 36-45.

Balschweid, M. A., & Thompson, G. W. (2002). Integrating science in agricultural education: Attitudes of Indiana agricultural science and business teachers. *Journal of Agricultural Education, 43*(2), 1-10.

Balschweid, M. A., Thompson, G. W., & Cole, R. L. (1998). The effects of an agricultural literacy treatment on participating K-12 teachers and their curricula. *Journal of Agricultural Education, 39*(4), 1-10.

Barab, S. A., & Luehmann, A. L. (2003). Building sustainable science curriculum: Acknowledging and accommodating local adaptation [Electronic version]. *Science Education, 87*(4), 454-467.

Bitto, C., Casey, B., & Casey, G. R. (Eds.). (2005). *California curriculum guidelines for agricultural literacy awareness.* Retrieved September 1, 2006, from http://www.cfaitc.org/CCGALA/index.htm

Committee on Agricultural Education in Secondary Schools. (1988). *Understanding agriculture: New directions for education.* Washington, DC: National Academy Press.

Connors, J. J., & Elliot, J. F. (1995). The influence of agriscience and natural resources curriculum on students' science achievement scores. *Journal of Agricultural Education, 36*(3), 57-63.

Conroy, C. A. (1999). Identifying barriers to infusion of aquaculture into secondary agriscience: Adoption of a curriculum innovation. *Journal of Agricultural Education, 40*(3), 1-10.

Dass, P. M. (1997). District-wide professional development of science teachers: Factors influencing the implementation of the Iowa Chautauqua Model [Electronic version]. *Proceedings from the National Association for Research in Science Teaching Annual Meeting,* Oak Brook, IL.

Dailey, A. L., Conroy, C. A., & Shelley-Tolbert, C. A. (2001). Using agricultural education as the context to teach life skills. *Journal of Agricultural Education, 42*(1), 11-20.

Darling-Hammond, L. (2002). *Solving the dilemmas of teacher supply, demand, and standards: How we can ensure a competent, caring, and qualified teacher for every child.* New York: National Commission on Teaching & America's Future. Retrieved September 1, 2005 from http://www.nctaf.org/article/index.php?g=0&c=4&sc=17&ssc=&a=21&navs=

Dewey, J. (1938). *Experience and education.* New York: MacMillan.

Elliot, J. (1999). Food and agricultural awareness of Arizona public school teachers. *Proceedings from the 18th Annual Western Region Agricultural Education Research Conference,* Corpus Christ, TX, 207-216.

Hall, G. E., George, A. A., & Rutherford, W. L. (1998). *Measuring stages of concern about the innovation: A manual for use of the SoC questionnaire.* Austin, TX: Southwest Educational Development Laboratory.

Hall, G. E., & Hord, S. M. (1987). *Change in schools: Facilitating the process.* Albany, NY: State University of New York Press.

Hall, G. E., & Hord, S. M. (2001). *Implementing change: Patterns, principles, and potholes.* Boston: Allyn & Bacon.

Hope, W. C. (1997). Resolving teachers' concerns about microcomputer technology. *Computers in the Schools, 13*(3/4), 147-160.

Joerger, R. M. (2002). One key to teacher retention: Understanding the experience and need of beginning teachers [Electronic version]. *News & Views, 44*(2), 6.

Kember, D., & Mezger, R. (1990). The instructional designer as a staff developer: A course team approach consistent with the Concerns-Based Adoption Model. *Distance Education, 11*(1), 50-71.

Knobloch, N. A., & Martin, R. A. (2000). Agricultural awareness activities and their integration into the curriculum as perceived by elementary teachers. *Journal of Agricultural Education, 41*(4), 15-26.

Leising, J. G., Pense, S. L., & Igo, C. G. (2001). An assessment of student agricultural literacy knowledge based on the food and fiber systems literacy framework. *Proceedings of the 28th Annual National Agricultural Education Research Conference,* New Orleans, LA, 259-268.

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

Loucks-Horsley, S. (1996). The concerns-based adoption model: A model for change in individuals. In R. Bybee (Ed.), *National standards & the science curriculum*. Retrieved April 18, 2005 from http://www.nas.edu/rise/backg4a.htm

Marsh, C. J. (1987). Implementation of a social studies curriculum in an Australian elementary school. *The Elementary School Journal, 87*(4), 475-486.

McKinnon, D. H., & Nolan, P. C. J. (1989). Using computers in education: A concerns based approach to professional development for teachers. *Australian Journal of Educational Technology, 5*(2), 113-131.

Meischen, D. L., & Trexler, C. J. (2003). Rural elementary students' understandings of science and agricultural education benchmarks related to meat and livestock. *Journal of Agricultural Education, 44*(1), 43-55.

Miller, G., & Gliem, J. (1994). Agricultural education teachers' ability to solve agriculturally related mathematics problems. *Journal of Agricultural Education, 35*(4), 25-30.

Mitchell, S. (1988). Improving instructional decision-making: The relationship between level of use of evaluation and student achievement. *Paper presented at the annual meeting of American Educational Research Association, New Orleans, LA.* (ERIC Document Reproduction Service No. ED301942).

Newhouse, C. P. (2001). Applying the concerns-based adoption model to research on computers in classrooms. *Journal of Research on Technology in Education, 33*(5). Retrieved March 9, 2005, from http://www.iste.org/inhouse/publications/jrte/33/5/newhouse.cfm?Section=JRTE_33_5

Ohene-Adjei, S. (1995). *Implementing new secondary agriscience courses in Illinois innovation configurations and teachers' stages of concern*. Unpublished master's thesis, University of Illinois, Urbana-Champaign.

Petrea, R. E. (1994). *An assessment of the stages of concern of teachers using the science applications in agriculture courses*. Unpublished early research requirement, University of Illinois, Urbana-Champaign.

Portillo, M. T., & Leising, J. G. (2003). An agricultural knowledge assessment of AITC trained teachers and non-trained teachers. *Proceedings of the 30th Annual National Agricultural Education Research Conference,* Orlando, FL, 458-469.

Project food, land & people. (1998). Scio, OH: Project Food, Land & People.

Project learning tree (9th ed.). (2002). Washington, DC: American Forest Foundation.

Project WET curriculum and activity guide (10th ed.). (2005). Bozeman, MT: Project WET.

Project wild K-12 curriculum and activity guide (9th ed.). (2005). Houston, TX: The Council for Environmental Education.

Rogers, E. M. (2003). *Diffusion of innovations* (5th ed.). New York: Free Press.

Santrock, J. W. (2001). *Educational psychology*. Boston: McGraw Hill.

Swortzel, K. A. (1997). How Ohio teachers use *AgVenture Magazine* to increase agricultural literacy among their students. *Journal of Agricultural Education, 38*(2), 30-37.

Terry, Jr., R., Herring, D. R., & Larke, Jr., A. (1992). Assistance needed for elementary teachers in Texas to implement programs of agricultural literacy. *Journal of Agricultural Education, 33*(2), 51-60.

Trexler, C. J., & Suvedi, M. (1998). Perception of agriculture as a context for elementary science teaching: A case of change in Sanilac County, Michigan. *Journal of Agricultural Education, 39*(4), 28-36.

Vygotsky, L. S. (1978). *Mind in society* (M. Cole, V. John-Steiner, S. Scribner, & E. Souberman, Trans.). Cambridge, MA: Harvard University Press (Original work published 1960)

Ward, J. R., West, L. S., & Isaak, T. J. (2002). Mentoring: A strategy for change in teacher technology education. *Journal of Technology and Teacher Education,10*(4), 553-569.

Wilhelm, A., Terry, R., & Weeks, W. (1999). Comparison of elementary teachers' use of agriculture in their teaching. *Proceedings of the 26th Annual National Agricultural Education Research Conference*, Orlando, FL.

Willis, J. (1992). Technology diffusion in the soft disciplines: Using social technology to support information technology. *Computers in the Schools, 9*(1), 81-105.