ELEMENTARY TEACHERS' EXPERIENCES IN ADOPTING AN AGRICULTURAL LITERACY CURRICULUM

By

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This labor of love is dedicated to my best friend and husband, Don, and our children, Shelby and Jacob, whose selfless sacrifices for my goals are eternally appreciated.

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The purpose of this study was to explore the concerns, levels of use, and innovation configurations of elementary teachers in their use and sustained adoption of the *California Curriculum Guidelines for Agricultural Literacy Awareness* as a resource for teaching the California state educational standards. A descriptive study was conducted, integrating both qualitative and quantitative components. The theoretical perspective was based on the Concerns Based Adoption Model with qualitative methods used to uncover the experiences of the elementary teachers. An attitudinal instrument was administered to the accessible target population (N=42). A purposive sample was selected for follow-up interviews (n=10). Sample participants completed a Stage of Concern questionnaire and participated in a Level of Use branching interview, as well as a semi-structured, in-depth interview regarding their experiences with an agricultural literacy curriculum. An innovation configurations checklist was developed using a modified Delphi method and

results were cross-referenced to transcript data to determine ideal, acceptable, and unacceptable use of the curriculum guidelines.

Descriptive statistics were used to analyze the demographic characteristics and attitudes of the participants, and to assess the stages of concern and frequencies of levels of use. Analyses indicated participants had generally favorable attitudes toward agriculture and its use as a context for teaching elementary students. Most elementary teachers had first or second highest concerns at the *awareness* or *informational* stage. Participants who self-reported no use of agriculture as an integrating context were at the *non-use* or *orientation* level of use.

The components that emerged from the innovation configurations checklist were use of the curriculum guidelines, cross-disciplinary reference to state standards, experiential learning opportunities, instructional approach, student assessment, and lesson purpose. Results of checklist development indicated that participants were generally acceptable and ideal with respect to instructional approach and experiential learning opportunities, but generally unacceptable with respect to use of the guidelines and cross-referencing to state standards.

Members focused on (1) time limitations, (2) role perceptions, and (3) a need for change facilitators as themes contributing to the decision process involved with choosing to adopt and sustain use of the *California Curriculum Guidelines for Agricultural Literacy Awareness*.

CHAPTER 1
INTRODUCTION

Beginning teachers are faced with many responsibilities and challenges as they embark on their chosen profession. 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) conceptualizes 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. There are many contributors to this period of uncertainty, all of which affect teacher retention rates. Alarmingly, average teacher attrition rates during the first three years can range from thirty to sixty percent (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 professional seeking job retention and tenure. Student performance on standardized achievement tests often determines levels of school funding for subsequent years, as well as whether or not administrators retain their positions for the following academic year. State performance standards often guide teachers in selecting curricula that will best prepare students for success on standards-based achievement tests.

To that end, beginning teachers are not only concerned with *how* to teach, but with *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 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. Even so, many children may be left behind if the primary measure of school quality is based on the results of an annual standardized exam (Meier & Wood, 2004).

Constructivist Epistemology

Many of the messages delivered to teachers encourage them to utilize curriculum resources that allow students to *construct* knowledge. 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; Schunk, 2000; Woolfolk, 1993). Constructivist pioneer Lev Vygotsky's analysis of practical intelligence in children and animals lends credence to learning in a context such as agriculture (1978).

Through his observations, Vygotsky proffers an analogy of children stacking experiences and repeated actions one upon another. This stacking serves to create clearer

commonalities and to distort differences until what remains are models of experience and understanding. As a child grows, so does the number of models and experiences obtained. The child's understanding of the world around him or her is acquired through linkages of those models to one another, creating a "rough blueprint for possible types of action in the future" (Vygotsky, 1978, p. 22). Thus, if students who have no experiences in agriculture are to learn of this context, learning about agriscience may need to be tied to other learning. Similarly, brain-based research embraces the ideology of interconnected meaning making and affords an opportunity to understand how students construct knowledge.

Caine and Caine (1991) opined that "Every complex event embeds information in the brain and links what is being learned to the rest of the learner's current experiences, past knowledge, and future behavior" (p. 5). Enveloping the student in lessons and activities, whereby he or she talks, listens, thinks, values, acts, experiences, and perceives relationships among those activities, provides an immersed environment for the learner to move past surface knowledge and into meaningful knowledge (1991).

Qualifying *surface knowledge* as anything that "a robot can 'know'" (p. 7), such as rote memorization of facts or formulas, Caine and Caine surmise that to truly acquire *meaningful knowledge*, a child must perceive relationships between new knowledge and past experiences. "Meaningful knowledge is anything that makes sense to the learner" (Caine & Caine, 1991, p. 7) and creates a deeper understanding of the larger patterns surrounding subject matter presented to the student (Falk & Dierking, 2000; Hardiman, 2003; Johnson, 2002). While brain-based research echoes constructivism at its core, it is

research delineating brain structure and function in making those connections that differentiates brain-based research from constructivist theory.

At the essence of brain-based learning are the cell communication processes and the connections made between axons and dendrites within the neurons (Hardiman, 2003). Axons send signals across synaptic gaps, which dendrites receive; thus, learning occurs. As more connections transpire between axons and dendrites, signals move faster and more efficiently; as more pathways are created, more dendrites grow (2003). Learning occurs during these neurological connections; logic follows, therefore, that the greater the number of connections, the more learning is facilitated.

Furthermore, when the brain perceives information worth retaining, information transfers to long-term memory storage and retention (Hardiman, 2003; Johnson, 2002). Not all brains form and develop identically, so neural connections may not be inspired the same way for all people (Caine & Caine, 1991).

Reinforcing this disparity of knowledge acquisition, Gardner (1993) theorized the concept of multiple intelligences; that the brain makes neural connections in more than just logical and verbal sequences. Rather, Gardner's focus is on *seven* intelligences, including musical, spatial, kinesthetic, interpersonal, and intrapersonal, as well as logical-mathematical and verbal (1993). In Gardner's view, intelligence is defined as "the ability to solve problems, or to fashion products, that are valued in one or more cultural or community settings" (p. 7). To that end, IQ points, as a single dimension, do not measure a person's intelligence, nor do the cumulative points obtained on the Scholastic Achievement Test (SAT).

Instead, Gardner's pluralized viewpoint regards the intelligences as a person's propensity to call on a combination of abilities to "work together to solve problems, to yield various kinds of cultural end states — vocations, avocations, and the like" (1993, p. 9). Bearing that in mind, beckoning a multitude of abilities learned through previous experiences in the learner's frame of reference, to construct new knowledge, is at the crux of agricultural education curriculum philosophy, as well as this study's epistemological foundation.

The Case for Agricultural Literacy Curriculum

Moore (1988) deemed Rufus W. Stimson as the "forgotten leader in agricultural education" (p. 50). Stimson gained that notoriety because of his visionary development of the project-based method of teaching that was subsequently credited to William Heard Kilpatrick. In 1908, Stimson broadcast his vision whereby students at Smith's Agricultural School would learn agricultural skills and techniques at school, but would "apply what they had learned on their home farms through the use of home projects" (p. 50). In less than a decade, Stimson's project-based method and philosophy spread from Massachusetts to the Panama-Pacific International Exposition in San Francisco. Soon after, the project method gained widespread use by progressive teaching practitioners in a variety of educational areas. Stimson's vision became the precursor to works by Kilpatrick and Dewey, as well as to modern day agricultural education supervised agricultural experiences (Talbert, Vaughn, & Croom, 2005).

Dewey's work, in particular, dictates a need for experience relevant to the context of the learner. Agricultural education at the secondary level epitomized the role of experience in education as Prosser and Allen documented in their theorems of vocational education (as cited in Talbert, Vaughn, & Croom, 2005). Of notable interest are

theorems that called for experiences capitalizing on students' interests and needs; providing engagement of both cognitive and psychomotor skills; and affording social, physical, and intellectual development of students. Since the passage of the Smith-Hughes Act in 1917, agricultural education values experience as a means for acquiring food, fiber, and natural resources understanding as the heart of the program (Wonacott, 2003).

Agricultural education students, their parents, agricultural teachers, and industry leaders possess strong beliefs about secondary level agricultural education courses. Specifically, they believe 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, "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 began to explore the potential success of this formula at the elementary and middle school levels.

Traditional agricultural education programs are viewed as education *in* agriculture, whereas an early effort by the National Academy of Sciences to define agricultural literacy at other educational levels was deemed education *about* agriculture (as cited in Talbert, Vaughn, & Croom, 2005). In 1991, Frick, Kahler, and Miller leveraged research efforts to operationally define agricultural literacy on a national level. The results of their research yielded the following definition:

> Agricultural literacy can be defined as possessing knowledge and understanding of our food and fiber system. An individual possessing such knowledge would be

> able to synthesize, analyze, and communicate basic information about agriculture. Basic agricultural information includes: the production of plant and animal products, the economic impact of agriculture, its societal significance, agriculture's important relationship with natural resources and the environment, the marketing of agricultural products, the processing of agricultural products, public agricultural policies, the global significance of agriculture, and the distribution of agricultural products. (p. 52)

The National Research Council (NRC) issued a report in 1988 calling for student education in and about agriculture at all levels (Committee on Agricultural Education in Secondary Schools). Since then, an onslaught of agriculturally based curriculum materials have been produced and distributed to elementary teachers as they sought to integrate agricultural concepts and provide contextual experiences for their students. Agriculture in the Classroom; Project WET; Project WILD; Project Food, Land, and People; Project Learning Tree; and a multitude of other national, state, and local curriculum packages, designed to integrate cross-curricular outcomes with agricultural themes, are currently available to elementary teachers. The challenge for teachers is not a lack of available resources for using agriculture as a context for teaching standards at all levels. Rather, the crux of the problem facing teachers is how they navigate standards, curriculum materials, professional development, administrative mandates, and then subsequently synthesize all of those components into a deliverable, student-centered package.

Numerous agricultural education research studies have cited the NRC report (Committee on Agricultural Education in Secondary Schools, 1988) calling for an increase in agricultural literacy and awareness throughout all levels of education (Doerfert, 2003; Frick, 1991 & 1993; Harris & Birkenholz, 1996; Humphrey, Stewart, & Linhardt, 1994). Moreover, the NRC's report highlighted that, while the need for more agriculturally literate students is critical, little is being done to educate teachers about

agriculture outside of secondary agricultural education teacher preparation programs (1988).

More recently, agricultural education has re-sounded a call for comprehensive agricultural literacy efforts. Hillison (1998) and Peterson (1999) indicated that partnerships with elementary teacher preparation programs are needed to educate preservice teachers about agriculture and its uses as a context for teaching. Clearly, there is a gap between what is needed to achieve the vision for an agriculturally literate society and providing the services to facilitate achievement of that preferred future. Although collaborating with preservice elementary teacher education programs may be a first step in fulfilling the NRC's recommendations, simply delivering a message about a particular subject matter area (e.g., agriculture) may not be enough.

California Curriculum Guidelines for Agricultural Literacy Awareness (CCGALA)

The California Food and Fiber Futures (CF3) program, a project funded by the W. K. Kellogg Foundation, responded to the call to increase the agricultural literacy levels of teachers by developing the *California Curriculum Guidelines for Agricultural Literacy Awareness* (Bitto, Casey, & Casey, 2005), or *CCGALA*. This comprehensive publication outlines each of the California state performance standards for students in kindergarten through grade twelve. Corresponding to each standard is a suggested lesson that teaches that standard using an agricultural context. Additionally, the resource for that lesson is listed.

CCGALA reflects the constructivist viewpoint that all knowledge is contingent upon human interaction and practice with objects, and that meaning is constructed in and out of such interaction between humans and the world in a social context (Crotty, 2003). Moreover, the requirement placed on each suggested lesson is that it must meet at least

two standards, and meet those standards in at least two content areas. Many of the suggested lessons exceed this requirement. Finally, grade-level appropriate literature sources are listed for each grade level.

Creating the *CCGALA* was the preliminary step in making agriculture a contextual, constructivist, and experiential learning reality accessible to elementary teachers. Preparing teachers to use the guide was a second, yet no less important, priority for CF3. Three West Coast university campuses embraced the *CCGALA* and committed to teaching preservice elementary teachers how to effectively use the guide as they prepared to teach. Specifically, these efforts were leveled at kindergarten through eighth grade pre-service teachers.

Educational Evaluation

In this age of accountability, evidence of student achievement is frequently measured using a standardized exam uniformly administered to all students. In this way, administrators can quantify student achievement, and track knowledge gains, by comparing group means from year to year. While this objective-oriented approach is one way to quantify program outcomes, there are other means by which to evaluate the effectiveness of an educational program. Strauss, Bowes, Marks, and Plesko (2000) maintain a constructivist notion whereby student achievement is the result of a cumulative effect based on what the student learned earlier.

Theory has played an important role in educational evaluation. Tyler, Bloom, Talmage, and others contributed to these theories through their work in measuring student outcomes related to educational and curricular programming (Worthen & Sanders, 1987). Although evaluation of specific programs may prove useful for program developers, one may argue that the true worth of an educational program is not based on

the intended outcome of the program. Instead, in the wake of educational reform, "evaluation" emphases may prove more fruitful if focused on the sustained use and *adoption* of educational innovations.

Innovation Adoption

An innovation, as defined by Rogers (2003), is an "idea, practice, or object that is perceived as new by an individual or other unit of adoption" (p. 12). Rogers expands on the definition by indicating that an innovation could be perceived as new simply by the lapse in time since it was originally introduced. Such time spans fail to exclude an idea, practice, or object from being categorized as an innovation. Instead, an individual's *perceived* nascence of an object is enough to merit the title of innovation (2003).

From Rogers' viewpoint, an innovation is adopted through the innovation-decision process. As such, a potential user passes from first knowledge or awareness of an innovation to the final confirmation and reinforcement of the decision to adopt or reject the innovation through this process (2003). Key players in Rogers' model are the opinion leaders — those who assess the merits of innovations early and then have influence over others in their area of expertise.

Unfortunately, in the educational genre, the presence of opinion leaders in adopting or rejecting educational innovations lacks the same level of effect as it does in other areas. While teachers may respect administrators or teacher educators, or may be sparked by a presentation at a professional development seminar, the reality remains that the teacher primarily makes decisions about adopting or rejecting an educational innovation within the walls of his or her own classroom. With that in mind, alternative measures for assessing the potential worth and continued use of educational innovations should be sought.

While agricultural education researchers and stakeholders have recognized and articulated a need for increased agricultural literacy efforts at all levels of the educational process, little research has been conducted beyond assessment of student and teacher knowledge and attitudes toward respective agricultural concepts (Trexler & Meischen, 2002). Moreover, research efforts have concentrated on individual curriculum packages or units, rather than evaluating systematic programs that infuse agriculture as a thematic context across the content areas at the elementary level. This study differed from previous agricultural literacy evaluation efforts in that its focus was on existing agricultural curriculum resources, cross-referenced to state standards, from kindergarten through grade eight. Likewise, traditional evaluation procedures assess the merit or worth of an educational innovation only through student achievement based on formal, paper and pencil assessments, or through simple assessment of teacher use or non-use. This study moved beyond fact-based evaluation of agricultural knowledge and attitudes and probed the attitudes, concerns, usage levels, and innovative adaptations teachers encountered after exposure to this curriculum innovation. Rather than focusing strictly on outcomes of curriculum use, this study sought to examine adoption of the curriculum innovation using the Concerns Based Adoption Model (Hall & Hord, 2001).

Statement of the Problem

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 deemed 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

The purpose of this study was to explore the concerns, levels of use, and innovation configurations of elementary teachers in their use and sustained adoption of the *California Curriculum Guidelines for Agricultural Literacy Awareness* as a resource for teaching the California state educational standards in grades kindergarten through eight.

Objectives

Using the Concerns Based Adoption Model (Hall & Hord, 2001) to describe elementary teachers' experiences with agriculture as the integrating context for teaching math, science, language arts, and social science standards, several objectives guided this project. The objectives were to:

1. Describe elementary teachers' attitudes and perceptions of agriculture as a context for teaching elementary students.
2. Describe elementary teachers' current stages of concern with respect to implementing an agricultural literacy curriculum.
3. Describe elementary teachers' current levels of use of the *California Curriculum Guidelines for Agricultural Literacy Awareness*.
4. Delineate the essential components for "ideal," "acceptable," and "unacceptable" implementation of an agricultural literacy curriculum.
5. Describe the innovation configurations that teachers employed while implementing an agricultural literacy curriculum.

6. Describe the perceived outcomes experienced by teachers who adopted the agricultural literacy curriculum.

Definition of Terms

Several important terms were utilized throughout this study. To ensure understanding of those relevant terms, the following definitions were established:

1. Agricultural literacy – education about agriculture, including the food, fiber, and natural resource systems (Talbert, Vaughn, & Croom, 2005).

2. Change facilitator – one who assists innovation users through the various stages and processes of adoption. According to Hall and Hord (1987), change facilitators may be administrators, teachers, district personnel, or innovation developers and trainers who serve to assist individuals in developing a level of confidence and competence needed to sustain use and adoption of an innovation.

3. Concerns Based Adoption Model – a mode of assessing educational innovation use based on teachers' concerns and comfort with the innovation, rather than on simple evaluation measures that ascertain use or non-use of an innovation (Hall & Hord, 2001).

4. Educational innovation – pertaining to a product or process as introduced into the educational genre. An innovation may be characterized as "a new textbook or curriculum materials, or . . . different approaches to discipline, counseling techniques, or instructional procedure" (Hall & Hord, 1987, p. 9). By this definition, this study investigated adoption of a product innovation known as the *California Curriculum Guidelines for Agricultural Literacy Awareness*.

5. Innovation configurations – recognition that during the innovation adoption process users may have a "tendency to adapt, modify, and/or mutate aspects of innovations" (Hall & Hord, 2001, p. 39). Articulation of ideal, acceptable, and unacceptable uses of an innovation, from the perspective of the developer, recognizes that natural process of mutation and provides useful guidelines to follow.

6. Levels of use – the sequence of levels through which an educator may pass as he or she gains confidence and skill in the use of an educational innovation (Newhouse, 2001). The eight levels, as defined by Hall and Hord (2001), are *Nonuse*, *Orientation*, *Preparation*, *Mechanical Use*, *Routine*, *Refinement*, *Integration*, and *Renewal*.

7. Stages of concern – an educator's perception of an educational innovation (Willis, 1992). Specifically, the seven stages of concern defined by Hall and Hord (2001) are *Awareness*, *Informational*, *Personal*, *Management*, *Consequence*, *Collaboration*, and *Refocusing*.

Limitations

Although the use of agriculture as a teaching context for integrating science, math, social science, and language arts may be similar to other curriculum programs, the results of this study should not be generalized beyond the target population. Likewise, all of the data were self-reported by the participants via questionnaire and in-depth interviews.

Researcher subjectivity and relationship with study participants warrant notation as a study limitation. Because participants were former students of the researcher, interview responses may have been biased in a favorable manner toward agriculture. In an effort to minimize such a limitation, initial data were collected from the population to develop a composite picture of the population before the sample was selected for follow up interviews.

Another limitation of this study related to gender demographics. The target population was predominately female (94%); however, this is representative of the elementary teaching profession as a whole (Bleicher, 2004).

Finally, this study focused only on beginning teachers as the target population. Beginning teachers, due to their limited experiences within the teaching profession, may be more or less adaptable when considering educational innovations for adoption; therefore, this study should not be considered as representative of all teachers.

Assumptions

The *California Curriculum Guidelines for Agricultural Literacy Awareness* is a curriculum that promotes agricultural literacy across the content areas in grades kindergarten through eight.

Respondents were honest in their responses regarding their attitudes toward agriculture, as well as in assessments about their use of the *CCGALA* during their

teaching experiences. Likewise, the study assumed that respondents were open and forthright in responding to the stages of concern questionnaire, as well as throughout the interview process.

Summary

While administrators strive to satisfy governmental edicts on pupil performance, teachers also struggle in their efforts to meet curricular standards and teach students to perform capably on standardized achievement exams. Students often struggle to learn subject matter foreign to their limited experiences from adults who have more experiences and a broader frame of reference of such subject matter (Dewey, 1997). Such a divergence of experience makes the use of teaching methods that are based in constructivist epistemology a sound and reasonable bridge between the learner and the learned. Agriculture as a context may be able to serve as that bridge.

If the agricultural education profession seeks to infuse agriculture across grade level and content area boundaries, traditional methods of evaluation may not suffice when the goal is to create conversationally literate citizens in the food, fiber, and natural resources system (National Council for Agricultural Education, 2000). Sustained and acceptable use of agricultural literacy curricula seems to be the most logical path in reaching that goal. Therefore, exploration of teacher concerns and levels of use in an agricultural literacy curriculum may serve to provide a richer understanding of why teachers elect to adopt, or reject, an agricultural literacy curriculum to teach elementary students.

CHAPTER 2
LITERATURE REVIEW

Chapter 1 outlined the basis for conducting this study. A portrait of how current educational accountability practices shape beginning teacher concerns was painted, and recognized that teachers, as curriculum gatekeepers, are concerned with far more than simply what to teach to their students.

The purpose of the research study and appropriate research objectives were stated. Research methods were overviewed, relevant key terms defined, assumptions delineated, and study limitations stated.

The Role of Context in Education

A key point of Dewey's philosophy of the role of experience in learning is that students' inexperience, especially at the primary grade level, limits their ability to develop their own learning experiences (Dewey, 1997). Likewise, it is because of this disparity between the student's experience level, as compared to that of their teacher, that "traditional" schools evolved as places where the learned teach, and the inexperienced learn. This idea that knowledge is static and unchanging is where schools bogged down in the educational process (1997).

Admittedly, there are some components of knowledge that are unchanging: mathematical equations, the shape and rotation of the Earth, the order of the alphabet, as well as others. However, early educators decided that certain levels of information are appropriate only to certain levels of learners. Through this limitation of curriculum delivery, teachers became accustomed to teaching specific concepts at specific grade

level intervals, without thought as to what students *could* do, given subject matter delivered in another context. In addition to prescribed curriculum delivery, Dewey proffered two other barriers relevant to allowing students to more fully participate in the experiential development process: difficulty accepting change and teacher proficiency levels.

Dewey recognized that change is difficult and that it is much less time consuming for teachers to continue teaching what they already know, than it is for them to diverge from that routine. In investigating principles of change in the educational genre, Hall and Hord (2001) acknowledged that teachers need time to accept and plan for change because there is grief over what is familiar and now lost to the educator. Without continued support in the change process, teachers may quickly revert to what they previously taught in an effort to demonstrate proficiency in front of students, parents, and administrators.

Secondly, Dewey contended that delivering organized bodies of knowledge to students is a mode of inflicting education from an external standpoint; however, teachers continue to do just that while interspersing activities under the guise of experientially demonstrating the concepts being taught. Teachers who include laboratory or experiential activities to simply demonstrate a concept, or to "fill time," exhibit contempt (albeit unwittingly), for what Dewey maintains is inherently necessary in experiential education (1997). The teacher must *facilitate* student experiences so that a connection to desired educational outcomes and future inferences in similar, yet not identical, situations can be achieved. By providing those facilitated experiences, teachers can achieve the balance needed to allow students to participate in their own development. By virtue of the teacher's maturity and experience, she or he can frame the information to be

delivered, but the students can more fully develop transitional and transferable organizational *skills* that can be recalled in the future.

Experiential Learning

Dewey proclaimed that properly facilitated learning experiences, based in real life contexts, serve as triggering events for future decisions in similar circumstances. Kolb (1984) drew from Dewey, Lewin, and Piaget, as well as his own learning style research, to conceptualize the experiential learning model (see Figure 2-1).

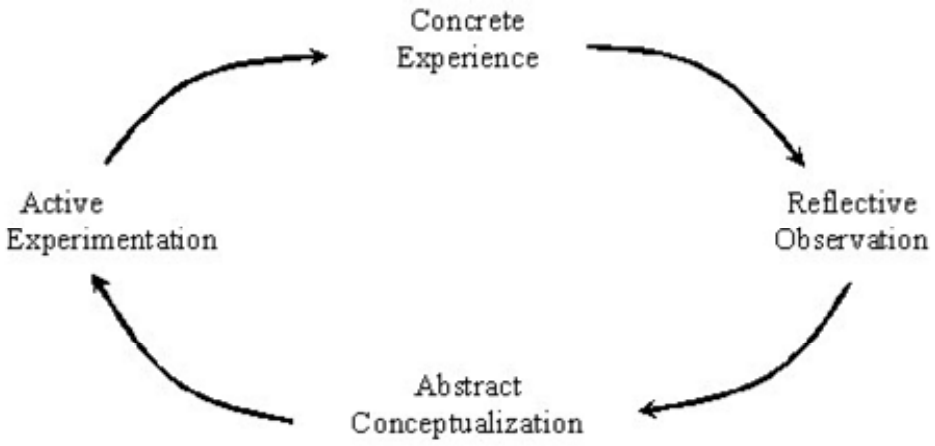


Figure 2-1. The Kolb Experiential Learning Model (1984)

Experiential learning theory is grounded on the assumption that learning is based in both content and process (Kolb & Kolb, 2005). The experiential learning model is a cyclical and continuous process. The model begins with a concrete experience that engages the student in a manner that he or she finds relevant and meaningful.

The second step involves reflective observation facilitated by the teacher that draws on the immediate experience of the student. This is the dimension where experiential theorists, like Dewey, indicate the *process* is sacrificed in favor of the *content*. Instead of piling one experience on top of another, students must have time to stop and engage in guided reflection (Proudman, 1992). As students reflect on each subsequent experience,

they gain valuable insight and readiness for the next step in the process. Proudman noted, "The need to mix experience with associated content and guided reflection is critical. The dissonance created in this mixing allows the learner opportunities to bring the theory to life" (p. 22).

The third step provides opportunity for the student to abstractly engage in conceptualization of new implications for action. Much like Vygotsky's (1978) analysis of the construction of learning experiences, this step allows students to search for and create patterns based in experience and reflection that will serve as foundational knowledge for new experiences (University Associates, Inc., 1990).

Finally, those new implications must be tested in new situations via active experimentation. Each of the new active experimentation situations serves as the basis for future concrete experiences from which the cycle begins again (Kolb, 1984). Although there are slight differences in terminology and visual concept, the Dewey, Lewinian, and Piaget models of experiential learning all reflect this same cyclical movement (1984).

Experiential learning theories emphasize the needs of the learner so as to stimulate interest and motivation within the learning environment (Zilbert & Leske, 1989). Specifically, "active engagement in activities which satisfy needs, involve physical or mental challenge, confrontation, or high levels of responsibility are important for stimulating interest, analysis, and growth" (p. 2).

Teacher Knowledge and Attitudes

Teacher attitudes and subject matter knowledge can play critical roles in the successful and continued use of any curriculum innovation. Much of what we know

about a person's propensity to behave in a particular way can be illustrated via Fishbein and Ajzen's (1975) Theory of Reasoned Action (see Figure 2-2).

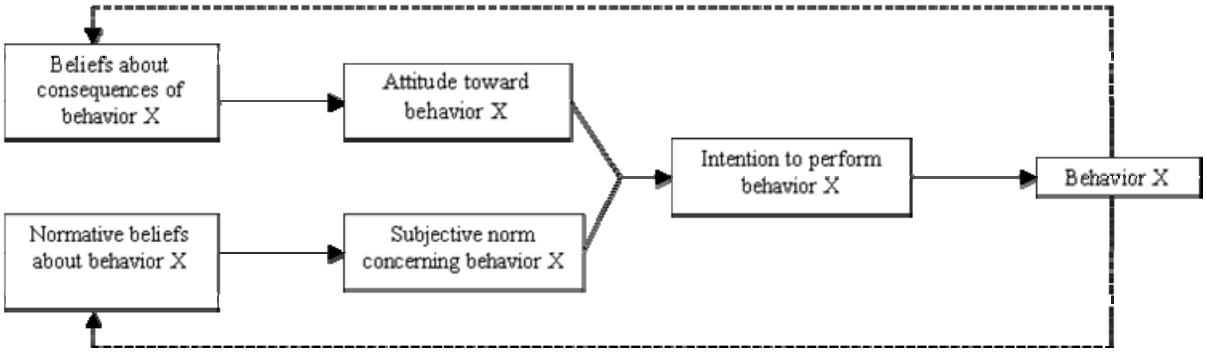


Figure 2-2. Theory of reasoned action (Fishbein & Ajzen, 1975)

Knobloch and Martin (2000) used the Theory of Reasoned Action as a theoretical framework to study elementary teachers' perceptions of agriculture and their integration of agricultural awareness activities into the curriculum. Based on a survey of 281 elementary teachers, the researchers sought to assess elementary school teachers' perceptions about agriculture, the need for agricultural awareness at the elementary level, and integration of agriculture into the curriculum. More than 80% of the respondents indicated agricultural activities were integrated into their curriculum. Interestingly, 50% of the respondents reported teaching in an urban or metropolitan area. Further, 97% agreed that agriculture could serve to enhance elementary curriculum, and 84% agreed that agriculture could serve as a context to link learning across all subject matter areas.

Using cluster sampling techniques from Missouri secondary schools, Harris and Birkenholz (1996) sought to determine the differences, if any, in knowledge of agriculture and attitude toward the agricultural industry. This study analyzed comparisons among administrators, agricultural teachers, language arts teachers, mathematics teachers, science teachers, and social science teachers. Not surprisingly,

agricultural teachers demonstrated the most knowledge and most positive attitude toward agriculture. Although mathematics and language arts teachers were least knowledgeable and had the least positive attitude toward agriculture, practical significance in this study indicates that all of the educator groups scored more than 80% on the knowledge instrument. Harris and Birkenholz concluded that attitude and knowledge were not perceived as major barriers to infusing agricultural concepts into curriculum; therefore, they recommended that teachers in all subject matter areas be encouraged to incorporate agriculture as a context for teaching at the secondary level (1996).

Humphrey, Stewart, and Linhardt (1994) surveyed 82 preservice elementary teachers to provide information regarding their existing knowledge about and perception toward agriculture. Statistical correlations demonstrated significant relationships between knowledge about agriculture and perceptions toward agriculture. Elementary education student teachers with higher knowledge scores tended to have a more positive perception toward agriculture. Likewise, elementary education student teachers with previous agricultural experience exhibited more confidence in their ability to teach agricultural concepts in the elementary classroom. Researcher recommendations pointed to a need for networking with teacher educators who prepare elementary teachers as a priority for agricultural education. Agricultural education cannot expect elementary educators to utilize agriculture as a context for teaching existing curriculum without providing a structure to teach those individuals about agriculture (1994).

Utilizing a case study method to interpret intended versus implemented behaviors of a middle school environmental science curriculum, Cronin (1986) indicated that teacher beliefs and teacher knowledge were among the most influential, and most

difficult to change, factors influencing a teacher's use of curricula. Cronin's study yielded a model akin to the Theory of Reasoned Action, yet the Curriculum Implementation Model focused specifically on the educational environment.

Use of Fishbein and Ajzen's work has more than adequately demonstrated that elementary teachers' attitudes and perceptions about agriculture as a context for teaching are generally positive, thus indicating an *intention* to use agriculture as a means for teaching. However, the research base lacks empirical evidence as to *why* elementary teachers are not following through with the intent to use agricultural literacy curricula as a more comprehensive means of teaching. The research base, especially in the agricultural education genre, does little to explore teachers' experiences with agricultural literacy curricula, and to explain sustained use and adoption of such curricula.

Agricultural Literacy as an Educational Innovation

Hall and Hord characterize educational innovations as *products* or *processes* (2001). Products may include, among others, incorporation of technology or a text; whereas processes may include school wide character education implementation efforts or cooperative learning techniques. Inasmuch as the *California Curriculum Guidelines for Agricultural Literacy* (*CCGALA*) is a resource guide designed for elementary teachers to use agriculture as the context for teaching across the content standards, *CCGALA* meets Hall and Hord's criteria as an educational innovation.

Furthermore, Hall and Hord indicated that educational innovations are characterized by size, whether they are small and simple, large scale, or require systematic reform (2001). To provide guidance related to relative size, innovations can be assessed according to the Hall Innovation Category (HiC) Scale, with parallels drawn from the Richter scale measuring the intensity of earthquakes (Hall & Hord, 2001).

Using the HiC Scale, *CCGALA* may be characterized as a seven on the ten point scale with a descriptor of *transforming* as it relates to the amount of effort required to obtain a level of successful implementation of the innovation (see Figure 2-3).

Level	Name	Examples
0	Cruise Control	1950s Teacher in same classroom for many years
1	Whisper	Pronouncements by officials Commission reports
2	Tell	New rules and more regulations of old practices
3	Yell	Prescriptive policy mandates
4	Shake	New text Revised curriculum
5	Rattle	Change principal Team teaching
6	Roll	Change teacher's classroom Change grade configurations
7	*Redesign*	Evening kindergarten *Integrated curriculum*
8	Restructure	Site-based decision making Differentiated staffing
9	Mutation	Teachers and principals belong to the same union Changing the role of school boards
10	Reconstitution	Local constitutional convention *Glasnost*

Figure 2-3. The HiC scale of relative size of innovations (Hall & Hord, 2001).

Summary of Agricultural Literacy Research

Much of what exists in the way of agricultural literacy empirical research, as it relates to the pre-secondary level, can be categorized into three major areas: student knowledge and attitudes, teacher preparation and professional development, and barriers to implementing agricultural literacy curriculum. In summarizing accessible agricultural literacy research, there is little continuity between researchers with respect to implementing a guiding theoretical perspective.

Student Attitudes and Knowledge

An early agricultural literacy study sought to determine differences in student achievement scores based on instruction, or lack thereof, in agriscience and natural resources courses (Connors & Elliot, 1995). This pre-experimental study used a static-group comparison design with the independent variable being the number of science credits students had completed, including agriscience and natural resources. The dependent variable was the science achievement score earned by students on a standardized exam developed by American Testronics.

Four Michigan high schools were randomly selected and 156 high school seniors were used as the study population. Multiple regression analysis was used to control for the extraneous independent variables of gender, race, grade point average, socioeconomic status, and school characteristics. The researchers found a considerable positive correlation between students' grade point average and their science test score, as well as a moderate correlation between the number of science credits completed and science test score.

The researchers concluded that high school seniors who had taken a course or courses in agriscience and natural resources fared as well as their non-agriscience counterparts on a standardized science achievement test. While this result is promising for agricultural literacy proponents, there is much that remains unclear in the study. To what extent did the agricultural teachers use the agriscience curriculum? Was the curriculum used as the developers intended? The most notable correlations were related to number of science credits taken and overall grade point average. Is the science knowledge obtained cumulative based on greater exposure to science in general? Are students with higher grade point averages more disposed to achieving higher test scores?

How much of the result can truly be attributed to the presence or absence of an agricultural context? Many studies seeking to attribute achievement scores to curricular components, like this one, often raise more questions than are answered. As such, agricultural literacy studies turned to assessing student attitudes and *gains* in knowledge.

Igo, Leising, and Frick (1999) investigated food and fiber knowledge of 800 kindergarten through eighth grade students, in three states, using a case study methodology. Analysis of pre- and posttest knowledge scores indicated significant knowledge gains in each of the five agricultural theme areas outlined by the *Food and Fiber Systems Literacy Framework* (Leising, Igo, Hubert, Heald, & Yamamoto, 1998) from which the teachers at the study sites infused agricultural concepts.

Interestingly, the posttest scores for students in grades six through eight at all three schools were lower than the pretest scores. While this study's primary purpose was to "assess food and fiber knowledge of selected students . . . before and after receiving instruction" (Igo, Leising, and Frick, 1999, p. 50) based upon an agricultural literacy curriculum's benchmarks and standards, the researchers reported data related to classroom observations and teacher interviews.

Data alluded to a range of experiences in implementing the intended curriculum. Specifically, some of the teachers "have difficulty making both formal and informal connections to Food and Fiber Systems" (p. 53). Other teachers at the same site, however, utilized not only the materials from the framework, but performed well above expectation in "connecting much of their textbook activity to the standards and benchmarks" (p. 53). The data, as reported, further indicated that some teachers incorporated material far more than others did via classroom decorations, dramatizations,

and construction of raised bed gardens. The study expectation, however, was that each teacher report a minimum of two lessons or connections to the food and fiber systems *per month*.

The researchers recommended a need for teacher in-service training to assist in making relevant connections between the subject matter areas and the food and fiber systems; however, a further need would be to investigate why there is such a wide disparity between the intended and the implemented use of the agricultural literacy curriculum.

In a subsequent study investigating the effects of the *Food and Fiber Systems Literacy Framework* (Leising et al., 1998) on student knowledge, Leising, Pense, and Igo (2001) sought to compare differences and determine relationships based upon the framework and its five thematic areas, as well as the number of teacher-reported instructional connections made to the framework. This study used a quasi-experimental nonequivalent control group design with 21 kindergarten through eighth grade classes as the treatment group, and seven kindergarten through eighth grade classes as the control group.

The researchers administered a researcher-developed pretest in an effort to control for preexisting food and fiber systems' knowledge. The grade grouped instruments, correlated to the benchmarks in the *Food and Fiber Systems Literacy Framework*, had reliability coefficients ranging from 0.78 to 0.95.

The treatment was a two phase professional development program designed to, first, introduce and orient teachers to the project, framework, standards, benchmarks, and lesson plans, as well as to provide hands on experience with the lesson plans. Secondly,

the teachers were introduced to the project website and were provided assistance in planning instructional time to address the food and fiber systems concepts.

The agricultural literacy standards and benchmarks were infused throughout the 1998-1999 academic year, and a post-test was administered to the treatment and control groups in May 1999. Additionally, teachers in the treatment group reported specific connections to the framework regarding standards, benchmarks, and themes infused in the curriculum.

The control group initially had higher pre-test agricultural knowledge mean scores in all grade groupings than the treatment group. However, the treatment group showed significant increases in mean scores following the post-test, whereas the control group failed to demonstrate similar gains. The researchers further indicated no existing relationship between the number of connections the teachers made and any increases in student knowledge.

The researchers highlighted the need for further exploration into the reasons why the number of connections and student knowledge failed to correlate with one another. Specifically, they recommended exploring how teacher behavior impacts agricultural knowledge acquisition; however, *behavior* may better be defined. By exploring teacher fidelity of use, as well as addressing teacher comfort level and efficacy using the framework, future studies may be enhanced.

Another pre- and post-test attitudinal and knowledge study was conducted by Brown and Stewart with 264 seventh and eighth grade students from 20 schools (1993). Using a single group, quasi-experimental design with length of instruction and type of test as the independent variables, Brown and Stuart sought to determine to what extent

students' post-test agricultural knowledge and attitudes differed from pre-test scores. Additionally, they wanted to assess to what extent students' knowledge scores differed in relation to varying lengths of agricultural instruction throughout the experiment.

Dependent variables were the achievement and attitude scores derived from the Agricultural Knowledge Assessment Instrument and the Agricultural Attitude Survey, respectively. Intact classes were randomly assigned to either 6, 9, or 18 weeks of agricultural instruction, with the test instruments administered before the first day of instruction and following the final day of instruction.

Following a multivariate analysis of variance using achievement scores and attitude scores as the dependent variables, the researchers ascertained that there was a significant difference between the pre-test and post-test knowledge scores. The mean knowledge scores improved from 26.3 to 28.6, with a possible total score of 40. Secondly, the researchers concluded that there was a significant difference in student attitude toward agriculture as the mean attitude scores increased from 103.5 to 108.3. Finally, multivariate analysis of variance was conducted to test for significance in knowledge and attitude based on length of agricultural instruction. Neither of those objectives was rejected as the length of instruction had no apparent effect on mean attitude and knowledge scores.

Overall, the mean knowledge scores were not high, even though students' attitudes were generally favorable toward agriculture. The researchers opined that both achievement and attitude can be significantly altered through the use of an agricultural literacy curriculum.

Meischen and Trexler (2003) conducted a qualitative study to move away from simply assessing students' knowledge of agricultural facts. Instead, their study was performed in an effort to discover students' understanding of the processes meat undergoes from farm to table.

Using a McDonald's™ hamburger to instigate conversation with seven purposefully selected fifth grade students, Meischen and Trexler conducted clinical interviews with the students and asked them to draw concept maps explaining the process they believed meat underwent from the farm to its ready-to-eat McDonald's™ form. The researchers based their interview questions on the benchmarks outlined in the *Food and Fiber Systems Literacy Framework* (Leising et al., 1998), as well as on science literacy benchmarks.

Based on interview and concept map analyses, the researchers concluded that, although the students grew up in a rural area, all of the students lacked understanding and conversational comprehension of the practices involved in producing and processing meat for consumption. Generally, the students understood that meat comes from animals, but could not articulate the appropriate processes involved, including transportation, processing, distribution, and consumption. Summarily, the researchers pointed to agricultural literacy efforts that continued to focus on educating students in urban and suburban areas about the origins of food. The authors articulated a need for education about the more complex uses and contributions of agricultural products, and their impacts on daily life, as a means to change student schemas as they pertain to agriculture (Meischen & Trexler, 2003).

Teacher Preparation and Professional Development

In an ex post facto study using static group comparison, Wilhelm, Terry, and Weeks (1999) sought to determine if participation in an in-service program influenced teachers' use of an agricultural literacy curriculum. The population consisted of 826 teachers on the Oklahoma Agriculture in the Classroom newsletter mailing list, and compared sample groups of 52 teachers who previously attended a summer institute with 93 who had not attended. The mailed questionnaire requested demographic data, as well as information pertaining to teacher use of topics related to agriculture, number of agricultural lessons used to teach core academic areas, and teacher development experiences. Examination of demographic data was in agreement with more recent studies conducted in other states related to Agriculture in the Classroom programs (Bacon, Anderson, & Watkins, 2005; Bellah & Dyer, 2005). Specifically, more than 90% of the participants in both groups were female and the group possessed an average of fifteen years of teaching experience.

This descriptive study determined that teachers who participated in the summer institute in-service program taught more topics related to agriculture, from a greater number of resources, than did their non-institute counterparts. While Agriculture in the Classroom resource materials were used by both groups of teachers, the researchers concluded that attending the summer institute was more "beneficial in helping teachers use concepts related to agriculture in their teaching" (Wilhelm, Terry, & Weeks, 1999, p. 73). Furthermore, the institute teachers reported statistically significant greater emphasis on teaching the core areas of language arts and information skills.

Although this study sought to compare means between the groups, the data reported included mean numbers of agricultural lessons taught in each of the core areas. Teachers

in both groups reported teaching more than 70 math and more than 63 science lessons using agriculture as the context. The researchers recommended longitudinal studies to determine *how* institute teachers were integrating agriculture into their teaching. Where this study, and others like it, fell short was that the researchers neglected to recommend investigation into *why* so many teachers, regardless of attendance at the summer institute, were choosing to use agriculture as a context for teaching.

In another 1999 study, Elliot posed a similar question regarding teacher agricultural literacy knowledge and opinions attributed to participation in professional development activities. This descriptive survey study used mailed questionnaires to describe differences in agricultural knowledge base, as well as opinions toward agricultural issues, among 139 Arizona educators who had registered for an agricultural literacy conference. Further, the researcher sought to ascertain the existence of relationships as determined by knowledge base, opinions toward agriculture, and demographics of the respondents. The two comparison groups were comprised of those who attended the conference and those who registered, but did not attend the conference.

Elliot's study revealed that conference attendees were statistically higher in their correct answers on the knowledge base portion of the study than were their non-attending counterparts. Moreover, those who attended were also statistically more favorable in their opinions toward agriculture than those who failed to attend the conference. Finally, results indicated that previous agricultural experience and background had bearing on neither knowledge, nor opinion scores; however, those educators who reported an affinity for raising plants recorded significantly higher knowledge scores than those without such experience. This study reinforced the need for quality professional development

programs if educators are expected to carry out the agricultural literacy for everyone edict, and to deliver accurate agricultural information to students while doing so.

In an investigation into agricultural educators' mathematical problem solving ability, Miller and Gliem (1994) utilized an ex post facto study involving 34 Ohio agricultural educators. Through static group comparison of teachers who chose to participate in one of four sprayer calibration workshops to non-participants, the researchers held three extraneous variables constant: gender, use of calculators, and one hour for completion of the researcher-designed questionnaire. The questionnaire assessed teacher mathematical problem solving ability through use of 15 open-ended mathematical word problems, which the researchers determined to have a Cronbach's alpha reliability score of .85. Respondent attitude was determined by a 15-item Likert-type instrument with a Cronbach's alpha of .87.

Miller and Gliem established that the relationship of ACT math score and score on the problem solving portion of the questionnaire was positive and significant. However, the relationship of problem solving scores to number of college level math courses completed was negative and not significant. The researchers opined that student success, with respect to mathematics, is more contingent upon *how* a student is taught, irrespective of *how much* a student is taught. Specifically, the researchers recommended that, "mathematical problem-solving be incorporated into technical agricultural courses taken by undergraduates" (p. 28) who are studying to be agricultural teachers. As such, the context in which preservice agricultural teachers learn about mathematical problem solving will assist them in designing appropriate contextual experiences for their students.

As recently as 2003, Portillo and Leising used agricultural literacy professional development training as a comparison determinant of 90 elementary teachers' agricultural knowledge. Specifically, Portillo and Leising assessed the knowledge of 44 Agriculture in the Classroom (AITC) trained teachers and 46 non-AITC trained teachers. Again using Leising and others' *Food and Fiber Systems Literacy Framework* (1998) as the basis for assessing teacher knowledge, the researchers developed a criterion-referenced test. This test was composed of 50 multiple-choice items distributed across the five thematic areas of the framework.

This study yielded interesting results related to demographic characteristics of the participants. Most notably, the teachers had no previous agricultural experience or background, had little collegiate level agricultural coursework, and almost no agriculturally-related work experience. These results held true irrespective of whether or not a teacher had participated in an AITC professional development activity. As shown in other agricultural literacy studies, teachers are using agriculture as a teaching context without previous background or experience.

Further results from this study indicated that AITC prepared teachers scored higher across all five of the theme areas than their non-AITC trained contemporaries; however, scores overall were significantly low in all but one of the theme areas (History, Geography, and Culture). Portillo and Leising's final recommendation underscored the necessity for overtly establishing the connections between how teachers learn about agriculture and the context regarding the way individuals use agriculture on a daily basis.

Much of the existing body of research related to teacher preparation and professional development, with respect to agricultural literacy curricula, focused on

teacher knowledge and attitudes as determined by their participation, or lack thereof, in a particular agricultural literacy professional development program. Terry, Herring, and Larke (1992) took a different approach in assessing fourth grade teachers' understanding and use of agricultural concepts. In particular, the researchers wanted to not only determine teachers' knowledge about and perceptions of agriculture, but they sought to identify the type and degree of assistance most desirable for supplementing teachers' agricultural literacy teaching skills.

To obtain an accessible set of respondents, the researchers used cluster sampling to collect data, via mailed questionnaire, from 510 fourth grade teachers. The questionnaire consisted of 97 items distributed throughout five parts which included teacher personal and professional demographics, attitudinal psychographics (perceptions), and agricultural knowledge. Further areas investigated were identification of agricultural concepts currently taught by the respondents and level of interest in assistance programs for teacher professional development.

Following analyses of the data, the researchers highlighted the low knowledge scores of the respondents. More than 73% of the teachers earned scores that resulted in categorization into the *unacceptably low knowledge* category. Parallel to a mean knowledge score of 48.4% across the respondents, more than 90% of the teachers perceived that *agriculture is farming and ranching only*.

Despite low knowledge scores and misperceptions revolving around the agricultural industry, respondents reported teaching agricultural concepts to their students, on average, more than 16 hours per year. Not surprisingly, of the respondents who reported teaching agricultural concepts, more than 70% ranked *textbook chapters*

about agriculture as their number one most commonly used resource for agricultural information.

Where this study departed from other similar studies was in its investigation into the types of assistance teachers desired to assist them in using agriculture as a context for teaching. Respondents, by and large, were very interested in *lists of materials currently available, lists of references for personal reading and research,* and opportunities to *consult local agricultural professionals.* Researcher recommendations supported not only a need for lists of available resources, but increased availability of such resources to teachers. Further, recommendations were strongly underscored regarding a need for providing short in-service workshops and graduate coursework for in-service and preservice teachers.

With brain based research as a theoretical underpinning, Thompson and Balschweid conducted an investigation to determine how agricultural teachers perceived the impact of integrating science in agricultural education programs (2000). Most markedly, the researchers wanted to discover teachers' perceptions concerning the role of teacher preparation as integration of science principles becomes more prevalent in middle and secondary agricultural education courses.

The researchers mailed the Integrating Science Survey Instrument to the target population of 111 Oregon Agricultural Science and Technology teachers. Following the initial mailing and a follow-up telephone call, the researchers yielded responses from 106 of the teachers. Results of the questionnaire indicated that 84% of the teachers had participated in one or more professional development activities with a focus on how to integrate science into an agricultural course. Respondent perceptions indicated that they

strongly agreed with the statements that *science concepts are easier to understand for students if science is integrated into the agricultural education program* and that *students are more aware of the connection between scientific principles and agriculture when science concepts are an integral part of their instruction.*

The respondents in this study were vociferous in their agreement that teacher preparation programs must "provide instruction on how to integrate science into the curriculum as a part of the undergraduate curriculum and as in-service for practicing teachers" (p. 78). The researchers further stated, in concurrence with Miller and Gliem (1994), that there is no apparent need for increasing the number of science courses required for undergraduates. Rather, teacher preparation should more strongly emphasize instructional methods courses that teach preservice teachers *how* to integrate science and other curricular disciplines into agricultural courses.

Barriers to Curriculum Implementation

Despite positive teacher and student attitudes toward agriculture, as well as continued research demonstrating the benefits of professional development activities that assist teachers in utilizing agricultural literacy curricula, there are still many barriers preventing teachers from following through with this contextual teaching tool. Conversely, investigations into what they are, and why those barriers exist seems to be the least investigated research area in the agricultural education genre.

Moving beyond cursory investigation of teacher attitudes toward agriculture, Conroy (1999) sought to identify specific barriers to implementing an aquaculture curriculum in secondary agricultural education programs. Using a random sample of 406 secondary agricultural educators, Conroy used a Likert-type survey, and conducted 28 follow-up individual interviews and focus group discussions with 19 teachers, as a means

to identify and compare perceived barriers between current or interested aquaculture curriculum users, and non-users.

Analyses indicated that users and non-users identified the same three barriers, although *t*-tests revealed non-users viewed each as more significant barriers to adoption and implementation than the curriculum users. The three perceived barriers were the considerable costs related to remodeling existing facilities for aquaculture, as well as the cost of equipment for teaching the curriculum; and limited physical facilities available to house the program.

Qualitative analyses of the interviews and focus groups, conducted with educators currently involved with aquaculture, exposed three major underlying themes related to perceived barriers. Although survey data indicated a concern for quality materials as a barrier to implementation, most interviewees point to increased availability of high quality instructional materials for aquaculture enthusiasts. Further, actively engaged aquaculture instructors believe that cost should not be a consideration when weighing adoption of an aquaculture curriculum. Teachers encouraged use of a variety of resources and grant funding programs as means to obtain equipment for an aquaculture program. Finally, qualitative analyses indicated that the third greatest challenge to aquaculture instructors was the time investment required for successful implementation. Inflexible feeding schedules, proximity to tanks for emergencies, and regular classroom interruptions by other agricultural instructors inquiring about the program were all examples of the time restrictions placed on agricultural teachers using an aquaculture curriculum.

Conroy's studied revealed that there are deeper issues to discover than survey material may reveal. Few teachers have opportunity to learn about this curriculum innovation beyond the awareness stage, and have developed much higher negative perceptions regarding the barriers surrounding successful implementation than current adopters of the innovation. As such, Conroy indicated, "since it is not possible to anticipate where these discrepancies will surface prior to the administration of the survey, more attention should be given to the value of mixed methods design" (p. 8). Conroy inadvertently indicated a need for a stronger theoretical base, such as the Concerns Based Adoption Model. Though this study indicated that teachers might choose to adopt a curriculum innovation, in spite of seemingly insurmountable barriers, the research fell short in investigating *why* and *to what extent* the curriculum innovation is used.

Examining perceived barriers of delivering an integrated science and agricultural curriculum, Balschweid and Thompson (2000) conducted a pre-experimental, static group comparison study using quantitative and qualitative analyses. The control group consisted of fifteen teachers who completed the program and obtained teaching positions during the previous five academic years. The six preservice teachers in the treatment group were involved in a three-phase process during the 1996-1997 academic year. To reinforce the concept of integration, the first phase utilized a microteaching course in which the preservice teachers viewed sample agricultural lessons and were taught science integration methods. The second phase occurred during the student teaching experience where the student teachers were required to deliver a science-based lesson to a class. The caveat was that the student teachers had to collaborate with an onsite science teacher for equipment and supplies, as well as to observe the science teacher in a classroom setting.

The third phase involved student teacher participation in a one-week job shadow and team teaching experience, with science teachers, at an urban middle school.

Subsequent to the completion of each phase, qualitative interviews were conducted with each of the treatment group participants. The purpose of the interviews was to ascertain changes in perception related to amount of science curriculum to be integrated, receptivity of science teacher collaboration, and agricultural teacher efficacy in integrating science principles. Additionally, results of the treatment group interviews were used to frame questions for development of the quantitative survey administered to both the treatment and control groups at the conclusion of the study. The data from this survey were used for comparison between the treatment and control groups.

Results of Balschweid and Thompson's study concluded that treatment group student teachers initially indicated that 74% of their agricultural curriculum should include integrated science principles (2000). Three months later, after completing student teaching, the estimate dropped to 54% with amount of time to incorporate the principles being the most frequently cited reason for the decrease. Although the student teachers indicated that integration of science and agricultural principles was important, a desire to teach scientific principles accurately and the reality of the preparation and collaboration time required were perceived as major barriers to curriculum integration. Further, the treatment group participants all "expressed concern that it would take at least one year, and most likely three years" (p. 43) to successfully integrate science principles on a regular basis into the agricultural curriculum. These results are in line with Hall and Hord's view of change as a process that may take several years to establish, rather than as a single event (2000).

Interestingly, the recommendations from Balschweid and Thompson's work call for 1) a focus on interdisciplinary teaching methods courses for preservice teachers; 2) joint in-service workshops for agricultural and science teachers; and 3) follow-up longitudinal studies, with the same treatment group, to ascertain continued integration of science into agricultural curriculum.

Balschweid and Thompson expanded their agricultural literacy research to capture the attitudes and perceived barriers of in-service agricultural science and business teachers toward integrating science in agricultural education courses (2002). Specifically, survey results from 170 teachers indicated that more than 70% of the respondents had attended a workshop on integrating science, and 39% indicated possession of a science endorsement. While mean scores indicated teachers generally agreed that using agriculture as the integrating context for teaching science principles created greater student awareness between agriculture and science (M=4.18), one of the greatest barriers to implementation was a lack of in-service training available to teachers.

This study neither addressed a specific recommended curriculum for science integration, nor provided any parameters for determining fidelity of curriculum use. Although teachers were favorable toward integrating science principles into agricultural curriculum, a weakness of this study clearly lies in the subjective manner with which participants can define "integration" within their personal framework.

Theoretical Perspective

Hall and Hord's (2001) *Concerns Based Adoption Model* (CBAM), was originally developed in 1973 and was the theoretical framework selected for this study (see Figure 2-4). 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 (SoC), Levels of Use (LoU), and Innovation Configurations (IC) 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).

Change Facilitators

Hall and Hord 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 (1987). 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.

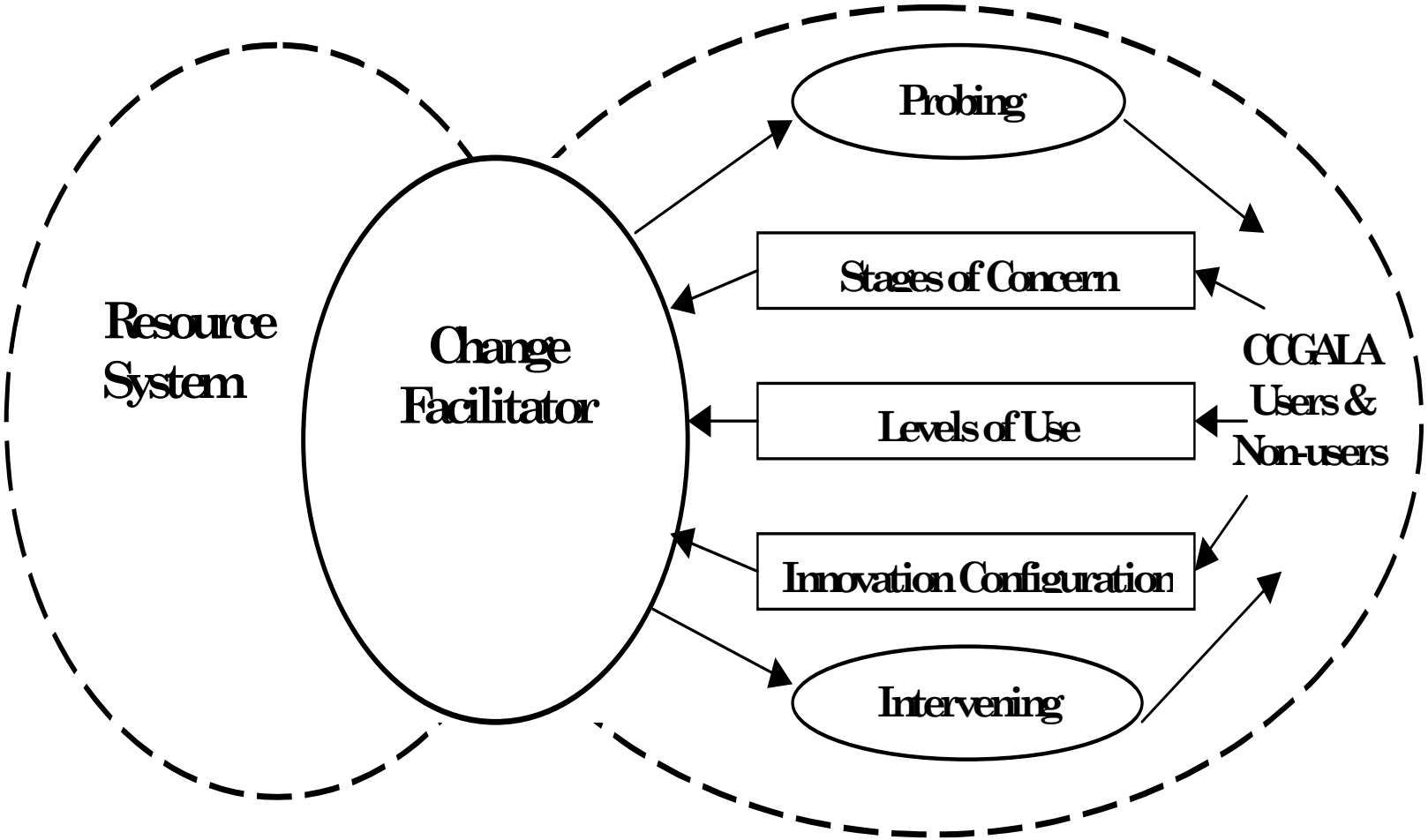


Figure 2-4. Concerns Based Adoption Model (Hall & Hord, 2001)

Resource Systems

In explaining the evolution of CBAM, 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, the developers and subsequent users of CBAM view change as a process (Hall & Hord, 2001). According to Loucks-Horsley (1996), CBAM suggests "the importance of paying attention to implementation for several years" (¶ 2) as it may take as long as three years for early stage concerns to be resolved and later stage concerns to emerge. Without ongoing resource and facilitator support, sustained use of the innovation is difficult to achieve.

Stages of Concern

The Stages of Concern (SoC) component of CBAM relates directly to how teachers perceive the educational innovation they are asked to implement (Willis, 1992). Through Hall and Hord's research (2001), the Stages of Concern Questionnaire (SoCQ) was developed to identify the stage of concern of a teacher with respect to the educational innovation under consideration. CBAM's seven stages of concern include *awareness* (0), *informational* (1), *personal* (2), *management* (3), *consequence* (4), *collaboration* (5), and *refocusing* (6). These stages span the areas of little concern, knowledge, or involvement about 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, that in no way indicates that the previous stage of concern is alleviated (Willis, 1992).

The SoCQ assists change facilitators and educational evaluators in determining into which category of Fuller's patterns of concerns (as cited in Hall & Hord, 2001) teachers fall: unrelated, self, task, or impact (see Figure 2-5).

	Stages of Concern		Expressions of Concern
Impact	6	Refocusing	How and what else can I do with this?
	5	Collaboration	How does this fit with what my peers are teaching?
	4	Consequence	How is this impacting my students?
Task	3	Management	Do I spend enough/too much time implementing this?
Self	2	Personal	Do I know enough to use this effectively in my class?
	1	Informational	Can you tell me more about this?
Unrelated	0	Awareness	I don't know. I don't care. What are you talking about?

Figure 2-5. Stages of concern (Hall & Hord, 2001)

A majority of research studies using the Concerns Based Adoption Model utilized the Stages of Concern Questionnaire as the primary evaluation instrument. Some studies focused solely on this component, while others incorporated one or more of the other components into the study.

Levels of Use

Levels of Use correspond 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.

Innovation Configurations

When an educational innovation is introduced to teachers, there are two factors with which those teachers must cope: the psychological effect of the change itself and the practice 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 to 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 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 (2001).

Concerns Based Adoption Model Empirical Research

In a study assessing a peer-mentoring program for preservice teachers in the development and implementation of Internet-based resources and web design, second and third year students served as mentors to first year elementary education students (Ward, West, & Isaak, 2002). Initially, 45 mentors developed Web Quests appropriate for use by kindergarten through sixth grade students as a means for the mentors to acquire Internet and technology integration skills. Subsequently, the mentors worked with 65 first year students to develop web pages focusing on Internet resources available for teachers. Through this experience, the mentors learned the technology skills and then taught those skills through a peer teaching and mentoring system.

The researchers used the SoCQ to assess pre and post experience concerns related to the peer-mentoring experience. Using multivariate repeated measures analysis to compare within subject changes, results indicated 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.

Qualitative analysis of a final open-ended questionnaire indicated that continued emotional and professional support of the protégés by the mentors provided a more comfortable environment for the protégés to ask questions, and to develop greater confidence in their own abilities. In this manner, the mentors are comparable to change facilitators working continuously with the protégés on an individual basis to facilitate the sustained use and comfort with the innovation (Horsley & Loucks-Horsley, 1998).

In an earlier study, researchers in Australia employed the Concerns Based Adoption Model in structuring professional development activities for twelve teachers applying newly acquired computer hardware and software skills as an integral part of

their teaching practice (McKinnon & Nolan, 1989). From February, 1988, until November 1989, researchers administered the Stages of Concern Questionnaire four times and analyzed results using the protocol designed by CBAM developers. During that time, participant concerns shifted from Stage 2 (*personal*) concerns to Stage 1 (*information*) concerns. The researchers attributed intense early focus on *personal* and *refocusing* (Stage 6) concerns to problems with technology during the first term of the study. Program designers used the first SoCQ as a diagnostic tool to redesign technology configurations. Secondly, all subsequent SoCQ results were used to conduct professional development activities to meet the concerns of the teachers, rather than on the schedule of activities the program designers initially planned.

McKinnon and Nolan introduced another dimension to their study by conducting the Levels of Use branching interview three times from May, 1989, until November 1989. Following first term technology difficulties, and parallel to the participant stages of concern, 58% of the participants remained at levels below routine use. In response, program designers focused subsequent professional development activities and interventions on assisting teachers to reach, at least, a *routine* level of use. By the end of the study, seven of the teachers (58%) reported levels of use at or greater than *routine*.

McKinnon and Nolan's study raised concern in that they failed to address the high levels of Stage 0 (*awareness*) reported throughout the study. Stage 0 indicates that a participant is aware that a change is being introduced, but there is little interest in, or knowledge about, the change (Hall & Hord, 2001). According to this study, the relative intensity of Stage 0 group concerns increased from just over 50% at the first SoCQ administration to nearly 80% at the third administration.

Dass (1997) collected qualitative data from 24 elementary school teachers implementing the Collier Chautauqua Program (CCP) of instructional approaches for science teachers. The CCP promoted a constructivist approach to teaching science using real-life experiences as the context for teaching. After conducting formal interviews and observations, as well as utilizing informal communication and written responses over a 2 year period, Dass used the stages of concern as category codes to analyze the data collected. To establish reliability of the data, Dass cross-checked different forms of data furnished by the same individual, and thereby ensured consistency by the respondents.

The stages of concern provided useful insight into what the teachers were experiencing while implementing the CCP at the classroom level, and specific recommendations for continued successful support and use of the CCP. Despite participating in summer workshops and continuing professional development activities throughout the school year, data demonstrated that teachers land at different stages of concern during the implementation process. Concerns ranged 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 CCP's affects on student SAT scores, and of being at odds with team teachers not using the program.

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). Furthermore, to avoid

program attrition, teachers must be supported in their efforts by change facilitators, continued professional development follow-up, and that educational innovations are useful only when part of an overall vision of change that is shared by all stakeholders.

Recognizing that teachers are the gatekeepers to their classrooms as it relates to curricular and pedagogical decisions, Luehmann (2002) conducted a qualitative study to develop a clearer picture of how teachers come to adopt a curricular innovation. Specifically, the researcher assumed a dual role as researcher and change facilitator working with a convenience sample of 30 secondary science teachers to ascertain their perceptions while they considered adoption of a technology-rich, project-based curriculum. The researcher used qualitative methods to garner a richer perspective of "the thinking processes of pre-service and in-service teachers" (p. 13). Using a technology-rich water quality unit, teachers were asked to consider the unit for classroom adoption. Data collected included teacher "think aloud" comments during interaction with and appraisal of the water quality unit. Additionally, the researcher used field notes to record concerns expressed and to which curricular features the teachers attended.

As the change facilitator, the researcher spent extensive time introducing the curriculum and observing the teachers as they proceeded through the appraisal process. Through observation and analyses, the researcher concluded that, if widespread use is to occur, curriculum designers must have essential understanding of criteria teachers use in constructing and supporting judgments regarding the potential adoption of a curricular innovation. Notably, teachers use the criteria of trust, identity, process goals, and situational constraints in considering whether to adopt an innovation and change facilitators serve valuable roles in strengthening the validity and credibility of those

criterion. Additionally, study implications indicated that curriculum designers should allow for adaptation, rather than providing inflexible, scripted innovations. This implication supported the need for developers and change facilitators to construct and use innovation configuration checklists as a means to establish *ideal*, *acceptable*, and *unacceptable* uses of a curriculum innovation to accommodate individuality within the change process.

Utilizing the Concerns Based Adoption Model to develop distance education courses with instructional designer and subject matter writing expert teams, Kember and Mezger (1990) described strategies for assisting lecturers as they moved through each of the seven stages of concern. The purpose for the course development teams was for the instructional designers to assist the subject matter experts (writers) with incorporation of more student-centered teaching approaches, and to move away from a traditional lecture-based format. Thirty-eight higher education lecturers were charged with the task of writing distance education courses within their subject matter expertise area. Because of the close, harmonious relationship within the designer/writer teams, a formal questionnaire assessing writer stages of concern was deemed inappropriate. Rather, the designers, considered experts in teaching methodology, used informal conversational assessment to categorically assign each writer to a stage of concern.

The researchers used Kendall's tau coefficient to establish reliability and consistency of the stages of concern assessments and found a high level of agreement. Further, consensus was reached on 31 of the 38 writers. Kember and Mezger noted that consensus was reached in only three of the cases as writers often indicated primary characterizations of one stage, while exhibiting tendencies from another stage. This is

consistent with the stages of concern profiles and scoring indicators, whereby participants are often on the cusp of moving into, or out of, a secondary stage (Hall & Hord, 2001). Additionally, studies using the Stages of Concern Questionnaire regularly report the two highest percentile scores as indicators.

Interestingly, this study referred to the instructional designer as a change *agent*. As defined by Rogers, a change agent serves as a support mechanism in hopes that a person will subsequently adopt a given innovation (2003). In this study, data indicated that the instructional designers played a significant and ever-changing role as each writer moved through his or her stages of concern. Kember and Mezger specifically indicated that the success of the program was contingent on the team aspect of curriculum development: "If successful development is to occur, academics need on-going support so that they can pass through the successive stages of concern" (1990, p. 61).

Finally, the researchers used the stages of concern to develop strategies for the instructional designers to assist writers at specific stages of concern. Recognizing that participants at the *awareness* and *informational* stages required a workshop that introduced the basics of distance learning, materials development, and appropriate types of study materials, the researchers also remarked that significant time in this workshop must be allotted for writers to raise concerns. Throughout these stages and into the *personal* stage, a high level of instructional designer investment through individual attention was critical to assist experienced teachers in moving away from their traditional teaching methods that were inadequate or inappropriate for a distance learning medium.

In this study, writers exhibited the highest levels of concern at *management* and *consequence*. At the *management* stage, the writers were ready to move through the

process in the most efficient manner possible, thus realizing and using the instructional designer as a valued resource and respected colleague. At this point, the instructional designer assumed more of an advisory and collaborative role. Shifting into *consequence* stage, the writers were willing to solicit and respond to feedback from students via informal and formal evaluation measures and became open to ideas that were more creative. At the *collaboration* stage, the interaction between designers and writers moved to a free exchange discussion. The writers suggested their own solutions, rather than voicing concerns and waiting for the designers to provide solutions.

This study provided strategies for instructional designers to utilize as new writers subsequently participate in the program. However, the researchers missed a valuable opportunity to highlight and explore the roles of the instructional designers as change *facilitators*.

McCarthy (1982) combined the stages of concern in CBAM with her own 4Mat System in an effort to improve staff development within teacher in-service opportunities. Distinctively, McCarthy synthesized the work of Kolb's Experiential Learning Model and other learning style researchers to create four major learning style composite descriptions. Based on the assumption that change is personal and occurs over time, McCarthy superimposed the stages of concern onto her 4Mat model to assist staff developers in internalizing the notion that techniques applicable to each of the four learning styles should be employed approximately 25% of the time during a professional development workshop. More importantly, McCarthy noted that knowledge of participants' individual learning styles was not a necessary component of the workshops. Rather, the researcher used her understanding of the stages of concern to present and

facilitate learning style research to teacher practitioners in an experiential learning manner.

After raising awareness about learning style and brain-based research among the participants, McCarthy then facilitated activities that allowed them to develop plans for applying the research in their own classrooms and to serve as consultants to one another. In effect, she structured the staff development agenda to present her research in a manner that addressed the concerns of the teachers and effectively engaged the Self, provided a tangible opportunity for Task, and empowered the teachers to focus on the Impact of the innovation when returning to their students and classrooms (1982).

Change is personal, and innovations should allow for adaptation by innovation users. These premises are spotlighted continuously in CBAM studies. As such, the model itself may allow for adaptability. In a 1992 study by Bailey and Palsha, the researchers used the Stages of Concern Questionnaire with 142 early childhood professionals participating in staff development workshops geared toward working with families. Before participation in the workshop, participants were administered the Stages of Concern Questionnaire. Following the instructions to score the device, the participants were grouped into an appropriate stage (0-6).

To test the psychometric properties of the Stages of Concern Questionnaire, the researchers conducted three analyses of the groupings: factor analysis to determine if the items loaded into the original seven factors, Cronbach's alpha to determine internal consistency and reliability of the subscales, and Pearson's Product Moment to assess the relationships among the stages of concern. The results of this study indicated that a five-factor solution was the best grouping of items for this particular sample. The researchers

proposed revised stages that included *awareness*, *personal*, *management*, *impact*, and *collaboration*.

Only two studies could be found within the field of Agricultural Education that used the Concerns Based Adoption Model as its theoretical framework – neither of which were published in peer-reviewed journals. In each of those studies the researchers sought to determine the expressed stages of concern of teachers who had used innovative *Physical Science Applications in Agriculture* and *Biological Science Applications in Agriculture* curricula in junior and senior agriscience courses in Illinois. Petrea (1994) reported that teachers expressed intense concerns about the relevance of the innovation and how the innovation would affect student outcomes (*impact* concerns). Teachers' second highest levels of intensity dealt with the demands of the innovation and the instructor's role in integrating the respective curriculum into existing subject matter (personal concerns). Ohene-Adjei (1995) reported similar concerns from the same population using the new curricula, indicating that those concerns may have long-term implications for teacher professional development.

Summary

Responding to nearly twenty years of consistent calls for an increase in agricultural literacy levels throughout the formal education process (National Council for Agricultural Education, 2000; Committee on Agricultural Education in Secondary School, 1988), a plethora of agricultural literacy curriculum innovations have been developed and implemented. These innovations have taken a variety of forms from unit plans to comprehensive, systematic resource guides. Further, these innovations have been used to infuse and integrate agricultural concepts from kindergarten through grade twelve.

There is overwhelming empirical research indicating that positive attitudes toward a particular subject matter precludes action taken to implement a specific curriculum. Similarly, the agricultural education research genre has reinforced theoretical underpinnings linking attitudes, perceptions, and beliefs to agriculture. The research expanse exists when seeking evidence describing the experiences beginning teachers encounter when deciding if, when, and how to implement such curricula. In particular, the research base in agricultural education is significantly lacking information related to elementary teachers' sustained use and success with agricultural literacy curricula.

This chapter sought to review existing literature related to agricultural literacy curriculum innovations, especially as they pertain to agriculture and its usefulness as a context for teaching across the subject matter areas in an elementary classroom. Further, the purpose of this literature review was to explain the Concerns Based Adoption Model as it relates to teachers' stages of concern, levels of use, and innovation configurations when engaged in adoption, or rejection, of an educational innovation.

Although this model has been in existence for more than three decades, agricultural education research is sparse in its use. Rather, many innovation adoption studies in agricultural education publications relied on Rogers' Diffusion of Innovations theory (2003). Moreover, these studies were geared toward production agriculture (Gamon & Scofield, 1998; King & Rollins, 1995; Rollins, 1993).

While there are published studies focusing on curriculum innovations in the agricultural education research genre (Conroy, 1999; Flowers, 1990; Wilson, Kirby, & Flowers, 2002), none employed CBAM as a theoretical basis for uncovering the experiences teachers undergo in the change process. Notably, two unpublished studies

were uncovered that related to agricultural education curriculum innovations (Ohene-Adjei, 1995; Petrea, 1994.

Although several studies in this chapter focused solely on one dimension of the model, the research consistently revealed a complex intertwining of the components that serve as an effective composite tool for understanding teacher concerns throughout the adoption process. In a 1991 article calling for agricultural education research programs with high impact, Williams outlined specific guidelines to help the profession reach that goal. Most notable, Williams highlighted that agricultural education research is often limited to other agricultural education research. With such narrow constraints, it becomes increasingly difficult for agricultural education to develop an in-depth theoretical framework respected by others outside of the profession. Instead, Williams posited, "Our research should be carefully tied to the applied sciences of agriculture and education and be rooted in the theories of biology, physics, psychology, and/or sociology" (p. 11). The Concerns Based Adoption Model can fit that need as it pertains to any agricultural education innovation, as well as providing a means to recognize the "importance and power of individual differences" (Burns & Reid, 1998, p. 21).

CHAPTER 3
METHODS

In an assessment of agricultural literacy research conducted since the NRC's edict for agricultural literacy instruction at all grade levels, Doerfert (2003) uncovered a significant chasm in agricultural education research with respect to investigating changes in teacher behavior, as a result of increased agricultural literacy efforts. Could such a break in the research body of knowledge be attributed to the type of research models and methodologies used in assessing adoption and use of curriculum innovations in agricultural education? This study sought to investigate and provide more balance to the implementation side of an agricultural literacy curriculum innovation.

Chapter 1 outlined the basis for conducting this study. A portrait of how current educational accountability practices shape beginning teacher concerns was painted, and recognized that teachers, as curriculum gatekeepers, are concerned with far more than simply what to teach to their students.

The purpose of this research study and appropriate research objectives were stated. Research methods were overviewed, relevant key terms defined, assumptions delineated, and study limitations stated.

Chapter 2 provided a review of relevant literature related to agricultural literacy curriculum innovations. This literature review revealed a clear incongruence of research methods and approaches to agricultural literacy curriculum developments. While research generally focuses on student and teacher attitudes, barriers to curriculum implementation, and professional development opportunities provided in tandem with

agricultural literacy curriculum introduction, there were few studies that utilized similar or consistent theoretical perspectives as a basis for conducting the research. As such, the Concerns Based Adoption Model arose as a viable theoretical perspective for this study. There is an exiguous amount of research conducted in the agricultural education research genre using this model; therefore, most of the Concerns Based Adoption Model empirical research presented in chapter 2 was focused on educational studies outside of this arena.

This chapter outlines the research methodology employed in this study. To that end, it presents the research perspective and methodology, the population and sample, researcher subjectivity, instrumentation, and data collection and analyses.

The purpose of this study was to explore the concerns, levels of use, and innovation configurations of elementary teachers in their use and sustained adoption of the *California Curriculum Guidelines for Agricultural Literacy Awareness* as a resource for teaching the California state educational standards in grades kindergarten through eight.

Research Perspective

Summative evaluation research practices are typically conducted at the end of an educational program in an effort to provide potential consumers, funding agencies, and supervisors with a judgment regarding the worth or merit of the program (Worthen, Sanders, & Fitzpatrick, 1997). In a review of literature, Cronin (1986) ascertained that curriculum evaluations are frequently mislabeled as curriculum implementation studies. Popular evaluation models concentrate primarily on comparing student achievement outcomes across whole class means, while curriculum implementation studies seek to examine teacher fidelity to the intended use of the curriculum as written.

This descriptive study focused on elementary teachers' attitudes toward, and experiences with, the use of agriculture as a context for teaching across the elementary

content areas. Further, teachers' Stages of Concern (SoC) in using and implementing curriculum guidelines for using agriculture as a context for teaching across the content areas were explored. Additional assessment of teacher Levels of Use (LoU) and the Innovation Configurations (IC) teachers employed, when applicable, in adapting an agricultural literacy curriculum to fit individual needs were conducted.

Research Methods

To address the guiding research objectives, a qualitative study was conducted, using some quantitative components to frame the study. As noted earlier, the Concerns Based Adoption Model was used to guide this project. Willis (1992) noted that the benefit of CBAM to educational change processes is that the model contains no standard set or sequence of strategies. This characteristic facilitated the use of the CBAM model in addressing the objectives that guided this study.

Population and Sample

The target population for this study was elementary teachers who participated in a five-week preservice course introducing instructional activities for integrating agriculture into elementary curriculum at a West Coast university (N=48). Enrollment in the course was voluntary, and could be taken in lieu of the biology requirement for preservice elementary teachers. Preservice teachers who enrolled earned three credit hours toward their degree program.

The course, entitled *AGC X424: Organizing and Teaching K-6 Standards and Awareness in Agricultural Literacy,* was offered during the summer quarter of 2002 and 2003. Twenty-five students enrolled in the summer of 2002, and 23 students enrolled in the summer of 2003. The students were contacted during the spring of 2005 and asked to complete a mailed questionnaire. Based on the self-reported number of days using

agriculture as the teaching context, a purposive sample of participants (*n*=10) was selected for in-depth personal interviews. The sample consisted of four participants who reported using the *California Curriculum Guidelines for Agricultural Literacy Awareness (CCGALA)* the greatest number of days, and six who did not use the *CCGALA* at all.

Researcher Subjectivity

The researcher's subjective relationship to the research topic was one of longevity and complexity. As a student of agriculture from an early age, the researcher participated in production agricultural activities with both plants and livestock. Further, the researcher participated in agricultural youth organizations such as 4-H and FFA.

The researcher's family came from a long tradition of Midwestern farmers, and has experienced the benefit of learning in an agricultural context. With such an upbringing, the researcher wanted to share that knowledge and those experiences with others. After graduating from a West Coast college of agriculture, the researcher taught agricultural science to high school students for three and one-half years. At the conclusion of this high school teaching experience, the researcher accepted a position as a lecturer in an agricultural education and communication program where she worked with preservice and in-service agricultural teachers.

During the researcher's last two summers before leaving for graduate school, the researcher's subjective relationship became more closely aligned to this study. During the summers of 2002 and 2003, the researcher served as the instructor for the participants who learned about the *CCGALA*. As such, this study was not designed to assess the participants' experiences during initial exposure to the curriculum guidelines. Rather, the study's design provided an opportunity for participants to pursue any direction related to his or her experiences through exposure to, and use of, the curriculum. Further, the

researcher's relationship to participants was one whereby rapport was already established, so participants were anticipated to have a high degree of comfort during the interview process.

Instrumentation

To assess teacher stages of concern, levels of use, and innovation configurations, three protocols were used, as recommended by Hall and Hord (2001). Following is a breakdown of each recommended instrument.

Teacher Attitudes and Perceptions of Agriculture

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 (Appendix D). Descriptive statistics were used to analyze this preliminary survey data.

The researcher used a similar questionnaire with 130 elementary teachers, from an East Coast 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. Scale reliability analyses yielded Cronbach's alpha levels of .70 and .87 for the *Attitudes Toward Agriculture* and the *Attitudes Toward Agriculture as a Teaching Context* constructs, respectively.

Stages of Concern

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 *California Curriculum Guidelines for Agricultural Literacy Awareness* (Appendix E). The theoretical test/retest reliability ratings for the Stages of

Concern Questionnaire ranged from .65 to .86 and internal consistency alpha-coefficients ranged from .64 to .83 (Hall & Hord, 2001).

Secondly, Hall and Hord's SoCQ Quick Scoring Device (2001) was used to assess the participants' current stage of concern relative to the *CCGALA* (Appendix F). 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.

Levels of Use

Hall and Hord's (2001) "Branching Interview" protocol was followed to assess participants' level of use (see Figure 3-1). This was an appropriate protocol for this study since Hall and Hord (1987) reported results of a specially designed validity study for the LoU interview procedure. Essentially, branching interviews were conducted with 45 teachers who were then assigned an LoU classification. To validate those ratings, 17 of those teachers were selected for independent researcher observations. Hall and Hord reported a correlation of .98 between the field observer's ratings and the interviewer's Level of Use ratings.

As questions relative to participant experiences emerged during the course of the interviews, those pathways were probed to describe the experiences of the participants in using the curriculum guidelines. Any barriers to implementing agriculture as the teaching context, where applicable, were explored and described.

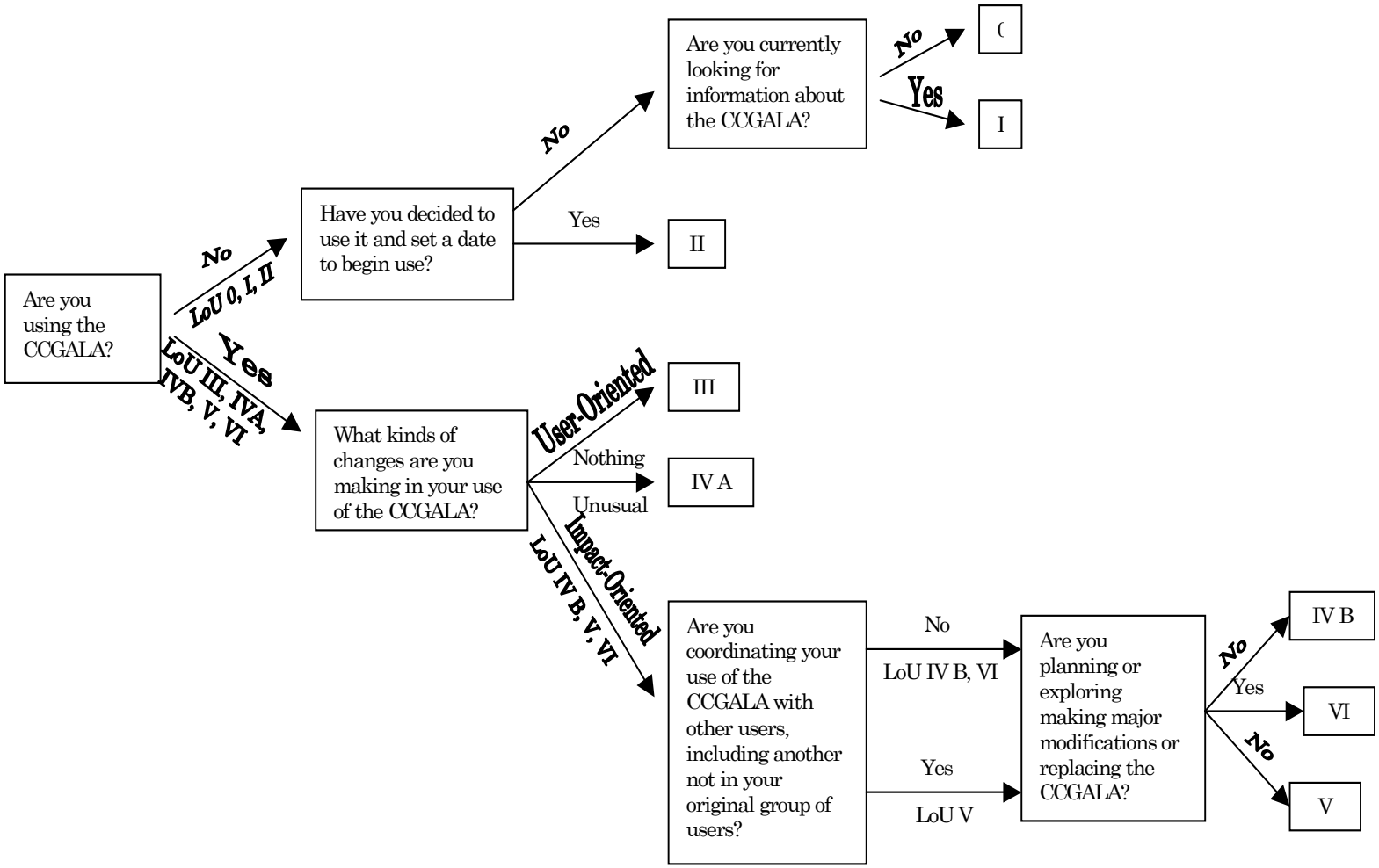


Figure 3-1. Format for the LoU branching interview (as adapted from Hall & Hord, 2001)

Innovation Configurations

The third dimension and diagnostic tool in the Concerns-Based Adoption Model is Innovation Configuration (IC). Understanding of IC in the adoption and evaluation of an educational change is critical for program developers. Educational programs must be designed with an ideal use in mind, but developers must also recognize that there will be variations based upon individual use of the program. To that end, developers can design a concept of ideal, acceptable, and unacceptable adaptations of the educational program (Hall & Hord, 2001).

Innovation Configuration Map Development

To identify essential components for "ideal," "acceptable," and "unacceptable" uses of the curriculum innovation, a Delphi approach was used. The CBAM developers recommend using a team of 2 to 7 experts familiar with the development and the intended use to create an innovation configuration map. To accomplish this goal with respect to *CCGALA* and this study, an iteration of the Delphi technique was employed. In a synthesis of research related to Delphi use, Martin and Frick (1998) indicated one of the most recent uses of the technique was for curriculum planning.

Twenty *CCGALA* developers, veteran teachers currently using the *CCGALA*, and teacher educators were contacted via electronic mail and asked to participate as appropriate experts. According to Dalkey (1969), 13 responses are necessary to produce a minimum reliability score where $r = .80$. In accordance with accepted Delphi descriptors (Martin & Frick, 1998), all experts who agreed to participate were asked to respond to the following three open-ended questions:

1. What would one observe in classrooms where *CCGALA* is used well?

2. What would one observe in classrooms where *CCGALA* is not being used well?
3. What will teachers and students do when *CCGALA* is in use?

From those responses, a holistic organizing scheme of possible components was developed, as outlined in Hall and Hord (2001). Those components are representative of what the innovation should entail when it is in use. That list, and a corresponding draft of word pictures describing the variations (2001), was sent out as the second round of the Delphi for consideration and revision by the panel of experts.

The final round sought opinion convergence on the components and variations, as well as drawing boundaries determining ideal, acceptable, and unacceptable uses. All correspondence with the experts during development of the innovation configurations map was facilitated through the use of electronic mail communication. The resulting innovation configurations map was cross-referenced with in-depth interview transcript data to depict the adaptations *CCGALA* users made, if any, in their implementation of agriculture as a context for teaching.

Innovation Configuration Interviews

Concurrent with the innovation configuration map development, in-depth interviews were conducted with the selected sample. In accordance with recommendations by Heck, Stiegelbauer, Hall, and Loucks (1981), *CCGALA* respondents were asked to describe their use of *CCGALA*. Furthermore, questions and probes related to responses provided by the participants were captured and analyzed to distinguish use of the components identified in the general innovation configuration map. Each respondent's self-reported use of *CCGALA* was then categorized as "ideal," "acceptable," or "unacceptable."

Perceived Outcomes Experienced by Teachers

Qualitative methodology often seeks to describe the perceived experiences from the point of view of the subject (Glesne, 1999). As such, teacher perceptions related to student outcomes were core to understanding the successful implementation and adoption of *CCGALA*. The final method used to collect data from respondents was via in-depth interviewing. Marshall and Rossman (1999) described Seidman's three types of interviews. The first type of in-depth interview focuses on the respondent's past experiences with the phenomenon of interest. The second type is that which is conducted to focus on the present experience. The third type "joins these two narratives to describe the individual's essential experience" (p. 112). In this study, the phenomenon of interest was the *California Curriculum Guidelines for Agricultural Literacy Awareness,* and the third interview type was used to create a narrative enjoining the participants' past and present experiences with the *CCGALA* and to describe the collective "essence" of participants' experiences using agriculture as a context for teaching at the elementary level.

Data Collection

Initial data were collected via electronic mail to conduct the Delphi study for innovation configurations map development. A mailed questionnaire was sent to population members to assess their attitudes and perceptions toward using agriculture as a context for teaching. From returned questionnaires, a purposive sample was selected for follow-up on site interviews. There were no perceived risks or benefits to survey respondents.

Each interview took approximately 75 minutes to complete with respect to Stages of Concern, Levels of Use, Innovation Configuration, and perceived outcomes and

experiences. While a guiding semi-structured interview protocol was utilized (Appendix H), the researcher probed respondents for further information when appropriate. All interviews were audio taped and transcribed, and member checks were conducted.

Whenever possible, the participants were allowed to select the setting in which the interviews were conducted. Three interviews were conducted in participants' homes, five in university or public libraries, and two interviews were conducted in participant classrooms.

There were no perceived risks to respondents. Participants selected for the follow up, on site interviews were compensated with a $100 honorarium. Participant home school districts were reimbursed for substitute teachers costs incurred as a result of the interview procedure. Compensation was provided through a W. K. Kellogg Foundation grant via the California Food and Fiber Futures (CF3) project.

Data Analysis

Demographic data, means, and frequencies related to participant attitudes toward agriculture and its contextual use at the elementary level were analyzed using the Statistical Package for Social Sciences (SPSS) version 13.0.

Stages of Concern Analysis

The Stages of Concern data were analyzed in accordance with Hall, George, and Rutherford's (1998a) recommendations for scoring the Stages of Concern questionnaire. Specifically, the researchers recommended that hand scoring be conducted in instances where only a small number of questionnaires are used. The 35 statements on the questionnaire correspond with seven fundamental areas of concern (Figure 3-2). Each stage of concern was represented by five statements on the questionnaire. The five

statements attributed to a particular stage of concern area were summed to determine the raw score for that concern area.

Item Number	SoC	Item Number	SoC	Item Number	SoC	Item Number	SoC
1	4	10	5	19	4	28	2
2	6	11	4	20	6	29	5
3	0	12	0	21	0	30	0
4	3	13	2	22	6	31	6
5	5	14	1	23	0	32	4
6	1	15	1	24	4	33	2
7	2	16	3	25	3	34	3
8	3	17	2	26	1	35	1
9	6	18	5	27	5		

Figure 3-2. Item numbers and associated stages of concern (Hall, George, & Rutherford, 1998a)

Subsequent to the summation of the seven raw scores for each participant, the raw scores were converted to a percentile with first and second high score stages used to establish a profile for innovation users and non-users.

Level of Use Analysis

The Levels of Use relative to the *CCGALA* were determined through parallel methods. Based on individual responses to the series of questions contained within the Levels of Use Branching Interview protocol, a preliminary level of use classification was assigned. Triangulation of this classification, as well as deeper reflection on the classification, was established through investigation and interpretation of transcript data from the semi-structured interviews. Overt and indirect statements pertaining to use, or lack thereof, of the *CCGALA* were lifted from the text and compared with the typical responses outlined in the “Guidelines for Rating Overall Level of Use” (Loucks, Newlove, & Hall, 1998).

Perceived Outcomes and Experiences Analysis

In line with qualitative inquiry, interview data were coded and analyzed from raw text to relevant text to repeating ideas until common themes were identified (Auerbach & Silverstein, 2003) regarding elementary teachers' experiences using agriculture as a context for teaching math, science, language arts, and social science competencies. Specifically, Marshall and Rossman (1999) recommended three phases in the analysis of data. The first phase requires the researcher to write a full description of his or her own experience with the phenomenon, in an effort to set aside and bracket any preconceived notions about the topic. This phase was completed through the researcher's subjectivity statement.

The second phase is referred to as reduction and consisted of the researcher grouping the data around themes that emerged from the interview data. Similar to Partis (2003), the researcher initially read each transcript carefully with the focus being on the whole to "identify the implicit or essential basis of the participants' experience" (p. 12) with agriculture as a context for teaching at the elementary level. Partis recommended holding each identified theme against the overall context of the story while determining if the theme's interpretation fits not only the context of the respective section, but of the text as a whole. In following the recommendation, the researcher sought to reflect critically on the choices made in selecting essential themes. Further, distracting and extraneous speech was deleted from the text. Similarly, repeating words that did not contribute to the overall statement were deleted.

As further noted by Marshall and Rossman (1999), the culminating stage of the inquiry methodology was via the collective description of the essence of the phenomenon of interest. Also referred to as structural synthesis, this stage involves exploration of all

possible meanings and perspectives based on the collected data. This final stage in the in-depth interview analysis concludes with a "description of the essence of the phenomenon and its deep structure" (p. 113).

In terms of meeting tests of rigor in qualitative inquiry, Guba and Lincoln (1983) outlined four terms and processes to parallel the scientific concerns of internal and external validity, reliability, and objectivity. Specifically, they challenge researchers to establish credibility, fittingness, and the ability to audit and confirm findings (1983).

To cushion against what Guba and Lincoln (1983) termed distortions "resulting from the researcher's presence" (p. 105) and "from the fieldworker's involvement" (p. 105) with the subjects, and to guard against bias on the part of the researcher, credibility was established through the initial attitude instrument mailed to the target population. Contact with the population members by the researcher had been absent for two to three years, dependent upon when the participants completed the course, before the study. The focus of the semi-structured interview was placed on the participants' experiences using the educational innovation *after* initial exposure to it. Direct questions pertaining to the course or methods used to introduce the innovation were purposefully omitted from the interview guide; thereby limiting a respondent's perceived need to respond in a favorable manner to interview inquiries.

Another threat to credibility is related to the manner in which data is collected. Guba and Lincoln (1983) indicated several methods for addressing data collection credibility, and two methods were employed in this study. Utilizing multiple data collection approaches to obtain and validate data served as a means to structurally corroborate and establish links between the methods (1983). Secondly, member checks

were conducted with the data as transcribed to ensure that respondents' experiences with the *California Curriculum Guidelines for Agricultural Literacy Awareness* were accurately captured.

With respect to fittingness, this study was clearly designed to focus on only the experiences of the selected sample and should not be generalized beyond the target population. For the quantitative instruments utilized, reliability and validity measures were investigated and reported.

Audit trails were established at all points along the data collection continuum. Specifically, triangulation was achieved by weighing results from the multiple quantitative instruments against the experiences and outcomes described by the participants throughout the interview. In all cases where interview data were used, textual quotations were included in the findings.

One additional manner in which an audit trail was established was via the use of an independent researcher analyzing the transcripts from an objective viewpoint. Guba and Lincoln (1983) indicated that "a second judge should be able to verify" (p. 122) categories identified by the initial judge. A second researcher analyzed two transcripts for themes. This researcher was connected neither to the study participants, nor to the institution in which the participants were enrolled in during the course. The independent auditor's results coincided with the researcher's findings.

Summary

This chapter addressed the research methods and design employed to meet the six main objectives initially introduced in Chapter 1. Specifically, the research perspective and qualitative inquiry approach were presented, and researcher subjectivity was

recognized and explained. Moreover, population and sample, instrumentation, data collection, and data analyses were proffered.

The design of this study was descriptive in nature and the attributes of a qualitative approach, supported with quantitative methods where appropriate, were discussed. The population of this study was all elementary teachers who enrolled in and completed a course at California Polytechnic State University in San Luis Obispo, California (*N*=48). The course related to integrating an agricultural literacy curriculum innovation and was entitled *AGC X424: Organizing and Teaching K-6 Standards and Awareness in Agricultural Literacy.* This course was offered during the summer quarter sessions of 2002 and 2003.

The sample of the study was purposively selected based on initial data collected from the population and a justification for the purposive selection was offered (*n*=10). The sample was used to collect in-depth and rich data to investigate the experiences of the teachers as related to the *California Curriculum Guidelines for Agricultural Literacy Awareness.*

The instruments utilized in the study were demarcated. The instruments were common to the Concerns Based Adoption Model and included the Stages of Concern questionnaire and the Level of Use Branching Interview protocol. Additionally, a researcher developed attitudinal questionnaire was utilized with the target population. Further, the researcher served as a qualitative instrument in examining the semi-structured interview transcripts for emerging themes and essential stories relative to participant experiences with the *California Curriculum Guidelines for Agricultural Literacy Awareness.* Credibility and fittingness of the methodology, along with the

ability to confirm and audit the findings of the study were expounded. Data collection and analysis methods served as the capstone discussion in this chapter.

CHAPTER 4
RESULTS AND DISCUSSION

Chapter 1 outlined the basis for conducting this study. A portrait of how current educational accountability practices shape beginning teacher concerns was painted, and recognized that teachers, as curriculum gatekeepers, are concerned with far more than simply what to teach to their students.

Also in Chapter 1, the purpose of the study and appropriate research objectives were stated. Research methods were overviewed, relevant key terms defined, assumptions delineated, and study limitations stated.

Chapter 2 provided a review of relevant literature related to agricultural literacy curriculum innovations. This literature review revealed a clear incongruence of research methods and approaches to agricultural literacy curriculum developments. While research generally focused on student and teacher attitudes, barriers to curriculum implementation, and professional development opportunities provided in tandem with agricultural literacy curriculum introduction, there were few studies that utilized similar or consistent theoretical perspectives as a basis for conducting the research. As such, the Concerns Based Adoption Model arose as a viable theoretical perspective for this study. There is an exiguous amount of research conducted in the agricultural education research genre using this model; therefore, most of the Concerns Based Adoption Model empirical research presented in Chapter 2 was focused on educational studies outside of this arena.

Chapter 3 outlined the research methodology and described the design utilized in this study. To that end, Chapter 3 delineated the research perspective and methodology,

population and sample, instrumentation, and data collection and analyses procedures, as well as acknowledged researcher subjectivity.

This chapter presents the findings that emerged from this study. The results address the objectives of the study and explore the concerns, levels of use, and innovation configurations of elementary teachers in their adoption and sustained use of the *California Curriculum Guidelines for Agricultural Literacy Awareness* as a resource for teaching the California state educational standards in grades kindergarten through eight.

The target population for this study was elementary teachers who participated in a five-week pre-service course introducing instructional activities for integrating agriculture into elementary curriculum at a West Coast university (N=48). As outlined in Chapter 3, initial data collection occurred via a mailed, researcher-developed questionnaire to assess population demographics and attitudes toward agriculture. The use of agriculture as a context for teaching elementary students across the grade level content standards was also assessed.

Of the 48 members of the target population, six could not be contacted for participation in this study. Therefore, the accessible population was reduced to 42 participants. 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.

Accessible Population Demographic and Psychographic Characteristics

One hundred percent of the returned instruments were deemed usable for assessing the demographic and psychographic characteristics of the target population. Female respondents comprised 88.9% of returned instruments (n=32). The average age of

respondents was 25 years old. Respondents ranged in age, however, 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 not all of the respondents currently held teaching positions (see Table 4-1), 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.

Table 4-1. Summary of Currently Teaching Participants and their Use of Agriculture and the *California Curriculum Guidelines for Agricultural Literacy Awareness* (*n*=36)

Statement	*f*	%
Yes, I am teaching agriculture using *CCGALA*	8	22.2
No, I do not use *CCGALA*, 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

While 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 *California Curriculum Guidelines for Agricultural Literacy Awareness* or was infused via other preparation means. Figures 4-1 and 4-2 indicate the distribution of teachers according to the type (*public, private,* or *charter*) and location (*urban, suburban,* or *rural*) of school in which they are currently teaching.

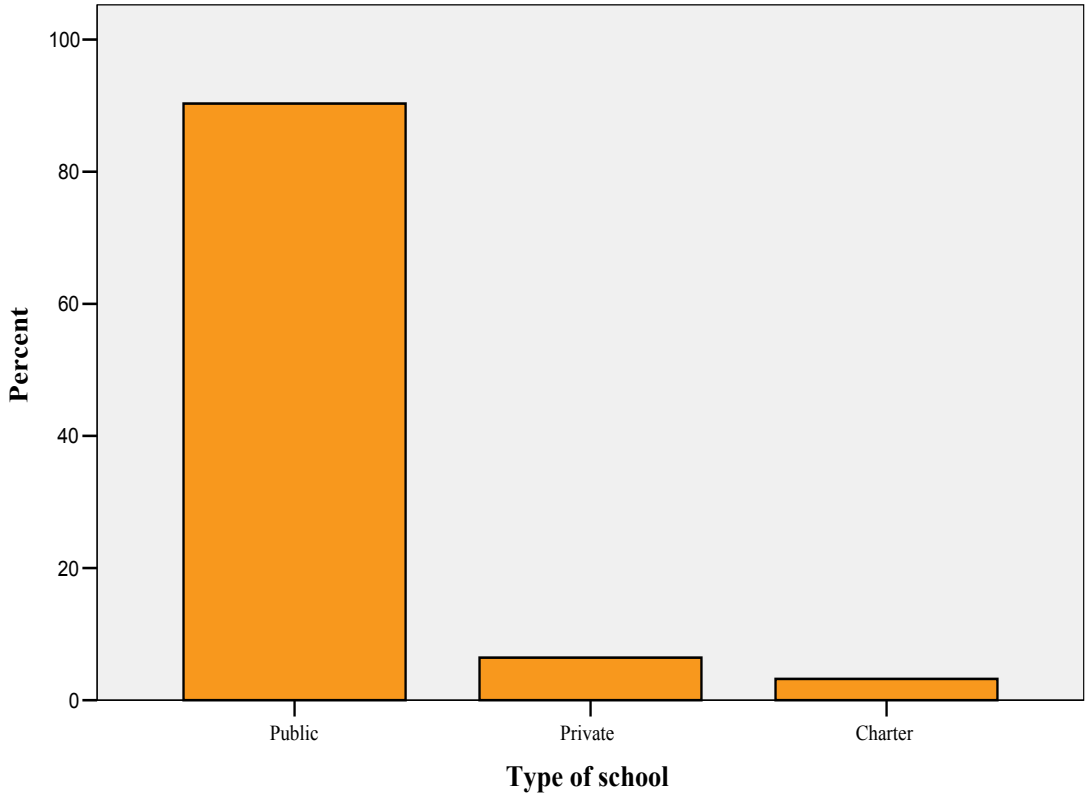


Figure 4-1. Type of school

Of the 31 respondents who are 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.

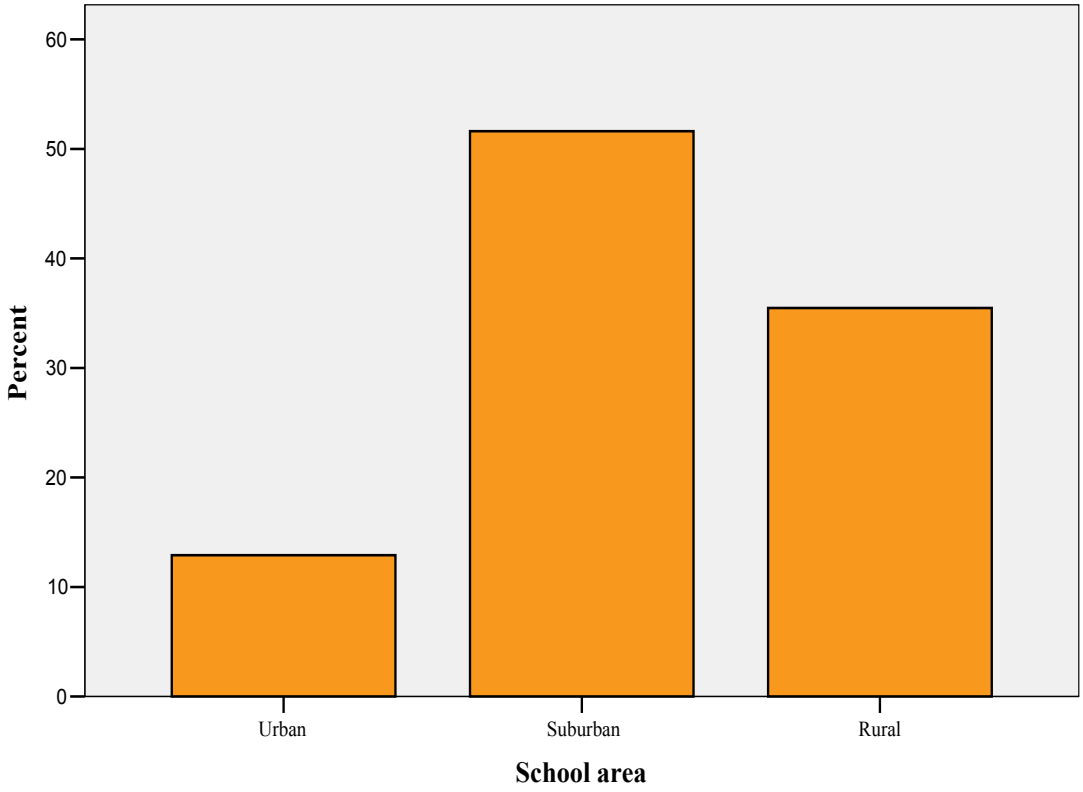


Figure 4-2. Location of school

With respect to 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). Merely five respondents reported teaching in an urban setting.

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

Previous Agricultural Experience

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 4-2).

Table 4-2. Previous Agricultural Experience

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 *AGC X424*.

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 *AGC X424: Organizing and Teaching K-6 Standards and Awareness in Agricultural Literacy.* This is the course from which this study's population was comprised.

Attitude toward Agriculture

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 4-3). Scores ranged from 18 to 30. The mean score was 23.92 (*SD* = 2.53).

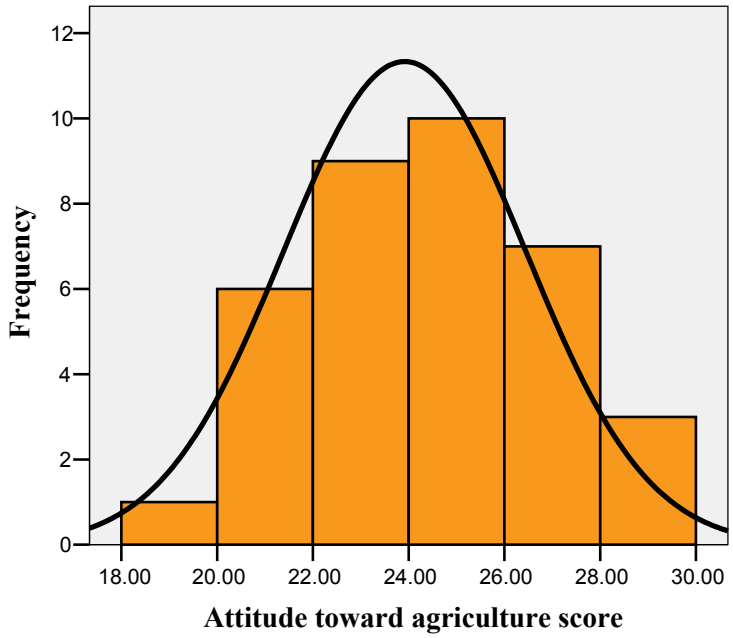


Figure 4-3. Distribution of participant attitudes toward agriculture scores

Individual item means ranged from 3.28 to 4.86 on positively worded items (see Table 4-3). The two negatively worded items resulted in means ranging from 1.61 to 2.28 and were reverse coded to calculate the attitude toward agriculture score.

Table 4-3. Attitude toward Agriculture Construct Summary of Individual Items

Item	*M*	*SD*
Agriculture provides beneficial products for society	4.86	.35
Agriculture provides safe products for society	4.28	.66
There are numerous career opportunities in the field of agriculture	4.11	.82
Most teachers in my school have a positive image of agriculture	3.50	.88
Most students in my school have a positive image of agriculture	3.28	1.06
Most elementary teachers are unaware of the impact of agriculture on their daily lives	2.28[a]	.91
Most elementary students are unaware of the impact of agriculture on their daily lives	1.61[a]	.65

Note. Likert-type scale was 1=Strongly Disagree to 5=Strongly Agree.
[a]Negatively worded items. Coding was reversed when computing attitude score.

Attitude toward Agriculture as a Context for Teaching Elementary Students

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 4-4). Valid data were collected from 36 respondents with scores ranging from 62 to 96. The mean score was 82.67 (*SD*=7.89).

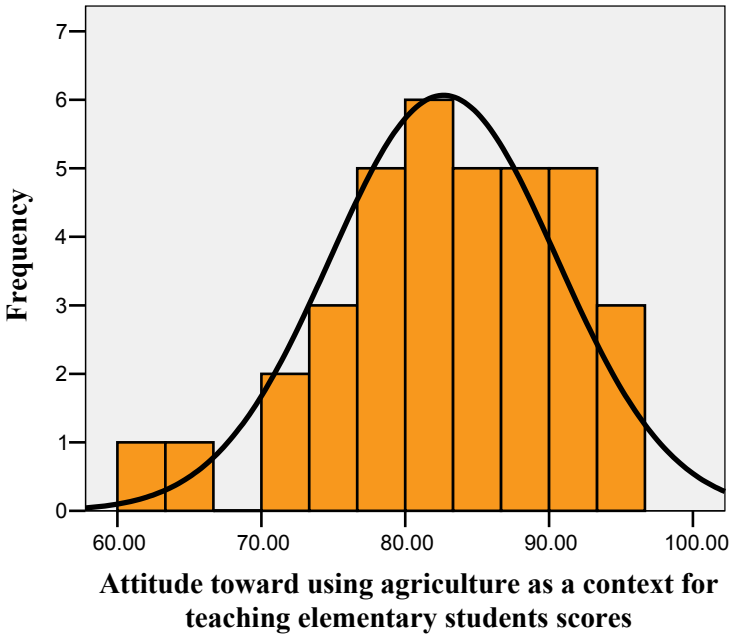


Figure 4-4. Distribution of participant attitudes toward agriculture as a context for teaching elementary students scores

Individual item means ranged from 2.19 to 4.72 across all items (see Table 4-4). With respect to attitudes toward multiple disciplinary applications of agriculture as an integrating context, congruence between science and agricultural integration recorded the highest mean (4.56, *SD*=.61) followed by social science (4.39, *SD*=.69), language arts (4.25, *SD*=.65), mathematics (4.25, *SD*=.69), and fine arts (4.06, *SD*=.89), respectively.

Table 4-4. Attitude toward Using Agriculture as a Context for Teaching Elementary Content Standards Construct Summary of Individual Items

Item	*M*	*SD*
All elementary students should be aware of agriculture	4.72	.45
Agriculture should be offered in both urban and rural areas	4.58	.55
Agriculture integrates multiple disciplinary applications in:		
Science	4.56	.61
Social science	4.39	.69
Language arts	4.25	.65
Mathematics	4.25	.69
Fine arts	4.06	.89
Elementary education about agriculture can help protect the environment and our natural resources	4.47	.61
Every elementary student would benefit from some instruction about agriculture	4.44	.77
Using agriculture as the context for teaching makes cross-disciplinary instruction more meaningful	4.17	.66
Infusing agriculture into elementary classrooms makes academic principles more meaningful to students	4.17	.66
Stronger ties should be made between agriculture and elementary curricula	4.14	.64
Infusing agriculture into elementary classes is beneficial for lower achieving students	4.11	.71
Elementary agriculture curriculum should become more cross-disciplinary based	4.06	.63
Teaching using agriculture as the context is effective in helping students understand the subject matter	4.06	.72
Using agriculture as the context motivates students to learn	3.92	.77
Infusing agriculture into elementary classes is beneficial for higher achieving students	3.89	.67
Learning is easier for students when teachers use agriculture as the context	3.47	.65
Increased emphasis on using agriculture as the teaching context produces little change in students' achievement	2.58	.55
Agriculture in elementary schools is most beneficial to students in rural areas	2.19	.82
Agriculture in elementary classes should be offered primarily in urban communities	2.19	.79

Note. Likert-type scale was 1=Strongly Disagree to 5=Strongly Agree.

Purposively Selected Sample

As previously delineated in chapter 3, a sample of the target population was purposively selected based on initial instrument response to demographic questions regarding teacher use of the *California Curriculum Guidelines for Agricultural Literacy Awareness* (*CCGALA*) as a mechanism for integrating agriculture across the elementary

content area standards. Four respondents who indicated use of the *CCGALA,* along with six respondents who reported no use of agriculture as a context for teaching, were selected for participation in the remainder of the study as it pertained to the remaining research objectives. The demographic characteristics of the sample can be viewed in Table 4-5.

Table 4-5. Summaries of Purposively Selected Sample Participants

ID	Gender	Age	Years teaching	Grade currently teaching	Agricultural background	Use of *CCGALA*	Days taught agriculture	School type	School location	Agriculture attitude score[a]	Elementary attitude score[b]
204	Female	24	2	4th	Collegiate & production	Yes	100	Public	Suburban	26	90
211	Female	25	1	7th	Collegiate	Yes	30	Public	Urban	24	90
212	Female	24	1	1st	1 college course	Yes	200	Public	Suburban	27	80
236	Female	23	1	1st	1 college course	Yes	50	Private	Suburban	23	96
207	Female	27	2	8th	1 college course	No	0	Public	Rural	24	84
247	Female	23	1	5th	1 college course	No	0	Public	Rural	28	80
240	Female	23	1	3rd	1 college course	No	0	Public	Suburban	26	75
215	Male	53	1	K	None	No	0	Public	Rural	28	66
209	Female	24	1	5th	1 college course	No	0	Public	Suburban	21	79
219	Female	23	1	7th-8th	Collegiate	No	0	Public	Suburban	18	71

[a]Population μ=23.92. [b]Population μ=82.67.

Gender, average age, and teaching experience demographics of the purposively selected sample parallel those of the target population (see Table 4-6).

Table 4-6. Summary Means of Sample and Target Population Demographic Characteristics

Characteristic	Sample *X*	Population 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

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).

Objective Two: 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 *California Curriculum Guidelines for Agricultural Literacy Awareness,* each interviewee was asked to complete a Stages of Concern instrument. Instrument developers reported test/retest reliability ratings for the Stages of Concern Questionnaire ranging from .65 to .86 and internal consistency alpha-coefficients ranging from .64 to .83 (Hall & Hord, 2001).

Stages of concern data were analyzed utilizing the Stages of Concern Quick Scoring Device (Hall, George, & Rutherford, 1998a). Raw scores were totaled and summed relative to each stage, as outlined in Chapter 3. Following summation, raw scores were converted to relative intensity percentiles according to the Stages of Concern

Raw Score-Percentile Conversion Chart for the Stages of Concern Questionnaire (see Appendix I).

Individual peak stages of concern were identified for each participant in the sample. Figures 4-5 and 4-6 illustrate the relative intensity of the participants for each respective stage of concern. According to Hall, George, and Rutherford (1998a), the greater the score in a stage of concern, the more intense the concerns are at that stage.

California Curriculum Guidelines for Agricultural Literacy Awareness Non-User Stages of Concern

Figure 4-5 illustrates the distributions of stage of concern relative intensity for those sample participants who indicated they were not using *CCGALA* as a context for teaching across the elementary grade level content standards.

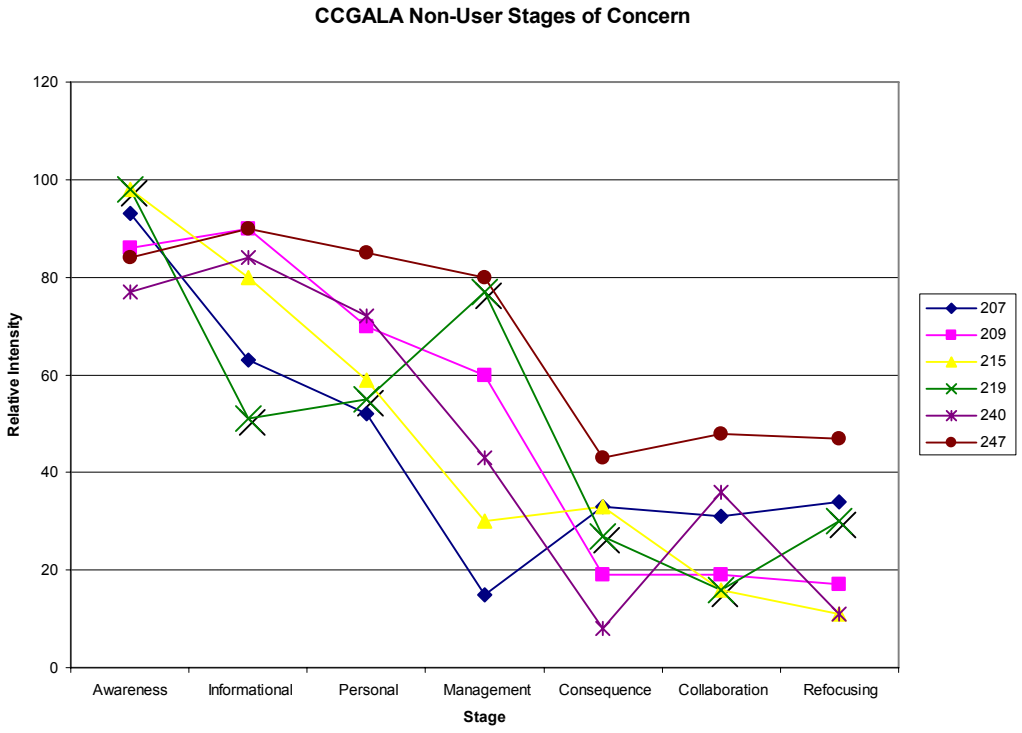


Figure 4-5. Distribution of stages of concern for *CCGALA* non-users (*n*=6)

The highest stage of concern, with a relative intensity score of 93 (raw score=15), for self-reported *CCGALA* non-user number 207 is *awareness*. The second highest stage of concern is *informational* (relative intensity=63, raw score=17).

The highest stage of concern, with a relative intensity score of 90 (raw score=25), for self-reported *CCGALA* non-user number 209 is *informational*. The second highest stage of concern is *awareness* (relative intensity=86, raw score=12).

The highest stage of concern, with a relative intensity score of 98 (raw score=20), for self-reported *CCGALA* non-user number 215 is *awareness*. The second highest stage of concern is *informational* (relative intensity=80, raw score=22).

The highest stage of concern, with a relative intensity score of 98 (raw score=21), for self-reported *CCGALA* non-user number 219 is *awareness*. The second highest stage of concern is *management* (relative intensity=77, raw score=20).

The highest stage of concern, with a relative intensity score of 84 (raw score=23), for self-reported *CCGALA* non-user number 240 is *informational*. The second highest stage of concern is *awareness* (relative intensity=77, raw score=9).

The highest stage of concern, with a relative intensity score of 90 (raw score=25), for self-reported *CCGALA* non-user number 247 is *informational*. The second highest stage of concern is *personal* (relative intensity=85, raw score=25).

California Curriculum Guidelines for Agricultural Literacy Awareness **User Stages of Concern**

Figure 4-6 illustrates the distributions of stage of concern relative intensity for those sample participants who indicated they actively used *CCGALA* as a context for teaching across the elementary grade level content standards. Peak stage concerns are unique to each individual participant who used the educational innovation.

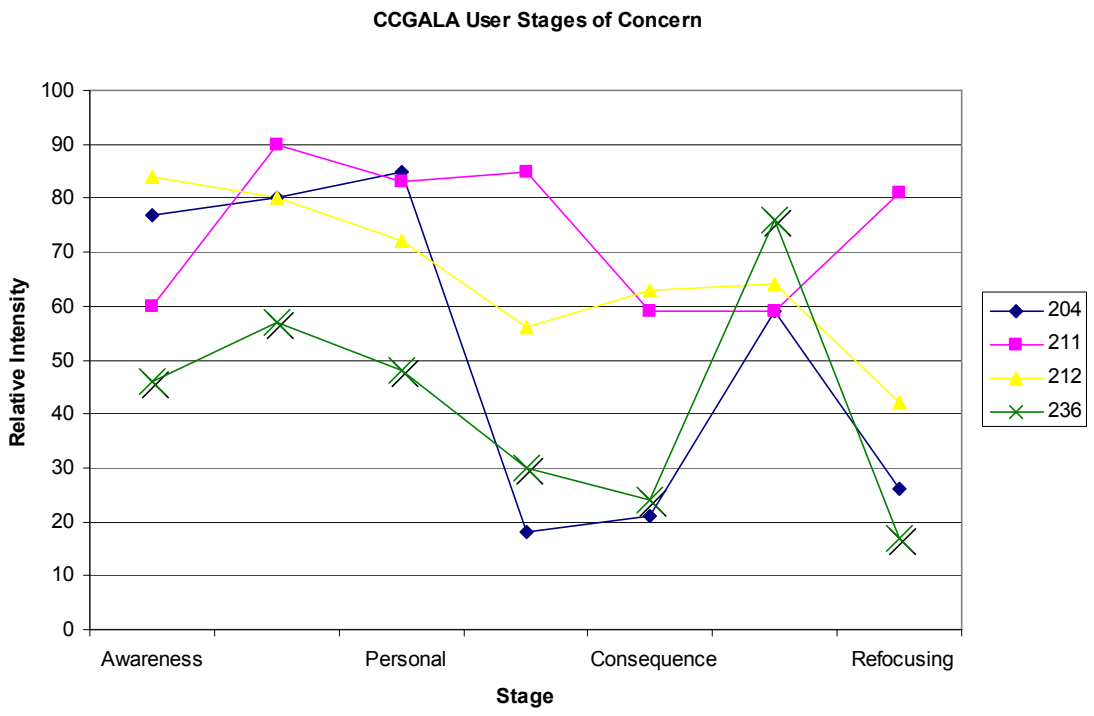


Figure 4-6. Distribution of stages of concern for all *CCGALA* users (*n*=4)

The highest stage of concern, with a relative intensity score of 85 (raw score=25), for self-reported *CCGALA* user number 204 is *personal*. The second highest stage of concern is *informational* (relative intensity=80, raw score=22).

The highest stage of concern, with a relative intensity score of 90 (raw score=25), for self-reported *CCGALA* user number 211 is *informational*. The second highest stage of concern is *management* (relative intensity=85, raw score=21).

The highest stage of concern, with a relative intensity score of 84 (raw score=11), for self-reported *CCGALA* user number 212 is *awareness*. The second highest stage of concern is *informational* (relative intensity=80, raw score=22).

The highest stage of concern, with a relative intensity score of 76 (raw score=27), for self-reported *CCGALA* user number 236 is *collaboration*. The second highest stage of concern is *informational* (relative intensity=57, raw score=15).

An aggregate reporting of data across all sample respondents (*n*=10) is contained in Table 4-7. Data were compiled based on the frequency of individuals that registered the greatest relative intensity for each stage.

Table 4-7. Frequency of Highest Concerns Stage for Individual Users of *CCGALA*

	Highest Stage of Concern						
	0	1	2	3	4	5	6
CCGALA Users	1	1	1	0	0	1	0
CCGALA Non-users	3	3	0	0	0	0	0

Each reported *CCGALA* user in the sample had a unique high stage of concern. No highest relative frequency concerns were recorded for management, consequence, or refocusing stages.

All self-reported non-users of the *CCGALA* in the sample reported a highest relative frequency concern as either *awareness* or *informational*.

Objective Three: Describe elementary teachers' current levels of use of the *California Curriculum Guidelines for Agricultural Literacy Awareness*.

As described in chapter 3, the Branching Interview Protocol was utilized to determine the Level of Use for each participant in the sample. For purposes of reliability, the Branching Interview Protocol was used to objectively assess participants' levels of use (see Table 4-8). Interview transcripts were further analyzed for statements indicating levels of use. Loucks, Newlove, and Hall (1998) provided guidelines for assessing interviewee statements and assigning such statements to a level of use.

Table 4-8. Participants' Level of Use of the *California Curriculum Guidelines for Agricultural Literacy Awareness*

ID	Level of Use	Study classification	Self-reported days taught agriculture
204	III	User	100
211	IV A	User	30
212	IV B	User	200
236	IV A	User	50
207	0	Non-user	0
209	I	Non-user	0
215	0	Non-user	0
219	0	Non-user	0
240	0	Non-user	0
247	I	Non-user	0

Congruent with results from the initial instrument sent to the target population, the selected sample of non-users of the *CCGALA,* registered at either the *non-use* (*n*=4) level or the *orientation* level (*n*=2). The remaining participants were distributed through the *mechanical use* (*n*=1), *routine* (*n*=2), and *refinement* (*n*=1) levels of use, as defined by Hall and Hord (2001). Table 4-9 presents a frequency summary of participants by level of use classification.

Table 4-9. Summary of Frequency of Participants' Levels of Use of the *California Curriculum Guidelines for Agricultural Literacy Awareness*

	Level of Use							
	0	I	II	III	IV A	IV B	V	VI
Number of individuals	4	2	0	1	2	1	0	0

Following the recommended guidelines for rating the overall level of use (Loucks, Newlove, & Hall, 1998), each respondent's in-depth interview transcript was analyzed for statements that reinforced the initial level of use placement. Figure 4-7 and 4-8 illustrate a set of typical responses a rater may encounter when classifying an individual into a level of use.

Level of Use	Classification	Typical Responses
0	Non-User	I don't see in the near future my learning anything about it. I have too many other things to do. I'm really not looking for anything right now. I am not using the innovation and have no plans to. I've heard of it, but at this time I'm not interested in learning anymore about it.
I	Orientation	I've set aside time every week for studying materials about the innovation and talking to people about the possibility of using it. I'm looking at materials pertaining to the innovation and considering using it some time in the future. I've attended a workshop and sat in on classes where teachers are using it.
II	Preparation	I'm looking through all these materials, attending workshops and basically getting organized to use it. I'm going to start using it next semester. Since I'll be using it come September, I'm identifying right now what I'll need and when I should begin to set things up.
III	Mechanical Use	Most of my effort is going into organizing materials and keeping things going as smoothly as possible every day. I'm not really sure what I'll be doing with it later this year or what its effects are and will be. There still seems to be so many problems to work out. I'm planning every night for what I will do the next day. I know in general what I'll do next month, but have not made detailed arrangements. Most of my time I spend with my colleagues trying to get things organized so the innovation can be more effective with students.

Figure 4-7. Summaries of typical responses at levels 0, I, II, and III (as adapted from Loucks, Newlove, & Hall, 1998)

Level of Use	Classification	Typical Responses
IV A	Routine	This year has worked out beautifully. I'm sure there will be changes next year, but basically we'll use the same ideas from this year. The students adjust so nicely to the innovation that I just haven't felt like I've needed to make many changes. We've done evaluations, but all the feedback has been good, so we really have not made any changes based on feedback.
IV B	Refinement	I'm trying to find out from books and workshop sessions how I can combat this effect (described particular effect) that the innovation seems to be having on students. I discuss some of the things that seem to be working best with my children and also the things I'm changing because they aren't as effective as I'd like. I recently developed a more detailed assessment instrument to gain more specific information from students on where I need to change my use of the innovation. I'm in the process of compiling the results. I provide a period each day for students to tell me what's on their minds – what they are liking and disliking about my use of the innovation and why.
V	Integration	A group of us started out working together when we began to use the innovation. Since then, we have branched out and pulled in other teachers including a new teacher this semester. Working together helps me to avoid repetition in content for our children. An experienced faculty member who just joined our group is strengthening our use of the innovation when it comes to more relevant interaction between us and our students. We have increased our original group from two to three because we discovered our students can profit from more coordination of use. Not everyone has all the skills needed to make best use of this innovation when it comes to relevance for children. For that reason, I've been working with another teacher for two years, and recently a third teacher is working with us.
VI	Renewal	I am still interested in the innovation and using it with modifications. Frankly, I'm reading, talking, and even doing a little research to see whether some other innovation might be better for children. There are so many potentially worthwhile innovations when it comes to what happens to children that I'm taking a good look at several of them together with what we are using here. I'm seriously considering combining use of another innovation with the one I'm now using. The combination ought to be more valuable for students.

Figure 4-8. Summaries of typical responses at levels IV A, IV B, V, and VI (as adapted from Loucks, Newlove, & Hall, 1998)

Mechanical use refers to significant effort being placed on the short-term, day-to-day use of an educational innovation. Changes, if any, are centered more on user, rather than client, needs. The participant who registered as a mechanical user of the innovation responded to a question regarding overcoming the perceived barrier of time to more fully implement the *California Curriculum Guidelines for Agricultural Literacy Awareness.* Her statements coincided with the concern of using it as a teaching tool for day to day use without much opportunity, as a new teacher, to plan for future use:

> I feel like if I could just teach the same grade level once, then I would have time to really look at some of those other areas. I was just finishing some work and they asked me, "Oh, what would you want to do for next year?" It's like, well, this year I really developed a plant unit, so next year I'd like to develop an animal unit and if I could just stay in the same grade level (laughs), it would just keep developing. (ID 204)

The Level of Use Branching Interview Protocol indicated two of the respondents were at level IV A, *routine* use. Routine use refers to stabilized use of the innovation with thought being given to neither improvement, nor consequences of its use (Loucks, Newlove, & Hall, 1998). Two statements, one from each level IV A user, indicated congruence with this descriptor.

> I've used it from day one in the classroom this year when I stepped in and didn't have any social studies or science curriculum set or any idea of where to begin. I took what I liked most and what was most familiar to me which is, you know, nature and everything outdoors and I brought that into the classroom and the class theme for the first three months was about trees. So everything we did we tied in: from what we were learning in grammar to the tree we had adopted to science lessons. We planted beans and we measured things. With all the weather that we were studying, we went outside on nature walks. So it really helped me just create a focus for the beginning of the year and then through that, you know, I've tied in other things. I adapted the guidelines to meet my immediate needs of it so the suggestions and the guidelines that require more prep time and more planning, which I am totally able to do in the future and willing to and wanting to, I wasn't able to do this year. So knowing now what I want to focus on for the next year I can more completely use the guidelines. (ID 236)

> I got a call from a mom who said the kid totally hated math last year and that, even though he's not passing the classes in any of the – but, he's finding that it's more motivating. She mentioned the banana activity to me, and so that provided feedback to me, but that got him excited, and obviously he's liking what's happening in the classroom because he likes math this year. (ID 211)

The fourth respondent from among those who considered themselves users of the *California Curriculum Guidelines for Agricultural Literacy Awareness* emerged as a level IV B user, or at the *refinement* level. Refinement refers to the use of the innovation "to increase the impact on clients within the immediate sphere of influence" (Loucks, Newlove, & Hall, 1998, p. 187). In discussing an autistic student in this participant's class, the teacher uses an agricultural context to engage the student in more productive conversations when he has outbursts related to his disability.

> A lot of times, when he acts up or needs to be separated from the class, I have to take him outside. He's really, really big into dinosaurs and it's amazing how much he knows about dinosaurs and when we go outside he'll be going off about some dinosaur and how it eats this other dinosaur. I'll try to like encourage, not encourage, but just like, branch off of that, you know, "Do you think they had that kind of plant back then?" and "Well, what do you think he would eat now?" and "How do you think they would live in our environment?" I just kind of, spawning, 'cause he's gonna ramble anyway. I might as well, you know, branch it towards something productive versus something that's going to be two dinosaurs fighting and dying a lot. I try and make them more educational conversations because you have to with him, and that incorporates science; otherwise, you're gonna lose him. He's not going to be interested. (ID 212)

Sixty percent of the respondents in the sample classified themselves as non-users of the *CCGALA* (*n*=6). Of those, four emerged at level 0, *non-user,* level of use and the remaining two surfaced at level I, *orientation*. Non-user descriptors range from a person who has never heard of the innovation to one who has knowledge of the innovation, but who is not currently considering or engaged in use. Further, a person at level 0 is passive with respect to consideration of its use. Statements from participants at level 0 paralleled

these when discussing hindrances in considering adoption of the *California Curriculum Guidelines for Agricultural Literacy Awareness.*

> Probably the main thing is that this is my first year teaching and I'm doing a scripted program. An intervention scripted program so that, here it's SRA, it's the state adoptive program and it's very scripted - teacher's up in the front and okay, say this, read this and that. It is where, I'm not teaching science. I'm just teaching English, math and history and so I think that has hindered me to be able to incorporate it into the lesson plans. (ID 207)

> In the real world, you really can't do that and we're not set up for that. Yes, we do have a garden out there that we walk through periodically, but it's so much effort. There's so little time because all the standards in math, reading, language arts, uh, P.E., science, all these other things, you know, that are being demanded. The science and social studies aren't there yet, but they're coming. They said that there is no time for the luxury of agriculture, but it would be nice to figure a way to do it. If you can figure a way to do it, go ahead and do it. (ID 215)

> I just teach English, you can't really incorporate agriculture, it's hard. And, frankly, it's hard just to teach just the state standards alone. There are so many and they are so obscure. And, I don't know, I don't like the curriculum and we don't get any choices. It's just tough. This year has been about survival. It's just been, I barely can do the standards, so I can't do anything extra. It's been really stressful, so that's why. (ID 219)

> I came into it [the teaching position] right before state testing started, and so a lot of what my principal had asked me to focus on was preparing the students for state testing. And because I jumped into it, like two days finding out what I was supposed to be doing, I just, I felt very rushed and like I didn't have enough time. So I haven't incorporated a lot of outside different things into my daily routine in the classroom, just, um, 'cause up till now it's been really busy. And I know busy is no excuse, but that's why. (ID 240)

The *orientation* level of use pertains to a person's desire to acquire information regarding the educational innovation and/or is exploring the innovation's value and potential demands upon the user and his or her system (Loucks, Newlove, & Hall, 1998). Statements made by the two respondents at this level are highlighted below.

> I haven't used [*CCGALA*] a lot. I haven't really done much with agriculture in my classroom right now. Um, I would definitely like to because, especially around here, there's so much agriculture going on. I think it's important for the kids to, you know, have an awareness of it, but I haven't really used it yet at all in the classroom, any sort of agriculture. (ID 247)

> I think that I want to go back and look at them [*CCGALA*]. They are very user friendly if you will. I think they're very straight forward and they are easy to use and go through and I guess, in honesty, I haven't really gone through and used them or looked at them in awhile. But I remember when I got them, like my little first through third that I have, it's just, it's something I never would have thought of. I'm like "Oh, yeah. When you go through and look at you really can see how it does relate to the standards that you have." (ID 209)

Interestingly, one of the level 0 participants demonstrated movement toward level I at the end of the in-depth interview. She indicated explicitly, and contrary to her response to the Level of Use Branching Interview protocol, the following:

> After thinking about this and talking, I'm like, I want to go home and pull out my stuff and look through the stuff that we did in class and see if I can incorporate anything. (ID 207)

Objective Four: Delineate the essential components for "ideal," "acceptable," and "unacceptable" implementation of an agricultural literacy curriculum.

As outlined in Chapter 3, a modified Delphi method was employed to obtain the data for constructing an innovation configurations map related to the *California Curriculum Guidelines for Agricultural Literacy Awareness.* The panel of experts used in this portion of the study was comprised of individuals who contributed to the initial development of the *CCGALA*. Furthermore, those experts also served in capacities such as current elementary educators, university teacher educators, California Department of Education agricultural literacy personnel, secondary agricultural educators, trained *CCGALA* workshop facilitators, and California Agriculture in the Classroom coordinators.

Round 1 of the data collection relative to this objective resulted in the compilation of expert responses regarding descriptors of the *CCGALA* (n=15). Additionally, experts were asked to describe what one might observe in classrooms where the *CCGALA* was being utilized well and not very well. Finally, the panel of experts was asked to describe

behaviors of students and teachers when the *CCGALA* was in use. Table 4-10 illustrates an example of two responses from the panel of experts.

Table 4-10. Round 1 Example Expert Panelist Responses

ID	Primary experience with *CCGALA*	*CCGALA* description	Used well	Not used well	Teachers & students doing
115	Developer, Teacher user, Other (lib. Media teacher)	1st concrete, hands on tool for educators to implement Agricultural curriculum CA state standards referenced	Agricultural curriculum is integrated Student projects, demonstrations, illustrations, literature, media Hands on to support standards	No link to agriculture with grade level standards	Students & teachers engaged in activities to correlate the standard addressed & agricultural information CCGALA is a tool providing hands on opportunities to embrace agriculture in the classroom
120	Developer	Connects agricultural lessons, units, & activities to state standards across disciplines Provides a context for understanding mostly abstract standards	Student-centered instruction Agriculture is the context for teaching core disciplines Students actively engaged	Teacher-centered instruction No real-world (agricultural) connection for students	Actively participating in the act of learning

Based on first round analysis of the word picture descriptions provided by the 15 respondents, a list of components and possible variations of those components was compiled for use during Round 2 (Appendix J). The list was sent electronically to the respondents from Round 1 (*n*=13). Respondents were asked to designate each variation from each of the six component areas as *ideal, acceptable,* or *unacceptable.* Table 4-11 shows the frequency of ideal, acceptable, and unacceptable responses from the panel of experts who responded in Round 2 (*n*=13).

The final round of analysis for the construction of the innovation configurations map was distributed electronically to the panel of experts seeking opinion convergence regarding the placement of *ideal*, *acceptable*, and *unacceptable* variations within each of the six components. The panel of experts unanimously agreed (*n*=13) with the results of the innovation configurations map for use of the *California Curriculum Guidelines for Agricultural Literacy Awareness* (see Figures 4-9 and 4-10).

Table 4-11. Summary of Frequency of Responses to Variation by Component

Component 1: Use of CCGALA & Curricular resources			
Variation	Ideal (*f*)	Acceptable (*f*)	Unacceptable (*f*)
1	7	5	1
2	8	5	0
3	1	9	3
4	0	4	9
5	0	3	10
Component 2: Cross-disciplinary state educational standards are addressed using an agricultural context			
Variation	Ideal (*f*)	Acceptable (*f*)	Unacceptable (*f*)
1	13	0	0
2	11	2	0
3	1	11	1
4	0	4	9
5	0	0	13
Component 3: Experiential learning opportunities			
Variation	Ideal (*f*)	Acceptable (*f*)	Unacceptable (*f*)
1	13	0	0
2	2	11	0
3	0	0	13
4	0	0	13
Component 4: Instructional approach			
Variation	Ideal (*f*)	Acceptable (*f*)	Unacceptable (*f*)
1	13	0	0
2	2	11	0
3	0	11	2
4	0	0	13
Component 5: Student assessment			
Variation	Ideal (*f*)	Acceptable (*f*)	Unacceptable (*f*)
1	12	1	0
2	2	11	0
3	0	3	10
Component 6: Lesson presentation and purpose			
Variation	Ideal (*f*)	Acceptable (*f*)	Unacceptable (*f*)
1	11	2	0
2	3	10	0
3	0	0	13
4	0	0	13

Innovation Configuration Components and Variations of the use of the
California Curriculum Guidelines for Agricultural Literacy Awareness

Teacher _____ Rater _____

I. Use of *CCGALA* & recommended curricular resources				
1. Refers to only recommended lessons & resources	2. Refers to *CCGALA* and uses some recommended lessons & resources to supplement existing teacher-developed or site-endorsed curriculum	3. Refers to *CCGALA* and uses only existing teacher-developed or site-endorsed curriculum	4. Does not refer to *CCGALA,* but uses agricultural lessons and resources to supplement existing teacher-developed or site-endorsed curriculum	5. Does not refer to *CCGALA* and uses only existing teacher-developed or site-endorsed curriculum
II. Cross-disciplinary state educational standards are addressed using an agricultural context				
1. Consistently employs an agricultural context to meet grade level standards across all disciplines (mathematics, science, social science, and language arts)	2. Consistently employs an agricultural context to meet grade level standards across two to three disciplines (mathematics, science, social science, and language arts)	3. Occasionally employs an agricultural context to meet grade level standards across all disciplines (mathematics, science, social science, and language arts)	4. Employs an agricultural context without consideration of grade level state standards in any discipline (mathematics, science, social science, and language arts)	5. Does not employee an agricultural context to meet grade level standards in any discipline (mathematics, science, social science, and language arts)

III. Experiential learning opportunities			
1. Students engage in experiential learning activities directly related to agricultural and environmental topics; reflection (via journals, discussion, or other) is **always** included to complete the experiential learning loop	2. Students engage in experiential learning activities directly related to agricultural and environmental topics; reflection (via journals, discussion, or other) is **sometimes** included to complete the experiential learning loop	3. Students may engage in activities, but the teacher does not facilitate or make connections with agricultural or environmental topics; reflection is **rarely** included to complete the experiential learning loop	4. Experiential component (laboratories, activities, etc.) of suggested lessons is omitted; written assignments are relied upon for primary activity base. Reflection is never included

- - - - - - To the left of slashed line is an *ideal* variation

_____ To the left of the solid line is an *acceptable* variation

_____ To the right of the solid line is an *unacceptable* variation

Figure 4-9. California Curriculum Guidelines for Agricultural Literacy Awareness innovation configurations map (page 1)

IV. Instructional approach

1.	2.	3.	4.
Daily student-centered instruction with multiple modality approach. Students are encouraged to interact with peers regarding agricultural concepts	Mostly student-centered instruction with occasional (1-2 instances per week) lecture-based instruction	Mostly teacher-centered instruction with occasional (1-2 instances per week) cooperative learning opportunities (working in pairs, small groups, large groups)	Daily teacher-centered instruction, lecture-based format. Teacher determines outcomes. Students learn in large heterogeneous classes and are rarely or never encouraged to engage in peer to peer communication

V. Student assessment

1.	2.	3.
Student progress and knowledge are assessed in a variety of ways, including (but not limited to) developing self-assessment tools. Focus is on concept-attainment and critical thinking	Student progress and knowledge are assessed via "unit exams" that may be measured through projects presented, oral and/or written exams, or student portfolios. Focus is on concept-attainment and critical thinking, but frequent reference is also made to standardized testing.	Student progress and knowledge is assessed solely via traditional paper and pencil exams. Focus is on, and frequent references made to, standardized testing.

VI. Lesson presentation and purpose

1.	2.	3.	4.
Students have a clear understanding of lesson purpose and objectives. Lesson presentation is seamless from introduction to conclusion. Frequent references are made between the agricultural concept presented and the standards addressed. Agricultural concepts presented follow a logical path.	Students have a clear understanding of lesson purpose and objectives. Lesson presentation is seamless from introduction to conclusion. Standards addressed are written on the whiteboard or chalkboard, but overt reference to standards is omitted. Agricultural concepts presented follow a logical path.	Students have an unclear or hazy understanding of lesson purpose and objectives. Standards addressed are written on the whiteboard or chalkboard, overt reference to standards is omitted. Agricultural concepts presented lack a logical flow from one to the next.	Students are unsure of lesson purpose and objectives. Teacher omits checks for understanding and/or opportunities for student practice. No reference or connection to state standards is made. Teacher wanders from one agricultural topic to the next without any logical flow.

- - - - - - To the left of slashed line is an ideal variation

_____ To the left of the solid line is an acceptable variation

_____ To the right of the solid line is an unacceptable variation

Figure 4-10. California Curriculum Guidelines for Agricultural Literacy Awareness innovation configurations map (page 2)

Objective Five: Describe the innovation configurations that teachers employed while implementing an agricultural literacy curriculum.

Although only 40% (*n*=4) of the purposively selected sample described themselves as "users" of the *California Curriculum Guidelines for Agricultural Literacy Awareness* educational innovation, the transcripts from all interviews were analyzed and used in conjunction with the innovation configurations map resulting from Objective Four. All transcripts were reviewed and classified as *ideal, acceptable,* or *unacceptable* because every participant in the sample revealed throughout the interview that he or she was using agriculture as a teaching context in some variation.

The Innovation Configuration Components and Variations of the use of the *California Curriculum Guidelines for Agricultural Literacy Awareness* were cross-checked against the sample participants' transcript data. Specifically, participant descriptors for self-reported use of the educational innovation and/or the self-reported use of agriculture as an integrating context across elementary grade level content standards were used to establish justification for classification as *ideal, acceptable,* or *unacceptable* use.

Because the innovation configurations map for this educational innovation was developed simultaneously to the investigation of participant experiences with the *California Curriculum Guidelines for Agricultural Literacy Awareness*, not all of the components may have emerged from the interview data. Therefore, whenever no evidence emerged in the data regarding a particular component, that component was not assessed for classification. Appendix K provides composite profiles of the configurations each member employed when agriculture was utilized as a teaching context in his or her classroom.

Six of the sample members indicated they did not use the *CCGALA* as a means to teach across the grade level content standards; therefore, each was classified as *unacceptable* in his or her use as it pertained to Component 1 (identified in Objective 4). Supporting statements from within each member's narrative supported that classification. Of the four sample members who indicated they used the *CCGALA,* two members' narratives revealed statements they were using the *CCGALA* and agriculture in an *unacceptable* manner. The remaining two members who indicated use of the *CCGALA* registered statements classifying them as *ideal* and *ideal/acceptable*, respectively, as related to Component 1.

Three of the four self-reported users of the *California Curriculum Guidelines for Agricultural Literacy Awareness* provided supporting narrative statements related to the second component of the innovation configurations map. Their statements indicated one was at an *ideal* level, one was at an *acceptable* level, and the third was borderline *acceptable/unacceptable*. The fourth user's narrative lacked specific reference to using agriculture across the content area standards.

Five of the six self-reported non-users made statements congruent with the *unacceptable* variation of Component 2. The sixth non-user alluded to an *acceptable* configuration in using agriculture to teach across the content area standards.

With respect to providing experiential learning opportunities for students, all four of the self-reported *CCGALA* users employed configurations that were either *acceptable* or *ideal*. Only two of the six non-users employed *acceptable* configurations of Component 3. The remaining four non-users fell into the *unacceptable* category.

All four of the self-reported *CCGALA* users employed *acceptable* (*n*=2), borderline *ideal/acceptable* (*n*=1), or *ideal* (*n*=1) configurations for Component 4. None of the non-users utilized *unacceptable* configurations with respect to instructional approach. However, two of the six non-users lacked narrative statements relative to this component. The remaining four utilized *acceptable* (*n*=3) or *ideal* (*n*=1) configurations.

Nine of the ten members lacked narrative statements alluding to student assessment as delineated in Component 5. The single member who provided evidence in her narrative regarding assessment indicated an *ideal* configuration with respect to this component.

Only one of the 10 members provided narrative statements relative to the sixth component. His statements indicated he employed configurations related to lesson presentation and purpose that bordered between *ideal* and *acceptable*.

Objective Six: Describe the perceived outcomes experienced by teachers who adopted the agricultural literacy curriculum.

The thematic reduction yielded eleven relevant textual areas that were reduced to three common themes. Participant narratives revealed their navigation through these themes during their conscious and subconscious consideration of the *California Curriculum Guidelines for Agricultural Literacy Awareness* and its use as a means to meet grade level content area standards. The eleven areas that emerged from the relevant text analysis included:

- Workload
- Self-perceived role as faculty member
- In-service collaboration
- Continued professional development opportunities
- Administrative support
- Initial exposure to *CCGALA*
- Cooperating teacher behaviors

- Student behaviors
- Changing teacher roles
- Misunderstanding of *CCGALA*

Following the relevant textual analysis, the narratives were further analyzed and reduced to repeating themes. Three common themes arose from the textual areas: *Time Limitations*, *Role Perceptions*, and *Change Facilitators*. Figure 4-11 illustrates the division of the textual areas into the three common themes.

Time	**Role Perception**	**Change Facilitators**
• Workload • Misunderstanding of *CCGALA* • Initial exposure to *CCGALA* • In-service collaboration	• Self-perceived role as faculty member • Student behaviors • Changing teacher roles	• Continued professional development opportunities • Need for experienced mentors • Administrative support • Cooperating teacher behaviors

Figure 4-11. Emerging themes related to the perceived outcomes and experiences of elementary teachers using an agricultural literacy curriculum

Theme 1: Time

As each of the respondents was in his or her first or second year of teaching, many of the concerns expressed were in line with Fuller's (1969) *task* concerns and the pressures of time. Throughout the interview process, the ten participants indicated a high level of concern for the limited amount of time in the teaching day.

Perceived workload expectations emerged as a seemingly insurmountable hurdle for many of the participants, regardless of self-reported use or non-use of the *CCGALA*. Time plays a factor for one member (ID 204) in her second year of teaching. Despite sporadically using agriculture as a teaching context, her concerns centered on time required to learn new subject matter:

> I think, honestly, it's just been a time issue this year. I feel like I've had very little time to learn anything extra. Like, last year, I taught seventh and eighth grade science and so I was just kind of focused on learning what I needed to teach and this year I got switched to fourth grade so I was learning all over again (laughs).

Additionally, responses to the workload expectation were mired in meeting the demands of state standards through mandated and scripted curricula. All of the participants acknowledged the priority placed on grade level content standards in California. To assess if the standards are being taught, focus is placed on taking standardized examinations and teaching the standards from mandated curriculum programs. As such, one member (ID 219) who taught in a low performing school classified her non-use of CCGALA as a situation rooted in survival mode:

> I really have to take it myself and incorporate it, and frankly, it's hard just to teach just the state standards alone. It's been a challenge this year because there are so many and they are so obscure and I don't know, I don't like the curriculum, and we don't get any choices. It's just tough, and this year has been about survival. It's just been, I barely can do the standards, so I can't do anything extra. I've been really stressed, so that's why. This is only my first year, so, later down the road when things, you know, calm down, and I can, I know what I'm doing, that would obviously be an option.

In contrast, one member, who reported using the *California Curriculum Guidelines for Agricultural Literacy Awareness* from day one, indicated no difficulty in meeting state standards while using agriculture as the teaching context. From her viewpoint, time was less of a factor because she was able to use agriculture as an integrating factor that allowed her to go more deeply into concepts at a slower pace (ID 236):

> I'm finding that I'm meeting all of them using agriculture because I'm using the standards and then just teaching them, you know, and they're so general that it's not difficult. You know, this is the baseline and then you either do it, you either teach it on a superficial level or you go much deeper with it and using agriculture makes that a much deeper learning experience for them. So I find that if I'm teaching to a standard and it didn't quite sink in, then I'll go to *CCGALA* and see what's suggested there and then try it that way and more often than not, it turns out that that was a successful way to teach the concept.

Even when members referred to their student teaching experiences, workload perceptions were cited as major factors preventing incorporation of agriculture into the curriculum. One member (ID 215), who made initial overtures about teaching with agriculture during his initial and full-time student teaching experiences, was told that there were too many time constraints:

> I did talk to the two master teachers that I had . . . and I did talk to them about integrating art into my lessons and that I had this interesting class with agriculture- the one that you taught- and the response to that was, "Well, in the real world you really can't do that and we're not set up for that, and yes we do have a garden out there that we walk through periodically, but it's so much effort, there's so little time because all the standards in math, reading, language arts, P.E., science, all these other things, you know, that are being demanded and the science and social studies aren't there yet, but they're coming." They said that there is no time for the luxury of agriculture, but it would be nice to figure a way to do it.

Another member (ID 207) focused on the scripted, site adopted curriculum used to teach the grade level standards at her school:

> Probably the main thing is that this is my first year teaching and I'm doing a scripted program, an intervention scripted program. Here, it's SRA. It's the state adoptive program and it's very scripted - teacher's up in the front and okay, say this, read this.

Several time-themed components emerged from the narratives as they related to misunderstandings of the integration context of agriculture. Specifically, members repeatedly referred to use of the *CCGALA* as an additional curricular program, rather than as a means to meet the same standards that other programs were meeting. Therefore, members perceived *CCGALA* as a further strain on time already filled with other expectations. One 5th grade teacher in her first year of teaching (ID 247) characterized the use of an agricultural context as extraneous to other priorities:

> There's so much in fifth grade that they're responsible for that, you know, if you deviate too much from a standard and do a quick lesson, it, then it's (pause) so that would be my main deterrence; that there's just not time that you could fit it in. But I know that I'm sure you can tie it into the standards in some ways, so just

> depending on how you organize in subjects. But yeah, also at the time there are constraints to be able to do activities that do incorporate agriculture. It takes just so much time.

Another member (ID 240), who did not classify herself as a teacher who uses the *California Curriculum Guidelines for Agricultural Literacy Awareness,* expressed a desire to use *CCGALA* and agriculture as a teaching context, but misunderstanding of the *CCGALA* resulted in false manifestation of a set of agricultural standards:

> I think they're similar to the guidelines or state standards we have to follow, so I don't think it would be any harder to incorporate them. I think it's just a lot of times we see math and reading, writing as the most important things to get in and there are only so many hours in the day, so I think that's why a lot of the times it gets brushed off. But, I think it's important. I'd like to use it more. I mean, I don't think it's hard.

A precursor to the state mandated and site adopted curricular programs were the grade level state standards. To ensure that students have an understanding of the concepts presented, and to provide a standard measure of group mean knowledge gained, California relies on standardized tests for collecting such student data. One member (ID 240) indicated the pressure placed on the school and her, from multiple levels, to provide students an opportunity to score well on the standardized examination as a need to spend extra time preparing the students strictly for test readiness:

> Part of it, they just wanted me to make sure that I was getting my students ready to take the state testing because state testing is, you know, forced on them heavily as well because they want the schools to do well. I work in a dual emersion classroom, so we had to, I think, spend a little extra time just because my students don't speak English very well. So that was a big priority, I think, coming from my administrator, and whoever is above them, to do well, to improve scores.

Pressure to perform well on standardized examinations was echoed by member 247:

> Like, there's such a press to do well on the state test that they are so strict, with "this and this and this has to be taught." It leaves no time for learning, for me to have, you know, these really creative great lessons that take two to three days,

> because I need to cover, you know, I need to cover at least three chapters in three days, not one concept in three days.

All of the interviewed members indicated a level of excitement about sharing their experiences in using agriculture as a context for teaching, regardless of whether their use was on a daily basis, or if it was comprised of a few sporadic lesson plans throughout the academic year. When the subject of collaboration surfaced during the inquiry process, however, nearly all of the members seemed to be operating in isolation with respect to the use of agriculture as an integrating context. Time to work with others may have limited the extent of collaboration experiences for two members. Collaboration for them consisted of loaning other faculty members their resources for teaching. Member 236 revealed this in her narrative:

> Well, I've loaned the *CCGALA* book to both the kindergarten teacher and the fourth grade teacher. The fourth grade teacher is a new teacher like me and she's so excited about agriculture. She has a butterfly unit going on and they set up a butterfly garden, and she was so excited about the fourth grade curriculum.

Another member not using the *CCGALA* (ID 209) disclosed during the interview that she occasionally made use of agricultural lessons as a means to provide real world connections for students learning about mathematical concepts. Despite the success she perceived her students experienced, she still lacked collaborative relationships with her academic peers:

> If I did any sort of work with it, it was just me looking back on what I collected from the course that I took at Cal Poly and going through my little thin guidelines of first through third because I never got four through eight, which is really sad. And then, kind of going back through the lessons that I had collected and seeing if there was anything there that I could use, so I didn't collaborate with anyone. It was just me, by myself, with resources that I already have.

While their narratives present a mired viewpoint with respect to their current year of teaching, many of the members expressed a level of anticipation, parallel to the Moir

Model (Joerger, 2002), for collaboration in the coming years. As such, a fourth grade teacher from a suburban area (ID 204) said:

> Even moving to fifth grade next year, the teacher next door and I have been talking about maybe, like, I'll teach science and she'll teach social studies for me, kind of switching.

Another member (ID 211) who experienced no collaboration during her initial year of teaching expressed hope and anticipation about future collaborative opportunities:

> But I didn't take the time this year to collaborate with teachers about agriculture. That's probably something I'm going to be more, you know, apt to do when I've got my classroom set, because it's- I finally feel like everything in my classroom is going smoothly. Now maybe I can talk about other things like that; where now I'm "Okay, what's the best way to teach fractions?" (laughs) You know, I didn't really, I didn't really talk about agriculture that much.

From a pre-service preparation standpoint, nearly every non-user respondent cited time from initial exposure and experience with the *CCGALA* until obtaining a first teaching position as a hindrance to their use of the guidelines. The course through which the target population had initial exposure to the *CCGALA* was open to any junior, senior, or graduate level preservice elementary teacher. As such, some members enrolled in the course very early with respect to his or her target student teaching date. Four of the six members who did not use agriculture as a context for teaching the grade level content area standards all cited the considerable time span from initial exposure to the guidelines until their first student teaching experience as a significant hindrance to using the *California Curriculum Guidelines for Agricultural Literacy Awareness.*

All four of those respondents completed the course a minimum of 18 months before beginning student teaching. For one member (ID 207), that time gap was a repeated theme within her narrative. When asked about her agricultural literacy level changes, she

alluded to a desire to use it as a teaching context, but had forgotten about the course and course materials:

> I think I definitely increased my literacy in agriculture just from taking your course at Cal Poly in the summertime and I don't know, increased it by maybe say 40%. And I would, like I said, I'm just kind of busy with everything. You forget about it, but I definitely think it is a good way, especially with low level students, to get them, it's more of a hands on type of approach to curriculum. So I think it would be something that's definitely beneficial for them to use in the classroom.

Later in the interview, the member struggled to recall the ease of use of the *CCGALA:*

> Um, honestly it's been what, two or three years, I can't really remember them but I think when I used them in class that they're fairly easy to use. I don't remember like them being difficult to understand.

Furthermore, when asked about factors that may have prohibited her from incorporating the curriculum innovation into her teaching repertoire, she said:

> Honestly, just like forgetting about that class because I took that class and then I think I went into my, um, credentialing program. I think it might have been right maybe even in the beginning of the credentialing program but I kind of just put it in the past and forgot about it, even though I enjoyed it so much, but just, you know, you put it on the side, you put it on a shelf and don't look at it.

Finally, she concluded the interview with a statement that, while it reinforced Hall and Hord's (1987) need for change facilitation, was deeply rooted in concern regarding time left in the school year:

> Just, after thinking about this and talking, I want to go home and pull out my stuff and look through the stuff that we did in class and see if I can incorporate anything into, probably this year there's only like three weeks left. Maybe not, but, you know, depending on what I teach next year. I remember you can integrate it into pretty much any subject.

During student teaching, another member alluded to the time that had passed after initial exposure (ID 247):

> I would just say that I'd been so busy and caught up in student teaching and um, school, graduating in general, but I kind of probably just forgot, you know. I mean,

> I have all my resources but having it on my schedule and I know I need to teach this lesson, that lesson and so I just, it probably just kind of passed my mind. I might have shoved it in my drawer, all my stuff in a drawer and I haven't looked at a lot of it, so that would be my reason or excuse.

Later in the interview, she used the lapse in time as justification for needing follow-up training and facilitation by role models and mentors:

> During the class, it was so exciting, but it was a year and half later that I started my student teaching. So I think part of that, I kind of lost it, but maybe seeing other teachers model and use it also, that would be very good.

A third non-user member (ID 240) expressed a need for more resources and guidelines to use agriculture as an integrating context. Her narrative, however, revealed a realization that she already possessed many resources, but the time span contributed to her forgetting about the resources:

> The only thing, I mean, I probably have resources down in my closet of all, where I can go to get ideas and stuff, um, but maybe just more ideas on like projects like Project Learning Tree, um, so more suggestions, just so I have a, um something to choose from.

When asked to describe an understanding of the *CCGALA,* the gap between initial exposure and teaching practice emerged in the narrative of member 219:

> Well, it's pretty much the standards of agriculture, from what I understand. Just the basic, it's been so long since we took the class. Pretty much, I think, since I teach English, that's, and it's middle school, it's just low priority, as far as teaching, I don't really remember much, it's just the basics, anything, everything related to agriculture, is what I remember.

Theme 2: Role Perceptions

Another consistent theme that emerged from the narratives pertained to how members viewed themselves as faculty members, and how that view affected their level of comfort in introducing the *CCGALA* as a suggested or preferred method of delivery. Additionally, the members articulated perceived changes in their roles in the classroom and in the behaviors exhibited by their students.

To begin with, many of the members likened themselves to inexperienced new professionals who were relegated to listening to the wisdom of the veteran teachers during faculty and department meetings. One first year teacher, who taught in an urban public school (ID 211), related her experiences in department meetings dominated by older teachers. In contrast, however, she indicated that if the older teachers introduced the topic of teaching agriculture, she would be more inclined to contribute:

> I'm more just soaking up their advice and information, like writing everything down and taking in all their ideas, finding out what works best for me and how I can incorporate it into my classroom. If they were talking about how to incorporate agriculture into their classroom, I would have definitely talked about that more.

Another member (ID 209) revealed in her narrative an insecurity of not wanting to stray from the curricular status quo:

> I think part of it is just being a first year teacher and being into it, you kind of go with the basic plan that everyone else has already set up. I don't want to feel like the new kid stepping out of line and you want to kind of follow suit with what everyone else is doing.

Still another member (ID 219) vilified herself for her inexperience:

> I feel like I know nothing, so I feel like I can't really contribute. I know that's not true, but since I feel like whenever they ask, "Oh, what do you think we should do about this?" I just feel like, well, I don't know, I don't know anything yet, I'm still new, and I still have a lot to learn.

Whereas many members taught in large schools with multiple faculty members functioning as grade level teams, member 236 is the only first grade teacher at her school. As such, she indicated a specific level of perceived responsibility to her students in representing their needs and interests:

> Because there's only one voice per grade, I feel it's my responsibility to speak up and be vocal and it's very supportive so if you do have, you know, anything that you want to share or bring ideas to the table, they're definitely open to suggestions.

Despite the preponderance of narrative evidence of insecurity in the presence of their teaching peers, that diffidence ceased when they described their changing role as teachers. The self-discovery and realization that their roles as teachers, when using an agricultural context, had shifted from that of espousers of knowledge to facilitators of the learning process recurred throughout the inquiry process. As member 211 explained, her students evolved into a peer to peer teaching situation, so she realized that she had more time to move among the students and answer their questions, rather than having to stand at the front of the room and function as the sole source of information:

> I kind of walk around and I just answer questions that are posed to me. There's a lot of hands-on stuff through every one [lesson] that I've done. It's been group work and I just go around. I'm more like there for guidance.

Even though one member did not have an existing agricultural background (ID 240), she did not allow her inexperience to hamper her use of agriculture as a teaching context. As such, she revealed how she was being more overt in her conversations with the students to build and construct their own learning experiences:

> I didn't know, so I encouraged them to go on their own and find that out, bring it back and share it with us, so they can teach us something; and so encouraging them to take control of their own learning because they don't always learn in a classroom.

Another aspect that emerged from the narratives was the level of enthusiasm that the members enjoyed from using agriculture as a teaching context. Member 212 experienced an increased agricultural literacy level after initial exposure to the *CCGALA* and explained the perceived effect of her enthusiasm on her students:

> I find that I'm actually interested in agriculture. I was never one to be in 4-H and that kind of thing. I was more of a tennis player sort of girl, but after that class and just a few other things, I got more interested in science, and just how agriculture affects people and their lives. So I think that just by being interested in something, you're more likely to tell other people about it, and so it obviously comes up in, in my lessons and I get all "amped" up about it in a lesson. The more I'm "amped" on

> it, the more they're going to be, even if they're not interested in whatever the lesson is. It's just me being excited about it. It's going to excite them to, to learn about more different things that may interest them.

Across the sample, members perceived that students were engaged, enthusiastic, and using multiple modalities throughout the lesson cycle when agriculture was used as an integrating context. Additionally, members perceived that, when using an agricultural context, the real world connection made grade level standard concepts more concrete to the students. Despite describing herself as a non-user, member 247 related a lesson she taught using vegetables to teach students mathematical concepts:

> They're more excited about it. The plant that they were taking measurements on was something that they can really connect to, and rather than learning a math equation on the board, they're in there with their hands on it and it's exciting for them. So I would say that it helps so much, and it's exciting as a teacher because you want to see your kids excited about it rather than just, you know, you have your good students that will do all the work that you tell them to do, but then there are those that don't and so, for those kids, they really get involved.

Another member (ID 240) noticed a heightened motivation in her students to spontaneously bring items from home related to the aquaculture unit in which they were engaged. She was unexpectedly surprised by the extension of learning outside the classroom.

> Well, I would expect the students to be more excited about the learning, because what we're doing right now is more, um, it's not so much like seat work. They aren't sitting at their seat and practicing their math facts or sitting at their seats and practicing writing a paragraph, but they actually get to see something from outside the classroom. I think that gets them excited because it's something new, something they see that's not at school that they can continue to learn about when school's over. So, I expected them to be excited about it and they have been. Um, unexpected would be kids that bring stuff in from home. I hadn't thought about that, kids taking it home and talking to their families about it and, and extending their learning that way. That was unexpected.

When talking about her perceptions of what happens in her classroom when she uses agriculture as a teaching context, member 211 discussed the change in student interaction:

> The students are collaborating a lot more. They're asking me questions. And I like that I can go around to each little group. There are students who need a lot more help and then there are my highest students who can just sail at it. So that's why I'm even thinking about changing this week and I'm just going to put them back into groups for good for the rest of the year now that testing is over and stuff, so this will be a benefit to the cooperative groups. I think the students helping each other out and then me being able to do a lot more one-on-one with them during those activities.

Still another respondent, who classified herself as a non-user (ID 209), related an experience where she used a hands-on approach to teaching the food guide pyramid. Her narrative overtly pointed to increased student engagement:

> For that small part of the lesson they were more engaged than, say, me standing up talking at them, where they have to sit there and listen to me. So anything that they get to be involved in, more hands on with themselves, you see the level of interest peak more so than just having to listen to me talk all day.

Student self-esteem and opportunity for success are central to the narrative of one first grade teacher (ID 236). She perceived that her lower ability level students were more engaged in class when learning utilized an agricultural context:

> Students who tend to be a little bit more withdrawn or just kind of indifferent about the lesson get so engaged and excited about what we’re doing and participate more. You don’t have to have taught them anything, specifically, to be able to come into one of the lessons on agriculture and, as I said, it’s just what they know before. So maybe a student who isn’t able to be successful in reading right now, which is really big, knowing that they’re interested in the different elements of agriculture, you can bring that in right away and then they feel successful and intelligent and that they’re adding to the class; where normally, in a class that is so focused on language arts and math, if those aren’t their strong points, then they’re not able to feel as successful as maybe other students.

Theme 3: Change Facilitators

As delineated in Chapter 2, a change facilitator serves as a key factor in the success or failure of an educational innovation. Typically characterized as principals, teachers, and/or other district personnel in an educational system, these individuals provide assistance to innovation users as they develop the confidence and competence needed to sustain successful use of an innovation (Hall & Hord, 1987). The perceived needs of the respondents as they discussed beginning and/or sustained use of the *California Curriculum Guidelines for Agricultural Literacy Awareness* reflected both the lack of, and the need for, change facilitation via multiple dimensions. Furthermore, anecdotes of cooperating teacher behaviors emerged as critical components from the viewpoint of the beginning teachers.

Members repeatedly expressed a desire to see lessons from other teachers who are using the *CCGALA*. That desire extended to a need for mentor teachers to not only share materials and resources, but to provide observational opportunities whereby the mentor teachers would model integration of agricultural lessons across the curriculum standards. The members indicated that having a set of teachers with whom they could collaborate and learn from would assist them in strengthening their comfort and confidence level using agriculture as an integrating context. Member 247 said:

> I have all of the resources, but sometimes it's hard to apply those without seeing a lot of, you know, seeing someone model it or do it for you, so that sometimes can be difficult… I always learn a lot from the other teachers, you know, at the school sites and even my cooperating teacher and others.

That was echoed by a member who taught eighth grade (ID (207). Her perception of herself as an inexperienced new teacher revealed:

> Probably because I am so new at teaching and the subject, eighth grade middle school level, that maybe observing someone who uses it, maybe with math or observe lesson plans that somehow they've incorporated it into their teaching style.

Another member (ID 209) touched on her lack of previous agricultural knowledge when she indicated a need for role models and mentors who regularly use agriculture as a context for teaching:

> I think if I had someone at my school that was like, "You know [name deleted], I kind of do it this way, you know, I use agriculture in the classroom to help teach other things." It would help encourage me. Like if I have to start running around myself, I don't necessarily think that I would be able to do it. And also I don't have, you know, that much background with it or supplementary materials or lesson plan ideas that I could help integrate it in through all of my teaching, so I think that's a bit of a road block.

Another method of change facilitation the participants perceived would assist them to begin and sustain use of the *California Curriculum Guidelines for Agricultural Literacy Awareness* is through regular professional development activities. Member 240 outlined a specific outline for a day long workshop that paralleled workshops she had previously attended:

> Maybe if agricultural people came into the classroom and showed how a lesson can be done in the classroom and then, uh, directed us where we could go for the resources. And the second half of the day was collaboration between teachers and how they wanted to use it.

An alternative to a one-day workshop was presented by member 209 in the form of a conference related directly to the *CCGALA*. She indicated that district level support and sponsorship of professional development activities would serve as an endorsement and encouragement for teachers to attend:

> If there is some way that the districts were involved and offered some sort of you know, "Hey, if you're interested in implementing, you know, *CCGALA* into your classroom, we're having a conference or we're having a Saturday where you can come and learn all these things and get exposure and see sample lessons." I think if teachers had the ability to see that sort of thing then that would definitely spark

> their interest and be like, "Oh, my gosh, I could do that. I could use that in my classroom. I could implement that."

One member who regularly uses agriculture as an integrating context (ID 204) indicated that multiple exposures to agricultural curriculum as a preservice student already served to solidify her use of it as a teacher:

> The basic thing was that we worked together and developed units that they wanted us to use. Like, one person, one *group,* did worms, and then our group did seeds, (laughs), so that's probably why I still teach it so much because it's engrained.

Hall and Hord (1987) indicated that principals can contribute significantly in their role as a change facilitator with as little as what they termed a one-legged interview. Specifically, a one-legged interview is comprised of an interaction between the change facilitator and the innovation user lasting about as long as a person can stand on one leg without losing his or her balance. Exchanges during this time may be as simple as a principal inquiring about the use of the innovation and the teacher's comfort level with the innovation. Simply showing interest in what the teacher is doing, and how well he or she is handling the change, may be enough to sustain use and enthusiasm by the teacher. The respondents in this study were no different in their need for administrative support of the *CCGALA*.

For the participant who taught first grade and used agriculture as the integrating context from day one (ID 236), her administration played a critical role in her sustained use:

> And, as far as administrative support, anything that I've done in class that is, you know, above and beyond what has been done before and that includes all the, you know, hands-on science experiments and activities we've been doing, they're completely supportive of and excited about and wanting to know more about.

Other participants shared a desire for implementation of the *CCGALA* to be facilitated at a higher level of administration. Notably, member 209 expressed a need for district-driven implementation to break through the barrier of mandated curricula:

> I think that would be really helpful, but it's also the kind of whole support from the district level because, as much as I think that, if I were to implement something like that in my classroom, as much as I think my principal or department head would be like, "Wow that's really novel, that's really something different." At the same time, I also think he would be like, "That's nice and all, but you need to focus on what we need to go through and meet standards like you're supposed to. You really need to get through the reading adoption or you do really need to get through the math adoption." So I think, I mean as great as it would be to start at the teacher level, I think where it needs to start is at the district level and trying it that way because it can kind of umbrella effect out to all of the teachers in the district.

Finally, cooperating teacher behaviors were discussed as significant factors, from both a positive and a negative perspective, in the educational innovation adoption process.

For all of these new professionals, cooperating teacher change facilitation, or the lack thereof, contributed significantly in the members' decisions to use the *CCGALA*. Some members received positive feedback and encouragement from their cooperating teachers, while others had less positive experiences.

For one member (ID 236), her cooperating teacher served as a change facilitator by allowing her to use the innovation in class, and by reinforcing the teaching technique via further use:

> Oh, she loved it. She thought it was a great idea and it made the children very engaged immediately and we did all the work outside and they thought it was so cool to be outside, "Wow, we never go outside." And then when we came back inside the classroom they just had a wealth of information to put down on paper. We did, you know, brainstorm, they all shouted their ideas out on the board and you know, wrote some of their suggestions and then they were able to just write, and so my master teacher was, "Oh, my gosh we're going to do this more often, you know, go outside and use our resources that we have out there."

A cooperating teacher who was already using agriculture as an integrating context served as a positive change facilitator for member 212. Her cooperating teacher's experience and influence were beneficial in increasing her awareness and appreciation for a myriad of resources available:

> Yeah, she had a great resource, you know, tons of resources. But, she was very open to my, you know, instructions and "What if we do this" and you know, kind of modifying her own lessons. But, yeah, it was, it was great because she had such a knowledge of agriculture and science in her own classroom that I could easily just enhance that and build onto that.

Many of the members reported timidity in introducing the idea of agriculture as an integrating context. Rather, those members simply continued within the same teaching vein the cooperating teacher had previously established.

The issue of timidity was clear with a teacher who primarily teaches language arts (ID 219):

> Well, I, it's not that I didn't have a choice there, it's just I had my master teacher, when they told me, "Okay, so this is what we're doing. So this is what you're gonna take over," and I took over math, and it was just like fractions. I would just do whatever they told me.

Member 215, despite being 52 years old at the time of student teaching, was another person reluctant to suggest a change in lesson delivery from what the cooperating teacher was already doing:

> Because the teachers had their, their curriculum in place already it wasn't part of, it wasn't part of theirs and I wasn't going to just bring in my own, you know, uh ways of doing things. I mean, it wasn't fair to the kids to right there shock them with a new approach. So, what was working, worked and I just followed through with that and was, when the new reading program was implemented and I took it over, it was just follow through on this. It relates to what they already learned. But, agriculture wasn't part of their teaching.

For other members who did not use the *CCGALA* during student teaching, their narratives revealed reluctance on the part of the cooperating teacher in allowing the

student teacher flexibility and creativity in lesson design and delivery. Even when timidity was not an issue, the cooperating teacher's attitude toward the change in context was not positive. Such was the case when member 211 approached her cooperating teacher about using agricultural lessons:

> I don't think I pulled in too much agricultural stuff, actually, because that was my first student teaching experience. I kind of just taught what the teacher did. She used absolutely no- nothing besides worksheets. It was worksheet after worksheet after worksheet. And I tried to present her with neat little activities, but I had to do exactly what she had to do.

Even when approaching her cooperating teacher again, this member was still discouraged from using the *CCGALA*.

> I even remember asking her one time if there was a garden at that school, because, you know, we learned about *A Garden in Every School*. I don't remember the exact name of it-but there was information on that in our class. I asked her about that. And she said "Oh, one was started awhile ago." It was in a fenced area behind her classroom. So I went and looked at it. There was nothing there. Nothing was growing. It was just this dirt, this rectangle of dirt, you know, marked off by a chain fence. I asked her if we could do stuff in it. She just said "No time. No time. No time," which seems kind of ridiculous now that I'm teaching. She could have made time if she wanted to make time. So that was all dictatorship, pretty much. She gave me what she wanted copied for the week and I was to be teaching those things. So . . . Yeah, it's too bad. She should have taken the class (laughter).

For two other members, they recalled using agriculture during their student teaching experiences, but not necessarily as an integrating context, nor as a part of something that they introduced. Member 247's narrative described a cooperating teacher who viewed agriculture as a fun, yet extraneous activity:

> She has been teaching so long, she does it, you know, kind of as a fun activity and the kids love it. I mean, they're measuring and doing different things so it's definitely educational, but I wouldn't say that she had looked at it as much as an agricultural, um, experience.

Member 207's cooperating teacher had already planned for a seed planting lesson in her curriculum before the student teacher's arrival. As such, the member had no say in what was taught, and gave no overt thought to its use as an integrating context:

> I never looked at the standards for teaching agriculture. It was just part of the curriculum that the teacher, master teacher I was working with, wanted to do.

Summary

This chapter presented the findings of this study as they pertained to the outlined objectives. The objectives were to: (1) describe elementary teachers' attitudes and perceptions of agriculture as a context for teaching elementary students; (2) describe elementary teachers' current stages of concern with respect to implementing an agricultural literacy curriculum; (3) describe elementary teachers' current levels of use of the *California Curriculum Guidelines for Agricultural Literacy Awareness*; (4) delineate the essential components for "ideal," "acceptable," and "unacceptable" implementation of an agricultural literacy curriculum; (5) describe the innovation configurations that teachers employed while implementing an agricultural literacy curriculum; and (6) describe the perceived outcomes experienced by teachers who adopted the agricultural literacy curriculum.

The findings presented in this chapter will be discussed in greater detail in Chapter 5. Discussion of these findings, conclusions, implications, and recommendations for both researchers and practitioners will also be presented in Chapter 5.

CHAPTER 5
SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

The purpose of this study was to explore the concerns, levels of use, and innovation configurations of elementary teachers in their use and sustained adoption of the *California Curriculum Guidelines for Agricultural Literacy Awareness (CCGALA)* as a resource for teaching the California state educational standards in grades kindergarten through eight.

Objectives

The objectives of this study were to:

1. Describe elementary teachers' attitudes and perceptions of agriculture as a context for teaching elementary students.
2. Describe elementary teachers' current stages of concern with respect to implementing an agricultural literacy curriculum.
3. Describe elementary teachers' current levels of use of the *California Curriculum Guidelines for Agricultural Literacy Awareness*.
4. Delineate the essential components for "ideal," "acceptable," and "unacceptable" implementation of an agricultural literacy curriculum.
5. Describe the innovation configurations that teachers employed while implementing an agricultural literacy curriculum.
6. Describe the perceived outcomes experienced by teachers who adopted the agricultural literacy curriculum.

Methods

The guiding research objectives were addressed via an integrating methods approach. The target population was comprised of all preservice elementary teachers who had enrolled in and completed *AGC X424: Organizing and Teaching K-6 Standards*

and Awareness in Agricultural Literacy at a West Coast university (*N*=48). Current contact information could not be obtained for six of the population members, thereby reducing the accessible population to 42 members. After the initial survey instrument was returned by 36 of the respondents (85.7% response rate), a sample of 10 participants was purposively selected based on the self-reported number of days teaching using agriculture as an integrating context for teaching across the grade level content standards. Four participants who indicated they used the *CCGALA* and six who indicated no use of agriculture as a context for teaching were selected for follow-up participation in the study.

Three instruments were used to assess respondent attitudes toward agriculture, stages of concern, and levels of use with respect to the agricultural literacy curriculum program. The first instrument was administered to the accessible population in its entirety, while the remaining two instruments were administered to only the ten members of the purposively selected sample.

The initial instrument was researcher developed and designed to assess elementary teacher attitudes toward agriculture and using agriculture as an integrating context. The instrument utilized a five point Likert-type scale to measure two attitudinal constructs. Mean scores for each construct were summarily obtained by adding the total score of all items comprising each respective construct. Demographic data were also collected via this instrument.

Utilizing the Concerns Based Adoption Model (Hall & Hord, 2001), stages of concern and levels of use regarding the *CCGALA* were assessed. The Stages of Concern Questionnaire was modified to specifically address the agricultural literacy curriculum

program in question. Hall and Hord's (2001) Stages of Concern Quick Scoring Device was used to provide a portrait of each member's first and second highest relative intensity stages of concern. Theoretical test/retest reliability ratings for the Stages of Concern Questionnaire were evaluated by Hall and Hord (2001) and ranged from .65 to .86. Internal consistency alpha-coefficients ranged from .64 to .83 (2001).

The Level of Use Branching Interview Protocol (Hall & Hord, 2001) functioned as the instrument used to assess the level in which each participant fell with respect to how he or she used the *CCGALA*. Hall and Hord evaluated validity of the protocol by comparing intensive interview ratings against the protocol. The researchers reported a correlation of .98 between the field observer's ratings and the interviewer's Level of Use ratings (2001).

A modified Delphi method was employed to develop the Innovation Configurations Map for the *California Curriculum Guidelines for Agricultural Literacy Awareness*. A list of developers was obtained from the grant project coordinator from which electronic mail was sent requesting their participation in the construction of the innovation configurations map. Twenty developers agreed to participate, of which 13 completed all three rounds of the Delphi. In accordance with recommendations by Hall and Hord (2001) in carrying out the construction of an innovation configurations map, there were three open-ended questions initially asked of the developers: (1) What would one observe in classrooms where *CCGALA* is used well? (2) What would one observe in classrooms where *CCGALA* is not being used well? (3) What will teachers and students do when *CCGALA* is in use?

The responses to those three questions were reduced to common statements and organized into one of six components. Further, developer responses served as the basis for the organization of variations of each component. Developers were asked during the second round to indicate their preference of *ideal, acceptable,* or *unacceptable* as it pertained to each variation under a given component. Round 2 responses resulted in an organized checklist of components with variations demarcated into a respective category deemed as *ideal, acceptable,* or *unacceptable.* The third round sought opinion convergence by the participants as they were asked only to agree or disagree with the arrangement of the checklist as it emerged from the results. A unanimous response was obtained from the developers and they were in agreement with the checklist.

In accordance with recommendations by Heck, Stiegelbauer, Hall, and Loucks (1981), *CCGALA* respondents were asked to describe their use of *CCGALA*. Further questions and probes related to responses provided by the participants were captured and analyzed to distinguish use of the components identified in the general innovation configuration map. Each respondent's self-reported use of *CCGALA* was then categorized as *ideal*, *acceptable*, or *unacceptable*.

Finally, an in-depth, semi-structured interview was conducted with each of the members of the purposively selected sample. Following a phenomenological research perspective and methodology, this study focused on elementary teachers' attitudes toward, and experiences with, the use of agriculture as a context for teaching across the elementary content areas. Following transcription of the interviews, each member's responses were critically reflected upon and analyzed using only the participants' language for the thematic reduction. Eleven thematic areas were identified as they

pertained to the participants' experiences and outcomes throughout the adoption decision process with the *California Curriculum Guidelines for Agricultural Literacy Awareness.* Following relevant textual analysis, narratives were further analyzed and reduced to repeating themes. Three common themes arose from the textual areas: *Time Limitations*, R*ole Perceptions*, and *Change Facilitators*.

Summary of Findings

The findings of this study were summarized using the objectives outlined in Chapter 1.

Objective One

The first objective sought to describe elementary teachers' attitudes and perceptions of agriculture as a context for teaching elementary students. Further, demographic indicators of the population were obtained and reported in this objective. Demographic results indicated the accessible population was comprised of 88.9% female respondents (n=32) with an average age of 25 years. Respondents were asked to indicate if they were currently teaching. If so, they were asked to indicate their use, if any, of agriculture as an integrating context for teaching across the grade level standards. The 31 currently teaching members reported a mean of 1.3 years in the classroom. Of the 31 members currently holding a teaching position, 14 reported not using any agricultural lessons to teach elementary students. Seventeen members reported using agriculture to teach across the grade level content standards, but only eight of those respondents were using the *CCGALA* as a resource for teaching.

Participants expressed relatively favorable attitudes toward agriculture and toward its use as a means to teach elementary students across the grade level content standards. The mean attitudinal score across the 36 respondents in the *attitude toward agriculture*

construct was 23.92 with a range of 18 to 30. The *attitude toward agriculture* construct was comprised of seven items. The mean attitudinal score across the 36 respondents in the *attitude toward using agriculture as context for teaching elementary students* was 82.67 with a range of 62 to 96. The *attitude toward using agriculture as context for teaching elementary students* construct was comprised of 21 items.

Objective Two

This objective sought to describe elementary teachers' current stages of concern with respect to implementing an agricultural literacy curriculum. Following selection of the purposive sample, interview appointments were established with the ten sample participants. In accordance with the recommendations of Hall, George, and Rutherford (1998a), the Stages of Concern Quick Scoring Device was used to analyze data collected using the Stages of Concern Questionnaire.

Individual peak stages of concern were identified for each member and the relative intensity for each stage was presented. As a group, the four members who indicated use of the *CCGALA* all registered at four different peak stages of concern. The four stages were *awareness, informational, personal,* and *collaboration*, respectively.

Six members reported not using agriculture as an integrating context. These members registered highest relative intensity concerns evenly between the *awareness* and *informational* stages.

Objective Three

This objective sought to describe elementary teachers' current levels of use of the *CCGALA*. The Level of Use Branching Interview Protocol (Hall & Hord, 2001) was administered to the members following the stages of concern questionnaire. Secondary analysis was conducted following recommendations outlined by Loucks, Newlove, and

Hall (1998) whereby transcript data were analyzed for statements indicating member level of use of the agricultural literacy curriculum.

The results from the Branching Interview Protocol coincided with the data lifted from participant narratives. Four of the members who reported no use of agriculture as an integrating context registered at the *non-use* level. The remaining two members who indicated no use of agriculture as an integrating context registered levels of use at the *orientation* level. The four members who reported using the agricultural literacy curriculum were distributed among the *mechanical* (n=1), *routine* (n=2), and *refinement* (n=1) levels of use. Typical responses at each respective level of use were reviewed and member narrative examples were lifted from the transcripts as they emerged relative to the level of use.

Objective Four

This objective sought to delineate the essential components and variations for *ideal, acceptable,* and *unacceptable* implementation of an agricultural literacy curriculum. Based on the three rounds of the modified Delphi, as outlined in Chapter 3, the participants' word picture descriptions resulted in six components of consideration pertaining to the *CCGALA*. The six components included (1) use of *CCGALA* and recommended curricular resources, (2) cross-disciplinary state educational standards are addressed using an agricultural context, (3) experiential learning opportunities, (4) instructional approach, (5) student assessment, and (6) lesson presentation and purpose.

Within each of the emerging components, there were variation descriptors identified and the participants, via the Delphi process, indicated into which category of *ideal, acceptable,* or *unacceptable* each descriptor fell. The number of variations within each component ranged from three to five descriptors, and the level of acceptability of

each variation was determined via participant response in Round 2 of the process. Final opinion convergence was sought and obtained with unanimous participant agreement with the final appearance and content of the innovation configurations map.

Objective Five

This objective sought to describe the innovation configurations that teachers employed while implementing an agricultural literacy curriculum. The narratives from each participant were reviewed, analyzed, and classified as *ideal, acceptable,* or *unacceptable* by component. Because the innovation configurations map was developed concurrently with the investigation of participant experiences as they related to the *CCGALA,* narrative evidence pertaining to every component may not have emerged from every participant. Whenever data were absent relative to a particular component, assessment of that component was omitted from this study.

Six of the sample members indicated they did not use the *CCGALA* as a means to teach across the grade level content standards; therefore, each was classified as *unacceptable* in his or her use as it pertained to Component 1 (identified in Objective 4). Supporting statements from within each member's narrative supported that classification. Of the four sample members who indicated they used the *CCGALA,* two members' narratives revealed statements they were using the *CCGALA* and agriculture in an *unacceptable* manner. The remaining two members who indicated use of the *CCGALA* registered statements classifying them as *ideal* and *ideal/acceptable*, respectively, as related to Component 1.

Three of the four self-reported users of the *California Curriculum Guidelines for Agricultural Literacy Awareness* provided supporting narrative statements related to the second component of the innovation configurations map. Their statements indicated one

was at an *ideal* level, one was at an *acceptable* level, and the third was borderline *acceptable/unacceptable*. The fourth user's narrative lacked specific reference to using agriculture across the content area standards.

Five of the six self-reported non-users made statements congruent with the *unacceptable* variation of Component 2. The sixth non-user alluded to an *acceptable* configuration in using agriculture to teach across the content area standards.

With respect to providing experiential learning opportunities for students, all four of the self-reported *CCGALA* users employed configurations that were either *acceptable* or *ideal*. Only two of the six non-users employed *acceptable* configurations of Component 3. The remaining four non-users fell into the *unacceptable* category.

All four of the self-reported *CCGALA* users employed *acceptable* (n=2), borderline *ideal/acceptable* (n=1), or *ideal* (n=1) configurations for Component 4. None of the non-users utilized *unacceptable* configurations with respect to instructional approach. However, two of the six non-users lacked narrative statements relative to this component. The remaining four utilized *acceptable* (n=3) or *ideal* (n=1) configurations.

Nine of the ten members lacked narrative statements alluding to student assessment as delineated in Component 5. The single member who provided evidence in her narrative regarding assessment indicated an *ideal* configuration with respect to this component.

Only one of the 10 members provided narrative statements relative to the sixth component. His statements indicated he employed configurations related to lesson presentation and purpose that bordered between *ideal* and *acceptable*.

Objective Six

This objective sought to describe the perceived outcomes experienced by teachers who adopted the agricultural literacy curriculum. Through qualitative inquiry analysis of the narratives provided by the members, the thematic reduction yielded results containing three themes. Members focused on (1) time limitations, (2) role perceptions, and (3) change facilitation as themes contributing to the decision process involved with choosing to use the *California Curriculum Guidelines for Agricultural Literacy Awareness* as an integrating means to teach across the elementary content area standards.

Conclusions

The sample in this study was not randomly drawn from the target population. With this limitation in mind, and based on the findings, the following conclusions were drawn:

1. Elementary teachers expressed generally favorable attitudes and perceptions about agriculture and about agriculture's use as an integrating context to teach across the content area standards.

2. Elementary teachers who were initially exposed to an agricultural literacy program, but who lacked preservice and in-service practice and experience with that program, exhibited either little concern or involvement with the innovation, or had a general awareness of and interest in learning more about the innovation.

3. Elementary teachers having preservice and in-service experience and practice with the agricultural literacy curriculum innovation were less homogeneous in their individual highest stages of concern, and demonstrated a propensity to move toward more substantive stages of concern.

4. Elementary teachers who were initially exposed to an agricultural literacy program, and who reported preservice and in-service experience and practice using the program, were at higher levels of use than their non-agricultural literacy program contemporaries were.

5. When considering ideal, acceptable, and unacceptable implementation of an agricultural literacy curriculum, the six components delineated by the panel of experts were (1) use of the *California Curriculum Guidelines for Agricultural Literacy Awareness* and curricular resources; (2) cross-disciplinary state educational standards are addressed using an agricultural context; (3) experiential

learning opportunities; (4) instructional approach; (5) student assessment; and (6) lesson presentation and purpose.

6. When using an agricultural literacy curriculum, elementary teachers employed a variety of innovation configurations related to each identified essential component. With the exception of experiential learning opportunities and instructional approach, elementary teachers generally articulated misunderstanding and misuse of the *California Curriculum Guidelines for Agricultural Literacy Awareness* and agricultural curricular resources as a context for teaching across the content area standards.

7. When using agriculture as a context for teaching across the content area standards, elementary teachers generally described three themes encompassing their experiences and perceived outcomes. Specifically, those themes include a preoccupation with time, perception of their roles as teachers and faculty members, and changes in student behavior, and an overwhelming partiality toward change facilitation.

Discussion and Implications

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

Conclusion: Elementary teachers expressed generally favorable attitudes and perceptions about agriculture and about agriculture's use as an integrating context to teach across the content area standards.

Agriculture in the Classroom coordination of agricultural literacy programs, materials, and conferences has been under the auspices of the United States Department of Agriculture since 1981 (United States Department of Agriculture, 2005). 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 *California Curriculum Guidelines for Agricultural Literacy Awareness* 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 that Ohio elementary teachers used *AgVenture Magazine* an average of only 8.6 hours per school year. Lack of time, interest, and knowledge about that agricultural literacy program were the primary reasons noted for not using the program. Similarly, 61.2% of participants in a program designed to assist teachers with the integration of agriculture into existing coursework used less than 20 agricultural lessons in an academic year (Balschweid, Thompson, & Cole, 1998). Barriers to curriculum adoption in that study were tied to time, access to resources, and inconsistency in teaching appointments from year to 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.

Whereas this study may have terminated at the jejune level of investigation achieved by its predecessors, the qualitative dimension allowed for a deeper explanation of the conflict between elementary teachers' attitude and action as it pertains to the *California Curriculum Guidelines for Agricultural Literacy Awareness.* Specifically, the sample participants' narratives indicated a level of enthusiasm for agriculture and its use as a context for teaching that reinforced the favorable results of the quantitative instrument administered to the target population. Although they were not asked to comment on the initial exposure to the curriculum guidelines, all of the sample

respondents alluded to how much they enjoyed learning about agriculture while enrolled in the preservice course. They perceived agriculture as a means for students to connect learning in a manner that is relevant to the world around them.

However, as is evidenced as a recurring theme in this study, many were mired in Fuller's "self" and "task" concerns of new professionals seeking to carry out the demands of their teaching load (as cited in Hall and Hord, 2001). Many were concerned with the day to day concerns of teaching state mandated curriculum, and perceived no control over curricular decisions both within their teaching team and at their school site. Although the teachers expressed a general desire to teach agriculture, their perception of it as something extraneous to the existing state standards resulted in many of them viewing an agricultural context as less than utile in meeting their prescribed curricular obligations. Notably, through the interview process, many of the non-users expressed an inclination to revisit the materials for the subsequent academic year and begin to implement an agricultural context *ab ovo*.

Objective Two: Describe elementary teachers' current stages of concern with respect to implementing an agricultural literacy curriculum.

Conclusion: Elementary teachers who were initially exposed to an agricultural literacy program, but who lacked preservice and in-service practice and experience with that program, exhibited either little concern or involvement with the innovation, or had a general awareness of and interest in learning more about the innovation. Elementary teachers having preservice and in-service experience and practice with the 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.

Because they were in the first or second year of teaching, it was expected that most of the participants would be focused on what Fuller termed "self" concerns: those concerns that deal with teaching, but center on the teacher, rather than on the students (as cited in Hall & Hord, 2001). Participant comments regarding the amount of time spent

preparing lessons, grading assignments, and determining ways to better manage their time were all comments that emerged from the narratives in this study. The Stages of Concern Questionnaire (SoCQ) administered to the 10 sample members in this study yielded expected results when it revealed that many of the members were at either the *awareness* or *informational* stages.

The results of the non-user Stage of Concern analyses followed Hall and Hord's (1987) model. Hall and Hord indicated that a typical non-user's relative intensity scores are highest at the *awareness* and *informational* stages (see Figure 5-1). Specifically, teachers who are not using an innovation may have little or no knowledge about the innovation, and exhibit little concern about learning more about it. These individuals are typically disengaged from the innovation.

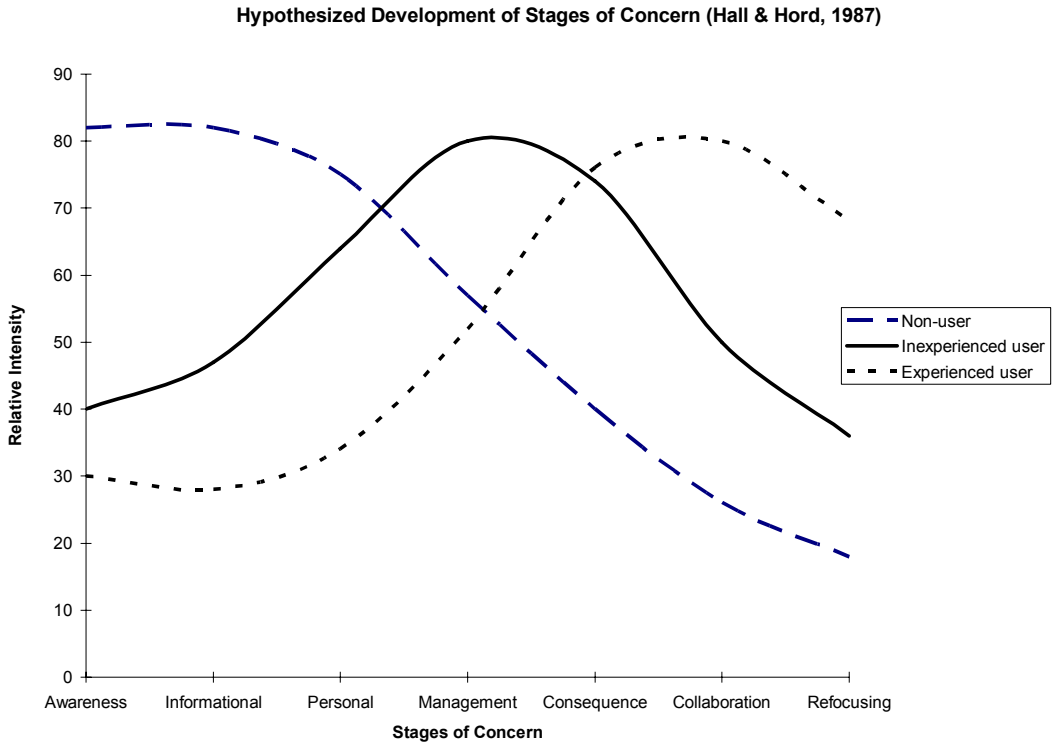


Figure 5-1. Hypothesized development of Stages of Concern

Hall, George, and Rutherford (1998a) also typified the innovation non-user profile as the most readily identifiable and most common profile when assessing stages of concern about a particular educational innovation. Typically, a non-user's highest stages of concern are at the *awareness*, *informational*, or *personal* stage. Lowest stages of concern for a non-user are *consequence*, *collaboration*, and *refocusing* (1998a). Five of the six non-user members of this study registered stages of concern profiles nearly identical to the typical non-user profile as theorized by Hall and Hord (1987). Figure 5-2 depicts the similarity between the mean relative intensity data of the non-users in this study to Hall and Hord's projected outcome.

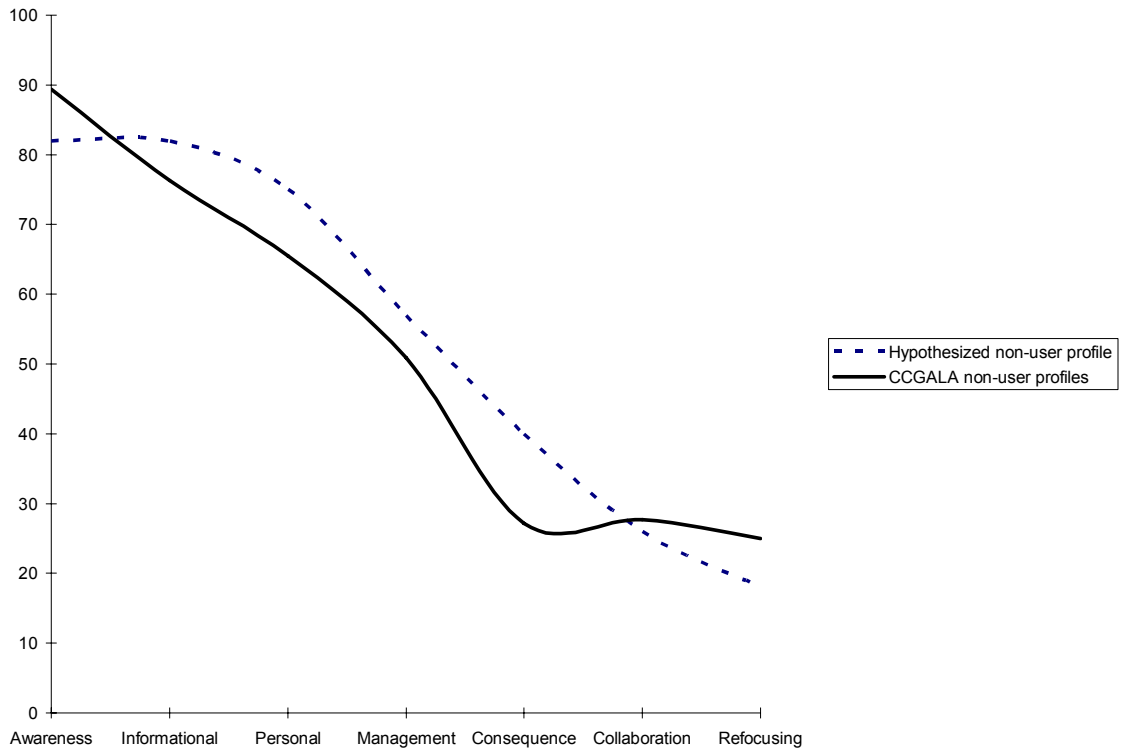


Figure 5-2. Distribution of Stages of Concern for *CCGALA* non-users (*n*=6)

Non-users with first and second highest concerns at the *awareness* and *informational* stages indicate individuals who are somewhat aware of an innovation and

interested in learning more about it. The low end stages of *consequence*, *collaboration*, and *refocusing* indicate that the participant is neither overly concerned with student impact of the innovation nor is the participant teeming with ideas about how to make the innovation more applicable.

When the relative intensity of the *informational* stage is near to that of the *awareness* stage, Hall and Hord (2001) opined that this indicates a non-user has a positive propensity to begin use of the innovation. Those with high Stage 1 concerns (*informational*) need to hear small bits of information about the innovation over time, rather than having information delivered all at once prior to implementation of the innovation.

Many of the non-users in this study pointed to the amount of time that had passed from initial exposure until opportunity to use as reasons for not using the curriculum guidelines as a teaching tool. More specifically, they simply forgot about the resources they had learned. Fortunately, none of the non-users registered profiles that indicated they were distrustful or negative in their potential use of the curriculum guidelines, as would be characterized by personal concerns overriding information concerns (Hall, George, and Rutherford, 1998a).

Highest stage concerns for the four members who self-reported use of the *CCGALA* as an integrating context for teaching across the elementary grade level standards were unique to each individual. Three of the four users, however, shared a second highest stage of concern at the *informational* level. To echo previous information, all of the members of this study were in their first or second year of teaching. It was, therefore, not

unexpected that all of the self-reported users of the innovation would register first or second highest stage concerns at *awareness*, *informational* or *personal*.

One of the innovation users was highest at the *personal* stage. At this stage, an individual is uncertain about the demands of the innovation, may feel inadequate in meeting those demands, and tentative in his or her role with the innovation (Hall, George, & Rutherford, 1998b). Furthermore, consideration of potential conflicts with the existing roles and structures of the organization of the system enter into the decision-making process with respect to implementing new innovations. This user clearly indicated a desire to integrate agriculture as a means for teaching across the grade level standards more frequently. However, her narrative alluded to respecting the guidance of an "overbearing" lead teacher who had been teaching a particular way for several years. This user felt confident enough to integrate agriculture on an occasional basis, but was insecure in advocating the use of the educational innovation to her departmental colleagues.

An unexpected result with a sample group of inexperienced elementary teachers was the emergence of one user whose highest concern was at the *collaboration* stage. This was the nearest any member in the study reflected the ideal goal of concerns-based implementation (Hall & Hord, 2001). Preferably, in reaching the ideal goal, the second highest concern would be at the consequence stage as that would indicate teacher focus on the impact of the innovation on the students, as well as how the teacher can work in concert with colleagues to improve delivery of the innovation. In this case, the member's second highest stage of concern was *informational*. In her case, she had been using the guidelines from day one to teach first grade because there was not an existing curriculum

in place when she was hired. As a first year teacher, she looked immediately to the curriculum guidelines to fulfill that need, but was still searching for more information about the innovation while exploring collaborative opportunities with others to make more widespread use of this innovation within the school system.

Again, mean relative intensity data were used to derive a trend line of the four *CCGALA* users (see Figure 5-3). This trend line was overlaid onto the hypothesized inexperienced and experienced user profiles.

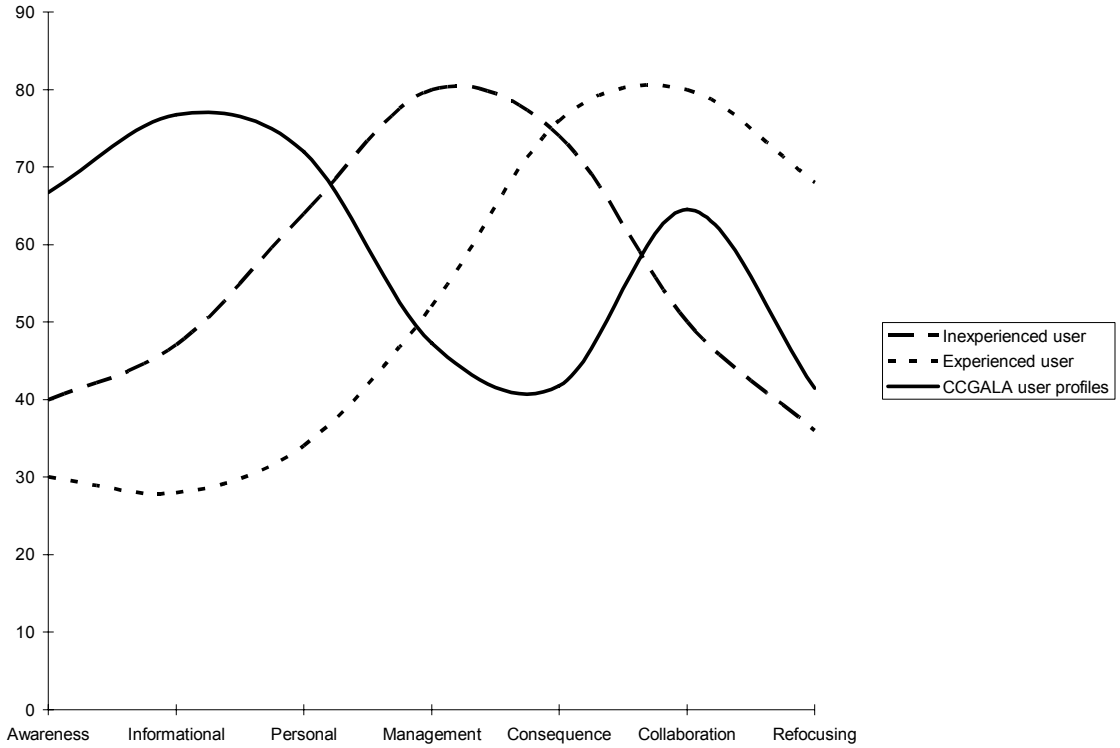


Figure 5-3. Distribution of Stages of Concern for *CCGALA* Users (*n*=4)

Non-user typical profiles reflected inexperienced users' concerns as a normal distribution 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

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 a 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 the *collaboration* stage. The questions that logically follow are: "Why are inexperienced users not concerned with *management*?" and "Why are they actively seeking more information and collaborative opportunities?"

Because these were beginning elementary 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. These members were generally inexperienced in their background and exposure to agriculture. As elementary teachers in quest of information about this educational innovation, there was an added implication that the agricultural context was foreign to them. As such, the participants' may have experienced a heightened sense of urgency in seeking more information to reinforce their confidence in using agriculture at the elementary level. Moreover, preservice exposure to the curriculum guidelines at a collegiate level, and underscored with a teaching methods approach, may have contributed to their willingness to use it in the classroom and to move more toward a collaborative stage without having a solid agricultural foundation in place.

To move beyond self concerns and into task and impact concerns, Kember and Mezger (1990) indicated that inexperienced teachers need the assistance of on-going support and adequate contact with other innovation users. Such is the case with the members of this study. Clear understanding of teacher Stages of Concern when undergoing the change process can serve as a catalyst to develop appropriately targeted professional development opportunities. By tailoring workshops and other professional development opportunities to current teacher concerns, change facilitators may be more effective in providing information about the innovation while bolstering participant confidence in the subject matter.

Objective Three: Describe elementary teachers' current levels of use of the *California Curriculum Guidelines for Agricultural Literacy Awareness*.

Conclusion: Elementary teachers who were initially exposed to an agricultural literacy program, and who reported preservice and in-service experience and practice using the program, were at higher levels of use than their non-agricultural literacy program using contemporaries.

All four of the curriculum guidelines users suggested they had support from their cooperating teachers in utilizing agriculture as an integrating context while student teaching. Further, they continued use, albeit at varying degrees, during their first year of teaching. As expected, those elementary teachers were at higher levels of use than the other members of the sample were. Conversely, none of the non-users experienced regular use and mentorship by cooperating teachers during their student teaching experiences; therefore, it was expected that they would be at the *non-use* and *orientation* levels of use.

Users at the *mechanical* level of use function in the day to day, short-term use of the innovation. At this level, changes, if any, and use are dominated by user needs (Loucks, Newlove, & Hall, 1998). The need for a change facilitator at this level is

critical as the implementing teacher is inefficient with his or her use of the innovation and is often disorganized in terms of time and access to materials. The regular presence of a change facilitator at this level would serve to guide a mechanical user to better conceptualize and implement the innovation (Hall & Hord, 2001). At such a tenuous time in the change process, the regular presence of a change facilitator, especially with a new teacher, could serve to avert frustration and premature abandonment of the innovation. The only member of this study at the *mechanical use* level, through statements evident in her narrative, indicated she loaned her resources to other teachers interested in using agriculture as an integrating context, but did not have an experienced mentor with whom she cooperated.

The two members at Level IV A, *routine* use, have established a regular pattern of use and are stabilized in that use. This level indicates that there is virtually little change made by the user, or that he or she only varies use as a part of an established way of doing things (Loucks, Newlove, & Hall, 1998). Because the sample members were in their first or second year of teaching, it is likely that if they continue to use the curriculum guidelines, they will not remain at this level. One confirmation of current level placement is a lack of change in current use. Lack of change notwithstanding, Loucks, Newlove, and Hall posit there should be no value judgment applied to a user at this level due to the possible "result of having recently made a high quality change" (1998, p.183). Furthermore, he or she may be waiting for a period of time to reflect on the possible effects of the change. Both members of this study who were Level IV A users are new teachers and have only begun regular use this year. Initial use as a beginning teacher may be equated to instituting just such a high quality change. Therefore, because both

members indicated they were successfully meeting content area standards, it stands to reason that they will continue to use the guidelines for a period of time before determining if changes or other adaptations are necessary for continued use.

Sixty percent of the members who indicated they were not using the *California Curriculum Guidelines for Agricultural Literacy Awareness* were at the *non-use* level (LoU 0). The remaining 40% of non-users were at the *orientation* level (LoU 1). Characteristics of teachers at the *non-use* level range from individuals who have never heard of the innovation to those who have heard of the innovation, but are not considering its use. The teachers in this study were all enrolled in, and successfully completed, a five-week preservice course specifically designed to prepare preservice teachers in the use and implementation of the curriculum guidelines. Therefore, all participants were at an equal awareness level of the curriculum guidelines.

Many of the respondents at both the *non-use* and *orientation* levels expressed concern about scripted, site-adopted curriculum programs that prevent use of outside resources to meet state standards. Their narratives clearly demonstrated a perceived lack of control in selecting teaching methodologies to meet state standards, as well as insecurity about veering away from the existing delivery structure. As noted previously and discussed further in objective six, another caveat was that many of the *non-use* and *orientation* level participants pointed to the lapse in time from completing the course until student teaching as a barrier to implementation.

Objective Four: Delineate the essential components for "ideal," "acceptable," and "unacceptable" implementation of an agricultural literacy curriculum.

Conclusion: When considering ideal, acceptable, and unacceptable implementation of an agricultural literacy curriculum, the six components delineated by the panel of experts were (1) use of the *California Curriculum Guidelines for Agricultural Literacy Awareness* and curricular resources; (2) cross-disciplinary state

educational standards are addressed using an agricultural context; (3) experiential learning opportunities; (4) instructional approach; (5) student assessment; and (6) lesson presentation and purpose.

Perhaps the most significant scholarly contribution resulting from this study is the development of an innovation configuration checklist relative to the *California Curriculum Guidelines for Agricultural Literacy Awareness.* In following Hord's steps for creating an innovation configurations checklist (1986), the original development team of the *California Curriculum Guidelines for Agricultural Literacy Awareness* provided feedback related to what the innovation was, what it should look like, and what students and teachers should be doing when it is in use. They were highly qualified for this task because they were all educators, teacher education faculty members, and peripheral agricultural educators from various agricultural outreach programs. The components drawn from the initial round of the Delphi were common across all participant responses.

In analyzing data and developing variations for each component, it was expected that all of the respondents would agree that the only ideal use of the curriculum guidelines, with respect to Component 1, "use of the *California Curriculum Guidelines for Agricultural Literacy Awareness* and curricular resources," was that the teacher would refer to the guidelines and use only the recommended lessons and resources. Contrary to that expectation, though, the developers indicated that ideal use would be the variation as described above, along with the variation that the teacher refers to the curriculum guidelines and uses the recommended resources to supplement existing curriculum. In essence, the developers left space for teachers to integrate the curriculum guidelines into existing site-adopted curriculum to allow teachers flexibility in outlining their own courses, as well as when using more scripted curriculum packages.

Heck, Stiegelbauer, Hall, and Loucks (1981) recommended that the innovation configurations map be used in combination with interviews and classroom observations of the teachers while using the educational innovation. Inasmuch as the innovation configurations map for this study was developed concurrently to the investigation of elementary teachers' experiences with the curriculum guidelines, observation of the participants was not possible. As such, subsequent investigations with the innovation configurations map should incorporate observations into the decision-making process.

The innovation configurations map developed for use with the *California Curriculum Guidelines for Agricultural Literacy Awareness* was cross-referenced to member narratives and provided rich data related to *ideal*, *acceptable*, and *unacceptable* use of the curriculum guidelines. The innovation configurations map was supplied to the grant project director who agreed to ask teacher educators and cooperating teachers to use the map when working with and assessing elementary teachers' use of the *CCGALA*.

This tool may be used by cooperating teachers, university supervisors, administrative evaluators, innovation developers, and others interested in assisting preservice and in-service teachers to diagnose the acceptability of configurations used. Typically, innovation developers spend little time

Objective Five: Describe the innovation configurations that teachers employed while implementing an agricultural literacy curriculum.

Conclusion: When using an agricultural literacy curriculum, elementary teachers employed a variety of innovation configurations related to each identified essential component. With the exception of experiential learning opportunities and instructional approach, elementary teachers generally articulated misunderstanding and misuse of the *California Curriculum Guidelines for Agricultural Literacy Awareness* and agricultural curricular resources as a context for teaching across the content area standards.

Accessible population responses to the initial attitudinal instrument indicated that 14 of the 36 respondents (38.9%) were not using agriculture as a context for teaching across the content area standards. As such, it was expected that the newly-developed innovation configurations checklist would be used with only those members of the sample who indicated they used the *California Curriculum Guidelines for Agricultural Literacy Awareness*. Upon analysis of transcript data, however, every member revealed use of agriculture as an integrating context in some manner during the academic year. With this revelation, the innovation configurations map was cross-referenced and appropriate text lifted from each sample participant's narrative as an indicator of the adaptations elementary teachers used in employing agriculture as an integrating context.

The innovation configurations map was developed in tandem with the in-depth interview process, so there was no way to forecast what components would emerge from the innovation configurations map process. On one hand, this was problematic because not every component was addressed and assigned a level of acceptability. However, it could also be heralded as a means to provide objectivity to the qualitative inquiry interview, since much of what emerged throughout the interview process was parallel to the components that surfaced in the innovation configurations development. In addition,

the participant narratives provided rich detail that alluded to the variations they employed while using agriculture as the integrating context.

Eight members of the sample (80%) were rated as unacceptable in their use of the *California Curriculum Guidelines for Agricultural Literacy Awareness* and recommended curricular resources (Component 1). While an unacceptable rating was expected because of disorganized use or lack of confidence due to participant background, member transcripts revealed an unexpected reason for the ratings. Reflecting on the accompanying narratives, many of the ratings could be attributed to a misunderstanding of the guidelines. Member comments indicated elementary teachers believed the curriculum guidelines were a separate set of curricular requirements designed to supplant state mandated materials, rather than a means to integrate the standards thematically to increase transference across the content areas. That misconstruction perpetuated itself with respect to the second component, "Cross-disciplinary state educational standards are addressed using an agricultural context." Fifty percent of the members were rated unacceptable in this component. Elementary teachers' perceptions were generally engrained in such a way that they were unable to see the connections between agriculture and academia beyond a math and science connection. One member, who primarily taught English, failed to see an overt connection between agriculture and the language arts. Another elementary teacher's one-dimensional perception of social studies as *history* articulated her own barrier of being able to integrate agriculture more fully across this content area.

Elementary teachers, regardless of the degree to which they incorporated agriculture in their classrooms, were generally rated as acceptable and ideal when they

provided agricultural experiential learning opportunities for their students. The teachers provided evidence of concrete experience, reflection, abstract conceptualization, and active experimentation throughout the narratives, even though they may not have been cognizant of those labels.

Outcomes related to the instructional approach component of the innovation configurations checklist were surprising only insomuch as they contrasted so vehemently with the reported frequency of use of agriculture as an integrating context. With the exception of two members' narratives where no evidence emerged, the remaining members were all rated as ideal and acceptable with respect to this component. As expected, elementary teachers reported engagement and enthusiasm by the students when agriculture was brought into the educational formula for teaching content standards. The teachers' perceptions of students who were traditionally less confident and participatory with lessons that are more passive indicated those same students were more attentive and focused when using agriculture as the integrating context. Likewise, teachers perceived that students retained information for a longer term when contextually aligned with agriculture. Teachers also reported their own positive behavior and enthusiasm changes when incorporating an agricultural theme. Whereas teachers reported such positive results with respect to student and teacher behaviors and outcomes, this study would have been an exercise in futility had it not sought to uncover the themes behind the experiences of teachers incorporating agriculture into the classroom.

Objective Six: Describe the perceived outcomes experienced by teachers who adopted the agricultural literacy curriculum.

Conclusion: When using agriculture as a context for teaching across the content area standards, elementary teachers generally described three themes encompassing their experiences and perceived outcomes. Specifically, those themes included a preoccupation with time; perception of their roles as teachers

and faculty members, and changes in student behavior; and an overwhelming partiality toward change facilitation.

As new professionals in the teaching field, it was expected that elementary teachers would raise concerns about lack of time to learn about and introduce a new curricular approach to their teaching repertoire. Furthermore, little surprise was garnered by the result of the elementary teachers seeing themselves as faculty members who should learn from veteran teachers and who should maintain the status quo with respect to the school system. First year teachers are often overwhelmed by the responsibilities of classroom management, preparing lessons in accordance with state standards, communicating with parents and administrators, and keeping current with respect to student assignments and assessments. What was surprising was the intensity with which the elementary teachers insisted that state mandated and site adopted curriculum materials must be taught and that effect on their organizational skills in developing and delivering contextual lessons relevant to the students' experiences.

The focus on scripted materials was heavily laden throughout the sample, even to a high degree within those members who were using the *California Curriculum Guidelines for Agricultural Literacy Awareness.* As such, many of the users recalled their understanding of the curriculum innovation as a separate set of state standards in an agricultural content area. The perception among those members was that they could not insert any other non-essential standard instruction into the curriculum with such intense pressure on reading and mathematics curriculum requirements.

One explanation as to why the elementary teachers felt such a need to not deviate from their curricular path was their perception of themselves as new faculty members. Because of their hiring recency, age, and naiveté about the teaching profession, many

members felt the need to burke their opinions and ideas during faculty meetings in reverence to their older, more seasoned colleagues. For several members, that suppression may have been learned through exposure to cooperating teachers who failed to encourage student teachers to take risks or to deviate from their planned curriculum.

The elementary teachers in this study expressed their environmental adaptation by indicating that they did not try to change the routine while student teaching because it was not their class and they did not feel comfortable attempting to shift delivery methods to the students. Selecting student teaching sites where cooperating teachers are well-versed and comfortable using an agricultural context may encourage student teachers to develop more confidence as advocates for their students and their curricular approach.

Thompson and Balschweid (2000) asserted that teacher preparation programs should be instrumental in providing instruction on *how* to integrate agricultural concepts into science and other subject matter areas. Results of their study indicated that undergraduate preservice teachers did not necessarily need more courses in a given content area, but that they needed overt methodological instruction on how to integrate content areas via a common theme. This study echoed Thompson and Balschweid's (2000) results as the time differential between initial exposure and first opportunity for implementation was so great for many participants that they had simply forgotten about the materials and how they could be used as an integrating context.

There are measures that may be taken to assist in increasing elementary teacher knowledge retention of the *CCGALA*. To begin with, preservice students should be encouraged to complete agricultural literacy integration coursework within one year before entering an initial student teaching experience. Also, student teaching

requirements should include assignments pertaining to use of agriculture as a theme. Finally, university supervisors should actively seek cooperating teachers who are familiar with, and willing to allow student teachers to use, *CCGALA* while under their mentorship.

Concurring with recommendations by Thompson and Balschweid (2000), participants in this study frequently cited a need for continuing professional development and on-site mentors who can demonstrate successful use of agricultural contexts across the content areas as a means to assist them in beginning and/or sustaining use of the *CCGALA*. This desire for continuing education and support throughout the change process reinforced Hall and Hord's (2001) contention that change facilitation is essential from administrators, colleagues, program developers, and other stakeholders vested in the success of the educational innovation at hand.

Throughout the interview series, elementary teachers who indicated they had simply forgotten about the materials later exclaimed that they were reminded about the materials as a result of initial contact from the attitudinal questionnaire and through the process of arranging for and conducting the interviews. These teachers articulated an intention to revisit the resources and look for ways to implement them in their curriculum. That revelation reinforced the "one legged interview" dimension of the Concerns Based Adoption Model (Hall & Hord, 2001). Essentially, when change facilitators take a few moments out of the day to inquire about an innovation, how the teacher is coping with the changes, and to ask if any assistance is needed, the implementer of the innovation is motivated to continue with the change effort. Those few moments are literally defined as the amount of time a person can stand on one leg without losing his or her balance, hence, the name "one-legged interview" (2001). If

administrators are aware of the *California Curriculum Guidelines for Agricultural Literacy Awareness*, change facilitation can be assisted simply through periodic inquiries and exchanges in the school hallways.

Recommendations for Practitioners

1. Many elementary teachers pointed to the length of time that had passed from initial exposure to the agricultural literacy curriculum until their student teaching experiences as a reason for not using agriculture as an integrating context for teaching. This would imply that university teacher education programs should offer an agricultural literacy course no more than one academic year prior to the initial student teaching experience.

2. Elementary teachers need practice in making the connection between the agricultural concept and the appropriate grade level content area standards. Therefore, preservice instructional time should be spent more overtly teaching future elementary teachers how to read and use the *California Curriculum Guidelines for Agricultural Literacy Awareness.*

3. Student teaching assignments, for those preservice teachers attending California universities that endorse the use of agriculture as an integrating context, should be tied to use of the *California Curriculum Guidelines for Agricultural Literacy Awareness.* By requiring preservice teachers to use the guidelines and incorporate agricultural lessons into their preservice experience, they will be reinforcing the use of, and exposure to, the guidelines.

4. Change facilitators should utilize teacher stages of concerns to tailor development of workshops and other professional development opportunities. Targeting experiences to current beginning teacher concerns may be more effective in providing information about the innovation while bolstering participant confidence in the subject matter.

5. Change facilitation emerged as a recurrent need for increasing elementary teachers' potential sustained use of the educational innovation. Therefore, university supervisors should spend time cultivating potential student teaching sites with cooperating teachers who have experience with, and regularly use, the *California Curriculum Guidelines for Agricultural Literacy Awareness.*

6. The innovation configurations map would be best utilized in tandem with both interviews and classroom observations. Cooperating teachers and university supervisors should use the innovation configurations map when observing preservice teachers during their student teaching experiences. School site administrators should use the innovation configurations map when conducting annual observations of in-service professionals.

7. The developers of the *California Curriculum Guidelines for Agricultural Literacy Awareness* should allocate resources more heavily toward the implementation portion of this curriculum innovation. As such, professional development opportunities should be provided for administrators, cooperating teachers, and university teacher education faculty to educate them about the innovation, as well as to provide training and experience in how to more effectively function as a change facilitator.

8. To strengthen the agricultural backgrounds of elementary teachers, agricultural teacher education programs should cooperate with elementary teacher education programs to provide agricultural and teaching methods courses to both elementary and secondary preservice teachers interested in using agriculture as an integrating context.

9. Given an increased nationwide focus on standards-based education, universities in other states should explore funding for adaptation of, and research related to, the *California Curriculum Guidelines for Agricultural Literacy Awareness* to reflect the state standards within each respective state.

Recommendations for Further Research

1. Because this study was conducted with new professionals in either their first or second year of teaching, further research should be repeated with this population in a longitudinal manner periodically over the next five years. Such research would provide a schema for tracking if/how elementary teachers' stages of concern and levels of use, as well as their innovation configurations, change over time.

2. 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.

3. One of the findings of this study was that elementary teachers of agriculture responded differently than expected in the relative intensity of their stages of concern, as compared to previous studies conducted with populations of high school teachers. Whereas the expectation was that these individuals would express concerns similar to their high school counterparts, elementary teachers in this study expressed intense levels of concern in the *awareness* and *informational* stages, as opposed to the *management* and *consequence* stages expressed by high school agriculture teachers. Conversely, elementary teachers in this study expressed their least intense concerns in the *management* and *consequence* stages than do either experienced or inexperienced users. Further research using larger sample sizes should be conducted to determine the potential for hybrid emergence of the model.

4. The *California Curriculum Guidelines for Agricultural Literacy Awareness* was funded by the W. K. Kellogg Foundation and delivered via a variety of approaches at three West Coast universities. Research should be conducted within each

population as defined by initial exposure at a respective university, as well as across the total population in an attempt to determine the optimal delivery method to preservice teachers.

5. The Concerns Based Adoption Model should be used to assess veteran elementary teachers' experiences with the *California Curriculum Guidelines for Agricultural Literacy Awareness.*

6. The change facilitator portion of the Concerns Based Adoption Model should be a primary focus for further research with this population. Specifically, administrators at each school site should be interviewed pertaining to their stages of concern and to what extent they encourage elementary teachers to use the *California Curriculum Guidelines for Agricultural Literacy Awareness.*

7. The Concerns Based Adoption Model should be used with other existing agricultural literacy curriculum innovations to better assess and evaluate the sustained adoption and use, rather than focusing on attitudinal or base level knowledge assessments, as means for determining the success and validity of such innovations.

8. This study relied on self-reported data from the sample members. As such, further studies should be conducted utilizing total immersion and observation methods within the members' classrooms.

Reflection

Many agricultural literacy curriculum programs have been assessed in a variety of ways. The agricultural education profession has not endorsed one program over another, nor has any particular evaluative methodology been consistently used. Dass (1997) pointed to conflict with existing curricular structures as a barrier preventing implementation of new educational innovations, such as the *California Curriculum Guidelines for Agricultural Literacy Awareness.* Essentially, veteran teachers may be concerned with the potential longevity of curriculum innovations and may make commitment decisions based on whether or not they perceive a program will remain a priority for the district or school. As such, agricultural literacy implementation efforts may be best focused on preservice teachers who have not yet established a routine and who may be less inclined to reject potential innovations in favor of "the old way" of

teaching. To date, the focus of *California Curriculum Guidelines for Agricultural Literacy Awareness* implementation efforts has been with preservice elementary teachers.

Additional challenges facing agricultural literacy innovations in the past have included assessment and evaluation of individual units and programs. Terry, Herring, and Larke (1992) recommended that lists of agricultural literacy resources be packaged together and that in-service workshops and graduate credit courses be offered to "assist and encourage teachers in their efforts to teach about agriculture" (p. 58). The *California Curriculum Guidelines for Agricultural Literacy Awareness* was packaged in just that manner, and was designed to allow teachers to select materials with which they are comfortable.

Meischen and Trexler (2003) lamented the suitability of one agricultural literacy program's benchmarks for the age groups for which it was designed. Specifically, they opined that an agricultural literacy curriculum should be developed to effectively understand a child's schema and to construct a curriculum that "causes dissatisfaction with pre-existing knowledge structures and pulls students into the conceptual change process" (p. 54). Bringing together educators who were experienced working with each respective elementary grade level and educators who were experienced in agriculture, the developers of the *California Curriculum Guidelines for Agricultural Literacy* sought to achieve Meischen and Trexler's recommendation.

While this study was in no way designed to be generalized beyond the target population, there are common threads woven throughout this and previous agricultural literacy studies. The agricultural education profession has a rich history of research investigating teacher preparation. Surprisingly, research focused on teacher concerns

related to materials and resources introduced for their use, at all levels, is extremely deficient. As such, investigation of previous and subsequent agricultural education innovation studies through a concerns based lens may unveil more commonalities and themes that propel the agricultural education profession ever closer to reaching the agricultural literacy goal of lifelong learning in and about agriculture.

APPENDIX A
INSTITUTIONAL REVIEW BOARD APPROVAL

UNIVERSITY OF FLORIDA

Institutional Review Board

98A Psychology Bldg.
PO Box 112250
Gainesville, FL 32611-2250
Phone: (352) 392-0433
Fax: (352) 392-9234
E-mail: irb2@ufl.edu
http://irb.ufl.edu/irb02

DATE: April 29, 2005

TO: Kimberly Bellah
310 Rolfs Hall
Campus

FROM: Ira S. Fischler, PhD, Chair IF/TF
University of Florida
Institutional Review Board 02

SUBJECT: **Approval of Protocol #2005-U-468**

TITLE: Elementary teachers' experiences in adopting an agricultural literacy curriculum

SPONSOR: Kellogg Foundation

I am pleased to advise you that the University of Florida Institutional Review Board has recommended approval of this protocol. Based on its review, the UFIRB determined that this research presents no more than minimal risk to participants. Given your protocol, it is essential that you obtain signed documentation of informed consent from each participant. Enclosed is the dated, IRB-approved informed consent to be used when recruiting participants for the research.

> It is essential that each of your participants sign a copy of your approved informed consent that bears the IRB stamp and expiration date.

If you wish to make any changes to this protocol, including the need to increase the number of participants authorized, you must disclose your plans before you implement them so that the Board can assess their impact on your protocol. In addition, you must report to the Board any unexpected complications that affect your participants.

If you have not completed this protocol by April 27, 2006, please telephone our office (392-0433), and we will discuss the renewal process with you. It is important that you keep your Department Chair informed about the status of this research protocol.

ISF:dl/tf

APPENDIX B
PRELIMINARY LETTER

UNIVERSITY OF FLORIDA

IFAS

Agricultural Education and Communication

305 Rolfs Hall/PO Box 110540
Gainesville, FL, 32611-0540
(352) 392-0502
Fax: (352) 392-9585
Website: http://aec.ifas.ufl.edu

May 10, 2005

CCGALA USER ID:

Dear :

As a former participant in a California Curriculum Guidelines for Agricultural Literacy Awareness course, we need your input in assessing the success and usefulness of agricultural curriculum in California. The purpose of this survey is to learn about your attitudes toward agriculture and the California Curriculum Guidelines for Agricultural Literacy Awareness materials.

The questionnaire will only take about 15 minutes to complete. It is enclosed with this letter. By law, I am required to tell you that you do not have to answer any question you do not wish to answer. There are no anticipated risks, compensation, or other direct benefits to you as a participant in this survey. You are free to withdraw your consent to participate and may discontinue your participation in the survey at any time without consequence. Only I will have access to the completed questionnaires. Your identity will be kept confidential and will not be revealed in the final manuscript. Your response to and return of the questionnaire will serve as your informed consent to participate in this research study. Some participants will be contacted and asked to participate in a follow-up interview.

If you have any questions about this research protocol, please contact me at (352) 392-0502, ext. 223 or my faculty supervisor, Dr. James E. Dyer, at (352) 392-0502, ext. 239. Questions or concerns about your rights as a research participant may be directed to the UFIRB office, University of Florida, Box 112250, Gainesville, FL 32611; phone (352) 392-0433. Please reference study number 2005-U-468.

Please fill out and return the completed questionnaire in the enclosed, postage paid envelope. By completing and returning the questionnaire, you will greatly assist us in improving the California Curriculum Guidelines for Agricultural Literacy Awareness program.

Sincerely,

Kimberly A. Bellah, M.S.
Graduate Assistant
Agricultural Educ. & Comm.
University of Florida

James E. Dyer, Ph.D.
Associate Professor
Agricultural Educ. & Comm.
University of Florida

APPENDIX C
INTERVIEWEE INFORMED CONSENT

Protocol Title: Elementary teachers' experiences in adopting an agricultural literacy curriculum

Please read this consent document carefully before you decide to participate in this study.

Purpose of this research study: To describe elementary teachers' experiences using agriculture as a context for teaching elementary students

What you will be asked to do in the study: To respond to a Stages of Concern questionnaire, participate in a Levels of Usage interview, and to answer and discuss 13 additional interview questions

Time required: About two hours

Risks and benefits: No more than minimal risk. There is no direct benefit to the participant. This research can add to the understanding of the experiences elementary teachers are having in relationship to using agriculture as a context for teaching, as well as what concerns teachers have when choosing to adopt an agricultural literacy curriculum.

Compensation: Participants will receive a $100 honorarium, as well as travel expenses encumbered because of the interview process (including, but not limited to substitute teacher reimbursement).

Confidentiality: Your identity will be kept confidential to the extent provided by law. The results will be presented in a dissertation as partial fulfillment of a doctoral degree program, to the California Food and Fiber Futures foundation in partial fulfillment of grant requirements, and to education journals and magazines for possible publication.

Voluntary participation: Your participation in this study is voluntary. There is no penalty for not participating.

Right to withdraw from the study: You have the right to withdraw from the study at anytime without consequence. You do not have to answer any questions you do not want to answer.

Whom to contact if you have questions about the study:
Kimberly Bellah, Agricultural Education & Communication Dept., 310 Rolfs Hall, PO Box 110540, Gainesville, FL 32611, (352) 392-0502, ext. 223 or James Dyer, PhD, Agricultural Education & Communication Dept., 310 Rolfs Hall, PO Box 110540, Gainesville, FL 32611, (352) 392-0502, ext. 239

Whom to contact about your rights as a research participant in the study:
UFIRB Office, Box 112250, University of Florida, Gainesville, FL 32611-2250, phone: (352) 392-0433

I have read the procedure outlined above. I voluntarily agree to participate in this study and have received a copy of this description.

_____	_____
Participant's signature	Date
_____	_____
Principal investigator's signature	Date
_____	_____
Faculty advisor's signature	**Date**

APPENDIX D
CALIFORNIA CURRICULUM GUIDELINES FOR AGRICULTURAL LITERACY AWARENESS PARTICIPANT ATTITUDINAL INSTRUMENT

Survey of California Curriculum Guidelines for Agricultural Literacy Awareness Participants

Please take a few minutes to assist in improving the California Curriculum Guidelines for Agricultural Literacy Awareness materials by completing this short questionnaire. Your honest responses will help us to structure our programs to best serve you and your colleagues in the educational field. Thank you.

Section 1. Please indicate your level of agreement with the following statements about agriculture and its usefulness as a teaching tool across the content areas ("Cross-disciplinary"). Categories of agreement include *strongly disagree (SD)*, *disagree (D)*, *undecided or no opinion (U)*, *agree (A)*, and *strongly agree (SA)*.

	SD	D	U	A	SA
1. There are numerous career opportunities in the field of agriculture.	1	2	3	4	5
2. Agriculture provides beneficial products for society.	1	2	3	4	5
3. All elementary students should be aware of agriculture.	1	2	3	4	5
4. Agriculture provides safe products for society.	1	2	3	4	5
5. Agriculture should be offered in both urban and rural areas.	1	2	3	4	5
6. Elementary education about agriculture can help protect the environment and our natural resources.	1	2	3	4	5
7. Agriculture in elementary classes should be offered primarily in urban communities.	1	2	3	4	5
8. Agriculture in elementary schools is most beneficial to students in rural areas.	1	2	3	4	5
9. Most elementary students are unaware of the impact of agriculture on their daily lives.	1	2	3	4	5
10. Most elementary teachers are unaware of the impact of agriculture on their daily lives.	1	2	3	4	5
11. Most students in my school have a positive image of agriculture.	1	2	3	4	5
12. Most teachers in my school have a positive image of agriculture.	1	2	3	4	5
13. Agriculture integrates multiple disciplinary applications in:					
Science	1	2	3	4	5
Mathematics	1	2	3	4	5
Fine arts	1	2	3	4	5
Language arts	1	2	3	4	5
Social science	1	2	3	4	5
14. Infusing agriculture into elementary classrooms makes academic principles more meaningful to students.	1	2	3	4	5
15. Using agriculture as the context for teaching makes cross-disciplinary instruction more meaningful.	1	2	3	4	5
16. Elementary agriculture curriculum should become more cross-disciplinary based.	1	2	3	4	5
17. Stronger ties should be made between agriculture and elementary curricula.	1	2	3	4	5
18. Infusing agriculture into elementary classes is beneficial for higher achieving students	1	2	3	4	5
19. Every elementary student would benefit from some instruction about agriculture.	1	2	3	4	5
20. Teaching using agriculture as the context is effective in helping students understand the subject matter.	1	2	3	4	5
21. Infusing agriculture into elementary classes is beneficial for lower achieving students.	1	2	3	4	5
22. Learning is easier for students when teachers use agriculture as the context.	1	2	3	4	5
23. Increased emphasis on using agriculture as the teaching context produces little change in students' achievement.	1	2	3	4	5
24. Using agriculture as the context motivates students to learn.	1	2	3	4	5

Section 2. Please help us understand how often CCGALA materials are being used in your classroom by answering the questions in this section.

1. Are you currently teaching agriculture using the CCGALA you learned about in your coursework?

- ☐ Yes, I am teaching agriculture using CCGALA
- ☐ No, I don't use CCGALA, but I infuse agriculture other ways
- ☐ No, I am not teaching any agriculture in my classroom

2. If you are currently using CCGALA materials, indicate the subjects and/or content areas you teach using those materials:

- ☐ Art
- ☐ Language arts
- ☐ Mathematics
- ☐ Music
- ☐ Science
- ☐ Social studies
- ☐ Technology
- ☐ Physical education
- ☐ Other (please specify): _____

3. Approximate number of days during the academic year you taught using the CCGALA material (mark "N/A" if you were not teaching during that year. Mark "0" if you were teaching, but did not use CCGALA materials) Also, please indicate any student teaching experiences (where applicable):

2002-2003 _____ Student teaching? Yes No
2003-2004 _____ Student teaching? Yes No
2004-2005 _____ Student teaching? Yes No

4. In what ways have you collaborated with existing agricultural teachers or agricultural programs near your school (mark all that apply)?

- ☐ None
- ☐ Partners in Active Learning Support (PALS)
- ☐ Petting zoo
- ☐ Food for America
- ☐ Other: (please list) _____

5. Have you collaborated with other teachers in your school? If so, please indicate with whom, and in what ways (please do not use teacher names):

- ☐ No
- ☐ Yes

_____
_____
_____
_____

Section 3. Please complete the following demographic data so that we can get a clearer understanding of who participates in CCGALA programs.

1. Age: _____

2. Gender: ☐ Male ☐ Female

3. Agricultural experience (mark all that apply):

- ☐ None
- ☐ Raised in a rural/agricultural family
- ☐ Participated in production agriculture
- ☐ Participated in youth agricultural/FFA/4-H experience
- ☐ Participated in paid work experience in agriculture
- ☐ Majored in agriculture in college
- ☐ Completed some agricultural coursework in college

4. Number of years teaching: _____

5. Grade you are currently teaching: _____

6. Type of school in which you teach:

- ☐ Public
- ☐ Private
- ☐ Charter
- ☐ Other (please specify): _____

7. Type of area where your school is located (mark only one):

- ☐ Urban
- ☐ Suburban
- ☐ Rural

Thank you for your time and effort in completing this questionnaire!
Please return this survey in the postage paid envelope by May 6, 2005 to
Kimberly A. Bellah, PO Box 110540, Gainesville, FL 32611.

APPENDIX E
STAGES OF CONCERN QUESTIONNAIRE

ID#_____

Please indicate your level of agreement with the following statements regarding your use of the California Curriculum Guidelines for Agricultural Literacy Awareness (CCGALA) and agriculture as a context for teaching across the content areas. Please respond to the scale as follows:

0	1 2	3 4	5 6 7
Irrelevant	Not true of me now	Somewhat true of me now	Very true of me now

1. I am concerned about students' attitudes toward agriculture.	0 1 2 3 4 5 6 7
2. I now know of some other approaches that might work better.	0 1 2 3 4 5 6 7
3. I don't even know what CCGALA is.	0 1 2 3 4 5 6 7
4. I am concerned about not having enough time to organize myself each day.	0 1 2 3 4 5 6 7
5. I would like to help other faculty in their use of CCGALA.	0 1 2 3 4 5 6 7
6. I have a very limited knowledge about CCGALA and agriculture as a context for teaching.	0 1 2 3 4 5 6 7
7. I would like to know the effect of using CCGALA and agriculture on my professional status.	0 1 2 3 4 5 6 7
8. I am concerned about conflict between my interests and my responsibilities.	0 1 2 3 4 5 6 7
9. I am concerned about revising my use of CCGALA.	0 1 2 3 4 5 6 7
10. I would like to develop working relationships with both our faculty and outside faculty using CCGALA.	0 1 2 3 4 5 6 7
11. I am concerned about how using agriculture affects students.	0 1 2 3 4 5 6 7
12. I am not concerned about CCGALA or agriculture as a teaching context.	0 1 2 3 4 5 6 7
13. I would like to know who will make the decisions regarding CCGALA use.	0 1 2 3 4 5 6 7
14. I would like to discuss the possibility of using CCGALA.	0 1 2 3 4 5 6 7
15. I would like to know what resources are available if I decide to adopt CCGALA.	0 1 2 3 4 5 6 7
16. I am concerned about my inability to manage all CCGALA requires.	0 1 2 3 4 5 6 7

17. I would like to know how my teaching or administration is supposed to change. 0 1 2 3 4 5 6 7

18. I would like to familiarize other departments or persons with the progress of this new approach. 0 1 2 3 4 5 6 7

19. I am concerned about evaluating my impact on students. 0 1 2 3 4 5 6 7

20. I would like to revise CCGALA's approach. 0 1 2 3 4 5 6 7

21. I am completely occupied with other things. 0 1 2 3 4 5 6 7

22. I would like to modify my use of CCGALA based on the experiences of my students. 0 1 2 3 4 5 6 7

23. Although I don't know about CCGALA, I am concerned about other things in the area of agriculture as a context for teaching. 0 1 2 3 4 5 6 7

24. I would like to excite my students about their part in this approach. 0 1 2 3 4 5 6 7

25. I am concerned about my time spent working with nonacademic problems related to CCGALA and agriculture as a teaching context. 0 1 2 3 4 5 6 7

26. I would like to know what the use of CCGALA and agriculture will require in the immediate future. 0 1 2 3 4 5 6 7

27. I would like to coordinate my efforts with others to maximize agriculture's effects. 0 1 2 3 4 5 6 7

28. I would like to have more information on time and energy commitments required by CCGALA. 0 1 2 3 4 5 6 7

29. I would like to know what other faculty are doing in this area. 0 1 2 3 4 5 6 7

30. At this time, I am not interested in learning about CCGALA and agriculture as a context for teaching. 0 1 2 3 4 5 6 7

31. I would like to determine how to supplement, enhance, or replace CCGALA. 0 1 2 3 4 5 6 7

32. I would like to use feedback from students to change the program. 0 1 2 3 4 5 6 7

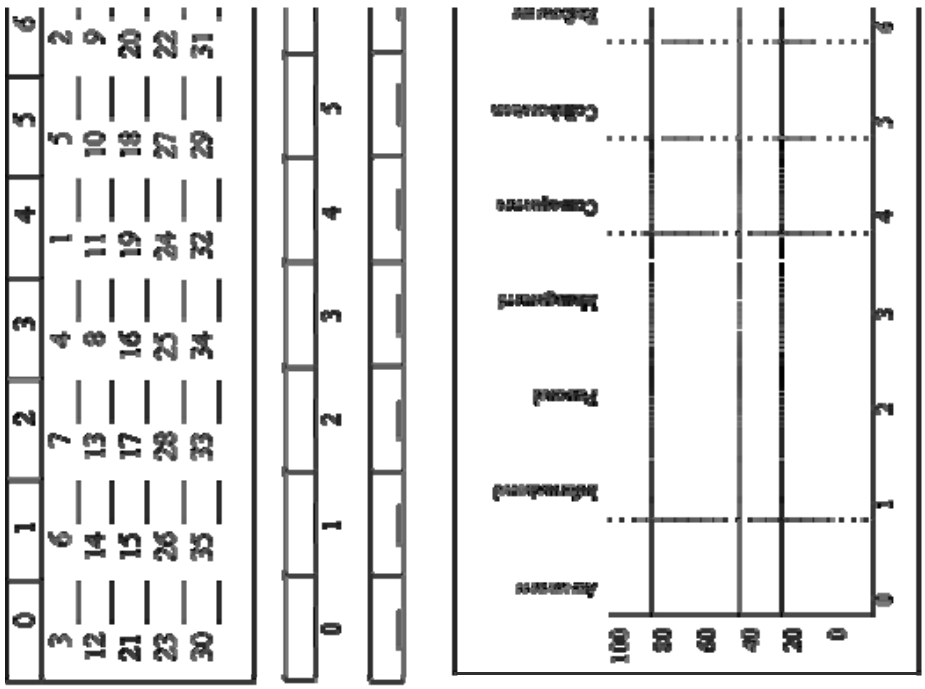
33. I would like to know how my role will change when I am using CCGALA and agriculture as a teaching context. 0 1 2 3 4 5 6 7

34. Coordination of tasks and people is taking too much of my time. 0 1 2 3 4 5 6 7

35. I would like to know how CCGALA and using agriculture as a teaching context is better than the elementary curriculum we have now. 0 1 2 3 4 5 6 7

APPENDIX F

STAGES OF CONCERN QUESTIONNAIRE QUICK SCORING DEVICE



Date: _____

Site: _____ ID: ___

Innovation: _____

Percentiles for

Raw Scale Score Total	Stage 0	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Stage 6
0	10	5	5	2	1	1	1
1	23	12	12	5	1	1	2
2	29	16	14	7	1	2	3
3	37	19	17	9	2	3	5
4	44	23	21	11	3	4	6
5	53	28	23	13	3	5	9
6	63	34	28	15	4	7	11
7	66	37	31	18	5	9	14
8	72	39	35	20	5	10	17
9	77	46	39	23	7	13	20
10	81	49	42	26	8	14	23
11	84	52	46	30	9	16	26
12	86	56	49	34	9	18	29
13	89	59	52	37	11	19	32
14	91	63	56	40	13	21	35
15	93	66	59	43	15	23	38
16	94	69	63	46	17	25	41
17	95	72	66	49	19	27	44
18	96	75	69	52	21	29	47
19	96	78	72	56	24	31	50
20	96	81	75	59	26	34	53
21	96	84	78	63	29	37	56
22	96	86	81	66	32	40	59
23	96	89	84	69	35	43	63
24	96	91	86	72	38	46	66
25	96	93	89	75	41	49	69
26	96	94	91	78	44	52	72
27	96	95	93	81	47	56	75
28	96	96	94	84	50	59	78
29	96	96	95	86	53	63	81
30	96	96	96	89	56	66	84
31	96	96	96	91	59	69	86
32	96	96	96	93	63	72	89
33	96	96	96	94	66	75	91
34	96	96	96	95	69	78	93
35	96	96	96	96	72	81	94

APPENDIX G

CALIFORNIA CURRICULUM GUIDELINES FOR AGRICULTURAL LITERACY AWARENESS INNOVATION CONFIGURATIONS ROUND ONE DELPHI INSTRUMENT

California Curriculum Guidelines for Agricultural Literacy Awareness

Innovation Configurations Development Questionnaire

User ID	Primary experience(s) with CCGALA (check all that apply):
	checkbox Developer/writer
	checkbox Teacher user
	checkbox Other (please describe):

1. Based on your experiences, please describe CCGALA:

2. What would one observe in classrooms when CCGALA is being used well?

3. What would one observe in classrooms when CCGALA is not being used well?

4. What will teachers and students be doing when CCGALA is in use?

Submit

Thank you for your time in completing this questionnaire!

APPENDIX H
INTERVIEW PROTOCOL

Interview guide

I want to talk with you more now on your specific experiences with the California Curriculum Guidelines for Agricultural Literacy Awareness. I am interested in your understanding of your experiences, challenges, barriers, and how you perceive your students' outcomes as a result of using agriculture as a context for teaching.

I would like to ask you a few questions.

1) Describe how your attitudes and perceptions toward agriculture were influenced through your use of agriculture as a teaching context?

2) What personal changes in agricultural literacy levels did you experience as a result of your use of the curriculum guidelines?

3) What factors helped you in teaching science, mathematics, language arts, and social science competencies in an agricultural context?

4) What factors hindered you in teaching science, mathematics, language arts, and social science competencies in an agricultural context?

5) To what extent did you use the curriculum guidelines during your student teaching experiences?

6) To what degree do you find the curriculum guidelines easy to use?

7) Describe your experiences related to teaching methods, strategies, and/or teaching techniques using agriculture as the context for teaching?

8) To what extent, and with whom, did you collaborate as a result of using agriculture as an integrating context?

9) Describe any changes in student behavior you observed when implementing the curriculum guidelines.

10) To what extent did you use the curriculum guidelines after completion of student teaching experiences?

11) Describe adaptations, if any, you made in implementing the curriculum guidelines.

12) Describe any expected and/or unexpected experiences you encountered in using agriculture as the integrating context?

13) Describe the type of perceived support did you received, if any, from others in the school system.

Do you have any questions or comments for me that you would like to share?

Thank you for your time today and I would like to follow up with you if the need arises.

APPENDIX I

STAGES OF CONCERN RAW SCORE PERCENTILE CONVERSION CHART FOR STAGES OF CONCERN QUESTIONNAIRE (HALL, GEORGE, & RUTHERFORD, 1998)

	Percentiles for								
Five Item Raw Scale Score Total	Stage 0	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Stage 6	Total Raw Score	Percentile
0	10	5	5	2	1	1	1		
1	23	12	12	5	1	2	2	1-42	3
2	29	16	14	7	1	3	3	43-55	6
3	37	19	17	9	2	3	5	56-60	9
4	46	23	21	11	2	4	6	61-66	12
5	53	27	25	15	3	5	9	68-72	15
6	60	30	28	18	3	7	11	73-74	18
7	66	34	31	23	4	9	14	75-78	21
8	72	37	35	27	5	10	17	79-80	24
9	77	40	39	30	5	12	20	81-83	27
10	81	43	41	34	7	14	22	84-86	30
11	84	45	45	39	8	16	26	87-89	33
12	86	48	48	43	9	19	30	90-92	36
13	89	51	52	47	11	22	34	93-95	39
14	91	54	55	52	13	25	38	96-98	42
15	93	57	57	56	16	28	42	99-101	45
16	94	60	59	60	19	31	47	102-104	48
17	95	63	63	65	21	36	52	105-107	51
18	96	66	67	69	24	40	57	108-110	54
19	97	69	70	73	27	44	60	111-112	57
20	98	72	72	77	30	48	65	113-114	60
21	98	75	76	80	33	52	69	115-118	63
22	99	80	78	83	38	55	73	119-122	66
23	99	84	80	85	43	59	77	123-125	69
24	99	88	83	88	48	64	81	126-127	71
25	99	90	85	90	54	68	84	128-132	74
26	99	91	87	92	59	72	87	133-136	77
27	99	93	89	94	63	76	90	137-141	80
28	99	95	91	95	66	80	92	142-144	83
29	99	96	92	97	71	84	94	145-150	86
30	99	97	94	97	76	88	96	151-156	89
31	99	98	95	98	82	91	97	157-161	92
32	99	99	96	98	86	93	98	162-173	95
33	99	99	96	99	90	95	99	174-189	98
34	99	99	97	99	92	97	99	191-245	99
35	99	99	99	99	96	98	99		

APPENDIX J
INNOVATION CONFIGURATION COMPONENT VARIATION TABLE

Directions: Please indicate your level of agreement with each component as *ideal (I), acceptable (A),* or *unacceptable (U).* Further, if there are variations of a particular component you believe are missing, please type those in the rows provided beneath each respective component.

Finally, if there are components missing, please add those into the spaces allotted at the end of the table. If there are particular attributes you want to see included in those suggested component variations, please include those in the column to the right of your suggested components.

Thank you for your cooperation!!

CCGALA ID No. _____

Component: 1	**Use of CCGALA & curricular resources**	**Ideal (I), Acceptable (A), Unacceptable (U)**
	Teacher refers to CCGALA and uses only the recommended lessons and resources.	
	Teacher does not refer to CCGALA and uses only existing teacher-developed or site-endorsed curriculum.	
	Teacher refers to CCGALA and uses only existing teacher-developed or site-endorsed curriculum.	
	Teacher refers to CCGALA and uses some recommended lessons and resources to supplement existing teacher-developed or site-endorsed curriculum.	
Component: 2	**Cross-disciplinary state educational standards are addressed using an agricultural context**	**Ideal (I), Acceptable (A), Unacceptable (U)**
	Teacher occasionally employs an agricultural context to meet grade level standards across all disciplines (mathematics, science, social science, and language arts).	
	Teacher consistently employs an agricultural context to meet grade level standards across two to	

	three disciplines (mathematics, science, social science, and language arts).	
	Teacher employs an agricultural context without consideration of grade level state standards in any discipline (mathematics, science, social science, and language arts).	
	Teacher consistently employs an agricultural context to meet grade level standards across all disciplines (mathematics, science, social science, and language arts).	
	Teacher does not employ an agricultural context to meet grade level standards in any discipline (mathematics, science, social science, and language arts).	
Suggested variation:		
Suggested variation:		
Suggested variation:		
Component: 3	**Experiential learning opportunities**	**Ideal (I), Acceptable (A), Unacceptable (U)**
	Experiential component (laboratories, activities, etc.) of suggested lessons is omitted; written assignments are relied upon for primary activity base. Reflection is never included.	
	Students may engage in activities, but the teacher does not facilitate or make connections with agricultural or environmental topics; reflection is rarely included to complete the experiential learning loop.	
	Students engage in experiential learning activities directly related to agricultural and environmental topics; reflection (via journals, discussion, or other) is sometimes included to complete the experiential learning loop.	
	Students engage in experiential learning activities directly related to agricultural and environmental topics; reflection (via journals, discussion, or other) is always included to complete the experiential learning loop.	

Suggested variation:		
Suggested variation:		
Suggested variation:		
Component: 4	**Instructional approach**	**Ideal (I), Acceptable (A), Unacceptable (U)**
	Mostly teacher-centered instruction with occasional (1-2 instances per week) of cooperative learning opportunities (working in pairs, small groups, large groups).	
	Mostly student-centered instruction with occasional (1-2 instances per week) of lecture-based instruction.	
	Daily teacher-centered instruction, lecture-based format. Teacher determines outcomes. Students learn in large heterogeneous class and are rarely or never encouraged to engage in peer communication.	
	Daily student-centered instruction with multiple modality approach. Students are encouraged to interact with peers regarding agricultural concepts.	
Suggested variation:		
Suggested variation:		
Suggested variation:		
Component: 5	**Student assessment**	**Ideal (I), Acceptable (A), Unacceptable (U)**
	Student progress and knowledge is assessed via traditional paper and pencil exams. Focus is on,	

	and frequent reference made to standardized testing.	
	Student progress and knowledge is assessed in a variety of ways, including (but not limited to) developing self-assessment tools. Focus is on concept-attainment and critical thinking.	
	Student progress and knowledge is assessed via "unit exams" that may be measured through projects presented, oral and/or written exams, or student portfolios. Focus is on concept-attainment and critical thinking, but frequent reference is also made to standardized testing.	
Suggested variation:		
Suggested variation:		
Suggested variation:		
Component: 6	**Lesson presentation and purpose**	**Ideal (I), Acceptable (A), Unacceptable (U)**
	Students have an unclear or hazy understanding of lesson purpose and objectives. Standards addressed are written on the whiteboard or chalkboard, but overt reference to standards is omitted. Agricultural concepts presented lack a logical flow from one to the next.	
	Students are unsure of lesson purpose and objectives. Teacher omits checks for understanding and/or opportunities for student practice. No reference or connection to state standards is made. Teacher wanders from one agricultural topic to the next without any logical flow.	
	Students have a clear understanding of lesson purpose and objectives. Lesson presentation is seamless from introduction to conclusion. Frequent references are made between the agricultural concept presented and the standards addressed. Agricultural concepts presented follow a logical path.	
	Students have a clear understanding of lesson	

	purpose and objectives. Lesson presentation is seamless from introduction to conclusion. Standards addressed are written on the whiteboard or chalkboard, but overt reference to standards is omitted. Agricultural concepts presented follow a logical path.	
Suggested variation:		
Suggested variation:		
Suggested variation:		
Suggested Component: 7		**Attributes:**
Suggested Component: 8		**Attributes:**
Suggested Component: 9		**Attributes:**

APPENDIX K
INNOVATION CONFIGURATION PROFILES

ID 207	
Component	**I. Use of CCGALA & recommended curricular resources**
Statement(s)	"Not at all. I've not looked at them." "This is my first year teaching and I'm doing a scripted program, an intervention scripted program so that, here it's SRA, it's the state adoptive program and it's very scripted."
Designation of use	Unacceptable
Component	**II. Cross-disciplinary state educational standards are addressed using an agricultural context**
Statement(s)	"I never looked at the standards for teaching agriculture. It was just part of the curriculum that the teacher, the master teacher I was working with, wanted to do."
Designation of use	Unacceptable
Component	**III. Experiential learning opportunities**
Statement(s)	"We did a class project. In little groups they had the seed, they planted the seeds and then it was, you know, I forget, it took like a month or something and we just watch the seed grow and the stages and it was very basic because it was second grade level" [referring to student teaching experience].
Designation of use	Unacceptable
Component	**IV. Instructional approach**
Statement(s)	No evidence emerged
Designation of use	
Component	**V. Student assessment**
Statement(s)	No evidence emerged
Designation of use	
Component	**VI. Lesson presentation and purpose**
Statement(s)	No evidence emerged
Designation of use	

ID 204	
Component	**I. Use of CCGALA & recommended curricular resources**
Statement(s)	"I think I'm using the materials and the general concepts and, a lot of times, without actually looking AT the guidelines." "It [agricultural context] pops up quite frequently in our readings and then you take that reading and you take something from your knowledge of agriculture and integrate it, how it relates to even their own lives."
Designation of use	Unacceptable
Component	**II. Cross-disciplinary state educational standards are addressed using an agricultural context**
Statement(s)	"I realize I'm doing math 'cause we're making charts and graphs, but I don't always necessarily connect that, oh I'm also teaching history with it." "I think more of social studies as being the past and a lot of times when I'm teaching agriculture it's more current issues that." "I more thought of it originally as just teaching science, and I didn't realize how I was teaching so much math with it. And I knew I'd be developing their language arts skills with it because of writing, but not to the extent that how often we journal everyday. So, I don't think I realized the extent of how it was gonna cross over so much."
Designation of use	Acceptable/unacceptable
Component	**III. Experiential learning opportunities**
Statement(s)	"Anything that you can bring in that's hands on, that they can actually see or touch or feel. A lot of the agriculture stuff is really easy to bring in or touch or find a book about it." "I knew I'd be developing their language arts skills with it because of writing, but not to the extent that how often we journal everyday."
Designation of use	Ideal
Component	**IV. Instructional approach**
Statement(s)	"I know I expected that they would really enjoy it because once again it was so hands on, they got to move around much more than a lot of the stuff that we're doing in, in language arts and math right now, that they would get excited about it and enjoy it."
Designation of use	Acceptable
Component	**V. Student assessment**
Statement(s)	No evidence emerged
Designation of use	
Component	**VI. Lesson presentation and purpose**
Statement(s)	No evidence emerged
Designation of use	

ID 209	
Component	**I. Use of CCGALA & recommended curricular resources**
Statement(s)	"The only real experience or integration I've had through agriculture in my classroom now, we've done some talking about natural resources and talking about the availability of them and how, when, how long they're going to be around or not. And then did some talk about nutrition, food pyramid, everything like that going through the different things about it. That's about as agriculturally based as I've gone this year."
Designation of use	Unacceptable
Component	**II. Cross-disciplinary state educational standards are addressed using an agricultural context**
Statement(s)	"It's just such a small part because even though it's like you really can't integrate it with the math and the reading. I think people try to think of it more as like a science background, you know, where you kind of squeeze it in and unfortunately it goes through the teaching time dedicated to state mandated testing. Your reading, math and you see what else you have time for."
Designation of use	Unacceptable
Component	**III. Experiential learning opportunities**
Statement(s)	"We focused mostly on like the food pyramid, that's what we focused on, going through each section. Well, what makes us go? A lot of brainstorming, a lot of partner share, group work, creating, you know. They did a diary of what they ate in a day."
Designation of use	Acceptable
Component	**IV. Instructional approach**
Statement(s)	"Very high end student engagement, involvement and you're not just standing there talking to them. They're actually doing something. They're involved, they're very hands on and I think that helps, engrain any, whatever the concept is that you're trying to get across."
Designation of use	Acceptable
Component	**V. Student assessment**
Statement(s)	No evidence emerged
Designation of use	
Component	**VI. Lesson presentation and purpose**
Statement(s)	No evidence emerged
Designation of use	

ID 211	
Component	**I. Use of CCGALA & recommended curricular resources**
Statement(s)	"I didn't use it more because I don't, because of time and me not planning well enough for it." "It makes me get online more, you know, and read a little more about it. I still, like I said, don't do it enough, but if I want to find activities without, you know, using ag statistics instead of, you know, statistics from something else, then I'm learning a lot myself on things that I can bring into my classroom."
Designation of use	Ideal/acceptable
Component	**II. Cross-disciplinary state educational standards are addressed using an agricultural context**
Statement(s)	"In my classroom I did only three activities this year, really, that were ag-related, because I felt so pressured with the first-year teaching thing."
Designation of use	Acceptable
Component	**III. Experiential learning opportunities**
Statement(s)	"Probably group work. That was the first time I brought scales into my classroom, because we had to actually measure the mass of bananas and then the rind, and then did the total mass. So we had to do three parts of it. And that was the first time I used the scales. So that was- that was good for me, because I hadn't done a lesson on that yet. But I think when I do activities like that; it's the cooperative groups, you know, where each student has been given an assignment.
Designation of use	Acceptable
Component	**IV. Instructional approach**
Statement(s)	"Yeah, actually bringing an object like the bananas. I did that by bringing a lot of bananas, and I think that's what, you know, the kids got to do hands-on activities. So that made the math more successful, that they actually got to do it instead of listening to me lecture. I often lectured (laughs), more often than not. And so they grasp the material better when they're in groups, working on projects. So I think that with ag lessons, it forced me to have the constant hands-on material. Plus, they got to do a little bit of reading, which is really good, because I don't do a whole lot of reading
Designation of use	Acceptable
Component	**V. Student assessment**
Statement(s)	No evidence emerged
Designation of use	
Component	**VI. Lesson presentation and purpose**
Statement(s)	No evidence emerged
Designation of use	

ID 212	
Component	**I. Use of CCGALA & recommended curricular resources**
Statement(s)	"I try to enhance the lesson. Some of the lessons you can tell the students are just bored out of their minds and so I try and use what quickly I can find in the classroom."
Designation of use	Unacceptable
Component	**II. Cross-disciplinary state educational standards are addressed using an agricultural context**
Statement(s)	No evidence emerged
Designation of use	
Component	**III. Experiential learning opportunities**
Statement(s)	"I feel if they understand it more, they have a more personal connection to it. Then they're just gonna be more excited about it. they're gonna want to share it in a class, you know and if there's time you can share it, but then that'll build someone else's, you know, self esteem about sharing their story."
Designation of use	Acceptable
Component	**IV. Instructional approach**
Statement(s)	"ELD methods where it's kind of maybe a little more visual and you're not just teaching them orally. You're teaching them with more ways that they can connect with their own background because then they'll understand what you're saying." in my personal life I incorporate more agriculture, like I've gotten to be much more into plants and "I bring that into the classroom. not just the physical plants but explaining it and, you know, different questions they may ask about it that, (laughs) I think it's just, I feel I'm more of an, I'm more of a tool to teach them things rather than just the straight half of the easy answer and I think agriculture's a great way to teach that."
Designation of use	Ideal/acceptable
Component	**V. Student assessment**
Statement(s)	No evidence emerged
Designation of use	
Component	**VI. Lesson presentation and purpose**
Statement(s)	No evidence emerged
Designation of use	

ID 215	
Component	**I. Use of CCGALA & recommended curricular resources**
Statement(s)	"I was just introduced to it there, but I really wasn't, you know, I didn't develop it and I wasn't interested in developing it at that point. I thought it was interesting, you know, because it was part of the class that I took, but my interest with agriculture is nil."
Designation of use	Unacceptable
Component	**II. Cross-disciplinary state educational standards are addressed using an agricultural context**
Statement(s)	"So I decided that when my science lesson comes up, I'm gonna just pick up where she was. We went through plants and how seeds get from one place to another. Why this plant is like this one. One has petals, this one doesn't, this one has leaves, and this one often loses its leaves or whatever. That was my focus for the science lesson, but then when I would do that, knowing that I'm teaching science there, and then the reading lesson for that week was animals, wildlife, uh, I would look for stories in the library that I could read during the reading time. Thirty minutes that had to do with plants and animals. So, kind of integrating like that. So, but that was the extent of my quote unquote agriculture.
Designation of use	Acceptable
Component	**III. Experiential learning opportunities**
Statement(s)	"I turn each of the science lessons that I did into our science art project. I would do that where we would make the plant out of muffin cups and sunflower seeds and use leaves from trees outside. I tried to bring things from outside in and they really spent more time doing rather than just putting, looking it up, I'm done here, you know, I'm gonna get a book and read now. So I think it engaged them a lot more.
Designation of use	Acceptable
Component	**IV. Instructional approach**
Statement(s)	It ties it together, it makes the day more complete when it isn't so disjointed. You know, if there's a common thread through certain portion of the day and even with the math section, um, I was using bean counts, you know, beans are agriculture (laughter)
Designation of use	Acceptable
Component	**V. Student assessment**
Statement(s)	No evidence emerged
Designation of use	
Component	**VI. Lesson presentation and purpose**
Statement(s)	"Presented as a lesson and expected children to feed back and learn. And then when I would ask them questions or do things to check understanding, they understood exactly what I wanted them to understand. I think it's probably 'cause you know, over planning until two a.m. in the morning
Designation of use	Ideal/acceptable

ID 219	
Component	**I. Use of CCGALA & recommended curricular resources**
Statement(s)	"They have told us, oh, we have, you know, the state adopted materials. We have Prentice-Hall, and I also teach Highpoint, which is uh, the English learners' curriculum. I teach, and it's just, they pretty much have told us, you're only teaching from here and you can't use anything else."
Designation of use	Unacceptable
Component	**II. Cross-disciplinary state educational standards are addressed using an agricultural context**
Statement(s)	"I just teach English. You can't really incorporate agriculture, it's hard and it, frankly it's hard just to teach just the state standards alone." "I kinda don't bring it up, because I, I don't know if it's sensitive. I don't want them to feel, you know, upset about it, or, I don't know, I just don't want them to feel shamed, in that kind of thing. And you know, other parents, they, for a living, they go out and pick oranges."
Designation of use	Unacceptable
Component	**III. Experiential learning opportunities**
Statement(s)	Well, it's, it's more a, informal, kind of, just, sitting around and you're pretty much, you're talking. You're discussing it with them and that's all I was doing.
Designation of use	Unacceptable
Component	**IV. Instructional approach**
Statement(s)	No evidence emerged
Designation of use	
Component	**V. Student assessment**
Statement(s)	No evidence emerged
Designation of use	
Component	**VI. Lesson presentation and purpose**
Statement(s)	No evidence emerged
Designation of use	

ID 236	
Component	**I. Use of CCGALA & recommended curricular resources**
Statement(s)	"That all of the subjects can be taught using agriculture and that it doesn't just have to do with science. I've pretty much based my whole science and social studies curriculums with this in mind and using this as a tool."
Designation of use	Ideal
Component	**II. Cross-disciplinary state educational standards are addressed using an agricultural context**
Statement(s)	"It just worked so easily to incorporate everything in both science and social studies into the Project Learning Tree and the ideas suggested in CCGALA." "With agriculture you can easily choose a theme and then, with that theme, it can be applied to all the different core competencies."
Designation of use	Ideal
Component	**III. Experiential learning opportunities**
Statement(s)	"I used a nature journal and we would go outside and observe the different things that we are seeing." "My teaching methods would be to do a discussion to get background before we do any activity or lesson and see what the children know. And then use that information and what I'm bringing to do a hands on activity that has to do with what we're going to be learning later. That also accesses more of the students' background knowledge that they didn't necessarily know they had and then we come back and talk about what we've learned there. And then there's usually, you know, the follow up activity afterwards."
Designation of use	Ideal
Component	**IV. Instructional approach**
Statement(s)	"It was in a third grade classroom and we tied it into language arts. I had to teach them a kind of style in poetry and so we brought it outside and first took scientific observations of a tree and then used those observations to follow the format as a poem that we are using and turn it into a poem."
Designation of use	Ideal
Component	**V. Student assessment**
Statement(s)	"I had a few students who just didn't understand the concept and putting a ruler onto the little picture on the page wasn't doing it for them. So we pulled out the plants that they had planted before and took the ruler and measured the lengths of the stems and the leaves. I think having that real life thing that they had planted made the connection and I think it's also important to get them off of the paper. And so, you know, because you can get in the routine of just putting the ruler against the picture and that's just what you do, but would have no idea how to transfer it to something else, so that was really helpful for those students."
Designation of use	Ideal
Component	**VI. Lesson presentation and purpose**
Statement(s)	No evidence emerged
Designation of use	

ID 240	
Component	**I. Use of CCGALA & recommended curricular resources**
Statement(s)	"I came into it [current teaching position] right before state testing started and so a lot of what my principal had asked me to focus on was preparing the students for state testing." "We had a specific set of test prep things that we were supposed to use to prep the students for the testing. I could've done Ag stuff separate from test prep in my other hours of the day, but not in that time, I don't think."
Designation of use	Unacceptable
Component	**II. Cross-disciplinary state educational standards are addressed using an agricultural context**
Statement(s)	"I just didn't incorporate it into, um, what my master teacher wanted me to do. Unless I don't know that I incorporated it and I did." (laughs) "The majority of my student teaching was based on ocean life and we might have gone into ... I can't really remember, like how the ocean, um. I don't, this is dumb, but I don't know if it incorporates the Ag, like fish and like how we use that , and what resources we can take from the ocean."
Designation of use	Unacceptable
Component	**III. Experiential learning opportunities**
Statement(s)	"Um, unexpected would be kids that bring stuff in from home. I hadn't thought about that, kids taking it home and, um, talking to their families about it and, and extending their learning that way. That was unexpected."
Designation of use	Unacceptable
Component	**IV. Instructional approach**
Statement(s)	"It was kind of a unit we incorporated through all of our, um, subjects throughout the day. The parents formed the classroom into an ocean. A lot of visuals up on the wall so they could see what they were learning." "We didn't use much hands on, like with a going to the tide pools, or doing something like that, we planned on it, but didn't follow through with it." "I didn't know, so I told them I said well, that's something you know. I encouraged them to go on their own and go find that out, bring it back and share it with us, you know, so you can teach us something. And so encouraging them to take control of their own learning 'cause they don't always learn in a classroom."
Designation of use	Acceptable
Component	**V. Student assessment**
Statement(s)	No evidence emerged
Designation of use	
Component	**VI. Lesson presentation and purpose**
Statement(s)	No evidence emerged
Designation of use	

ID 247	
Component	**I. Use of CCGALA & recommended curricular resources**
Statement(s)	"I'm not really familiar. I probably couldn't tell you any one of them right now." "I haven't really done much with agriculture in my classroom right now." "The reading program and it's so structure. We spend two and a half hours a day on this reading program that's, you know, word for word structured out."
Designation of use	Unacceptable
Component	**II. Cross-disciplinary state educational standards are addressed using an agricultural context**
Statement(s)	"I can definitely see agriculture helping in math." "I used, um, products, different food products as examples in math and the kids really, they connect to that." "We did some vegetables about shapes and just showing them things like that they really can connect that, so I guess that, I mean I would say that's using agriculture really in a way."
Designation of use	Unacceptable
Component	**III. Experiential learning opportunities**
Statement(s)	"They wrote about it and stuff like that, but I'm not sure if it was, yeah, it was kind of more of a fun activity that, I mean math and reading were tied into it, but it was more because it was St. Patrick's Day and fun for the kids."
Designation of use	Unacceptable
Component	**IV. Instructional approach**
Statement(s)	"The math lesson that we did with all the different food objects, they loved that. I mean they were really involved. They knew they were going to get to eat it afterwards, so it's some of the things afterwards, they love that. They just, it seems like they really become more involved. They're more excited about it. The plant that they were taking measurements on it, something that they can really connect to, and rather than learning, you know, a math equation on the board, they're in there with their hands on it and it's exciting for them." "You have your good students that will do all the work that you tell them to do, but then there's those that don't and so for those kids, you know, they really get involved."
Designation of use	Ideal
Component	**V. Student assessment**
Statement(s)	No evidence emerged
Designation of use	
Component	**VI. Lesson presentation and purpose**
Statement(s)	No evidence emerged
Designation of use	

LIST OF REFERENCES

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

Auerbach, C. F., & Silverstein, L. B. (2003). *Qualitative data: An introduction to coding and analysis.* New York: New York University Press.

Bacon, K., Anderson, R., & Watkins, L. (2005). Summer agriculture institute: Assessing the impacts. *NACTA Journal, 49*(2), 61.

Bailey, Jr., D. B., & Palsha, S. A. (1992). Qualities of the stages of concern questionnaire and implications for educational innovations. *Journal of Educational Research, 85*(4), 226-232.

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.

Bellah, K. A., & Dyer, J. E. (2005). Elementary teachers' attitudes toward using agriculture as a context for teaching. *NACTA Journal, 49*(2), 64.

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

Bleicher, R. E. (2004). Revisiting the STEBI-B: Measuring self-efficacy in preservice elementary teachers. *School Science and Mathematics, 104*(8), 383-391.

Brown, W. B., & Stewart, R. (1993). Agricultural instruction in the middle school. *Journal of Agricultural Education, 34*(4), 17-23.

Burns, D. E., & Reid, B. D. (1998). The tools we need. *Journal of Staff Development, 19*(4), 21-23.

Caine, R. N., & Caine, G. (1991). *Making connections: Teaching and the human brain.* Alexandria, VA: Association for Supervision and Curriculum Development.

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.

Cronin, L. L. (1986). Intended versus implemented curricula: An interpretive study. PhD dissertation, University of Georgia. Retrieved December 5, 2005, from ProQuest Digital Dissertations database. (Publication No. AAT 8706858).

Crotty, M. (2003). *The foundations of social research.* London: Sage.

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.

Dalkey, N. C. (1969). *The Delphi method: An experimental study of group opinion.* Santa Monica, CA: The Rand Corporation.

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=

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.

Dewey, J. (1997). *Experience and education.* New York: Touchstone.

Doerfert, D. L. (2003). Agricultural literacy: An assessment of research studies published within the agricultural education profession [Electronic version]. *Proceeding from the 22nd Annual Western Region Agricultural Education Research Conference,* Portland, OR.

Educational Research Service. (2001). *No Child Left Behind: A special reprint of President George W. Bush's education plan, with relevant discussion questions education leaders should ask.* Arlington, VA: Author.

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.

Falk, J. H. & Dierking, L. D. (2000). *Learning from museums: Visitor experiences and the making of meaning.* Walnut Creek, CA: AltaMira Press.

Fishbein, M., & Azjen, I. (1975). *Belief, attitude, intention, and behavior: An introduction to theory and research.* Reading, MA: Addison-Wesley.

Flowers, J. (1990). Competency based education in NC vocational agriculture programs: Ten years after adoption. *Journal of Agricultural Education, 31*(2), 62-67.

Frick, M. J. (1991). A definition and the concepts of agricultural literacy. *Journal of Agricultural Education, 32*(2), 49-57.

Frick, M. J. (1993). Developing a national framework for a middle school agricultural education curriculum. *Journal of Agricultural Education, 34*(2), 77-84.

Frick, M. J., Kahler, A. A., & Miller, W. W. (1991). A definition and the concepts of agricultural literacy. *Journal of Agricultural Education, 32*(2), 49-57.

Fuller, F. F. (1969). Concerns of teachers: A developmental conceptualization. [Electronic version]. *American Educational Research Journal, 6*(2), 207-226.

Gamon, J. A. & Scofield, G. G. (1998). Perceptions of sustainable agriculture: A longitudinal study of young and potential producers. *Journal of Agricultural Education, 39*(1), 63-72.

Gardner, H. (1993). *Multiple intelligences: The theory in practice.* New York: Basic Books.

Glesne, C. (1999). *Becoming qualitative researchers: An introduction* (2nd ed.). New York: Longman.

Guba, E. G., & Lincoln, Y. S. (1983). *Effective evaluation: Improving the usefulness of evaluation results through responsive and naturalistic approaches.* San Francisco: Jossey-Bass Productions.

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

Hall, G. E., George, A. A., & Rutherford, W. L. (1998b). *Stages of concern about the innovation: The concept, verification, and implications.* 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.

Hardiman, M. M. (2003). *Connecting brain research with effective teaching: The brain-targeted teaching model.* Lanham, MD: Scarecrow Education.

Harris, C. R., & Birkenholz, R. J. (1996). Agricultural literacy of Missouri secondary school educators. *Journal of Agricultural Education, 37*(2), 63-71.

Heck, S., Stiegelbauer, S. M., Hall, G. E., & Loucks, S. F. (1981). *Measuring innovation configurations: Procedures and applications.* Austin, TX: The University of Texas.

Hillison, J. (1998). 1997 distinguished lecture: The role of the agricultural education teacher educator yesterday, today, and tomorrow. *Journal of Agricultural Education, 39*(1), 1-7.

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

Hord, S. (1986). *A manual for using innovation configurations to assess teacher development programs.* Austin, TX: Southwest Educational Development Laboratory.

Horsley, D. L., & Loucks-Horsley, S. (1998). Tornado of change. *Journal of Staff Development, 19*(4), 17-20.

Humphrey, J. K., Stewart, B. R., & Linhardt, R. E. (1994). Preservice elementary education majors' knowledge of and perceptions toward agriculture. *Journal of Agricultural Education, 35*(2), 27-30.

Igo, C. G., Leising, J., & Frick, M. (1999). An assessment of agricultural literacy in K-8 schools [Electronic version]. *Proceedings of the 26th Annual National Agricultural Education Research Conference,* Orlando, FL.

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

Johnson, E. B. (2002).*Contextual teaching and learning: What it is and why it's here to stay.* Thousand Oaks, CA: Corwin Press.

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.

King, R. N., & Rollins, T. (1995). Factors influencing the adoption decision: An analysis of adopters and nonadopters. *Journal of Agricultural Education, 36*(4), 39-48.

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.

Kolb, A. Y., & Kolb, D. A. (2005). Learning styles and learning spaces: Enhancing experiential learning in higher education. *Academy of Management Learning & Education, 4*(2), 193-212.

Kolb, D. A. (1984). *Experiential learning: Experience as the source of learning and development.* Englewood Cliffs, NJ: Prentice Hall.

Leising, J., Igo, C., Hubert, D., Heald, A., and Yamamoto, J. (1998). *A Guide to Food and Fiber Systems Literacy: A compendium of standards, benchmarks, and instructional materials for grades K-12.* Stillwater, OK: Oklahoma State University.

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, S. F., Newlove, B. W., & Hall, G. E. (1998). *Measuring levels of use of the innovation: A manual for trainers, interviewers and raters.* Austin, TX: Southwest Educational Development Laboratory.

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

Luehmann, A. L. (2002). Powerful hidden forces affecting teachers' appraisal and adoption of innovative technology-rich curricular supports for secondary water quality learning [Electronic version]. *Proceedings of the American Education Research Association Annual Meeting,* New Orleans, LA.

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

Marshall, C., & Rossman, G. B. (1999). *Designing qualitative research* (3rd ed.). Thousand Oaks, CA: Sage Publications.

Martin, A. G., & Frick, M. J. (1998). The Delphi technique: An informal history of its use in agricultural education research since 1984. *Journal of Agricultural Education, 39*(1), 73-79.

McCarthy, B. (1982). Improving staff development through CBAM and 4Mat. *Educational Leadership, 40*(1), 20-25.

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.

Meier, D., & Wood, G. (Eds). (2004). *Many children left behind: How the No Child Left Behind Act is damaging our children and our schools.* Boston: Beacon Press.

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).

Moore, G. E. (1988). The forgotten leader in agricultural education: Rufus W. Stimson. *The Journal of the AATEA, 29*(3), 50-58.

National Council for Agricultural Education (2000). *A new era in agriculture: Reinventing agricultural education for the year 2020.* Alexandria, VA: Author.

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.

Partis, M. (2003). Hope in homeless people: A phenomenological study. *Primary Health Care Research and Development,* (4), 9-19.

Peterson, R. L. (1999). 1998 AAAE distinguished lecture: Experiencing agricultural education. *Journal of Agricultural Education, 40*(1), 1-13.

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.

Proudman, B. (1992). Experiential education as emotionally-engaged learning. *The Journal of Experiential Education, 15*(2), 19-23.

Rasmussen, J. (1998). Constructivism and phenomenology: What do they have in common, and how can they be told apart? [Electronic version]. *Cybernetics and Systems: An International Journal, 29,* 553-576.

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

Rollins, T. (1993). Using the innovation adoption diffusion model to target education programming. *Journal of Agricultural Education, 34*(4), 46-54.

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

Schunk, D. H. (2000). *Learning theories: An educational perspective* (3rd ed.). Upper Saddle River, NJ: Merrill.

Schwandt, T. A. (2001). *Dictionary of qualitative inquiry* (2nd ed.). Thousand Oaks, CA: Sage Publications.

Strauss, R. P., Bowes, L. R., Marks, M. S., & Plesko, M. R. (2000). Improving teacher preparation and selection: Lessons from the Pennsylvania experience. *Economics of Education Review, 19,* 387-415.

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.

Talbert, B. A., Vaughn, R., & Croom, D. B. (2005). *Foundations of agricultural education.* Caitlin, IL: Professional Educators Publications, Inc.

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.

Thompson, G. W., & Balschweid, M. M. (2000). Integrating science into agriculture programs: Implications for addressing state standards and teacher preparation programs. *Journal of Agricultural Education, 41*(2), 73-80.

Trexler, C. J., & Meischen, D. (2002). A qualitative study of prospective elementary teachers' grasp of agricultural and science educational benchmarks for agricultural technology. *Journal of Agricultural Education, 43*(2), 68-81.

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.

United States Department of Agriculture. (2005). *About AITC: History of AITC.* Accessed November, 2005, from http://www.agclassroom.org/aitc/history.htm

University Associates, Inc. (1990). *The experiential learning cycle.* San Diego, CA: Author.

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 [Electronic version]. *Proceedings of the 26th Annual National Agricultural Education Research Conference,* Orlando, FL.

Williams, D. L. (1991). Focusing agricultural education research: Strategies for the discipline. *Journal of Agricultural Education, 32*(2), 7-12.

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

Wilson, E., Kirby, B., & Flowers, J. (2002). Factors influencing the intent of North Carolina agricultural educators to adopt agricultural biotechnology curriculum. *Journal of Agricultural Education, 43*(1), 69-81.

Wonacott, M. E. (2003). *History and evolution: A compilation of vocational and career-technical education.* Columbus, OH: Center on Education for Training and Employment.

Woolfolk, A. E. (1993). *Educational psychology* (5th ed.). Boston: Allyn and Bacon.

Worthen, B. R., & Sanders, J. R. (1987). *Educational evaluation: Alternative approaches and practical guidelines.* White Plains, NY: Longman.

Worthen, B.R., Sanders, J.R., Fitzpatrick, J.L. (1997). *Program Evaluation: Alternative approaches and practical guidelines* (2nd ed.). New York: Longman.

Zilbert, E., & Leske, G. (1989). Agricultural education and experiential learning. *The Visitor, 76*(1), 1-4.

BIOGRAPHICAL SKETCH

Kimberly Ann Pauley was born May 11, 1969, in a Charleston, South Carolina, naval hospital. Upon her father's departure from the United States Navy, the Pauley family moved to Lakeside, California. Upon graduation from high school in 1987, she moved to San Luis Obispo where she attended California Polytechnic State University. Her Bachelor of Science degree was earned in agricultural science from the Department of Agricultural Education and Communication. She earned her Master of Science degree in agriculture from California Polytechnic State University in 1995.

After teaching high school agricultural education at Morro Bay High School for three years, she married Don Alex Bellah in 1996 and returned to the Agricultural Education and Communication Department at California Polytechnic State University. For seven years, Bellah served as a teacher educator, as well as the agricultural education professional development coordinator for the California Department of Education. During that time, Bellah and her husband had two children, Shelby Ann and Jacob Roy Alex.

In 2003, Bellah accepted a graduate assistantship and was awarded the Newbern Fellowship from the Agricultural Education and Communication Department at the University of Florida. While pursuing her doctoral degree, Bellah wrote curriculum for the Space Agriculture in the Classroom project jointly sponsored through the United States Department of Agriculture and the National Aeronautics and Space Administration. Additionally, Bellah designed and delivered Space Agriculture in the

Classroom professional development workshops for elementary, middle, and high school teachers across the United States. Further, Bellah served as a graduate assistant in the teaching methods courses, as well as supervised student teachers during their undergraduate field experiences.

During her tenure at the University of Florida, Bellah was initiated into Alpha Tau Alpha and Gamma Sigma Delta professional honor fraternities. She was also honored in 2005 with the Outstanding Graduate Student Teaching Award from the North American Colleges and Teachers of Agriculture association.

In 2005, Bellah was offered and accepted an assistant professorship with the Agricultural Services and Development Department at Tarleton State University in Stephenville, Texas. She serves as a teacher educator and currently resides with her husband and children in Hico, Texas.