Agriscience Teachers' Concern Profiles for Content Area Reading Strategies

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Although students today will need to rely on text more than in the past, American students are struggling to read and comprehend text. Research has supported the ability of content area reading strategies (CARS) to increase students' ability to read and comprehend text. The purpose of this research was to assess agriscience educators' implementation of CARS in their classrooms. A descriptive, census survey of 371 Florida agriscience teachers was completed using a tailored–design, web–based questionnaire. Overall, agriscience teachers' Stages of Concern profiles were non–user profiles. The researchers concluded CARS professional development programs are not meeting the needs of agriscience teachers; thus, these teachers are not progressing through the Stages of Concern and are not implementing CARS at a high level. Research should be completed to develop an Innovation Configuration which would provide a more unified vision for CARS implementation. Practitioners should develop and provide a consistent, in–depth professional development program to provide ongoing training and support of the innovation throughout a several year process.

Keywords: content area reading, professional development; stages of concern

Introduction

Over a 20 year period, The College Board (2002) statistics showed a 23 point increase in mathematics scores on the SAT while the verbal scores remained the same. The U.S. Department of Education has reported over eight million struggling readers in the United States between fourth and twelfth grade (2003). U.S. students have ranked toward the bottom of an international comparison of reading proficiency even below students from developing countries (Snow, 2002). These statistics have prompted a number of state and national reading initiatives.

The No Child Left Behind (NCLB) Act has mandated a major change across the nation in education, and a large section of the NCLB Act has focused on improving student literacy. A statement by then U.S. Secretary of Education Paige (2001) noted the ability of this legislation to help meet the needs of America's students and to provide a quality education to all students. However, *Mapping America's Educational Progress 2008*, a report published by the United States Department of Education to

measure the accountability of NCLB, highlighted continuing literacy problems. Only about 30% of fourth and eighth grade students performed at the *proficient* reading level. Those numbers decreased significantly for students of low socioeconomic status and minority ethnicities. Two percent of the same students performed below *basic* levels. Since 2002 these students have made steady improvements in math scores. However, fourth graders have improved their reading scores minimally and eighth graders' reading scores have slightly declined. The *Mapping Florida's Progress 2008* report shows that Florida's students rank below the national average for reading achievement.

Referring to The College Board's (2002) report on the ten–year trend of SAT scores, Scherer (2002) stated "educators must take a long–range view in balancing student needs as they implement the much needed national initiatives" (p. 5). She noted an emphasis on mathematics and science aided in increasing math scores; however, the narrow focus on reading limited the improvement of verbal scores. Reading programs have focused on early

literacy with little attention given to reading comprehension beyond primary grades (Allington, 2002). Researchers underscored the importance reading comprehension and reading in the content area play in communication, education, employment, and citizenship (Meltzer, 2001; Vacca, 2002a). Students will need to be taught new literacy skills so they can learn how to comprehend reading materials. "Reading and writing play a crucial role in the ability to 'learn for understanding'" (Meltzer, p. 1).

William S. Gray, one of the first prominent reading educators and researchers, conceptualized content area reading in the *Twenty–Fourth Yearbook of the National Society for the Study of Education, Part One* (Whipple, 1925 as cited in Vacca, 2002b). Gray believed reading was necessary in all content areas and identified content area reading instruction as a characteristic of good teaching.

The issue of adolescent literacy continues to demand attention. The Commission on Adolescent Literacy of the International Reading Association emphasizes the importance of adolescent literacy:

> Adolescents entering the adult world in the 21st century will read and write more than any other time in human history. They will need advanced levels of literacy to perform their jobs, run their households, act as citizens, and conduct their personal lives. They will need literacy to cope with the flood of information they will find everywhere they turn. They will need literacy to feed their imaginations so they can create the world of the future. In a complex and sometimes even dangerous world, their ability to read will be crucial. Continual instruction beyond the early grades is needed. (Moore, Bean, Birdyshaw, & Rycik, 1999, p. 3)

The point in school when students have been expected to use higher level thinking to extract information from text with unfamiliar structure, organization, vocabulary, and syntax has been the same time they have stopped receiving reading instruction (Allington, 2002; Meltzer, 2001; Scherer, 2002; Vacca, 2002a). Although responsibility for reading instruction has fallen on English teachers in the past, students require reading instruction from other teachers as well (D'Arcangelo, 2002; Vacca, 2002a; Vacca 2002b). Content teachers should help students learn how to learn in their specific disciplines by equipping them with strategies which would aid them in reading comprehension and in becoming effective learners (D'Arcangelo, 2002; Scherer, 2002).

Competent readers utilize suitable readings skills to develop a comprehension of the topic (Vacca, 2002a). Reading in the content area required students to interact with reading material before, during, and after reading (Literacy Matters, 2008). Comprehension of text also requires students to understand the literal meaning of text, make inferences, and evaluate the material. All content area teachers could help meet the comprehension needs of students by incorporating Content Area Reading Strategies (CARS) instruction throughout all content areas (Fisher & Ivey, 2005; Literacy Matters 2002; Scherer, 2002). Teachers who equip their students with suitable reading level material and reading strategy instruction have more successful students (Allington, 2002; Literacy Matters, 2002). Fluent readers have learned to become strategic readers when their teachers have embedded reading instruction and model reading strategies into the curriculum (Bryant, Ugel, Thompson, & Hamff, 1999; Vacca, 2002a). D'Arcangelo (2002) noted CARS can be embedded easily into all content areas.

Content area teachers have often overlooked the importance of incorporating CARS into content instruction (D'Arcangelo, 2002). Early in CARS research, O'Brien and Stewart (1990) found of the pre–service content area teachers in their study, agricultural educators were the most resistant towards implementing classroom reading; eighty–five percent of the pre–service agricultural educators rejected content area reading. Meltzer (2001) highlighted the importance of using discipline–specific CARS. Park and Osborne (2006a) noted the major obstacle to CARS implementation in agriscience was the teachers' lack of knowledge and confidence. Further, Park and Osborne (2006b) concluded that agriscience teachers cannot identify specific CARS to implement in their curricula. Continuing professional development and support for teachers has been suggested by research as being instrumental to successfully

implement and sustain CARS instruction (Vacca, 2002a, 2002b).

A roundtable discussion at the National Agricultural Education Inservice emphasized the ability of agriscience teachers to capitalize on students' motivation to learn the content of agriculture courses in order to teach reading strategies which students can transfer to lifelong literacy skills (Park, 2008). Fisher and Ivey (2005) also recognized content reading as "a way to engage students in the content at hand" (p. 6).

School systems have invested substantial time and money into professional development and initiatives focused on improving student literacy. A need to determine the effectiveness of CARS professional development and level of CARS utilization in agriscience exists (Park & Osborne, 2006b). Documentation of implementation must be achieved before the success of a program can be evaluated (Hall & Hord, 2006). Have The CARS professional development programs met the needs of agriscience teachers? Are agriscience teachers incorporating CARS into their curriculum? The problem under investigation in this study was, are agriscience teachers implementing CARS into instruction in order to address the low reading performance of students?

Literature Review/Theoretical Framework

In a pre– and post–interview study, Bryant, Ugel, Thompson, Hamff, and Hougen (2001) identified the following areas of needed professional development for CARS: word identification, partner reading, collaborative strategic reading, modeling, supporting meetings, and teams. The researchers recommended developing a shared understanding of content literacy goals to guide professional development. Masten, Stacks, Priest, Scott, and Vitale (1999) found that middle school teachers who attended a three hour CARS training utilized significantly more reading comprehension strategies than teachers in the control group who attended a 3 hour behavioral principles workshop.

Aneke and Finch (1997) researched educational reform and found, "the intensity and stages of the teachers' concern profiles changed when teachers were grouped according to hours of reform–related training" (p. 10). They

recommended that teachers with minimal training in an innovation be provided additional training to gain exposure to the innovation at hand. They noted, "reform–related in–service training has great potential to serve as an effective method of exposing teacher to the reform experience" (pp. 11–12). The researchers noted that such training should help teachers move from lower level concerns to higher level concerns; however, these workshops must first address the personal concerns of the teachers.

Baker, Gertsen, Dimino, and Griffiths (2004) identified ongoing professional development and support as an influential variable for sustained use of an educational innovation. They identified three key components to an innovation model that led to successful implementation: (a) an initial training that developed the *big picture*, (b) use of continued, on–site support from trained graduate students for the first five years of the innovation, and (c) investment of funds to provide logistical support for the innovation. Baker et al. made several conclusions about the success of professional development and an innovation. First, they noted the importance of using professional development to "[enhance] teaching rather than asking teachers to substitute radically new teaching methods for current ones" (p. 20). This approach eased the change process by allowing teachers to maintain autonomy in their teaching. Additionally, ongoing professional development and logistical support contributed to the success of the innovation. Finally, the professional development should develop teachers' conceptual and procedural knowledge.

The Concerns–Based Adoption Model (CBAM) (Hall & Hord, 2006) was chosen as the theoretical base of this study because it has been based on 35 years of research focused on educational change, it has been extended and tested in different settings, and it is recognized as one of the strongest models for educational change (Anderson, 1997; Hall & Hord, 2006). The Concerns–Based Adoption Model was designed to help facilitate change and provide diagnostic means of measuring implementation of an innovation (Hall & Hord, 2006). The model consists of the environment, the user system culture, resource system, change facilitator team, interventions, users and nonusers, and three diagnostic measures: stages

of concern, levels of use, and innovation configurations (Hall & Hord).

Stages of Concern (SoC) is one of the diagnostic instruments of the CBAM which addresses the affective side of change (Hall & Hord, 2006). The feelings and perceptions of participants are known as concerns. The development of the SoC has been based on research of the evolution of concerns through the change process. The SoC define a progression of concerns which people move through as they implement an innovation. Focused workshops, individual coaching sessions, and strategic plans can be designed upon the SoC of participants to more effectively facilitate change.

Based on Fuller's (1969) identification of concerns, Hall and Hord (2006) have developed seven Stages of Concern. George, Hall, and Stiegelbauer (2006) offered the following definitions for each of the Stages of Concern:

0 Awareness: Little concern about or involvement with the innovation is indicated.

1 Informational: A general awareness of the innovation and interest in learning more detail about it is indicated. The person seems to be unworried about himself/herself in relation to the innovation. She/he is interested in substantive aspects of the innovation in a selfless manner, such as general characteristics, effects, and requirements for use.

2 Personal: [The] individual is uncertain about the demands of the innovation, his/her inadequacy to meet those demands, and his/her role with the innovation. This includes analysis of his/her role in relation to the reward structure of the organization, decision–making, and consideration of potential conflicts with existing structures of personal commitment. Financial or status implications of the program for self and colleagues may also be reflected.

3 Management: Attention is focused on the processes and tasks of using the innovation and the best use of information and resources. Issues related to efficiency, organization, managing, scheduling, and time demands are utmost.

4 Consequences: Attention focuses on impact of the innovation on clients in his or her immediate sphere of influence. The focus is on relevance of the innovation for clients, evaluation of outcome including performance and competencies, and changes needed to increase client outcomes.

5 Collaboration: The focus is on coordination and cooperation with others regarding use of the innovation.

6 Refocusing: The focus is on the exploration of more universal benefits from the innovation, including the possibility of major changes or replacement with a more powerful alternative. [The] individual has defined alternatives to the proposed or existing form of the innovation. (p. 8)

Research has shown "there is a quasi–developmental path to the concerns as the change process unfolds" (Hall & Hord, 2006, p. 141). Although, they stated that neither the progression of concerns nor the direction of the progression is guaranteed. When proper conditions exist (e.g. appropriateness of change, proper involvement from leaders, and effective facilitation) participants move from Stages 1 and 2 to Stage 3 during the first couple years, and ideally they will move to Stages 4 and 5 around three to five years into implementation. Undesirable conditions can cause participants to cease progression or regress. Hall and Hord (2006) highlighted, SoC "reflect the idealized, developmental approach to change" (p. 142).

Anderson (1997) explains, "CBAM theory idealizes the Stages of Concern as a developmental progression in which teachers implementing a change have concerns of varying intensity across all seven stages at different points in the change process" (p. 334). However, teacher concern may not progress through all stages in the suggested order.

The Stages of Concern Questionnaire (SoCQ) is the most rigorous and reliable form of SoC assessment (Hall & Hord, 2006). It has been revised to address some of the concerns of the previous instrument and to reestablish its validity (G. Hall, personal communication, June 19, 2008). The assessment consists of 35 Likert type questions and is noted for being psychometrically sound and easy to take (Hall & Hord). Hall and Hord also recommend adding an open–ended concerns statement to the end of the questionnaire to ensure that all possible concerns can be expressed. From the results, SoC profiles can be developed. The strengths of the

instrument include the strong reliability and validity of the instrument and the ability to develop concerns profiles. The main disadvantage of the SoCQ is participants' lack of willingness to complete it. Hall and Hord recommended this assessment for formal evaluation efforts and encouraged facilitators and evaluators to use this technique a maximum of two to three times a year.

Hall and Hord (2006) identified twelve principles of change which have emerged from CBAM research. These principles have been supported with enough evidence to be considered valid in all cases of change. The individual principles are not mutually exclusive and only cover certain aspects of change. Hall and Hord outlined the principles of change that must be understood to comprehend the components of CBAM (Hall & Hord, 2006):

1: Change is a process, not an event.
2: There are significant differences in what is entailed in development and implementation of an innovation.
3: An organization does not change until the people within it change.
4: Innovations come in different sizes.
5: Interventions are the actions and events that are key to the success of the change process.
6: There will be no change in outcomes until new practices are implemented.
7: Administrator leadership is essential to long–term change success.
8: Mandates can work.
9: The school is the primary unit for change.
10: Facilitating change is a team effort.
11: Appropriate interventions reduce resistance to change.
12: The context of the school influences the process of change. (pp. 4–14)

Purpose and Objectives

The purpose of this research was to assess agricultural educators' implementation of content area reading strategies (CARS) in their classrooms. In order to meet the purpose of this study, the following objectives were investigated:

1. Ascertain agriscience teachers' CARS professional development history.
2. Determine the Stages of Concern of agriscience teachers who have completed CARS professional development program.
3. Determine the Stages of Concern of agriscience teachers who have not completed CARS professional development program.

Methodology

A descriptive census survey design was used in this study. The researcher used a web–based questionnaire to collect the concerns of Florida agriscience teachers towards the implementation of content area reading strategies (CARS). The population for this study was Florida agriscience teachers. The researcher obtained a list of current Florida agriscience teachers ($N = 371$) from the 2008 Florida Agricultural Education Directory which served as the population frame (Myers & Warner, 2008). The 2008 Florida Agricultural Education Directory was chosen as the population frame because it functioned as the only updated, comprehensive list of Florida agriscience teachers.

The researcher utilized the Stages of Concern Questionnaire (SoCQ) developed by George, Hall, and Stiegelbauer (2006). This questionnaire was composed of 35 Likert–type questions that assessed the concerns of the individuals involved in the educational innovation change process – the integration of Content Area Reading Strategies (CARS). This questionnaire allowed respondents to indicate the relevance and intensity of their concerns towards CARS. In addition to the Likert questions, a free–response question allowed participants to express their concerns in their own words, as recommended by Hall and Hord (2006) and G. Hall, personal communication (2008). In addition to the SoCQ, the researcher included several questions to determine the CARS professional development history of the teachers. Teachers were asked to indicate if they had completed different levels of training, give the numbers of hours spent in each training, and provide a brief description of the training. Lastly, demographic questions were included to better understand the population.

George, Hall, and Stiegelbauer (2006) stated that validity testing of the SoCQ has been

performed by testing the relationship of the scales to one another and to variables from other concerns theories. George et al. utilized correlational matrices and factor analysis to determine "the seven scales [in the SoCQ] tapped seven independent constructs that could be identified readily with the seven Stages of Concern proposed by the Concerns–Based Adoption Model (CBAM)" (p. 14). George et al. reported coefficients of internal reliability for each of the seven Stages of Concern which ranged between an alpha of .64 and .83, for the Stages of Concern Questionnaire. Santos (1999) stated an alpha score of .7 or greater is acceptable. George et al. also reported test–retest correlations for the SoCQ, which ranged between r = .65 and r = .86. These reported reliability scores fall within the acceptable range of reliability estimates as stated by Santos with the exception of Stage 0. Stage 0 has been under revision to help improve the reliability (George et al., 2006; Hall & Hord, 2006).

Upon IRB approval, the researcher proceeded with the survey using Dillman's (2007) Tailored Design Model for survey collection. In order to analyze the data from this study, the researcher used Statistical Package for the Social Sciences (SPSS) 17.0 for Windows. Descriptive statistics, including frequencies and central tendencies, were used to analyze the concerns of agriscience teachers towards CARS. Additionally, the Microsoft Excel SOCQ–075 Graph and Print program was used to create an overall concerns profile for the group and sub–groups (Scott & Persichitte, 2006). To address objective one, assessing the teachers' CARS professional development history, SPSS was utilized to calculate frequencies and central tendency statistics. To address objectives two and three, the researcher used the Microsoft Excel SOCQ–075 Graph and Print program to determine the concern profiles for teachers with CARS professional development training and those without training.

These findings were part of a larger study in which a total of 371 online questionnaires were sent to the population via a web link sent in an e–mail to agriscience teachers in the state of Florida. The completion of 214 questionnaires provided a response rate of 57.7% ($n = 214$). Dillman (2007) encouraged addressing nonresponse error in all survey–based research studies since the potential for nonresponse error exists in all survey research. Because it would be challenging to address the Stage of Concern variable in a brief phone survey with nonrespondents, concern profiles were created to compare early respondents and late respondents. Research has shown that similarities usually exist between late respondents and nonrespondents (Ary, Jacobs, Razavieh, & Sorensen, 2006). Pace (1939) found that nonrespondents and late respondents are similar. These similarities allow for researchers to estimate the responses of nonrespondents based upon late respondents. Thus, early and late respondents were compared to address nonresponse error. Participants who responded to the cover letter with the first link to the survey, before the reminder e–mail was sent were categorized as early respondents ($n = 66$). Those who responded after the final contact was made were defined as late respondents ($n = 42$). Both of the profiles were non–user profiles; however, the early responders had higher intensity concerns than the late responders across all stages.

Post hoc reliability (Table 1) was calculated with SPSS using Cronbach's Alpha for each SoC. Santos (1999) stated an alpha score of .7 or greater is acceptable. Although the reliability scores were slightly low in Stages 0 and 1, they were similar to other studies (George et al., 2006). Stage 0 has been under revision to improve reliability (Hall & Hord, 2006; George et al., 2006).

Table 1
Post Hoc Reliability Scores for Each Stage of Concern ($N = 214$)

Stage	Stage 0	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Stage 6
Alpha	.57	.67	.78	.78	.71	.78	.71

Findings

*Objective 1: Ascertain agriscience teachers'
CARS professional development history.*

Teachers were asked to indicate their participation in a range of CARS professional development experiences, which included: pre–professional, continuing education, training with reading coach, school training, county training, Florida Reading Initiative training, or other

training (Table 2). The majority of teachers surveyed (75.9 %; $n = 104$) had participated in school training for CARS and at least half of the respondents had participated in continuing education course work, pre–professional course work, county training, and personal reading coach training regarding CARS. Only about one fourth of the respondents had participated in Florida Reading Initiative training or other CARS professional development.

Table 2
Teacher Participation in CARS Professional Development

Training	n	f	%
School	137	104	75.9
Continuing education	140	88	62.9
Pre–professional	144	81	56.3
County	133	73	54.9
Reading coach	142	75	52.8
Florida Reading Initiative	104	28	26.9
Other	96	26	27.1

Note. f = frequency.

Teachers were asked to specify the total cumulative hours they had devoted to each professional development experience in which they had participated (Table 3). On average, teachers devoted the highest number of hours ($M = 24.06$, $SD = 13.00$) to Florida Reading Initiative training. Teachers spent the fewest number of hours ($M = 14.43$, $SD = 11.838$)

training with their reading coach. The total number of hours participants reported in the different types of professional development programs were added to determine the total number of professional development hours. The mean total number of CARS professional development hours completed was 60.56 with a standard deviation of 52.20. The range was 312.

Table 3
Number of Hours Teacher Devoted to CARS Professional Development

Training	n	Min.	Max.	M	SD
Florida Reading Initiative	35	0	>30	24.06	13.00
Pre–professional	73	0	>30	22.51	12.75
Continuing education	88	0	30	21.30	11.65
Other	22	0	>30	20.14	13.28
County	72	0	>30	16.44	11.39
School	99	0	30	14.58	10.95
Reading coach	77	0	>30	14.43	11.89

Note. Min. = minimum; Max. = maximum.

*Objective 2: Determine the Stages of Concern of
agriscience teachers who have completed a
CARS professional development program.*

An overall concerns profile (Figure 1) was developed to illustrate the concerns of the population regarding implementing CARS into

the agriscience classroom. *Unconcerned* was the primary stage of concern with a percentile score of 91. Informational, personal, and management concerns were relatively high. The lowest SoC was consequences, followed by collaboration and then refocusing.

A group concerns profile was developed for teachers who reported receiving CARS professional development (Figure 1). The primary SoC for the group concerns profile was Stage 0, *unconcerned*, with a 96th percentile score. The secondary SoC for this group was *management*, Stage 4, with an 80th percentile score. These teachers also had high concerns in the informational and personal stages. Their lowest SoC was consequences with a 33rd percentile score. Collaboration and refocusing scores for this group were around the 50th percentile.

Objective 3: Determine the Stages of Concern of agriscience teachers who have not completed a CARS professional development program.

A group concerns profile was created for teachers reporting having no CARS professional development (Figure 1). The primary SoC for this group was *unconcerned*, Stage 0, with a 91st percentile score. This concern was followed by *informational*, Stage 1, and *management*, Stage 4, both with an 88th percentile score.
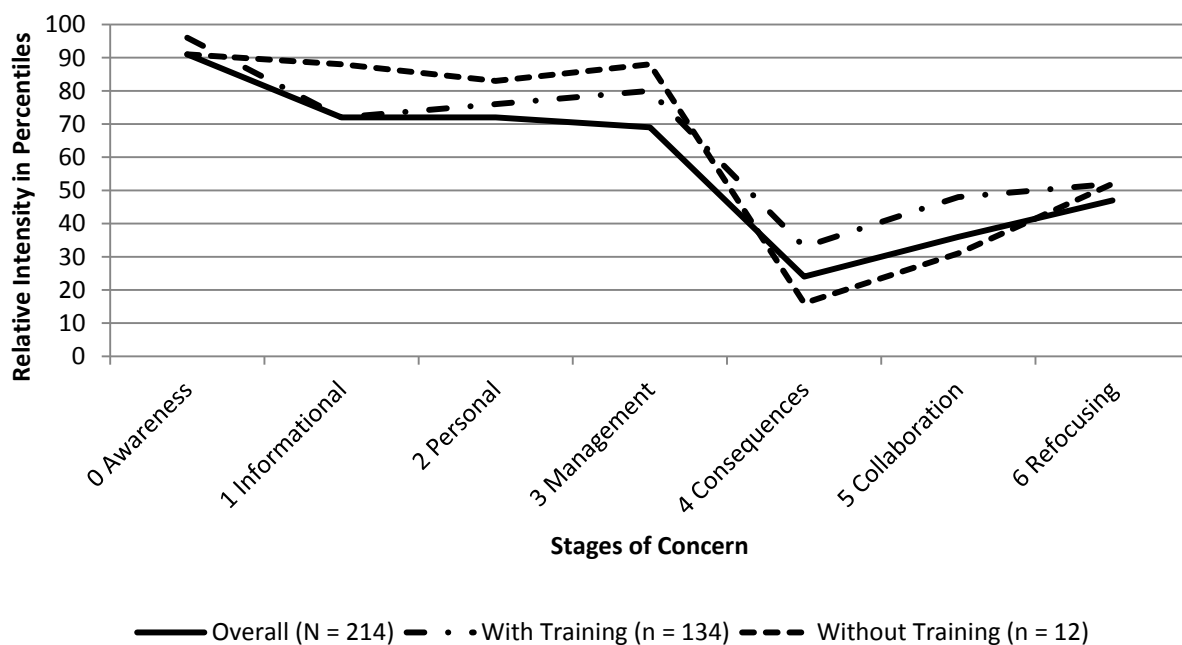

Figure 1. CARS concerns profiles

Conclusions & Recommendations

Conclusion 1: The overall concerns profile for agriscience teachers is a non–user profile.

According to George, et. al. (2006), the overall concerns profile was that of a *typical nonuser*. Figure 2 illustrates the common user profiles and their hypothesized progression. When evaluating group data, one must consider that it will be affected by "dominant high and low Stages of Concern" (George et al., 2006, p. 34). Based upon the overall profile, as a whole, respondents were not entirely aware of the innovation or focused on other innovations and

obligations. However, relatively high scores in Stages 1 and 2 indicated a possible interest in learning about the innovation. Teachers were not intensely concerned about consequences or collaboration with this innovation. The *tailing–up* of the profile at Stage 6 signified that the teachers may have other ideas which they think deserve more time and attention and that they may be resistant to change.

Hall and Hord (2006) underscore, "the crucial step in using [concern profiles is] to make *concerns based interventions* that will be able to resolve the concern and move the person toward more advanced use of the innovation" (p.

142). Continued interventions and support should be utilized to assess and address teacher resistance and to help these teachers progress through the implementation of CARS. Until the teachers have fully implemented CARS, no

research on the effectiveness or student outcomes can be completed, because there will be no change in outcome until there is a change in behavior (Hall & Hord, 2006).
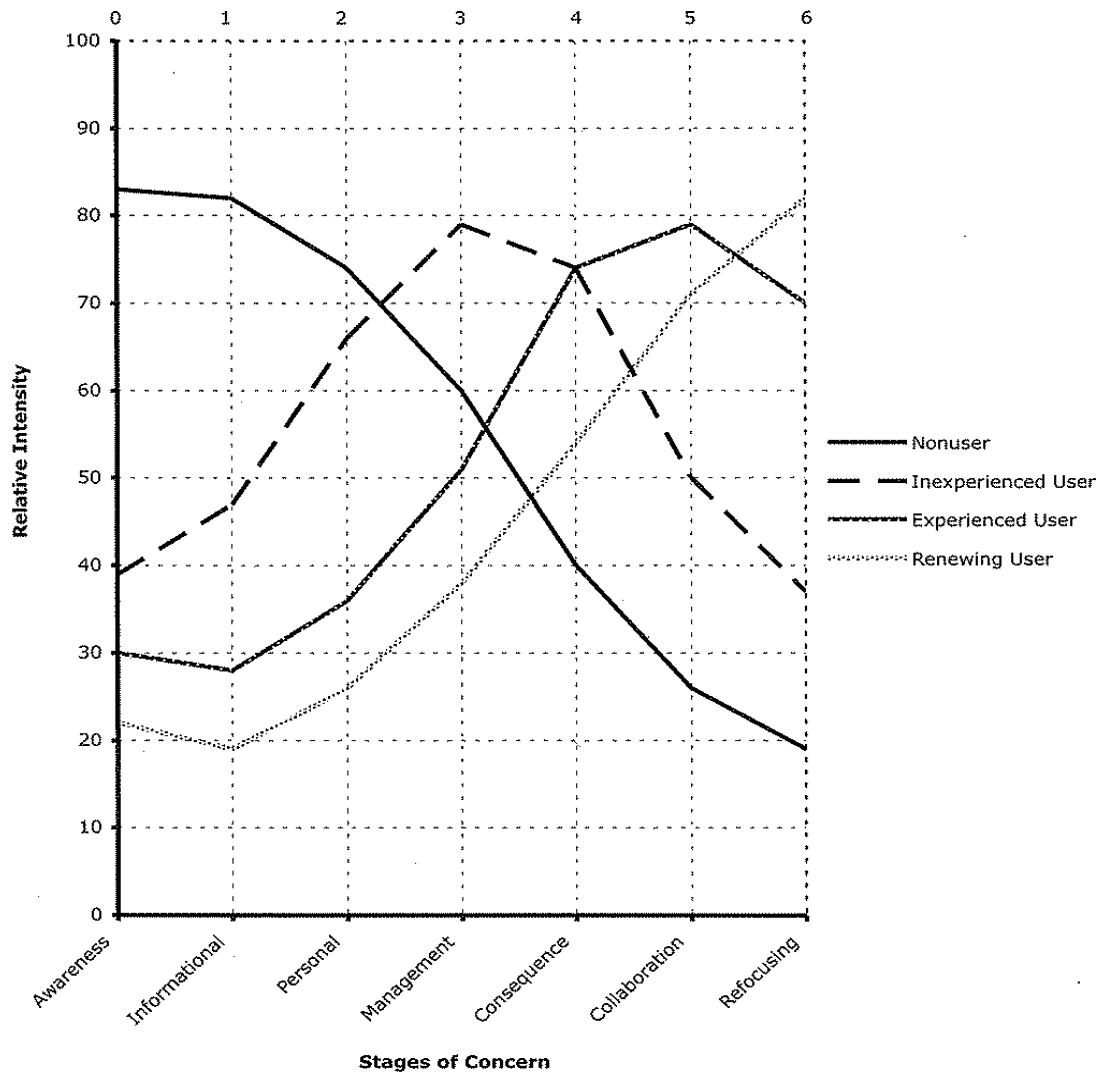

Figure 2. Hypothesized development of Stages of Concern (George et al., 2006, p.36).

Conclusion 2: In general, agriscience teachers show resistance to the CARS innovation.

A majority of the group concerns profiles had a *tailing–up* of Stage 6 which in a non–user profile indicates a resistance to change (George et al., 2006). George et al. states that when the tail increases more than 10 percentile points, it should be considered an alarm.

Since agriscience teachers interact often through various regional, state, and national events, they have a unique user system culture which affords them the opportunity to discuss current educational problems or innovations. This time allows for constructive or destructive mushroom interventions to emerge. If teachers who disapprove of the innovation take the

opportunity to express their disproval and persuade others against the innovation, it could be detrimental to the innovation. On the other hand if teachers use the time to support the innovation and collaborate, the interaction between these teachers could support the implementation of CARS.

Change Principle 11 notef, "appropriate interventions reduce resistance to change" (Hall & Hord, 2006, p. 13). Hall and Hord defined interventions as "various actions and events that [change leaders] and others take to influence the [change] process" (p. 8). They suggest that change facilitators need to identify one of three reasons for resistance so each may be addressed through an appropriate intervention either individually or within the whole group. Research and interventions should assess and address the cause of agriscience teachers' resistance. Possible sources may be attitudes, knowledge, philosophy, perceptions and conceptions, and motivation. If professional development addresses the causes of resistance before covering the strategies, teachers may be much more attentive and willing to implement CARS.

Conclusion 3: Agriscience teachers are not focused on the consequence of implementing CARS or the potential for collaboration.

The consequence SoC was consistently the lowest SoC which indicates, agriscience teachers do not realize how the implementation of CARS will affect students' learning. An understanding of the direct benefits of CARS to students and teachers may lower awareness scores and increase consequences scores. Professional development programs should focus on marketing the benefits of CARS implementation to the teachers. Teachers might then recognize CARS as a valuable teaching tool rather than another mandate.

Collaboration concerns were also scored consistently low. If teachers are not collaborating, they are missing opportunities to share applications of CARS. Change Principle 9 asserted, "the school is the primary unit for change" (Hall & Hord, 2006, p. 12). Although change must first occur in the individual, successful organizational change must occur on a school level. For school–wide change to occur, collaboration is required among teachers and between the teachers and the change facilitator team. Collaboration should be encouraged to

foster implementation. By learning from each other and sharing their experiences, teachers could decrease concerns in the informational, personal, and management stages and increase concerns in consequence stages. Research should investigate the effects of teacher collaboration on progression through the Stages of Concern and the implementation of CARS. Professional development programs and school systems should focus on ways to foster collaboration, such as a wiki or newsletter.

Conclusion 4: CARS professional development programs are not meeting the needs of agriscience teachers; thus, these teachers are not progressing through the Stages of Concern and are not implementing CARS at a high level.

The group concerns profile developed for teachers who had not completed CARS professional development is a nonuser profile with an additional peak at Stage 3 and a *tailing–up* of Stage 6. According to descriptions provided by George, et. al. (2006), teachers in this group are likely more concerned with something other than the implementation of CARS and possessed high managerial concerns. Consequences and collaboration were both of low concern. This profile also had a strong *tailing–up* of over 20 percentile points. George et al. (2006) noted that this may show strong resistance to the innovation and suggested it be "heeded as an alarm" (p. 42).

Based on George et al.'s (2006) description of concern profiles, several conclusions can be drawn about the group concern profile of teachers completing CARS professional development. The high relative intensity score for Stage 0 indicated that teachers were more concerned about other responsibilities or innovations. The second peak at Stage 3 identified the strong management concerns, such as time and logistics. This profile indicated low interest in consequences of CARS and mild interest in collaboration on CARS. The *tailing–up* of the concerns profile at Stage 6 revealed that teachers had ideas about changing the innovation and may be resistant to the implementation of CARS. However, the *tailing–up* in this profile was slight and should not cause great concern.

According to George, et. al. (2006) low scores in Stage 0 are indicative of individuals who view the innovation as important to his or

her work. On the other hand, high scores indicate that other innovations or consideration are of greater importance to the teacher. This explanation of the awareness concern can explain the consistently high awareness SoC. Agriscience teachers have many responsibilities and have not bought into the CARS innovation. They may view the innovation as just another mandate which adds to their work load. Reform–related trainings should address the personal concerns of the participating teachers (Aneke & Finch, 2001). By administering the Stages of Concern Questionnaire prior to a professional development program, instructors can assess and address the concerns of the participants through the training. Hall and Hord (2006) recommended using open–ended concerns statements before and after professional development programs to identify, target, and assess development of teachers' Stages of Concerns through the program which should increase the quality and effectiveness of the professional development. Baker et al. (2004) suggested making a smooth and gradual transition so that the innovation *enhances* teaching instead of asking teachers to make a drastic change in the teaching methods. Specifically, CARS professional development for agriscience teachers should focus on the areas those teachers have identified: "where, how, and why to use CARS in their agriscience courses" (Park, 2005, p. 138–139).

Based on this study, the researcher suggests that practitioners consider the following recommendations:

1. A consistent, in depth professional development program should be implemented to provide ongoing training and support of the innovation throughout a several year process.

2. Schools should utilize Stages of Concern questionnaires and interventions to identify and attend to concerns which need to be addressed by professional development.
3. Professional development trainers should address the Stage 6 concerns in order to decrease resistance to the innovation.
4. School systems should encourage teacher collaboration to foster CARS implementation.

This study has identified the need for research in the following areas:

1. Research should be completed to develop an Innovation Configuration which would provide a more unified vision for CARS implementation.
2. Research should be conducted to verify the concern profiles developed in this study.
3. In order to better understand the effectiveness of the professional development programs, research should be conducted to determine the characteristics and effectiveness of various CARS professional development programs to design more effective and efficient programs.
4. Research should be conducted on the types of interventions agriscience teachers receive for CARS implementation and the effects of the identified interventions.
5. Researchers should identify the sources of resistance agriscience teachers have about CARS.
6. Research should investigate the effects of teacher collaboration on progressing through the Stages of Concern and the implementation of CARS.
7. Research on the outcomes of CARS should not be performed until successful implementation can be documented.

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