

Full Length Research Paper

Adoption of innovative teaching strategies in active learning and experiential learning by Egyptian agricultural technical schools instructors

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Agricultural Technical School (ATS) instructors in Upper Egypt have been engaged in professional development workshops intended to improve classroom and laboratory teaching by implementing active learning strategies and workshops designed to enhance student learning through real-life experiences via internships. The adoption of these new innovations has been successful; however, through assessments of concerns the ATS instructors have indicated that there is need for additional information and workshops, and that implementing multiple innovations into their programs is a concern. The leaders of innovation in the ATS system (Ministry personnel, headmasters, others) need to be aware of the levels of concern of the ATS instructors and design implementation strategies to ensure that changes can be made in the adoption process through support and additional workshops.

Key words: Active learning, internships, professional development, stages of concern, Egyptian agriculture technical schools.

INTRODUCTION

Since 2005, four professional development workshops focusing on active learning strategies have been conducted for Agricultural Technical School (ATS) instructors in Upper Egypt through the Value-Chain Training project. Since 2007, professional development workshops focusing on implementing internship programs have also been conducted for ATS instructors. The project is funded by USAID through the Midwest Universities Consortium for International Activities (MUCIA). The Concerns Based Adoption Model [CBAM]

(Hall and Hord, 2006) provides a framework to evaluate one aspect of the effectiveness of this work. Specifically, the Stages of Concern (SoC) indicates what aspects of the innovations (active learning strategies and internship programs) ATS instructors are focusing on in the implementation of the strategies. By identifying the ATS instructors' areas of concern in this implementation, future professional development sessions can be better designed to help instructors progress through the model to full implementation of active learning and internships in

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the ATS curriculum.

Conceptual framework

Active learning

Active learning, as defined by Bonwell and Eison (1991), is engaging students in doing things and in thinking about what they are doing. Davis (1993), in her book *Tools for Teaching*, wrote that learning is an active process where new knowledge is acquired in relation to previous knowledge, and that information becomes meaningful when it is presented in a recognizable framework. Active learning involves providing opportunities for students to meaningfully reflect on the content, ideas, issues and concerns of the subject (Myers and Jones, 1993).

Many faculties believe that all learning is inherently active; therefore students are actively involved when listening to a formal presentation (Bonwell and Eison, 1991). However, research by Chickering and Gamson (1987) suggests that students must also read, write, discuss and/or be engaged in problem solving activities to be actively involved. Active learning engages students in higher-order thinking (analysis, synthesis, evaluation) (Bonwell and Eison, 1991; Stanford University, 1993). Using active learning strategies helps students develop skills in handling concepts within the discipline, reflect upon ideas, and reflect on how to use those ideas (Stanford University, 1993).

Various authors have described active learning strategies that can be used in the classroom (McKinney, 2010; Bonwell and Eison, 1991; Stalheim-Smith, 1998; McKeachie and Svinicki, 2006). A major purpose of the value-chain training project for agricultural technical school instructors in Egypt has been to provide teachers with examples of how they can use active learning strategies in their classrooms. Egyptian ATS teachers are not formally prepared to teach, having attained an education in a technical field of agriculture. If the overall purpose of the project is to be achieved, that is, to prepare work-force ready graduates, teachers must engage students in higher order thinking by utilizing active learning strategies in their classrooms and labs. Therefore, teachers need to learn new strategies and develop new skills in teaching (Seeler et al., 1994).

Experiential learning

Experiential learning has been an integral part of agricultural education programs in the United States for many years (Roberts and Harlin, 2007). However, prior to the implementation of the Value-Chain Training project, this pedagogy had not been adopted by ATS instructors in Egypt. It is theorized that educational principles transcend the borders of the United States and are

therefore applicable in the ATS system in the Arab Republic of Egypt, which was the focus of this part of the project. ATS instructors were provided in service training that addressed planning, conducting, supervising and evaluating internship programs.

Experiential learning activities such as internships are relevant for teaching career skills to students. Osborne (1994) stated that experiential learning made students better able to transfer knowledge, understand problems in agriculture, develop their self-confidence, connect practice and principle, improved psychomotor skills, develop problem solving skills, retain more knowledge, and become interested in learning. Joplin (1981) posited characteristics of experiential learning, including personal and student-based, process and product orientation, and evaluation. Kolb (1984) described a four-stage model of experiential learning, including concrete experience, reflective observation, abstract conceptualization, and active experimentation. "Students learn through real-life experiences and experience influences how they learn because experiences shape a persons' schema by building knowledge and past experiences to influences future experiences" (Knobloch, 2003:25).

A need exists for including experience-based programs in all program areas of the agricultural technical schools in Egypt. Workshops provide training for the ATS instructors so that they can ultimately provide better instruction to their students. Content in the ATS programs typically lacks real-life experiences outside of school, not utilizing the local resources necessary to conduct experiential learning activities (MUCIA, n.d.). The agricultural concepts and business skills that students need to learn cannot be synthesized from books, but require active participation (Roberts, 2006).

Stages of concern

In order to determine how successful a professional development session is in bringing about a desired change, a number of factors can be considered. One of these is teacher concern regarding the innovation, which has been assessed in past research through the Stages of Concern Questionnaire (SoCQ) (George et al., 2006). Derived from Francis Fuller's CBAM, the stages of concern profiles provide explanations regarding the developmental progression that individuals go through when adopting an innovation. These concerns typically begin with self-related concerns, and then progress to task-related concerns and finally impact-related concerns (Hall and George, 1979). The seven stages, shown in Table 1 (Hall and Hord, 2006), were originally identified through various research endeavors conducted by the staff members of the Research and Development Center for Teacher Education of the University of Texas at Austin in 1969. Innovation users can move through these stages according to their developmental familiarity with

Table 1. Seven stages of concern.

Stage	Title	Description
6	Refocusing	The individual focuses on exploring ways to reap more universal benefits from the innovation, including the possibility of making major changes to it or replacing it with a more powerful alternative
5	Collaboration	The individual focuses on coordinating and cooperating with others regarding the use of the innovation
4	Consequences	The individual focuses on the innovation's impact on students in his or her immediate sphere of influence
3	Management	The individual focuses on the processes and tasks of using the innovation and the best use of information and resources
2	Personal	The individual is uncertain about the demands of the innovations, his/her adequacy to meet those demands, and/or his/her role with the innovation
1	Informational	The individual indicates a general awareness of the innovation and interest in learning more details about it. The individual does not seem worried about himself or herself in relation to the innovation
0	Unconcerned	The individual indicates little concern about or involvement with the innovation

Adapted from George et al. (2006).

the innovation. While this developmental pattern is not a certainty, it remains fairly consistent (George et al., 2006). The SoCQ has been utilized repeatedly in order to examine teacher concerns across academic settings (Christou et al., 2004; Gwele, 1997; Shoulders and Myers, 2010).

George et al. (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 that "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)". George et al. (2006) reported coefficients of internal reliability for each of the seven Stages of Concern which ranged between an alpha of 0.64 and 0.83 for the Stages of Concern Questionnaire. Santos (1999) stated an alpha score of 0.7 or greater is acceptable. George et al. also reported test-retest correlations for the SoCQ, which ranged between $r = 0.65$ and $r = 0.86$. 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 (Hall and Hord, 2006; George et al., 2006).

Plans for conducting future professional development activities for ATS instructors in the areas of internships and active learning strategies can be based on what is discovered in this study. By addressing the attributes of these teachers, programs can be developed for subgroups of teachers on traits identified through the

Stages of Concern assessment.

Purpose and objectives

The purpose of this research was to assess Egyptian Agricultural Technical School (ATS) instructors' implementation of active learning strategies in their classrooms and implementation of student internships in their programs. In order to meet the purpose of this study, the following objectives were investigated:

1. Describe the population of ATS instructors who have participated in the MUCIA active learning and internships professional development sessions.
2. Determine the Stages of Concern of ATS instructors who have participated in the MUCIA professional development sessions.
3. Examine relationships between Stages of Concern and years of involvement with the innovative strategies, level of use of the innovations, experience conducting training for other instructors, years of teaching, and involvement with other teaching innovations.

METHODS

Implementation of active learning

Population

The population for this part of the study was Egyptian ATS instructors

who had participated in at least one MUCIA professional development workshop on active learning strategies. The researchers obtained a list of participants ($N = 230$) from the MUCIA Cairo Office Chief of Party. The workshops included instruction in and demonstration of 17 active learning strategies that could be used by ATS instructors in their teaching. The active learning strategies taught included: Lecture, discussion, carousel brainstorming, case studies, clarification pauses, cooperative groups, concept maps, daily journal, frequent short quizzes, jigsaw procedure, learning cycle, muddiest point, magnetic diagrams, one-minute paper, field exercise, problem solving techniques, and think/pair/share.

Data collection

A descriptive census survey design was used in this study. The researchers used a paper questionnaire to collect the concerns of Egyptian ATS instructors towards the implementation of active learning strategies. The researchers utilized the Stages of Concern Questionnaire (SoCQ) developed by George, et al (2006). Stages of Concern (SoC) are a diagnostic component of the Concerns Based Adoption Model (CBAM) which addresses the affective side of change (Hall and Hord, 2006). The feelings and perceptions of participants are known as concerns. The stages were developed based upon research on the evolution of concerns throughout the change process and depict a progression of concerns through which people move during the implementation process. Knowing the concerns of teachers can help judge implementation of change or can be used to develop focused workshops, provide individual coaching, and create strategic plans to more effectively facilitate change.

The 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 active learning strategies into their teaching. This questionnaire allowed respondents to indicate the relevance and intensity of their concerns towards active learning strategies. In addition to the SoCQ, demographic questions were included to better describe the population and differences among subgroups.

The instrument was translated into Arabic by staff of the Value-Chain Training program in Cairo, since most ATS instructors are only partly fluent in English. Minor modifications were made to some wording to help in the translation. The instrument was then translated back into English to reaffirm that the Arabic version replicated the original instrument.

A total of 162 usable responses were received. Teachers who were no longer teaching were not included in the study; likewise, headmasters and education supervisors were deleted from the participant list. The instrument was administered by Value-Chain Training staff, resulting in a complete set of responses from participants who had completed a workshop and were still teaching.

Implementation of Internships

Population

The population for the second part of the study was Egyptian ATS instructors who had participated in the initial MUCIA professional development workshop on internships in July 2007. The researchers obtained a list of participants from the MUCIA Cairo Office Chief of Party. The workshops included instruction in 23 competencies that could be used by ATS instructors in implementing an internship program for their students.

Data collection

A descriptive census survey design was used in this study. The researchers used a paper questionnaire to collect the concerns of Egyptian ATS instructors towards the implementation of internships. The researchers again utilized the Stages of Concern Questionnaire (SoCQ)

developed by George et al. (2006) as described in the previous section and followed the same protocol in preparing the instrument in the Arabic language.

There were 80 participants in the July 2007 workshops. For this study, a total of 59 usable responses were received, which represented the entire accessible population. Teachers who had participated in the workshop but were no longer teaching were not included in the study; likewise, headmasters and education supervisors were deleted from the participant list. The instrument was administered by Value-Chain Training staff, resulting in a complete set of responses from participants who had completed a workshop and were still teaching.

Data analysis

For both parts of the study, responses were analyzed using the calculations recommended by George et al. (2006) and developed in Excel format by Scott and Persichette (2006). Raw scores in each stage of concern were averaged by different groupings according to variables identified in the objectives. In order to perform accurate analysis, average raw scores of different variable groups in each stage of concern were converted into percentile scores. Examination of group data can be done through averaging raw scores before converting to percentile scores, as percentile scores do not have equal intervals. The 2006 Stages of Concern Questionnaire publication by George, Hall, and Steigelbauer, as well as the Excel program, provides the raw score-percentile conversion chart and can be utilized for producing individual and group profiles (George et al., 2006). This percentile chart was utilized throughout the previously-mentioned validation studies and has proved to be representative of various innovations (George et al., 2006). When analyzing percentile scores, the higher the score, the more intense the concerns are at that stage. Because percentile scores in each stage of concern are dependent on one another, analysis was conducted through the use of a concerns profile. The concerns profiles create visual images of the average concern intensities of a group of respondents, as recommended by George et al. (2006) and are the most interpretive and most frequently used method for analyzing SoCQ data. The use of percentile scores is not recommended for statistical analysis due to the violations of assumptions on which the tests are based, so data were only analyzed through descriptive measures (George et al., 2006).

RESULTS

Active learning

Description of the population

Participants in the active learning study were teachers in one of the program areas offered at the Agricultural Technical Schools in Upper Egypt: Horticultural production, laboratory technician, agricultural mechanization and land reclamation, fish production and processing technology, food processing and pastry, and animal and poultry production. The teachers were employed in 34 different schools. The average age of the participants was 41.4 years, with a range of 25 to 58 years. The typical teacher had taught 14.9 years, with a range of 1 to 32 years.

Stages of concern

Regarding the adoption of use of active learning teaching

Table 2. Adoption of active learning strategies stages of concern.

Highest stage of concern	Second highest stage of concern							Row f^a	Row % ^b
	0	1	2	3	4	5	6		
0 Unconcerned	0	14	4	10	0	5	5	38	20
1 Informational	0	0	12	3	1	7	4	27	14
2 Personal	1	10	0	3	0	15	6	35	18
3 Management	3	1	2	0	0	3	1	10	5
4 Consequence	1	0	1	1	0	2	1	6	3
5 Collaboration	0	4	18	1	5	0	7	35	18
6 Refocusing	3	4	9	1	2	20	0	39	21

^a Individuals with ties for highest or second highest stage of concern were recorded in multiple categories resulting in total frequency to be higher than total number of participants in study. ^b Does not equal 100% due to rounding.

strategies, the largest number of participants ($n = 39$; 21%) indicated their most intense level of concern being in Stage 6 closely followed by Stage 0 ($n = 38$; 20%). Those indicating a high intensity of concern in Stage 6 can be interpreted as those individuals have addressed the majority of their informational, personal, and management concerns and are now focusing on how to adapt and modify the innovation (active learning strategies) to best fit their own situation. In this stage the participants are no longer just applying the innovation as it was taught to them, but they have developed a deeper understanding of the principles undergirding the innovation and are seeking to apply those principles in the personalization of the innovation and thus providing more ownership to the individual. Many of the teachers with the highest stage of concern in Stage 6 reported their second highest stage of concern being in Stage 5: Collaboration ($n = 20$). This finding further reinforces the notion that these teachers have developed more ownership over the innovation and are working to help others implement the innovation and are seeking how to reap more benefits from that innovation.

It should also be noted that an almost equal number of teachers reported their highest stage of concern in Stage 0: Unconcerned as did those reporting the highest stage as Stage 6: Refocusing. This high level of concern in Stage 0 indicates that these teachers believe that there are many other tasks or innovations also drawing upon their time. It is not an indicator of level of use of the innovation. The second highest stage of concern reported by this group was in Stage 1 ($n = 14$). A high ranking of Stage 1 is indicative of teachers who want to know more about an innovation. It is not an indicator of level of knowledge, only that these individuals seek more information regarding the innovation itself; what it is, how to apply it.

Based on observations of the data, a trend regarding the relationship between Stage 2: Personal and Stage 5: Collaboration was noted. The largest number of individuals who noted their highest intensity of concerns was found in Stage 2 stated their second highest level of

concern was found in Stage 5. Furthermore, the largest number of those reporting their highest level of concern in Stage 5 noted the second highest stage of concern at Stage 2. The interplay between concerns regarding collaboration with other teachers and the impact that collaboration and adoption of the innovation will have on individual demands and rewards warrants further investigation (Table 2).

Internships

Description of the population

Participants in the internships study were also teachers in one of the program areas offered at the Agricultural Technical Schools in Upper Egypt: Horticultural production, laboratory technician, agricultural mechanization and land reclamation, fish production and processing technology, food processing and pastry, and animal and poultry production. The 59 teachers were employed in five different schools. The average age of the participants was 42 years, with a range of 25 to 58 years. The typical teacher had taught 11.2 years, with a range of 3 to 27 years. Nearly all of the teachers are male.

Stages of concern

More teachers indicated Stage 0: Unconcerned as their highest stage of concern ($n = 26$; 36%) regarding the adoption and implementation of internship programs. Reporting a high intensity of concern in Stage 0 is indicative of teachers feeling that there are several other tasks and innovations that they are being asked to implement at the same time. A high score in Stage 0 cannot be used as an indication of level of use of the innovation or even the desire to implement the innovation. Concerns of this type are best addressed by limiting the number and scope of innovations teachers are asked to adopt at any given time. To support this

Table 3. Implementation of internship programs stages of concern.

Highest stage of concern	Second highest stage of concern							Row f^a	Row %
	0	1	2	3	4	5	6		
0 Unconcerned	0	3	7	11	1	2	2	26	36
1 Informational	1	0	10	1	1	1	0	14	19
2 Personal	1	4	0	1	0	5	0	11	15
3 Management	1	1	2	0	0	0	0	4	5
4 Consequence	0	0	0	0	0	0	0	0	0
5 Collaboration	0	1	4	0	4	0	1	10	14
6 Refocusing	0	2	2	0	1	3	0	8	11

^a Individuals with ties for highest or second highest stage of concern were recorded in multiple categories resulting in total frequency to be higher than total number of participants in study.

conclusion, the second highest stage of concern indicated by more teachers who rated Stage 0 as their highest stage was Stage 3: Management. High levels of concern in Stage 3 can indicate that individuals are focused on the process and tasks of using an innovation and how to best utilize the information they have on the innovation.

It should also be noted that 19% ($n = 14$) teachers indicated that their most intense concerns regarding the implementation of internship programs are found in Stage 1: Informational with a majority of those showing their second highest level of concern being in Stage 2: Personal. This combination of highest levels of concern is indicative of teachers who want more information about the innovation with at least some of that information addressing the individual demands of the innovation and the individual reward structure for implementation of the innovation (Table 3).

DISCUSSION

Results of the Stages of Concern analysis will be used in determining additional in service educational needs of Agricultural Technical School instructors who have participated in past activities as well as in planning future workshops for other instructors. Teachers indicated a need for more information and assistance. Additional workshops should be designed and offered to address those needs. Follow-up classroom observations and mentoring by headmasters and others may be helpful as well.

Since concerns were noted regarding the value of using active learning strategies, research needs to be conducted that would show differences in student achievement between groups that are taught using active learning techniques and groups that are not. Positive results of that investigation may help alleviate the concern that adopting the innovation is not worthwhile.

A holistic evaluation of the findings leads to the conclusion that many of the barriers facing the integration

of active learning strategies and internship programs in the Egyptian Agricultural Technical Schools are contained within the culture of the system. ATS instructors do not have opportunities to be rewarded financially or professionally for excelling in teaching. Since the ATS instructors revealed some resistance to adopting the innovation of active learning strategies and internships, a reward system could be implemented that recognizes improvements in teaching, such as materials and supplies for the program or opportunities to participate in other professional development activities. Further, issues regarding the acceptance of the innovations by others can be addressed by providing additional information and/or workshops for school headmasters and Ministry of Education personnel. It is this area of acceptance from the school culture that shows indications of being one of the biggest barriers facing implementation of these innovations. Further investigation is needed to understand both the formal and informal support and reward structure in place at the ATS. This understanding is key to assisting instructors wishing to improve their teaching to succeed in the education system in the area of professional and financial advancement and security.

Results of the Stages of Concern analysis will be used in determining additional inservice educational needs of Agricultural Technical School instructors who have participated in past activities as well as planning future workshops for other instructors. Based on the analysis of the group concern profiles, four conclusions can be drawn:

- (1) As ATS teachers became more involved in the innovations, they tended to progress through the stages of concern as posited by Hall and Hord (2006).
- (2) Teacher groups with the most experience and involvement with the innovations showed the highest concern levels in later stages of the concern model while those with less experience had highest concerns in the earlier stages, as also reported by Warner and Myers (2013), Shoulders and Myers (2011), and Thoron et al. (2010). This also reinforces the position stated by Hall

and Hord (2006) that professional development experiences need to be built to assist teacher progress through the stages. Teachers who had the most years of experience with the innovations tended to also be the teachers who conducted the training on the innovation for other teachers, as also noted in Bellah and Dyer (2009). Further investigation is needed to verify the impact of the train-the-trainer model on those that do not have the opportunity to act as a workshop trainer.

(3) Early users tended to have high personal and/or management concerns regarding implementing the innovations. In many of the group concerns profiles it was found that teachers that were early in the use or had not yet used the innovations had high concerns in how the innovation would impact them, both personally and professionally. These concerns could include things such as social standing with other teachers, teacher self-efficacy, job security, and other related issues. They were also highly concerned on the logistics of implementing the innovations as also found by Thoron et al. (2010). These findings are consistent with the work of Bellah and Dyer (2009), Balschweid et al. (1998) and Barrick et al. (2011). The teachers focused on how to manage the process. Further research should be conducted to identify the specific aspect of the innovations that is of most concern to these teachers and then develop professional development opportunities to address those concerns.

(4) Total years of teaching experience did not tend to impact concern level regarding the innovation.

Overall trends did not emerge by analysis of group concern profiles of teachers based on years of experience. Early career teachers did show some signs of greater personal and management concerns regarding the innovations than other groups, which is consistent with previous research conducted domestically (Warner and Myers, 2010; Warner and Myers, 2011; Warner and Myers, 2013; Shoulders and Myers, 2010) and internationally (Myers et al. 2010), but no substantial trends were discovered. Thus it can be concluded for this group of individuals, total teaching experience was not a major factor in concern level regarding the adoption of the innovations.

(5) Teachers in the first or second year of another innovation implementation had high personal concerns. This conclusion is consistent with that of Hall and Hord (2006) and Warner and Myers (2011). It is often challenging for teachers to manage implanting multiple innovations at the same time. Teachers showed high personal concerns which can stem from their fear of retributions from administrators and other teachers for failing to implement an innovation championed by that individual. Further, introducing multiple changes into the classroom can be disruptive to the students. Further investigation should be conducted to determine the other innovations being implemented and the drivers of those innovations.

The concerns faced by Egyptian ATS instructors in

managing innovations are similar to those faced by American agriculture teachers (Warner and Myers, 2010; Shoulders and Myers, 2010; Baker et al., 2004). Thus, American agriculture teacher educators should become more involved in international professional development to apply and continually assess the effectiveness of professional development models to assist in the adoption and implementation of new instructional techniques.

The findings of this research provide valuable insight to the leaders of the innovations in Egyptian Agricultural Technical Schools. Further, leaders of other educational innovations can garner insight on the adoption process to ease the implementation of other ideas. This information should be used by program leaders to develop professional development opportunities and other support mechanisms for teachers involved in this project.

Conflict of Interest

The authors have not declared any conflict of interest.

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