A Needs Assessment to Determine Knowledge and Ability of Egyptian Agricultural Technical School Teachers Related to Supervised Agricultural Experience

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This research was conducted approximately one year after Egyptian Agricultural Technical School (ATS) instructors attended workshops on integrating placement Supervised Agricultural Experience as an instructional tool in their programs. Following a year of implementation, the purpose of this study was to determine ATS teacher knowledge and ability to apply the 23 placement SAE competencies delivered in the workshops. To some extent, ATS instructors had knowledge of and could apply all 23 placement SAE competencies. However, Mean Weighted Discrepancy Scores for knowledge and ability to apply for all 23 placement SAE competencies were positive, indicating some level of need for future workshops on all topics. Based on the rankings, it was recommended that future in–service workshops should be conducted with this group of ATS teachers that focus on: (a) explaining the process of learning by doing; (b) defining the types of experience programs for ATS students; (c) identifying the role of the community in planning and conducting internships; (d) describing the evolution of supervised experience; and (e) explaining the relationship between internship and classroom instruction.

Keywords: experiential learning, supervised experience, needs assessment

Introduction

Education has often been seen as a stimulus for social change (Dewey, 1916). From the very beginning, the underlying purpose of secondary agricultural education programs focused on social change (Stimson & Lathrop, 1942). Stimson and Lathrop explained that as the United States was rapidly evolving from an agrarian to industrial society in the late nineteenth and early twentieth centuries, many people from lower economic strata in rural areas did not have the same quality of life as other citizens. During this period of time, agriculture and the vitality of rural communities were interconnected as a substantial number of people in rural areas operated small–scale farming operations (Buttel, Larson, & Gillespie, 1990). Vocational education, including agriculture, was seen as a mechanism to develop a skilled workforce, which would lead to greater revenue, which would ultimately lead to an increased quality of life in rural areas (DeYoung, 1987). Within vocational agricultural education, the emphasis was more focused on advancing agricultural production through commercialization and innovation (Phipps & Osborne, 1988). Although a true cause and effect relationship cannot be verified, agricultural production in the United States has

grown exponentially, and the quality of living in rural parts of the United States characterized with small scale farming operations has advanced considerably since the early 1900s (Buttel et al., 1990). Over time, secondary school agricultural education programs have also evolved and now look much different than they did a century ago (Phipps, Osborne, Dyer, & Ball, 2008).

The relationship between agricultural production and quality of life in rural areas is not a phenomenon unique to the United States. Today, in the Arab Republic of Egypt, agricultural production in Upper Egypt (the areas south of Cairo) has largely been characterized by small scale and subsistence farming. People in Upper Egypt are largely in the lower economic strata. According to a report by the International Fund for Agricultural Development, 34% of the people living in Upper Egypt live in poverty, compared to only 11% in rural areas in Lower Egypt (IFAD, 2009). Recognizing this situation, the United States Agency for International Development (USAID) has funded several projects to the Midwest Universities Consortium for International Activities (MUCIA) related to improving agricultural production and marketing in the area. Building from the lessons learned in the United States a century ago, a component of these projects has been to advance education in agriculture at the secondary school level.

In Egypt, secondary agricultural education is conducted at Agricultural Technical Schools (ATS). Upper Egypt has 50 ATS, with approximately 160 instructors and 2,500 students at each school. Instruction at these schools has largely been theoretical in nature, with little or no application in school or community contexts (MUCIA, n.d.). Recognizing this disconnect between theory and practice, MUCIA team members identified a need to integrate more experiential learning activities into the ATS curricula. Using agricultural education in the United States as the model, Supervised Agricultural Experience (SAE) was seen as the appropriate pedagogy. Experiential learning, as applied through SAE, has long been a key feature of secondary agricultural education in the United States (Roberts & Harlin, 2007). However, the multitude of approaches to SAE in the United States was deemed too comprehensive for ATS

schools. Consequently, placement SAE was selected as the most appropriate method to integrate experiential learning. To facilitate the adoption of this pedagogy, a series of workshops was conducted for ATS instructors in July 2007 as a part of a project funded by USAID through MUCIA.

Theoretical Framework

The theoretical framework for this project was built on the theory of Teacher Adaptive Expertise (Hammerness et al., 2005). According to this theory, teacher expertise is developed through either efficiency or innovation. Expertise in efficiency results in the ability to accomplish a task with little or no attention. Expertise in innovation results in attempting new things and altering current practices. Teachers have adaptive expertise when they have expertise in efficiency and innovation. Consequently, effective professional development should lead to adaptive expertise.

Supervised Agricultural Experience has been examined by numerous scholars in agricultural education. Roberts and Harlin (2007) presented a theoretical summary that went back to Stimson's (1919) Home Farm projects. Their analysis revealed that the scope of SAE has evolved over time. Dyer and his colleagues (Dyer & Osborne, 1996; Dyer & Williams, 1997a; 1997b) conducted a thorough synthesis of all the research published on SAE. Their work revealed several key findings. First, SAE quality varies greatly from school to school. Second, SAE is widely recognized as benefiting students and reinforcing career–related skill development. Third, students, employers, and parents all valued the supervisory role played by teachers. Dyer and his colleagues did emphasize that the body of knowledge related to SAE in the United States failed to provide a comprehensive picture of current practices. Examining the SAE practices in Egypt has received even less attention. Preliminary research as a part of the current project (Barrick, Samy, Roberts, Thoron & Easterly, in press) revealed that ATS instructors believed that SAE activities were important.

The SAE expertise of secondary agricultural education teachers in the United States has been studied by numerous researchers, typically in the format of needs assessments. An examination of

these studies revealed three recurring deficiencies expressed by teachers: (a) SAE supervision, (b) developing SAE programs, and (c) working with people in the community.

Teachers typically feel inadequately prepared to supervise SAE programs. Duncan, Ricketts, Peake, and Uesseler (2006) reported that Georgia teachers expressed a need for in–service education on supervising SAE programs. Garton and Chung (1997) found that beginning teachers thought SAE supervision was important, but that their ability to supervise SAE was lower than needed. Similarly, Birkenholz and Harbstreit (1987) also found that SAE supervision was one of the most important competencies needed in in–service workshops. Roberts and Dyer (2004) reported that both traditionally and alternatively certified teachers expressed a high need for in–service education on supervising SAE programs. Washburn, King, Garton, and Harbstreit (2001) examined SAE in Missouri and Kansas. They found that teachers from both states had a moderate need for education on supervising SAE programs. Garton and Chung (1996) found that beginning teachers in Missouri believed that supervising SAE programs was important; however, they felt only somewhat competent for this activity. Accordingly, Garton and Chung identified supervising SAE as one of the ten areas in which in–service education was most needed.

Teachers generally feel ill–prepared to help students develop SAE programs. Duncan et al. (2006) found that in–service education on developing SAE programs was one of the five most needed topics by Georgia teachers. Layfield and Dobbins (2002) found that South Carolina teachers also expressed a need for in–service education on this topic. Layfield and Dobbins did report that beginning teachers had a greater need than more experienced teachers. Roberts and Dyer (2004) found that Florida teachers also expressed a need for education in this area. Interestingly, teachers certified through traditional means expressed a greater need than teachers certified through alternative means. Washburn et al. (2001) found that both Missouri and Kansas teachers expressed a moderate need for education in learning how to help students develop SAE programs. In an earlier study, Garton and Chung (1996) found that beginning teachers in Missouri also expressed a need for in–service education on this topic.

SAE activities, especially placement SAE, typically require teachers to work closely with people throughout the community. However, teachers often feel unprepared for this activity. DeLay and Washburn (2008) found that teachers thought it was important to build relationships with people in the community. Roberts and Dyer (2004) found that Florida teachers expressed a need for education on developing business and community relations. This study did show that alternatively certified teachers had less need than traditionally certified teachers, perhaps due to their previous work experience outside education. Washburn et al. (2001) also found that teachers had a moderate need in this area. Layfield and Dobbins (2002) found that beginning teachers had a greater need for education on developing a community–based program than their more experienced colleagues.

SAE programs have long been advocated as a key feature of a total agricultural education program in the United States (Roberts & Harlin, 2007). Teachers generally express the importance of SAE (Dyer & Osborne, 1996), but the adaptive expertise of teachers in the United States related to SAE programs is limited by deficiencies expressed by teachers in: (a) SAE supervision, (b) developing SAE programs, and (c) working with people in the community. Little is known about SAE outside the United States. Workshops were conducted with Egyptian ATS instructors on these and other SAE–related topics. Given the innovativeness of this pedagogy in Egypt, previous research with this population was non–existent. Would targeted in–service education on placement SAE give Egyptian ATS instructors the knowledge and ability to fully implement this pedagogy? Is there a need for follow–up in–service workshops?

Purpose & Objectives

This research was conducted approximately one year after Egyptian ATS instructors attended workshops on integrating placement SAE as an instructional tool in their programs. After a year of implementation, the purpose of this study was to determine ATS teacher knowledge of and ability to apply the 23 placement SAE competencies delivered in the workshops. This information can be used to plan future

workshops. Specifically, the following objectives were used to guide this inquiry:

1. Determine ATS teacher knowledge of placement SAE competencies.
2. Determine ATS teacher ability to apply placement SAE competencies.
3. Prioritize competencies for future workshops.

Methods

A series of workshops was developed and delivered in July 2007 to address the needs of Egyptian Agricultural Technical School (ATS) instructors based on their perceived needs as well as the needs identified by industry experts (Thoron, Barrick, Roberts, & Samy, 2008). It was determined *a priori* that placement SAE, or internships, was the most appropriate form of experiential learning for ATS instructors to implement. Based on best practices outlined for placement SAE in the United States, 23 competencies were selected as the foundation for the workshops (Barrick et al., 1992).

In June 2008, one year after the workshop, a follow–up survey was conducted with the ATS instructors who attended the 2007 workshop (N = 90). The survey utilized an instrument based on Borich's (1980) approach to needs assessment. The instrument listed the 23 competencies and asked participants to rate (a) the importance, (b) their knowledge, and (c) their ability to apply the competencies on a five–point rating scale, 1 = low to 5 = high. Using the 23 competencies from the original workshops (2007) established the content validity of the instrument. The instrument was translated into Arabic by faculty of Egyptian universities. Subsequently, the Arabic version was translated into English by a third party, native Arabic–speaking faculty member in the United States for a blind comparison to the original English version. It was determined that the Arabic version replicated the original English version of the instrument. Those involved in this process were also asked to examine the instrument for clarity and understandability, thus establishing face validity. A post–hoc analysis of reliability

was conducted, resulting in Cronbach's alpha of .82. The instrument was administered face–to–face by the staff of the USAID MUCIA project in Cairo. Responses were obtained from all of the ATS instructors that were still teaching (*n* = 80), which represented 88.9% of the original participants.

Data from the rating scales were treated as interval data and summarized by calculating means. Rankings were calculated for ATS instructor (a) knowledge of and (b) ability to apply the 23 placement SAE competencies. Rankings were determined by calculating Mean Weighted Discrepancy Scores (MWDS) (Borich, 1980). For each competency, the difference between perceived importance and perceived level of knowledge or ability was calculated (the discrepancy score). Those differences are then ordered according to relative weight, which was calculated by multiplying the discrepancy score by the average perceived importance of all respondents to obtain the MWDS (Barrick, Ladewig, & Hedges. 1983; Borich, 1980; Edwards & Briers, 1999). A positive MWDS occurs when importance is higher than knowledge (or ability) and indicates a need for additional in–service workshops. Conversely, a negative MWDS indicates that knowledge or ability either meets or exceeds the needs of respondents.

Results

Objective One: Determine ATS teacher knowledge of placement SAE competencies.

Results are presented in Table 1. All competencies were rated above the midpoint of the scale (2.50). ATS instructors had the highest knowledge in the competencies: Define internships (*M* = 3.94), Establish record–keeping systems (*M* = 3.92), Create an internship plan (*M* = 3.85), and Create a system for evaluation (*M* = 3.84). The competencies that rated the lowest for knowledge were Describe the evolution of the supervised experience (*M* = 3.37), Identify the role of students in internships (*M* = 3.39), Identify the role of the community in internships (*M* = 3.48), and Identify the role of parents in internships (*M* = 3.48).

Table 1
Competency rank based on Mean Weighted Discrepancy Score

Competency	Importance Mean	Knowledge Mean	MWDS	Application Mean	MWDS
Explain the relationship between internship and classroom instruction (*n* = 80)	4.23	3.74	2.06	3.53	2.96
Explain the process of learning by doing (*n* = 76)	4.45	3.57	3.06	3.79	2.93
Identify the role of teachers in planning and conducting internships (*n* = 78)	4.31	3.81	2.10	3.62	2.93
Define the types of experience programs for ATS students (*n* = 80)	4.24	3.61	2.65	3.56	2.86
Identify the role of the community in planning and conducting internships (*n* = 79)	4.08	3.48	2.37	3.37	2.84
Describe the benefits and outcomes of internships for students (*n* = 80)	4.28	3.68	2.49	3.65	2.68
Create an internship plan for students in my ATS program (*n* = 79)	3.28	3.85	1.90	3.68	2.65
Describe the benefits and outcomes of internships for the community (*n* = 80)	4.18	3.82	1.48	3.59	2.46
Describe the evolution of supervised experience. (*n* = 78)	4.17	3.37	3.32	3.62	2.25
Describe the benefits and outcomes of internships for employers. (*n* = 78)	4.13	3.61	2.14	3.58	2.22
Establish requirements for growth and success of internships (*n* = 78)	4.10	3.65	1.84	3.61	2.10
Describe the benefits and outcomes of internships for teachers (*n* = 79)	4.13	3.70	1.83	3.65	2.04
Identify strategies for supervision (individual on–site and group) (*n* = 76)	4.18	3.79	1.62	3.71	2.04
Identify suitable internship sites (strategies for working with business and industry) (*n* = 77)	4.10	3.73	1.53	3.63	1.97
Create a system for evaluating internships and recognizing achievement (*n* = 79)	4.11	3.84	1.20	3.65	1.92
Describe the benefits and outcomes of internships for the school (*n* = 80)	4.01	3.60	1.63	3.54	1.90
Identify the role of employers in planning and conducting internships (*n* = 79)	4.15	3.70	1.84	3.68	1.89
Identify the role of parents in planning and conducting internships (*n* = 79)	3.94	3.48	1.74	3.47	1.80
Establish a record–keeping system for internships (*n* = 78)	4.24	3.92	1.41	3.83	1.74
Identify examples of potential agricultural internship experiences (*n* = 76)	4.08	3.64	1.88	3.70	1.56
Define supervised agricultural experience internships (*n* = 79)	4.15	3.94	0.84	3.77	1.52
Identify the steps needed to establish a Technical Internship Center (*n* = 79)	4.08	3.71	1.50	3.74	1.45
Identify the role of students in planning and conducting internships (*n* = 77)	3.98	3.39	2.31	3.60	1.40

Note. MWDS=Mean Weighted Discrepancy Score; Scale: 1= low to 5=high

Objective Two: Determine ATS teacher ability to apply placement SAE competencies.

Results are depicted in Table 1. All competencies were rated above the midpoint of the five–point scale. The competencies that ATS instructors could best apply in their teaching were Establish a record–keeping system for internships (M = 3.83) and Explain the process of doing by learning (M = 3.79). Define supervised internships (M = 3.77) and Identify the steps to establish a Technical Internship Center (M = 3.74) also were ranked high. Competencies that ATS instructors felt least comfortable in applying were: Identify the community's role in internships (M = 3.37), Identify the role of parents in internships (M = 3.47), Explain the relationship between internships and classroom instruction (M = 3.53), and Describe the benefits and outcomes of internships for the school (M = 3.54).

Objective Three: Prioritize competencies for future workshops.

This objective was met through calculating Mean Weighted Discrepancy Scores (MWDS) for ATS instructors' (a) knowledge of SAE placement competencies and (b) ability to apply SAE placement competencies. The MWDS was calculated using the difference between importance and either knowledge or ability to apply. Complete results for MWDS for both knowledge and ability to apply are presented in Table 1. A summary of the top ten competencies for knowledge and ability to apply is presented in Table 2.

All MWDS for knowledge scores were positive, indicating some need for additional in–service education programs. The competencies with the greatest MWDS for knowledge were Describe the evolution of supervised experience (MWDS = 3.32); Explain the process of learning by doing (MWDS = 3.06); Define types of experience programs (MWDS = 2.65); Describe the benefits and outcomes of internships (MWDS = 2.49); and Identify the role of the community in planning and conducting internships (MWDS = 2.37). The next five highest ranked competencies were Identify the role of students in planning and conducting internships (MWDS = 2.31); Describe the benefits and outcomes of internships for employers (MWDS = 2.14); Identify the role of teachers in planning and conducting internships (MWDS = 2.10); Explain the relationship between internship and classroom instruction (MWDS = 2.06); and Create on internship plan for students in my ATS program (MWDS = 1.90).

Table 2
Highest Ten Rankings of SAE Placement Competencies Based on MWDS

Competency	Knowledge		Ability to Apply	
	MWDS	Rank	MWDS	Rank
Explain the relationship between internship and classroom instruction (*n* = 80)	2.06	9	2.96	1
Explain the process of learning by doing (*n* = 76)	3.06	2	2.93	2
Identify the role of teachers in planning and conducting internships (*n* = 78)	2.10	8	2.93	2
Define the types of experience programs for ATS students (*n* = 80)	2.65	3	2.86	4
Identify the role of the community in planning and conducting internships (*n* = 79)	2.37	5	2.84	5
Describe the benefits and outcomes of internships for students (*n* = 80)	2.49	4	2.68	6
Create an internship plan for students in my ATS program (*n* = 79)	1.90	10	2.65	7
Describe the benefits and outcomes of internships for the community (*n* = 80)	1.48		2.46	8
Describe the evolution of supervised experience (*n* = 78)	3.32	1	2.25	9
Describe the benefits and outcomes of internships for employers (*n* = 78)	2.14	7	2.22	10
Identify the role of students in planning and conducting internships (*n* = 77)	2.31	6	1.40	

The MWDS for ability to apply were all positive, indicating some need for additional in–service on all 23 competencies (see Table 1). As displayed in Table 2, the highest ranked competency was Explain the relationship of internship and classroom instruction (MWDS = 2.96). Other competencies in the top five were: Explain the process of learning by doing (MWDS = 2.93), Identify the role of teachers in planning and conducting internships (MWDS = 2.93), Define the types of experience programs for ATS students (MWDS = 2.86), and Identify the role of the community in planning and conducting internships (MWDS = 2.84). The remainder of the top ten competencies were: Describe the benefits and outcomes of internships for students (MWDS = 2.68), Create an internship plan for students in my ATS program (MWDS = 2.65), Describe the benefits and outcomes of internships for the community (MWDS = 2.46), Describe the evolution of supervised experience (MWDS = 2.25), and Describe the benefits and outcomes of internships for employers (MWDS = 2.22).

Nine competencies were in the top ten for both knowledge and ability to apply (Table 2). Three competencies were in the top five: Explain the process of learning by doing (ranked 2nd and 2nd); Define the types of experience programs for ATS students (ranked 3rd and 4th); and Identify the role of the community in planning and conducting internships (ranked 5th and 5th).

Conclusions and Discussion

Objective One: Determine ATS teacher knowledge of placement SAE competencies.

ATS instructors were somewhat knowledgeable on all 23 SAE competencies related to placement. ATS instructors had the greatest knowledge in: Defining internships, Establishing record–keeping systems, Creating an internship plan, and Creating a system for evaluation. ATS instructors had the least knowledge in: Describing the evolution of the supervised experience, Identifying the role of students in internships, Identifying the role of

the community in internships, and Identifying the role of parents in internships.

The self–identified deficiencies of Egyptian ATS teachers were similar to their peers in the United States. Identifying the role of students in internships would be related to helping students develop SAE programs. This topic was also identified as deficient by numerous groups of teachers in the United States (Duncan et al., 2006; Garton & Chung, 1996; Layfield & Dobbins, 2002; Roberts & Dyer, 2004; Washburn et al., 2001). Involving the community and parents in SAE is related to working with people in the community, which was identified in numerous studies in the United States (Layfield & Dobbins, 2002; Roberts & Dyer, 2004; Washburn et al., 2001).

Objective Two: Determine ATS teacher ability to apply placement SAE competencies.

To some extent, ATS instructors could apply all 23 placement SAE competencies. ATS instructors could best apply: Establishing a record–keeping system for internships, Explaining the process of doing by learning, Defining supervised internships, and Identifying the steps to establish a Technical Internship Center. ATS instructors were least comfortable in applying: Identifying the community's role in internships, Identifying the parents' role in internships, Explaining the relationship between internships and classroom instruction, and Describing the benefits and outcomes of internships for the school.

The abilities of ATS teachers were also similar to their peers in the United States. As with their knowledge, ATS instructors did not feel comfortable with their ability to apply competencies related to working with the community. This also held true for teachers in the United States (Layfield & Dobbins, 2002; Roberts & Dyer, 2004; Washburn et al., 2001).

Objective Three: Identify and prioritize competencies for future workshops.

For both knowledge and ability to apply, the MWDS for all 23 placement SAE competencies was positive, indicating some level of need for future workshops on all topics. Nine competencies were in the top ten for both knowledge and ability to apply. They were: Explaining the relationship between internship and classroom instruction, Explaining the

process of learning by doing, Identifying the role of teachers in planning and conducting internships, Defining the types of experience programs for ATS students, Identifying the role of the community in planning and conducting internships, Describing the benefits and outcomes of internships for students, Creating an internship plan for students in my ATS program, Describing the evolution of supervised experience, and Describing the benefits and outcomes of internships for employers.

Three competencies were in the top five in need for both knowledge and ability to apply. These were: Explaining the process of learning by doing, Defining the types of experience programs for ATS students, and Identifying the role of the community in planning and conducting internships. The two highest ranked items were Describing the evolution of supervised experience for knowledge and Explaining the relationship between internship and classroom instruction for ability to apply. Interestingly, both of these competencies were in the top ten of both knowledge and ability to apply, but neither was in the top ten of both.

Needs assessments conducted in the U.S. were not specifically targeted at just SAE topics and thus did not provide the specificity of the needs assessment presented in this study. However, it appears that Egyptian ATS teachers had similar needs for in–service education on SAE topics similar to their peers in the United States. Both groups had a need to learn how to better work with people in the community (Layfield & Dobbins, 2002; Roberts & Dyer, 2004; Washburn et al., 2001). In contrast, Egyptian ATS instructors expressed a need for in–service education focused on the evolution of SAE and connecting SAE to the classroom instruction. These topics were not identified in needs assessments of teachers in the United States. Perhaps this is an indication of the adequacy of pre–service teacher education programs in the United States and the lack of pre–service programs in Egypt.

Recommendations and Implications

Future in–service workshops on placement SAE should be conducted with this group of ATS teachers that focus on: (a) explaining the process of learning by doing, (b) defining the types of experience programs for ATS students,

(c) identifying the role of the community in planning and conducting internships, (d) describing the evolution of supervised experience, and (e) explaining the relationship between internship and classroom instruction.

If future in–service education is conducted with other groups of ATS teachers, the curricula for those workshops should be altered to better address the five competencies mentioned above. Additionally, these five topics, along with the content from the original workshops, should be integrated into a pre–service teacher program in Egypt for ATS teachers.

Results outlined in this study represent only self–perceived knowledge and abilities of Egyptian ATS instructors. It is not known how well these competencies are actually being implemented. Follow–up research should be conducted to determine the actual practices of ATS teachers related to SAE. These observations would provide a much better picture of the impacts of the in–service education that was conducted in 2007. This research would also afford a much clearer idea of the need for future pre–service and in–service education.

The long–term goal for the original USAID MUCIA project is to increase the quality of life in the rural areas of Upper Egypt. The true impact of placement SAE as a small piece of the solution to this issue will not be known for some time. It is recommended that a follow–up study examine the economic climate of Upper Egypt and specifically with employers, teachers, parents, and students to see if participation in a placement SAE program made a difference. It could very likely be at least ten years or more before an accurate assessment can be made.

Examining the literature related to SAE in the United States revealed that much of the research only examined teacher knowledge of SAE in a broad terms. The research conducted in the current study examined a series of specific SAE–related competencies. It would be beneficial to ascertain a current picture of what teachers in the United States know about the specific topics related to SAE. The instrumentation used in the current study could provide a mechanism for this task. This knowledge could lead to improving pre–service and in–service education about SAE, and perhaps reduce the variance in SAE program quality noted by Dyer and his colleagues (Dyer & Osborne, 1996; Dyer & Williams, 1997a; 1997b).

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