Introducing Active Teaching-Learning Methods and Materials into Egyptian Agricultural Technical Secondary Schools

Burton E. Swanson  
Professor Emeritus of Rural Development  
University of Illinois at Urbana-Champaign  
1301 West Gregory Drive, Urbana, IL 61801  
Telephone: 217-244-6978, Fax: 217-244-1873  
e-mail: swansonb@uiuc.edu

Jamie Cano  
Associate Professor of Agricultural Education  
The Ohio State University

Mohamed M. Samy  
Egypt Coordinator, AERI Institutional Linkage Project  
University of Illinois at Urbana-Champaign

James W. Hynes  
Lecturer, Department of Curriculum and Instruction  
Sam Houston State University

Benjamin Swan  
Assistant Professor of Agricultural & Extension Education  
University of Idaho

Abstract  
This paper summarizes activities undertaken by teacher-educators from several U.S. Land Grant Universities to introduce active teaching-learning methods and materials into 25 agricultural technical (secondary) schools (ATSs) in Upper Egypt. The goal of the project was to transform the cognitive and psychomotor skills being taught in these schools from knowledge recall and comprehension to higher-level cognitive skills, including problem-solving, critical thinking and decision-making, as well as practical skill training. Each of the seven steps taken to implement this pilot project are summarized and discussed. This project is educationally significant because vocational agriculture education programs have been neglected in most developing countries; also, most international donor agencies allocate the majority of their educational resources to strengthening basic education. As a result, this effort to pilot-test and validate how vocational agricultural education programs in these ATSs can be strengthened has considerable educational significance, not only in outlining a methodology for strengthening the remaining 105 ATSs in Egypt, but also in outlining a strategy and approach that could be used to strengthen vocational agricultural education programs in other developing countries.

Keywords: Egypt, vocational agriculture, teaching methods, lesson plans, instructional materials
Introduction
There are 130 agricultural technical (secondary) schools (ATSs) in Egypt, with an average enrollment of 2,750 students in each school. These vocational agricultural high schools have about 154 teachers per school, with about 42% of these instructors teaching agricultural courses; the remainder teach general education courses. The 65 or so “agricultural” instructors in each school are organized into technical departments, including field crop production, livestock production and animal health, horticulture, agricultural economics and agricultural mechanics.

Problem
All ATSs in Egypt are required to follow the same basic curriculum, with each of the 33 agricultural courses being organized around a standard textbook. Teachers are required to prepare students for standardized tests at the end of each school year. In addition, most technical agriculture teachers have had no training in teacher education, including different teaching methods and how to prepare lesson plans. As a result, most teachers lecture or teach for the year-end test and settle for rote learning on the part of students. Therefore, little or no attention is given to developing higher-level cognitive skills, as outlined by Bloom (1956). Most ATS graduates are poorly prepared to utilize the knowledge and skills covered in these ATS courses, whether they work on family or commercial farms or in agribusiness firms upon graduation. The unemployment rate of ATS graduates can run as high as 98% (Megahed, 2001).

In addition to lacking any type of training in effective teaching methods, the only tools available to most agriculture teachers are the course textbook and a blackboard and chalk in the classroom. The exception is in laboratories where a limited amount of equipment is available to demonstrate particular techniques. The overwhelming majority of teachers do not have any audio-visual (AV) equipment, such as overhead projectors (OHPs), illustrative transparencies or supplemental teaching aids. Most teachers merely lecture from the textbook and students follow along, taking notes as needed.

All ATS schools have a school farm averaging about 25 acres (feddans). However, these school farms are primarily used to generate income for the school and are not actively used to train students in practical skills related to field crops, horticulture and livestock production and related agricultural mechanization skills. Also, most of the work on these school farms is carried out by laborers who want to keep their jobs. Engaging students in practical training activities on the school farms has not been a priority at most schools. Finally, many teachers lack the practical training and experience needed to integrate hands-on or psychomotor skill training into their courses, so most practical training is carried out by the field laborers on the school farm, not by the teachers themselves. This arrangement contributes to an educational disconnect between classroom instruction (cognitive skills) and the minimal levels of practical field training (psychomotor skills) made available to students.

Purpose
The purpose of this paper is to describe a strategy currently being introduced into 25 ATSs in Upper Egypt under the auspices of the Agricultural Export and Rural Income (AERI) Institutional Linkage Project being implemented by the Midwest Universities Consortium for International Development (MUCIA), involving a consortium of six Land Grant Universities1, with funding being provided by the U.S. Agency for International Development (USAID)ii. The objective of this project component is to enhance the teaching methods and materials being used by agricultural instructors in these ATSs as the first step in transforming the teaching-learning
process in these schools. Once it has been empirically documented that the use of active teaching-learning methods and materials will directly improve the cognitive skills of students, then the next step will be to transform the overall curricula to enable students to develop cognitive, psychomotor and leadership skills that are directly related to the agricultural economy, both on farms and in agribusiness firms. The focus of this paper will be on the introduction of active teaching-learning methods (including teaching materials and equipment) needed to enhance the development of higher level cognitive skills among students attending the 25 selected ATSs.

**Philosophical Framework**

As Chickering and Gamson (1987, p. 3) stated, “Learning is not a spectator sport. Students do not learn much just by sitting in class listening to teachers, memorizing prepackaged assignments, and spitting out answers. They must talk about what they are learning, write about it, relate it to past experiences, and apply it to their daily lives. They must make what they learn part of themselves.” This is the overall educational philosophy that has guided the first phase of this effort which seeks to improve the teaching methods being used by over 1,600 agriculture teachers in the 25 selected ATSs, including the provision of lesson plans, teaching aids (primarily transparency film) and OHPs now being installed in every classroom of these 25 ATSs.

Surprisingly, use of the term "active learning" by educators has relied more on intuitive understanding than a common definition. Consequently, many teachers assert that all learning is inherently active and that students are, therefore, actively involved while listening to formal presentations in the classroom. Analysis of the research literature (Chickering & Gamson, 1987) suggests that students must do more than just listen. Students must read, write, discuss, or be engaged in solving problems. Within this context, it is proposed that strategies promoting active learning be defined as instructional activities involving students in doing things and thinking about what they are doing. By understanding Bloom’s Taxonomy of Educational Objectives (1956), educators can move from knowledge recall and comprehension toward more advanced cognitive skills, including analysis, synthesis and evaluation of information and knowledge, so they can solve problems and make informed decisions. Simply knowing information is not enough; knowing how to address and solve problems is the desired outcome.

Active learning begins with an interest approach that prepares and connects learners to what they are about to learn. Examples of active learning activities that involve students include: carousel brainstorming, case studies, clarification pauses, cooperative groups, concept mapping, daily journal, frequent short quizzes and feedback, jigsaw procedure, learning cycle, muddiest point, one-minute paper, moveable magnetic diagrams, field exercise and think/pair/share, etc. The bottom line is that students should be actively engaged in those learning activities that systematically move students toward the desired objectives. To clarify these educational objectives, Bloom (1956) divided educational objectives into three overlapping domains, the affective, cognitive and psychomotor. The affective domain deals with feeling and emotion; the psychomotor domain addresses motor skills; and the cognitive domain applies to thinking skills. Within the context of agricultural education courses, educational objectives are primarily written in the cognitive and psychomotor domain. The overlapping occurs between the cognitive and psychomotor domain as students must think through practical, “hands-on” training exercises to accomplish a task or solve a problem, such as soil testing or tractor maintenance.
Rosenshine and Furst (1971) identified 11 teaching behaviors that effective teachers should display. Of those 11 behaviors, Garton, Miller, and Torres (1992) identified 5 that could readily improve teacher performance in the classroom. These 5 teaching behaviors were: 1) being business like, 2) being enthusiastic, 3) being clear, 4) providing students with opportunities to learn current material, and 5) varying teaching methods to maintain student interest.

Lesson plans guide the actions of teachers and the learning activities they undertake in each class. Lesson plans can incorporate four of these desirable teaching procedures. The enthusiasm demonstrated by the teacher in the classroom is something that comes from within the teacher and cannot be planned out. However, the other four behaviors can be incorporated into each lesson plan. For example, by following the lesson plan and staying on course, teachers can be business like. Next, clear directions within each lesson plan will increase the clarity of the subject matter being covered, enhance the teacher’s communications with students and enable teachers to assess student understanding before transitioning to the next learning activity. Lesson plans including activities that are closely aligned with desired objectives will directly assist the teacher in being more effective. Finally, lesson plans that outline different teaching methods and learning strategies will help keep students engaged and interested.

When developing lesson plans, the desired outcome must be the guiding force. This outcome is determined by what the students will be expected to do after completing each lesson, unit, course and program that will lead to the improvement of production practices on the student’s home farm or in gaining employment in the private sector. In agricultural education courses, learning about specific technical knowledge and specifications, as well as being able to solve different types of problems, are the types of educational outcomes that effective teachers and schools should seek to carry out. In short, lesson plans must be written to guide the teacher through the learning process, with a central emphasis on active learning methods and techniques, so that students will be able to achieve the desired educational outcomes upon graduation, i.e., applying these newly acquired skills and knowledge on the job when they enter the workforce.

To conclude, class time is brief and precious, and the concepts, knowledge, information and skills that each ATS teacher wants to communicate to students is important. While lecturing is an important method of teaching, it is not the best way of engaging students in the learning process, or in teaching the higher-level cognitive skills that students will need after graduation. Lecturing induces passivity of thought, even in the best of students. Students hurriedly take notes, but have little time to reflect on or question the content being recorded. As indicated above, the more students become engaged, active learners in the classroom, the more likely they will develop the desired cognitive and psychomotor skills they will need after graduation.

**Approach, Activities and Results**

The following section describes and analyzes the specific steps taken to transform the teaching methods being used by agriculture teachers in the selected ATSs as a means of pilot-testing this new approach. If this approach proves successful, the Ministry of Education is interested in applying this method to the remaining 105 ATSs throughout Egypt and, possibly, in transforming the overall curriculum, including updating the textbooks and teaching materials for all 33 courses. The Ministry of Education is also interested in using the ATS school farms to expand practical training. The introduction of leadership training into the ATSs is also being considered, including the establishment of rural youth organizations, such as the FFA or 4-H clubs. The overall goal is to up-grade and strengthen these schools so they can contribute directly
to improving the skills and knowledge of rural young people who will play an important role in the short- and long-term development of the agricultural sector in Egypt.

Step 1: Training the ATS teachers in active teaching-learning methods
The first step was to train the majority of agricultural teachers in the 25 selected schools on how to utilize active teaching-learning methods and new teaching aids in their respective classrooms. To accomplish this, 45 Egyptian university faculty members from different subject matter areas were trained by two, highly-experienced, teacher-educators from MUCIA partner universities. The focus was on active learning strategies and how to use visual aids to enhance learning. The two MUCIA teacher-educators conducted a 28-hour practical (i.e., learning by doing) workshop on active learning strategies for the Egyptian faculty members who would serve as future trainers. During this workshop a total of 15 active learning strategies were taught and practiced by the Egyptian faculty members. In order not to overwhelm the trainers and the ATS teachers, the MUCIA team suggested that one active learning strategy be practiced each week, so that these teachers would become fully comfortable and skilled in using each approach.

Next, the most effective Egyptian university teachers who emerged during this “train-the-trainer” workshop were selected to begin conducting similar workshops for ATS teachers. Since the ATS teachers do not speak English, these workshops had to be taught in Arabic. At the beginning of the second, 16-hour workshop the MUCIA teacher-educators took the lead. But, as the Egyptian faculty members translated the active learning concepts and techniques into Arabic for the ATS teachers, they began to play a central role, and primary responsibility for leading the workshop progressively shifted to the Egyptian faculty members. By the end of the workshop they were leading all of the discussions with the ATS teachers. At the end of each workshop day, the MUCIA teacher-educators and Egyptian workshop leaders met to discuss what went well and which areas needed improvement during the next workshop.

Given the progress made during the second workshop, the MUCIA teacher-educators turned over full responsibility to their Egyptian counterparts during the third workshop, which was conducted for 50 ATS teachers. During this third workshop, the MUCIA teacher-educators provided guidance and support only as needed. The Egyptian and MUCIA teams continued to meet each evening to conduct a qualitative assessment of the workshop activities. At the end of the workshop it was clear that the Egyptian trainers had mastered this approach. They were assigned the task of conducting over 20, two-day workshops over the next four months to train over 1,000 ATS teachers in active learning strategies and techniques.

Step 2: Developing instructional materials for use by ATS teachers
The second step was to develop and provide ATS teachers with instructional aids for use in the classroom. A four-person, MUCIA instructional materials team worked in Egypt for approximately two weeks to initiate this second step. In planning this program, it became apparent that most ATS teachers lacked any type of AV equipment or teaching aids. Therefore, the MUCIA team focused on developing low cost transparencies that could be reproduced cheaply and easily and then distributed to ATSs throughout Upper Egypt. Transparencies are useful teaching tools as they can utilize figures, photos and other illustrations to demonstrate the concepts or techniques being discussed. Also, transparencies can be especially beneficial to those agriculture teachers whose backgrounds are not based in farming and production agriculture. These low-cost teaching aids could be easily duplicated and distributed to all ATS schools in Egypt.
Prior to traveling to Egypt, the MUCIA team selected a range of instructional materials developed by the instructional materials centers at the University of Illinois, The Ohio State University and Texas A&M University. The team brought these materials with them to Egypt. These materials covered all of the major subject matter areas within the ATSs, including field crop production, horticulture, livestock production and health, farm and business management and agricultural mechanics. These instructional materials included teacher’s guides, cassette disks of manuals and transparencies, videos and DVDs, as well as textbooks and lab manuals. Upon arrival, the MUCIA team was divided up and paired with Egyptian faculty members in each of the major subject matter areas. These newly-formed teams first reviewed all teaching aids, texts, and videos from the United States; they then reviewed syllabi from the different ATS courses. There was extensive sharing of ideas within and across disciplines to determine the best way to incorporate these new teaching aids and materials into the existing curriculum.

Action plans and outlines were developed for each set of instructional materials. Particular emphasis was put on determining which of the available U.S. instructional material could be integrated into the ATS curriculum. All teams scanned the U.S. transparencies and other teaching aids to facilitate their modification and eventual translation into Arabic. For example, certain videos were transferred to extract potentially useful clips. Web searches were done to locate additional materials from the U.S. extension services, instructional materials centers and the USDA. Particular attention was given to enhancing the existing curriculum through the use of these visual aids. These visual aids were incorporated into PowerPoint (PP) slides, including a range of photos, graphs and other scanned illustrations, so that full color, overhead transparencies could be easily printed on transparency film and distributed to all of the 25 selected ATSs.

After the MUCIA team’s departure, the format of each transparency was finalized and all the transparencies were translated into Arabic so that the electronic transparencies could be easily duplicated onto transparency film. As a result of this joint effort involving both the Egyptian and MUCIA faculty members, about 120 illustrated color transparencies were developed for each of the 33 ATS courses. A total of nearly 4,000 new transparencies were created in electronic format. These transparencies have now been printed on transparency film in color with multiple copies being supplied to each school, depending on the number of teachers in each school who teach a particular course. In addition, 1,100 overhead projectors and screens have been purchased and installed in each ATS classroom for use with these new transparencies. All of these teaching aids have been integrated into the newly developed lesson plans for each course as carried out during the third major step of this component.

Step 3: Developing lesson plans for each ATS course
The third step was to prepare lesson plans for use by ATS teachers that both enhanced the use of active teaching-learning methods and were fully integrated with the new teaching aids developed under step two above. It should be noted that none of the ATS teachers had ever seen or used a lesson plan before, so this new addition to their portfolio was expected to be somewhat unfamiliar. First, it was mandatory that these lesson plans followed the basic content of each course, as outlined and presented in each textbook. However, the purpose of these lesson plans was to show and encourage ATS teachers about how they could effectively incorporate active teaching-learning methods and techniques into each chapter of a course to enhance the learning process. These lesson plans will enable teachers to shift their focus from “what to teach” (i.e., the content of each course) to “how to teach.” Since these teachers had never seen or prepared a
lesson plan before, the impact of these lesson plans was considered to be instrumental in transforming the teaching-learning process. To enable each ATS teacher to understand how to fully utilize these lesson plans, teaching aids and their newly acquired active learning methods, a second round of workshops was planned, as described in Step 6 below.

*Step 4: Headmaster study tour to the Netherlands*

To introduce the headmasters of each ATS to how vocational agricultural programs can be more effectively linked to the private sector, all ATS headmasters and selected Ministry of Education ATS administrators were sent to the Netherlands for a one week study tour. The purpose of this study tour was to introduce them to the Dutch vocational agriculture system and to investigate some new and innovative ideas that might be adopted by the Egyptian ATS system. For example, they visited an Innovation and Practical Training Center specializing in on-the-job training for students who are interested in specialized areas of expertise. Another agricultural school they visited offers a range of courses in agribusiness, rural development, animal production and management, horticulture and arable crop production, while another visit included a school farm that was entirely managed and operated by students. Finally, the group visited a company that provides “accredited agribusiness training” for students. This exposure to the Dutch vocational agricultural education system was a very new and eye-opening experience for all of the ATS headmasters. They could see directly how this evolving Dutch educational system was tied directly to development in the Dutch agricultural economy, especially in producing a range of crops and products for export.

*Step 5: Refocusing ATS school farms and utilizing them for practical skill training*

As noted earlier, the ATS school farms are primarily utilized to generate operating funds for the school, rather than concentrating on providing practical skill training for students. Since many of the agriculture teachers have limited or no practical work experience in the agricultural sector, it makes it more difficult for them to integrate classroom instruction with practical field training. The crops grown on these school farms are traditional field crops, rather than the more labor intensive, high-value export crops. Since a major goal of the AERI project is to increase agricultural exports to increase farm income and rural employment, there is an increasing gap between the crops grown on these school farms and the direction the agricultural economy is moving in Upper Egypt. As a result, MUCIA sent the manager of a U.S. university school farm to Egypt to develop a work plan that will both change the focus of these school farms toward the production of high-income, labor-intensive export crops and reorient these school farms to give more emphasis to hands-on, practical training for students. The project, in turn, is providing grant funds to each school to enable them to purchase the necessary seed, equipment, facilities and other tools they will need to develop these high-value crop and livestock production systems. The basic model being introduced is from both the U.S. and Dutch educational systems. The objective is for students to help manage and operate these school farms under the guidance of the farm manager. But the primary goal is to provide practical training and experience for all agricultural students. This program is still in the early implementation stage, but the goal is for many of these new innovations to become operational by the beginning of the 2007–08 school year.
**Step 6: Training ATS teachers in using lesson plans and instructional materials**

As noted earlier, prior to this project, most ATS teachers or headmasters had no knowledge of or experience in writing or using lesson plans or in using an OHP, transparencies or other teaching aids. To assist these ATS teachers in utilizing the new teaching tools, a second round of teacher workshops was planned and organized. The same procedures outlined in Step 1 above were followed, since both the lesson plans and instructional materials emphasized the use of active-learning methods in the classroom. The same Egyptian trainers who had implemented the first set of workshops (Step 1) were used to conduct the second round of ATS teacher workshops. Since the Egyptian trainers had already mastered the use of active-learning methods and had been directly involved in the preparation of the instructional materials (Step 2) and lesson plans (Step 3), this final step in implementing the first phase of the project was straightforward. The MUCIA team leader for Steps 1 and 3 returned to Egypt to conduct a two-day “train-the-trainer” course for the participating Egyptian faculty members. Then, the Egyptian faculty members conducted a 2-day workshop in Arabic for ATS teachers to refine the workshop procedures and to make modifications as needed. Then the Egyptian trainers conducted two-day workshops at each ATS so that all ATS teachers were properly trained in using these tools and methods. A second goal was to build a common philosophy and commitment among all ATS agriculture instructors about the value of active learning methods and practical skill training.

**Step 7: Assessing progress and refining the lesson plans and instructional materials**

The final step of this current project, to be carried out during the summer of 2007, will be to meet directly with selected ATS teachers and their students to assess the value and impact of the different innovations in improving the teaching-learning process at these 25 ATSs. After reaching a consensus as to what was especially useful and where changes are needed, the final step will be to modify the lesson plans and/or instructional materials as needed, based on the first hand experience of teachers and students in each subject matter area. In effect, these ATS teachers and students have been engaged in a pilot project during the 2006–07 school year field testing these new methods and tools. It is fully expected that some modifications will be needed to fine-tune lesson plans and instructional materials that were not fully understood by either the teachers and/or the students. After conducting this assessment, the joint MUCIA-Egyptian team will modify the selected lesson plans and transparencies so that both sets of teaching aids can be reproduced for use during the 2007–08 school year. The Ministry of Education has expressed interest in having the lesson plans and transparency sets (120/course) for each of the 33 courses reproduced and made available to teachers in all of the other 105 ATSs throughout Egypt. By the summer of 2007, it would be possible to reproduce all of these teaching aids, as well as to procure the necessary OHPs and screens. Since the Egyptian trainers have mastered the active-learning methods and have been instrumental in developing these teaching aids, they are fully qualified and prepared to implement workshops for all agriculture instructors in Egypt. These additional workshops would emphasize active teaching-learning methods, including how to utilize the lesson plans and instructional materials to fully implement this innovative vocational agricultural education strategy.

**Educational Importance, Implication and Application**

Vocational agricultural education has been neglected in most developing countries as governments and donor agencies have concentrated on expanding primary education. In Egypt, the government had invested in vocational agriculture schools but, until the 2006–07 school year,
ATS teachers concentrated on rote learning and teaching for the test at the end of each school year. These schools were poorly equipped to provide practical training for students and most courses and curricula had not been up-dated for two decades or longer. As a result, the focus of these ATSs is no longer relevant to the changing employment demands of the agricultural sector, in general, or to the current technical and managerial needs of commercial farms and agribusiness firms in Upper Egypt. As a result of this intervention, teachers are now helping to improve the cognitive skills of the students by enabling them to analyze and solve problems. This relatively low-cost approach to transforming the teaching-learning process is directly applicable to the other ATSs in Egypt and to vocational agricultural programs throughout the developing world.

References


---

i. The U.S. universities that are helping the Midwest Universities Consortium for International Activities (MUCIA) to implement this project include: University of Illinois at Urbana-Champaign (lead university), Lincoln University, Purdue University, The Ohio State University, University of Florida and University of Minnesota.

ii. This paper outlines activities being undertaken by the MUCIA and that are made possible by the generous support of the American people through the United States Agency for International Development (USAID) Cooperative Agreement No. AERI-ILA 263-A-00-03-00044-00. The contents of this paper are solely the responsibility of the authors and do not necessarily reflect the views of USAID or the United States Government.