Preparing Market-Ready Graduates: 
Adapting curriculum to meet the agriculture employment market in Egypt

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Abstract

This study is designed to prepare a baseline survey of the skill gap between graduates preparation to enter the labor force and the needs of prospective employers. The study surveyed 254 employers and 1,000 graduates from five faculties of agriculture in Upper Egypt. Employers ranked the importance of skills and level of competence of newly hired employees coming from the universities. Graduates ranked the importance of the skill in relationship to their current job as well as their perceived level of preparedness upon graduation. Cross tabulation revealed the skill gap. An analysis of the mode scores revealed the most critical skills required on the job compared to the level of preparation or competence. The results of this study will be used for adapting the curriculum for all five faculties of agriculture to ensure market ready graduates enter the current agricultural labor force of Upper Egypt with the skills required by the private sector.
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Introduction

Faculties of agriculture in Upper Egypt face a challenge preparing graduates for the changing employment market of the country. Egypt’s agriculture sector, in particular dairy, horticulture and agribusiness are developing into export-oriented, international supply chains for their production. The private sector requires a new set of skills in their employees to support the growth of Egyptian agriculture into the international arena. Furthermore, graduates of the faculties of agriculture in rural areas face the difficulty of finding their first job upon graduation.

As part of the U. S. Agency for International Development sponsored Agricultural Export and Rural Incomes project, a skills gap analysis was completed establishing a baseline for determining the direction for curriculum reform in five faculties of agriculture in Upper Egypt. The baseline survey included the graduates’ perspective as well as the prospective employers perspective to determine the skills-gap currently between the university curriculum and employer needs.

Rogers and Taylor (1998) distinguish learning outcomes among four general areas: knowledge, understanding, skills/competencies and attitudes. For the purpose of this study, we focus on the skills or competencies reflecting the ability to put knowledge to use. It reflects an understanding of principles and theory as one applies knowledge. We do not address attitudes defined as the feelings toward what is being learned.

Skills or competencies are outward manifestations showing that someone knows how to do something. An individual can demonstrate the ability to do something whether it is a physical skill (e.g., changing a tire) or a mental skill (e.g., calculating the surface area of a trapezoid). For example, one can have knowledge of computers and computer systems such as PC or Mac systems, desktops versus laptops. This is different from having the skill to use the computer that can be at various levels of expertise. At a rudimentary level, one may type at a computer using just two fingers or ten fingers. One may be able to create a presentation using graphics and digital photographs. Continuing up the scale of ability, some people troubleshoot when there is a computer problem; and these people often have the ability to write a computer program.

The skills-gap analysis is an outcome assessment tool designed to measure skills or competencies. It can measure the difference between expectations, or reality, and the needed ability or level of performance. Using the approach of Wiggins and McTighe (1998), the skills-gap analysis permits for backward planning of the curriculum reform in the AERI project. The survey instrument was designed to measure the expectations of skills and abilities desired by employers in college graduates compared to the perceived competency and use of these same skills on the job by recent graduates.
Purpose and Objectives

The purpose of the skills-gap analysis was to establish a baseline study for the purposes of setting new directions for curriculum revisions and reforms as part of the Agricultural Export and Rural Income project. The goal is to define the skills necessary to educate market ready graduates for the agricultural private sector in Egypt.

The objectives for the study were to:
- identify the skill set for graduates entering the employment market in Egypt;
- assess the skills graduates perceive themselves to have upon graduation;
- determine the importance of these skills for their first job;
- assess the skills employers want in graduates of the universities;
- rank the employers perception of graduate competence in these skills when hired.

Method

In December-January, 2004 two survey instruments were developed using an iterative process. A list of skills for graduates in multiple fields of agriculture entering the private sector was developed from the literature and the documented curriculum of five faculties of agriculture. This list was then shared with professors in agribusiness or economics, horticulture and dairy or animal sciences to refine. The third iteration of the instrument was done by Egyptians working within the higher education system giving the final list of competencies to be evaluated. The instrument was translated into Arabic and field-tested prior to conducting the survey.

The survey instrument consisted of two categories of skills: general skills and technical skills. The general skills included: communication, management and computer. The technical skills included: extension and training, horticulture, agronomy, animal science, food technology and agricultural economics. These disciplines are the major areas of study currently found in the approved national curriculum in agriculture universities.

There were two samples for the study: 254 employers in the field of agriculture registered with the Ministry of Agriculture in Egypt and 1,000 graduates from each of five faculties of agriculture in Upper Egypt. The employers represented 90 horticulture firms, 83 animal production firms, and 81 food technology or processing businesses. Two-hundred graduates were selected from the graduating classes of 2000, 2001, 2002 or 2003 from the following faculties of agriculture: Cairo University—Giza, Cairo University—El Fayoum, Al-Azhar University, Minia University, and Assiut University. The enumerators for the study were employees of the Agricultural Extension and Rural Development Research Institute. Face to face meetings were held while the enumerators read down the list of skills. Graduates were asked to select two responses on a five-point scale. Employers were read the same list of competencies and asked to select a response using a five-point scale as well. The scales for the two groups are presented below.
Table 1. Survey scale

<table>
<thead>
<tr>
<th>Graduate scale</th>
<th>Employer scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Importance</td>
<td>Importance</td>
</tr>
<tr>
<td>Level of</td>
<td>Level of</td>
</tr>
<tr>
<td>Preparedness</td>
<td>Competence</td>
</tr>
<tr>
<td>1. Not applicable for the job</td>
<td>1. Not applicable for the job</td>
</tr>
<tr>
<td>2. Not Important</td>
<td>2. Somewhat prepared</td>
</tr>
<tr>
<td>3. Somewhat important</td>
<td>3. Prepared</td>
</tr>
<tr>
<td>4. Important</td>
<td>4. Very Prepared</td>
</tr>
<tr>
<td>5. Very Important</td>
<td>5. Prepared</td>
</tr>
</tbody>
</table>

Analysis of the data was completed using the Statistical Package for the Social Sciences (SPSS) version 12.0. The descriptive statistics function provided summaries for the demographic information. The analysis revealed areas for the curriculum reform program using cross-tabulations and matrices between level of importance and the level or perceived preparedness for graduates or competency demonstrated for employers.

Results

The structure of the higher education programs in Egypt is evolving. The five universities participating in the study use a national curriculum approved by the Ministry of Higher and Education and the Supreme Council. Students select a specialization with the exception of the University of Minia, which offers only a general agriculture degree. This study has 47.9% of the graduates holding the general agriculture specialization. Students also specialized in food technology (17.7%), animal production (14.3), horticulture (12.4%), economics (3.7%), agronomy (3.0%) and extension (1.0%). Gender in the sample is 74.3% male, 25.7% female graduates.

Employment is the end goal of this study and having graduates prepared for the job opportunities available is a major factor of consideration. Within the sample of graduates responding to the survey, 56% of the graduates are employed. The jobs they hold can be put into three organizations: private sector, public sector—temporary, public sector— permanent and non-governmental organizations. Of those currently holding jobs, the graduates are dispersed across these employer organizations in the following percentages: 27.3, 52.4, 18.9 and 1.4.

The study collected data on educational programs after graduation. This was a series of questions to determine the extent to which graduates sought additional training or for those hired upon graduation, received training by their employer. Of the 1,000 graduates, only 37.4% were members of vocational societies associated with their field of study. Training to newly hired graduates was offered by 65.7% of the organizations in the sample. The majority of these organizations (68.8%) used internal staff as trainers, 12.6% used external trainers, and 18.6% used both sources of trainers for their programs.
Table 2. Examples of Skills

| Communication Skills          | • Interpret written information  |
|                              | • Write effectively              |
|                              | • Analyze information           |
| Management                   | • Think creatively              |
|                              | • Apply problem-solving skills   |
|                              | • Develop a basic budget        |
| Technical Skills             | • Develop an irrigation management plan for multiple crops |
|                              | • Select and breed high quality fruits |
|                              | • Calculate costs of production for a specific crop |

The use of the crosstabulation in the analysis of the data resulted in identifying several issues. Graduates and employers both ranked the importance of the skill in relationship to the position held by the graduate or for which an employer would be hiring a college graduate. This rank was then crosstabulated to the same individuals ranking of their perceived preparedness based on studies at the university to demonstrate that skill or the ability as determined by the employer for the graduate to do that skill.

The value of these matrices is the ability to identify skills required on the job by people holding positions within organizations as well as the employers’ assessment of the need for that skill. In the example below, one sees a comparison of the two scores for the skill first indicating the importance rank in relationship to the job followed by the perceived level of preparedness.

Table 3. Crosstabulation of Interpret written information

<table>
<thead>
<tr>
<th>Level of Preparedness</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Importance</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>5</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td>3</td>
<td>10</td>
<td>21</td>
<td>21</td>
<td>30</td>
<td>2</td>
<td>57</td>
</tr>
<tr>
<td>4</td>
<td>29</td>
<td>74</td>
<td>93</td>
<td>49</td>
<td>4</td>
<td>249</td>
</tr>
<tr>
<td>5</td>
<td>106</td>
<td>143</td>
<td>160</td>
<td>135</td>
<td>62</td>
<td>606</td>
</tr>
<tr>
<td>Total</td>
<td>151</td>
<td>240</td>
<td>276</td>
<td>188</td>
<td>69</td>
<td>924</td>
</tr>
</tbody>
</table>

In this case, the majority of respondents listed this as an important skill they use on the job. Their perception however of how well prepared they were to do this based on their university level education varies from not prepared all the way to over prepared. It is this data that will be used to indicate where the need to include this skill throughout the curriculum is necessary in relationship to the importance ranking given by the graduates.

In contrast, looking at the employer data, we have a very different shaped matrix. Again, it presents the importance rank made by the employer followed by the level of competence for the newly hired graduates.
The majority of the respondents show a very low level of competence in the graduates’ ability to draw the chart. However, the spread in variation across the level of importance reflects that there may be certain employers that need this skill in their future employees.

A second level of analysis was the spread between the mode score for each skill. In this analysis, the data would indicate which skill may be rated essential or important for the job, but the level of competence or preparedness was either incompetent or not prepared. Lists of these polar opposite mode scores for the graduates and employers follow.

Graduates ranked the following skills as having high importance but ranked themselves low on preparedness to demonstrate these skills upon graduation:

- Analyze information
- Speak effectively with a target audience
- Think creatively
- Apply problem-solving skills
- Apply time management skills
- Develop a basic budget
- All computer skills including word processing, spreadsheets, presentations, e-mail for communication, access to the internet for resources and information
- Evaluate the competitive environment and identify opportunities
- Demonstrate knowledge of regulations impacting firm and industry
- Conduct situational analysis
- Manage and maintain financial records
- Use tissue culture to vegetatively propagate horticulture species
- Sort or grade fruits using international standards
- Operate milking machine equipment
- Evaluate and manage animal environmental
- Handle livestock
- Grade/evaluate wool
- Negotiate contract for buying or selling products
- Establish and develop contacts with suppliers and marketers
• Manage post-harvest handling of major fruit crops to ensure long shelf life and quality produce
• Calculate costs of production for a specific crop
• Design a year-round growing plan for a field/greenhouse

Graduates indicated a few areas where they ranked the importance of the skill to their current job essential as well as a high ranking for the level of preparedness in the following areas:
• Name scientific names of horticulture crops of Egypt
• Conduct, test and identify microbial analyses for pathogens
• Monitor sanitary milk delivery and transportation system
• Formulate complete balanced rations for livestock
• Identify diseases, assess risks and define mitigation strategy for crops
• Calculate application rates and apply herbicides

In contrast, the mode score of employers listed the widest gap in importance of the skill on the job to the level of competence in the following areas:
• Analyze information
• Applying time management skills
• Develop a basic budget
• Access internet for resources/information
• Calculate credit options for investment or rates of return
• Analyze the chemical composition of a feedstuff
• Conduct, test and identify microbial pathogens
• Design appropriate packaging for processed foods
• Write a farm business plan
• Conduct cost benefit analysis of an agricultural project
• Evaluate competitive environment and identify opportunities
• Demonstrate knowledge of regulations impacting firm and industry
• Regulate fertilizer application, and make recommendations for soil amendment
• Develop an irrigation management plan for multiple crops
• Use tissue culture to vegetatively propagate horticulture species
• Select and breed high quality fruits and vegetables
• Sort or grade fruits using international standards

This data also revealed areas that were considered not important for graduates and for which they were not prepared as well. These skills appear to be of little importance to the employers as skills or qualifications of their new hires. Among these skills are: evaluating abnormal milk, command milk marketing skills, grade and evaluating wool, design a landscaping plan, identify key weed problems and define a mitigation strategy, calculate costs of production for a specific crop.

One skill stood out as a skill ranked important on the job and a competent ranking for the graduates. The skill is: Name scientific names of horticulture crops of Egypt.
Conclusion

This study provides the baseline assessment of the skill gap in curriculum for five faculties of agriculture in Upper Egypt. The study used self-assessment process by graduates to rank their perception of the importance of a set of skills related to their job and their perceived level of preparedness to enter the job market. In tandem with the survey of graduates, this study interviewed employers within the agriculture sector to rank the importance of this same list of skills compared with their assessment of the level of competence of newly hired university graduates. The difference in employer expectations and graduates perceived preparation overlap in several of the skill areas identified using the national curriculum. There are skills, especially in the communication, management and computer skill sets that are not being addressed in the curriculum today. The list of skills identified by both employers and graduates as essential or very important and reflecting a low level of preparation or competency is very similar. These areas will be the target of some of the first interventions made as the curriculum revision proceeds in the Capacity Building component of the Agricultural Export and Rural Income project is implemented in Upper Egypt.

Educational Importance

This study marks a new effort within Egypt to address the critical need for market-ready graduates entering the labor force today. The process for writing curriculum has been to convene a panel of experts, select the topics and content of a course followed by requesting highly regarded experts in the field to write a textbook for each course. This skill-gap analysis has begun at the end. It reached out to employers needing employees who can function in an international agriculture system. Today’s graduates must understand competition, supply-chain thinking, strategic planning as well as the science of the discipline chosen as a specialization. Egyptian employers are expecting a graduate to arrive at the work place with more than just knowledge given the competitive nature of their business as they enter the international marketplace.

Using the data from these surveys, a process has begun to enhance the Egyptian universities’ educational programs to adapt the curriculum in such a manner as to instill in graduates the skills identified in this study. This project is bridging the gap as well in the interaction between universities and employers. New opportunities are being explored to provide an increased amount of experiences for undergraduates that provide them sufficient practice to develop this set of skills. It will also provide an opportunity for the Egyptian professors and lecturers to expand their repertoire of teaching methods as the revisions to the curriculum continue moving towards that market-ready graduate required for Egypt in the 21st century.

References

Cairo University. (2004). Prospectus of Faculty of Agriculture, Fayoum Branch.

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