

VIRGINIA AGRIBUSINESS COUNCIL MEMBERS' PERCEPTIONS OF  
BASIC SKILLS FOR HIGH SCHOOL GRADUATES

by

Jeffrey Allen Perry


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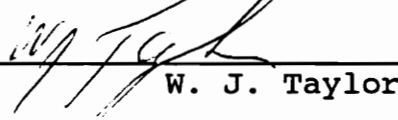
in

Vocational and Technical Education

APPROVED:

  
\_\_\_\_\_  
J. H. Hillison, Chairman

  
\_\_\_\_\_  
J. D. Oliver

  
\_\_\_\_\_  
W. J. Taylor

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Committee Chairman: John H. Hillison

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(ABSTRACT)

A survey of the Virginia Agribusiness Council members was conducted to identify the basic and technical skills that are important for high school graduates to develop prior to seeking entry-level employment in the agricultural industry. Available entry-level positions were categorized and the mean years of experience at each position identified.

Skills were ranked in order of decreasing importance based on mean scores of the survey respondents. Overall, basic skills ranked higher than technical skills. The top five skills in order of importance were: a positive work attitude, self-motivation, the ability to follow directions, safe equipment operation, and working without supervision. Data were analyzed by firm category as utilized by the Virginia Agribusiness Council. Contrary to the skill ranking of the other firm categories, the producer category ranked the ability to follow directions as the most important skill.

The entry-level positions identified could be

classified into the following categories: management, laborer, skilled operator, sales, and clerk/office employee. The most frequent entry-level jobs identified were in the laborer and management training classifications. The mean years of work experience for all positions, across all categories, was seven years.

Basic and technical skills are both essential elements for high school graduates seeking entry-level employment in agriculture. Neither area should be emphasized over the other in preparation for work at the high school level. A firm foundation of basic and technical skills needed in the agricultural industry is recommended for students' successful transition from school to work.

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## Chapter 1

### Introduction

#### Background and Recent History

The need for education in agriculture has been questioned in many states across the nation. However, the importance of agriculture in our lives can readily be documented. In the United States, agriculture employs over 20% of the American labor force. The agricultural industry, which includes farming, transportation, processing, manufacturing, and retailing food and fiber, accounts for 20% of the nation's Gross National Product. Exports account for 30% of the cash receipts for U.S. farmers. This volume of trade works directly to reduce our trade deficit with countries world wide (The Nation's Largest Industry, 1984).

In Virginia alone, agriculture is the state's largest industry. Twenty percent of the total jobs and economic activity are generated by the agricultural industry (Virginia Agribusiness Council, 1989).

A national study on agricultural education in secondary schools was initiated in 1985 due to concerns about the declining profitability and international competitiveness of American agriculture, as well as concerns about declining enrollments, instructional content, and quality of agricultural education programs. The report

suggested two primary thrusts of agricultural education programs at the secondary level:

- a. Education about agriculture to generate awareness of the importance of agriculture to our lives and economy, and
- b. Education in agriculture to develop students with the skills and interest in agriculture to enter businesses in agriculture, or enter post-secondary education in agricultural studies. (Committee on Agricultural Education in Secondary Schools, 1988)

The previous two potential focus points for agricultural education programs represent the primary components of the current debate among agricultural educators as to the philosophy and focus of agricultural education in the future. While the National Resource Council supports the implementation of both specific skills and general knowledge courses in agricultural education, some members of the profession disagree. McCormick and Cox (1988) stressed the importance of the specific job training orientation of traditional vocational agriculture programs and identified several negative consequences of any change in focus including the potential loss of federal funding and the loss of effectiveness in the current instructional delivery system utilized in agricultural education. In an opposing view, Kahler (1988) argued for a broader agricultural education mission including agricultural

literacy, basic skills, and science principles alongside updated technical agricultural skill training. He stated that many of the current and future agriculture students have no intention of becoming employed in agriculture following graduation. Kahler cited two Iowa studies by Ruff in 1985 and Striegel in 1988 that found only 25% to 40% of agricultural education graduates had entered agricultural occupations up to seven years after graduation.

While the debate over program focus continues, a second issue has entered the discussion. The relative importance of job-specific skills versus basic skills to perspective employees following high school graduation is receiving attention in the current literature. Debertain and Williamson (1987) saw a need to redirect the skills taught in vocational agriculture programs to emphasize skills that are not purely vocational or agricultural in nature. Many of these skills such as public speaking, parliamentary procedure, work attitude, job safety, interpersonal skills, and problem solving have always been an important part of agricultural education, but may need a renewed emphasis as a central component of the curriculum. In a study by the Committee for Economic Development cited in South Carolina (1986), employers expressed concern over the quality of workers entering the job market out of high school. Employers were satisfied with the performance of

vocational graduates, except for a need for increased employability skills including basic academic skills, general occupational aptitudes, and a strong work ethic. A Virginia study by Martin and Tolson also cited in South Carolina (1986) found that most employers wanted workers who can:

- read, understand and apply technical materials;
- express themselves clearly in verbal or written media;
- think clearly, logically, and creatively in order to apply their knowledge as broadly as possible;
- apply skills to using a computer;
- present themselves as friendly, concerned, and well informed employees. (p.12)

The information provided by the South Carolina study and reports cited in it provide a framework that appears to move towards incorporating basic employability skills into vocational training rather than emphasizing primarily the trade specific skills taught in the past.

The question of what overall skills to teach in a vocational setting takes on new relevance when viewed with the knowledge of the recent push to move school curriculums towards requiring more basic academic courses for all students. An increase in the number of required courses will reduce student options for electives, including

vocational education. At the same time, questions are arising as to which academic skills are needed by successful employees, and who should teach these skills (Panel on Secondary School Education for the Changing Workplace, 1984). While there is controversy regarding the extent of accountability vocational education should have for basic skills knowledge, there is overall agreement that basic skills instruction must be improved in vocational settings as found by Parks, McKinney, and Mahlman, cited in Weber, Puleo, and Kurth, (1989). At the same time, Conrad (1985) identified the need for basic skills such as a strong work ethic and computer literacy, but also found a large lack of training in areas of electronics, hydraulics, and international trade for employees in the agricultural mechanics field. There is an evident need for both basic and technical skill instruction in current agricultural education programs.

One final impetus for a review of current basic and technical skills needed by the agricultural industry in Virginia comes from the Carl D. Perkins Vocational and Applied Technology Education Act of 1990 (American Vocational Association, 1990). In section 116. State Assessment, it is specified that each State board shall conduct an assessment of program quality utilizing several criteria including:

- (1) the integration of academic and vocational education;
- (2) sequential courses of study leading to both academic and occupational competencies;
- (3) increased student work skill attainment and job placement; [and]
- [4] the relevance of programs to the workplace and to the occupation for which the students are to be trained, and the extent to which such programs reflect a realistic assessment of current and future labor market needs. (p.72)

Although there is debate over the place of basic and technical skills in the agricultural curriculum, there is a need to identify the skills required by graduates of agricultural programs be they basic or technical in nature. The two indisputable reasons for a review of important skills is the necessity of maintaining an up-to-date curriculum which should include the current skills needed by the industry, and the federal mandate as identified by the 1990 Perkins Act for the integration of basic and technical skills. The vocational education act also stressed an increased emphasis on program relevance to the current workplace. Employers opinions, on this issue, should be obtained due to their position as the ultimate users of agricultural graduates and the training and education they

have completed. The basic and technical skills needed by agricultural businesses are important to the continued success of agricultural education and its graduates as they become involved in the agricultural industry of the future.

#### Purpose of the Study

This study identified basic and technical skills that are important for entry-level positions in agricultural businesses based on information provided by a survey of Virginia Agribusiness Council members. The survey generated a list of skills and characteristics that are important in assessing the agricultural education curriculum as it works to prepare high school students for employment opportunities in agriculture.

#### Research Objectives

1. To determine the rank order importance of basic and technical skills for high school graduates seeking entry-level employment in Virginia agricultural firms.
2. To determine the rank order importance of basic and technical skills by firm classification.
3. To determine such demographics as firm classification, size of firm, and mean number of full-time; part-time; and

seasonal employees in the firm.

4. To categorize the entry-level positions available in agricultural firms, mean experience for those positions, and identify employee turnover rates and future hiring needs for those categories.

Definitions:

There are several definitions of primary importance to understanding this study.

1. **Basic Skills** are competencies and abilities of literacy and computation necessary in becoming a productive part of society (Fitzgerald, 1985). These competencies and abilities are found primarily in the five basic categories of reading, writing, math, science, and social studies.

2. **Basic Workplace Skills** include basic literacy (decoding), communication skills, and problem-solving in job related contexts (Packer, 1988). These skills are needed by a large number of workers across many job categories.

3. **Technical Skills** are defined as abilities dealing with the application of techniques and theories as they relate to employment. For the purpose of this study, technical skills will include only those skills used in agricultural firms.



4. **Entry-Level Employees** are defined as workers at a level in the firm that does not require a college degree or work experience beyond that of part-time employment during high school. Some on-the-job training is usually required.

5. **Agribusiness** "involves the manufacture and distribution of farm supplies; production operations on the farm; and the storage, processing, and distribution of farm commodities and items made for them (Cramer & Jensen, 1985 p.425)." For this study the agribusinesses will be grouped as identified by the Virginia Agribusiness Council firm classification categories of :

- I. Producers of Agricultural Products
- II. Suppliers of Goods and/or Services to  
Agricultural Producers
- III. Persons Who Process Agricultural Products and  
Persons Who Market Agricultural Products
- IV. General Industry Organizations
- V. Professional Individuals

6. **Full-time employees** are individuals employed at least 40 hours per week for 12 months per year.

7. **Part-time employees** are individuals employed less than 40 hours per week for 12 months per year.

8. **Seasonal employees** are individuals employed less than 11 months-per-year, regardless of the hours-per-week worked.

9. **Employability skills** are those aptitudes and abilities utilized in most job positions.

## Chapter 2

### Review of Literature

#### Introduction

The overall purpose of this study was to identify the skills and characteristics important for entry-level employment in Virginia agricultural firms. Identification of necessary skills is a recurrent theme in studies throughout the United States and encompasses all areas of education.

As the nation's demographic and economic situations change over time, the needs of employers also change. Education's perceptions of what those needs are should be revised on a timely basis to provide adequate information for the many organizations that base recommendations for changes to the educational system on such information, be it a move toward more basic academic skills or a push for more specialized training at an earlier age. The chances of finding a well designed, useful recommendation becomes increasingly difficult if the information upon which it is based is out of date.

There are two lines of thinking that continue to define the primary argument in the utilization and evolution of vocational and/or occupational education. One argument is for an emphasis on specific technical skills, while a

growing number of employers and educators are pushing for more basic skills preparation emphasis across all levels of elementary and secondary education (South Carolina, 1986).

### Basic Versus Technical Skills

Historically, the basis of support for vocational education stems from the need for specific job skills training for workers entering directly into a workforce where such skills can be utilized for many years as a master tradesman. Support for continued development of specific skills training programs can be found in both the education and employer factions. A survey by McKinney, Franchak, Halasz-Salster, Morrison and McElwain cited by South Carolina, (1986) included over 5000 respondents across seven states. The study findings ranked secondary vocational education goals in the following order of importance:

1. Provide skills needed to obtain a job
2. Create awareness of various occupations
3. Provide an opportunity to explore various jobs
4. Place students in training related jobs (p.9)

A survey by the South Carolina State Council on Vocational & Technical Education (1986) found that nearly 75% of the 1245 employers that responded preferred to hire workers who had received vocational training over those who

had not. Approximately one-half of the respondents indicated a preference for vocational students due to the strong performance of vocational graduates and the reduced amount of training needed for these workers. However, that same study also found that the four most preferred worker characteristics included: good work habits and attitudes; interpersonal skills; specific job skills; and prior work experience. Problems with reading, writing, oral communication, math, and problem solving were seen as severe employee limitations (South Carolina, 1986).

These findings provide a mixed message to vocational education. Several other studies also displayed a mixed emphasis on basic and specific skills. A study in North Dakota (1989) was undertaken to answer the questions of what are the "desired student outcomes" expected from students completing vocational education experiences, and what kind of "model" curricular framework should be utilized to strive for those desired outcomes. One component of the study was a survey designed to gain the public's perception of how well vocational education was being accomplished as well as what ought to be accomplished. This survey was sent to teachers, teacher educators, administrators, school board members, government legislators, and leaders from business, labor, and economic development. The resulting mean ratings of perceptions for academic and vocational experiences were

divided into five categories:

**Applied Academic Skills** consist of applied communications, listening, math, science, and systems of technology skills.

All skills had mean ratings over 4.5 on a 5.0 (highest) scale as to their degree of importance except systems of technology which rated a mean of 4.2. Schools' degree of achievement in these areas rated M=3.2 or less with listening skills being the lowest with a mean of M=2.4.

**Career Development Skills** consist of beginning levels of career awareness, technologies and change, keyboarding and computer use skills, and understanding the world of work.

The respondents rated the degree of importance of these skills at M=4.5 or above, however, the schools' degree of achievement rated below M=3.1 in all areas.

**Workplace Basic Skills** were identified as the foundation for building broader, more sophisticated job-related skills (identified as Skills Employers Want, American Society for Training and Development). Respondents rated the mean of these skills at 4.15 to 4.8 on a 5.0 scale in degree of importance with specific ratings as:

	<u>M</u>
Problem solving	4.80
Self-esteem	4.77
Learning to learn	4.73
Teamwork	4.62
Goal-setting/motivation	4.55
Interpersonal skills	4.54
Leadership	4.53
Creative Thinking	4.50
Personal & Career Devel.	4.39

Negotiation	4.17
Organizational effectiveness	4.15

The degree of achievement ranged from M=2.82 to M=3.27.

**Work/Career Exploration** includes such exploratory areas as home repair (M=3.35), clothing care skills (M=3.61), understanding job options (M=4.24), career planning skills (M=4.31), word processing, nutrition skills, and resource management (all M=4.1). The degree of school achievement averaged M=3.05.

**Initial Job Skills** were identified as the traditional service areas of vocational education. All areas rated between a mean of 3.5 and 4.0 on a scale of 5.0 in degree of importance. The degree of achievement ranged from M=2.5 for entrepreneurial skills to M=3.4 for home economics and business office skills. A few of the study's conclusions drawn from the review of literature, survey, and focus group discussions included:

1. Vocational and academic education need to work together to integrate the teaching of workplace readiness skills and knowledge.
2. More quality time-on-task is needed, beyond the traditional 180-day school year, to give students the necessary instruction to address the technological, economic, social, demographic, and organizational changes affecting the workplace.

3. Vocational education needs to place greater emphasis on teaching concepts of technology and entrepreneurship and integrating academic skills and workplace basic skills into the curriculum.
4. Public schools and institutions of higher education need to expand their efforts in developing structured transitional programming from high schools to two-year colleges (North Dakota State Council on Vocational Education, 1989).

This study presented a clear movement towards incorporating a more rigorous use of basic skills into the vocational setting, while at the same time, not reducing the amount of specific initial job skills currently taught in the traditional service areas of vocational education.

Another midwest study was designed to provide a possible framework for generic skill clusters in secondary vocational education in Minnesota (Zuga & Lindstrom, 1989). The study generated a list of knowledge, skills, and attitudes (KSAs) that are necessary for all public education students. Four possible scenarios were proposed in the utilization of KSAs in a secondary vocational curriculum.

- a. Vocational educators would teach KSAs as their primary responsibility.
- b. The KSA competency level of students would be



monitored and assessed, with deficiencies being remediated.

c. Specific KSAs would be identified as being appropriate to teach in vocational education.

d. Emphasize the technical skills of vocational education to the exclusion of KSAs.

(Zuga & Lindstrom, 1989)

The first alternative, of being fully responsible for KSA education, was argued against by the research of Selz, Jones, and Ashley (1980). They identified the school, home, and workplace as all being the primary places where generic KSAs should be transmitted. No one provider is responsible or capable of delivering the entire realm of KSAs.

The idea of using assessments and remediation of KSAs in vocational education is supported in a study conducted by Bradley and Anderson (cited in Zuga & Lindstrom, 1989). Indications were that KSA deficiency can detract from students' ability to obtain competency in occupationally specific skills. It was recommended that students be pretested and remediated for deficiencies to attain student competence of such basic skills prior to occupationally specific training.

The third option of teaching specific KSAs was recommended by Selz, Jones, and Ashley (1980) only for specific KSAs that are most appropriately taught in a

vocational setting. This was suggested because of the unique advantage provided by teaching such skills in a realistic setting.

The fourth option of excluding KSAs in favor of technical skills was rejected by Pratzner (1978) due to the need for transferable basic skills in all occupations. The KSAs are even more important as demands of the work place move towards more flexible skills in workers and the ability to transfer skills from one job to another.

The validation panel of this study strongly endorsed the use of a version of option three involving vocational education teaching KSAs in practical, realistic settings, but not maintaining responsibility for the initial instruction of generic KSAs. Vocational education would reinforce and develop the initial student aptitude of the different KSAs (Zuga & Lindstrom, 1989). This study argued for the endorsement of basic skills, without removing the specific skill areas from the curriculum. It was suggested that achievement of this goal can be met through integration of basic and specific skills. This concept may also strive to provide motivation and an applied context for basic skills education.

Alongside the studies that support some form of integration of basic and trade specific skills, there are some groups that prefer to scale back the trade specific

skills and provide more transferable skills such as career planning, job search skills, and work maturity programs. These transferable skills are seen as full occupational programs in lieu of the current vocational curriculum which often deals with these items briefly, but still emphasizes specific skills. This concept, along with the idea that jobs lead to training rather than vice versa, is supported in a development series by Duggan and Mazza (1986).

In a study of the specific relationships between education and work (Fitzgerald, 1985) data from a national employee survey indicated that poor attainment of basic skills is one of the major problems with youthful applicants and workers. The national survey of 600 employers found that poor work habits and work ethics along with poor job search skills and lack of basic skills were three major problems of youthful applicants and workers. These three problem areas were included in the term "general employability skills" used in the study. Basic skills were identified as basic academic skills that are almost universally applicable across occupations. Beyond the data supporting the importance of the general employability skills, one other point was suggested that in the current atmosphere of identifying the lack of basic skills in today's graduates. It is argued that schools are not doing a worse job than they used to in teaching the basics, but

the knowledge expected from each graduate has increased. The marginal students are not being eliminated from the schools and more are beginning to learn the basics, but not to the level now required by our society (Fitzgerald, 1985). While Fitzgerald does not specifically address the place for specific skill training, she identified the primary importance that basic skills and general employability skills are playing in our changing society.

In a literature review specifically emphasizing literacy for the workplace, Mikulecky (1988) identified the heavy demands on reading ability and basic skills found in training courses provided by employers. Students in job training programs actually spent more time reading texts and manuals than did high school juniors (135 minutes daily versus 97 minutes daily -- Mikulecky, 1982 cited in Mikulecky, 1988). Students' successes were found to be dependent, in part, on their ability to read and apply information obtained from textual and graphic materials. Henry and Raymond cited in Mikulecky (1988), found that over 65% of companies responding to a Center for Public Resources survey noted that basic skill deficiencies limited the job advancement of their high school graduate employees, and 73% responded that such deficiencies inhibit the advancement of nongraduates.

The problem of limited transfer of skills from one

setting to another was also identified by Mikulecky (1988). Skills often differ so much from task to task that a skill used one way for a given task may be used very differently for a similar task in a different job context.

A report on high schools and the changing workplace by the Panel on Secondary School Education for the Changing Workplace (1984) looked at the needs of high school graduates entering the labor force directly following high school. The necessary skills were identified without reference to how employees obtained those skills. One important point identified was that high school graduates that enter the workforce directly need essentially the same core competencies as those going on to college. The report identified the core competencies as goals to be met, not minimum standards. However, all students' educations should be oriented towards these competencies. Other areas of education such as personal development and preparation for citizenship were seen as important parts of schools' goals for the students, but were not a part of this report. The core competencies identified included:

- Command of the English language
- Reasoning and problem-solving
- Reading
- Writing
- Computation
- Science and technology
- Oral communication
- Interpersonal relationships
- Social and economic studies

-- Personal work habits and attitudes

The report also found that specific training is often needed beyond these core competencies as graduates progress through their careers. The differences between college-bound and work-bound students were found to be less controlled by desire to learn and ability than by economic resources, social backgrounds, lifestyles, aspirations, and values. The standards and expectations should not be lowered for the work bound, but the educational setting or techniques could be varied to reach those with different values and backgrounds (Panel on Secondary School Education for the Changing Workplace, 1984). This variation in educational setting is often provided by vocational courses on the condition that the classes are rigorous and do incorporate basic skills into the technical content areas.

Kang and Bishop (1984) utilized the longitudinal data on the 1980 seniors that completed the High School and Beyond (HSB) survey to identify the relative impact of high school academic and vocational education, performance in course work, and the skill levels in basics (English and mathematics) on non-college bound youth's labor market outcomes. The following patterns were identified through cross tabulation analysis:

1. Taking additional vocational courses is only slightly associated with taking fewer courses in the

core academic subjects.

2. Taking additional vocational courses is strongly associated with success in the labor market immediately after high school. Non-college bound students who took at least four vocational courses in their last three years of high school were more employable than the 30% who took one or fewer vocational courses.

3. Taking additional academic courses is not associated with higher earnings directly after high school. Non-college bound students who took 12 to 14 rather than 6 to 8 academic courses in their last three years of high school received a 3.5% lower wage rate, earned 14% less income, and worked 8.5% less.

4. Taking an increased amount of both academic and vocational courses is associated with greater success in the labor market. (p.84)

Non-college bound students that took at least 16 academic and vocational courses in their final three years of high school met with greater labor market success than those that took fewer than 10 courses. The observed patterns were suggested to show that vocational education has a strong positive impact on success in the labor market, with academic education also having a positive, but smaller, effect, than vocational education. Through work with a quadratic specification model, Kang and Bishop (1984) argued

that complete specialization in vocational education that ignores the training in basic skills will not be as effective as incorporating both basic and technical skills into a student's program. They also identified four key issues central to any discussion about the place basic or technical skills should have in vocational education. Regardless of the skills involved, the following should be addressed:

1. Insure that a minimum level of basic skill competence/ functional literacy is achieved by all young people.
2. Improve the quality of academic preparation of all young people, especially for college-bound students.
3. Improve the quality of vocational/occupational preparation of young people, especially for the workforce oriented student.
4. Improve the employability skills (career selection, job searching, work habits, etc.) of young people.

(p.55)

Bishop (1987) discussed the idea that basic skills and occupational skills are complements rather than substitutes. Occupational skills and knowledge are essential because they directly affect productivity. Basic skills are important primarily because they contribute to the learning of job specific and occupational skills.



### Technical and Basic Skills in Agriculture

A study entitled AGRI-MASS (Litzenberg & Schneider, 1987) surveyed a national sample of agri-businesses to identify the skills and characteristics needed by future managers in the types of firms surveyed. Six categories of skills and characteristics were identified. They included:

- Business and economic skills
- Computer, quantitative, and management information
- Technical skills
- Communication skills
- Interpersonal characteristics
- Previous work experience (p.1)

The survey had respondents rate the importance of specific skills within each category. The results were ranked based on the respondents' ratings. Interpersonal characteristics were ranked highest followed by communication and business/economics. The remaining categories varied in ratings between respondent sub-groups.

The AGRI-MASS survey was a lengthy, in-depth instrument with a potential problem in not providing information to standardize the reasoning for respondents' ratings of the skills and characteristics. However, the survey results were similar to those found in skills identification research at the secondary education level. This similarity showed the possibility of having certain skills, traditionally thought of as being related to occupational and vocational needs, become a form of basic skills for

employment if identified as being needed regardless of the situation following high school, be it work or college.

At the high school level, Warmbrod and Bobbit (1987) conducted a study for the Michigan State Department of Agriculture and Extension Education. Employers of secondary agricultural education graduates were interviewed to identify the strengths and weaknesses of the graduates from programs throughout the state. Production agriculture represented 46% of the respondents with ornamental horticulture (21%), agricultural business (18%), and agricultural mechanics (15%) rounding out the sample categories. The most important skills identified for employment were speaking skills, technical agriculture skills, computer skills, and science application skills. Math and writing skills were less frequently rated as most important. Work attitudes were also identified as an integral component of the agriculture education curriculum. Skills needing improvement the most were writing, speaking, and technical skills with math rated as needing improvement less often.

In a position paper by the National Association of Supervisors of Agricultural Education (1987) the skills identified as most important to employers in the Food and Fiber elements of agriculture included:

- a. Good work attitudes

- b. An understanding of international agriculture and agri-marketing
- c. Communication and computation skills
- d. Understanding the underlying broad agricultural concepts on which today's agricultural industry is based
- e. General employability skills such as problem solving, following directions, etc.

These areas include both basic and technical skills that are important to the strength of the agriculture industry.

#### Summary

The debate as to the importance of basic skills versus job specific skills will continue inside educational and employment circles. However, there is a trend towards integrating basic skills into the vocational setting to provide an applied basis for the basic skills essential to all employment and education, while trying not to neglect the general employability skills of attitude, problem solving, and specific technical knowledge. This trend is evident in both areas of literature that relate to the general basic and technical skills, or to agriculturally related skills. Most literature cited stressed the importance of basic skills, but the need and usefulness of skills related to employment were also identified.

### Demographics

In a study designed to identify important skills for employment by an industry-wide group, it is necessary to break down the industry into smaller subunits for more understandable and workable data from the respondents.

In a study by McClay (1978), essential competencies were identified and evaluated by agricultural firms. Because of the diversity of types of firms in agriculture, the overall sample was categorized by the seven classifications of: (a) production; (b) supply and service; (c) mechanics; (d) products (processing and marketing); (e) horticulture; (f) natural resources; and (g) forestry. The study identified competencies needed for each classification through an identification and validation procedure utilizing employee/employer review teams in the various categories. Having the sample broken into several categories allowed different skill lists to be developed for each classification. The categories allowed more specificity and diversity in the competencies selected for each group. This is important when including so many diverse occupations in the study sample. Within the seven classifications, specific jobs were identified with lists of needed competencies attached. This further analysis by job position allowed competencies to be tied directly with those jobs that required them. This method of categorization was

adapted for use in this study.

In a report by the United States Department of Education (1988), workplace research indicated that the skills and analytical tasks workers perform routinely are different from those tasks that students are taught in schools. Since the application of basic skills on the job is embedded in real job tasks, education and training programs are moving toward using the functional context of jobs to teach skills.

The categorization of the agricultural firms utilized in this study is used as an aid in trying to distinguish between any unique content found in one group of employers when compared with another group. In this way, more precise, effective analysis of the skills ranked by respondents can be utilized. A report on task verification techniques by Douglass and Patton (1989) recommended including businesses and industry in the curriculum development process at an early stage. Employing a classification system allows all areas of an industry to be represented equally in a task review or analysis without unknowingly concentrating on one specific area alone.

Coinciding with firm classification needs is an interest in identifying specific job positions for use in identifying specific skills needed for each entry-level position of employment. A report by the United States

Department of Education (1988) listed the components of a good workplace literacy curriculum as: (a) being organized by job tasks, not discrete basic skills; (b) include problems and situations that call for the use of skills as they will be used on the job; and (c) use actual job materials as instructional texts when possible. (p.35)

Together, these components are important considerations as a local program analyzes its current situation, and identifies the materials needed for the future.

The job classifications system employed in this study is based on an adaptation to the job classification system utilized by the Virginia Employment Commission (Tayloe Murphy Institute, 1980). "The six summary groups included: (a) Managerial occupations; (b) Technical, sales, and administrative support occupations; (c) Service occupations; (d) Farming, forestry, and fishing occupations; (e) Precision production, craft, and repair occupations; and (f) Operators, fabricators, and laborers. (p.ix)" In the Virginia Agribusiness Council survey used in this study, the farming, forestry, and fishing occupations were all encompassed under the title agricultural industries, and the other five summary groups are adapted to be utilized as the job classification system within agriculture. This system is employed as explained by Packer (1988) whereby each job category has a series of skills associated with it as

identified in the Dictionary of Occupational Titles. In this way, important skills can be related directly to a list of potential jobs for the student who successfully completes a given task.

#### Summary

The use of firm categories and job description classifications are designed to aid in the clarifications of what skills are deemed important in a specific type of business, and further identify the specific cluster of tasks important to a given job within a firm classification. This high degree of specificity may be important to local programs when they begin to review the strengths and weaknesses of their own programs as they relate to entry-level employment opportunities.

## Chapter 3

### Design of Study

#### Introduction

The intent of this study was to generate descriptive data of the skills needed by high school graduates anticipating entry into the Virginia agricultural industry. The method used to generate this information was a survey of individuals linked to the agriculture industry through membership in the Virginia Agribusiness Council.

#### Population and Sample

The population for this study was composed of the members of the Virginia Agribusiness Council. The Council is a non-profit membership organization representing all sectors of the state's diversified industry of agriculture. It includes five categories of membership.

- Class I Producers of Agricultural Products
- Class II Persons Supplying Goods and Services to Producers of Agricultural Products
- Class III Persons Who Process and/or Market Agricultural Products
- Class IV General Industry-wide Organizations
- Class V Professional Individuals

The actual membership is approximately 520 members, with a



representation of 90,000 people due to industry-wide organizations and diversified businesses being represented. The survey was directed at the individual Council members. The results of this survey will be generalized only to the agricultural industry as represented by the Virginia Agribusiness Council.

### Respondents

The survey mailed to all Council members resulted in slightly over a 10% response rate (n=55). The supplier and producer categories were represented with approximately the same number of respondents. The remainder of the respondents were primarily processors and marketing firms although responses from all categories were collected (see Table 1). The majority of respondents held management positions in their firms. Producers had a larger number of owners than the other categories while the supplier respondents were primarily managers with the remainder of the responses coming from across the spectrum of position levels (see Table 2).

Due to the low response rate a follow-up survey was judged to be necessary. Cost and logistics prohibited the use of a second mailing of the survey instrument. In lieu

Table 1

Description of Respondents

Category	Questionnaire (n=55)	Telephone (n=24)	Total (N=79)
Producers	20	8	28
Suppliers	22	6	28
Processors & Marketers	7	8	15
General Organizations	4	1	5
Professional Individ.	2	1	3

Table 2

Title of Respondent's Position in Firm

Title	<u>Responses per Position</u> <sup>a</sup>				Overall
	Prod	Suppl	Mark	Gen	
President	2	2	0	1	5
Vice President	0	1	2	1	4
General Manager	2	14	2	2	20
Personnel Manager	1	1	1	0	3
Owner	11	1	1	1	14
Other	2	2	1	1	6
Non-responses	2	1	0	0	3

<sup>a</sup> Tabulations includes the original 55 responses only.

of the second mailing, a telephone survey was initiated utilizing the 45 questions regarding the importance of basic and technical skills from the original survey (see Appendix A). The nonrespondents were identified and a random list of Agribusiness Council members was employed to collect a 5% sample of the nonrespondents (n=24). The 24 telephone respondents were equally representative of the producer, supplier, and processor/marketing categories with one representative from the general organization and professional categories. The final response rate including both mail and telephone responses was 14%.

#### Data Collection Plan

With the help of Agribusiness Council President, Carlton Courter, III, the survey instrument was approved for inclusion in a Virginia Agribusiness Council newsletter mailing. An article explaining the purpose of the survey and confidentiality of responses was incorporated into the newsletter (see Appendix B). In this way, all Agribusiness Council members received a copy of the survey instrument at a minimum cost. A reminder notice (see Appendix C) was printed in a subsequent newsletter in lieu of a follow-up mailing due to cost limitations and restrictions on the Agribusiness Council mailing list.

### Instrumentation

The questionnaire (see Appendix A) used was developed to specifically relate to the research objectives for this study.

#### **Steps in Preparing the Questionnaire:**

1. Identify the information needed including demographics, and the research questions of interest.
2. Search the literature available for existing questions, scales, and formats related to the subject of interest.
3. Draft new questions and revise existing questions.
4. Develop the format of the questionnaire based on the research questions and objectives of interest.
5. Submit draft questionnaire to content experts and members of the target population for evaluation.
6. Field test on a sample of the target population.
7. Obtain comments from the respondents of the field-test.
8. Eliminate questions not focused on the problem or not resulting in data related to the research purpose.
9. Revise faulty questions and include peer review.

The input from peers and experts knowledgeable of the population was used in the formative stages to cross-check the knowledge of the two groups and maintain content validity. The field test identified problems that were not

seen in the formative stages of the questionnaire design.

The survey involved skills to be rated on a scale of 0 to 5 as well as selected open ended questions pertaining to specific information. The scale range included:

0 = Not Applicable; 1 = Strongly Disagree; 2 = Disagree; 3 = Undecided; 4 = Agree; and 5 = Strongly Agree.

**Validity:** A field test was administered to a small sample of the population to assess possible flaws in the instrument. A panel of experts from Virginia Tech was also involved in the questionnaire design to maintain content validity. A list of basic and technical skills was presented to experts in the fields of agricultural economics; agricultural mechanics; crops, soil, and environmental science; animal science; horticulture; and conservation and forestry. Each expert approved the selected skills as being representative of the technical skills expected of entry-level employees in each individual area of the agricultural industry.

**Reliability:** Reliability was supported by having all sub-groups of the population receiving the same instrument. A second source of reliability was generated through a question in the second half of the survey instrument. The question asked respondents to identify the basic and technical skills that they rated as very important (SA) in the first section of the instrument. They were to then rank

up to five of those skills in decreasing order of importance based on the need of the skill to high school graduates applying for entry-level employment. The rankings were tabulated using the method described for the analysis of nominal group technique results as identified by Oliver and Hillison (1990). The overall ranking identified self-motivation as the most important skill followed by a positive work attitude; carrying out written and verbal instructions; working without supervision; and problem solving. Safety and maintenance skills as well as product salesmanship were the highest ranked technical skills and entered the ranking as ninth in importance. The results from this question were very comparable to the ranking identified using individual question means as listed in Table 3. This similarity across analysis techniques provides a measure of reliability to the survey instrument.

### Data Analysis

For all analysis calculations and findings, the professional individuals category was combined with the general industry organization category due to the small number of responses in each group. All results are based on the importance of identified skills as defined by the following range of mean scores: 4.50 -- 5.00 Most important skills; 3.50 -- 4.49 Important skills; 2.50 -- 3.49

Inconclusive ratings -- undecided; 1.50 -- 2.49 Unimportant skills; 1.00 -- 1.49 Very unimportant skills.

The first objective of this study was to determine the rank order importance of basic and technical skills needed by high school graduates seeking entry-level employment in Virginia agricultural firms. The level of importance was identified by the mean and standard deviation of the ratings for each survey respondent.

The Not Applicable category was not included in the calculation of the mean and standard deviations so that the ranking of basic and technical skills would be on an equal basis. Some technical skills were not needed by every firm category.

The second objective was to determine the rank order importance of skills as identified by respondents in a specific firm classification. The mean responses of each firm classification for each question were ranked from highest to lowest.

A third objective of the survey was to determine the demographics of the survey respondents by grouping them using firm type frequency, respondent position in the firm, and the mean size of the firm. The data for the respondent's position in firm included the 55 original responses. The 24 telephone follow-up responses were not requested to provide complete demographic information.



The final study objective involved categorizing the entry-level positions available across the sample surveyed, and identify the mean years of experience for each job category as well as employee turnover rates and future hiring needs. All survey respondents (excluding telephone follow-up respondents) were asked to identify their five most common entry-level jobs and provide information relating to the mean years of experience employees in each job have as well as the rate of turnover and expected hiring need. The entry-level positions available were identified by frequency of the specified position in each of the firm categories. The average years of experience was determined by means, standard deviations, and range values for each firm classification.

## Chapter 4

### Findings

#### Introduction

The primary purpose of this study was to identify the skills and characteristics that are important for entry-level employment in Virginia agricultural firms. A survey was mailed to the members of the Virginia Agribusiness Council to collect the necessary information. The 55 responses from the initial mailing were combined with the 24 follow-up telephone responses. The mean responses for each individual question from both the initial mailing and follow-up were compared for significant differences using a t-test. No significant differences were found for the 45 survey questions at an alpha level of 0.10.

#### Importance of Basic and Technical Skills

The first objective of this study was to determine the rank order importance of basic and technical skills for high school graduates seeking entry-level employment in Virginia agricultural firms. The basic and technical skills that received the highest ratings from survey respondents with a range of  $M=4.53$  to  $M=4.80$  encompassed basic skills relating directly to the employability of an individual. The skills

identified included having a positive work attitude, self motivation, being able to follow directions, and working without supervision. Safe equipment operation was the only technical skill to be in the most important rating level with  $M=4.67$  (see Table 3). The second level of importance with a range of  $M=4.47$  to  $M=3.64$  included 64% of the questions rated by Agribusiness Council members. The remaining basic skills were included in this category with problem solving, verbal communication, working on a team, business math, and interpreting work plans having the highest mean ratings along with the technical skills of equipment maintenance skills and product salesmanship. The skill in supervising others was the lowest basic skill rated with a mean score of  $M=3.61$  (see Table 3).

Ratings of technical skills showed a pronounced agreement with the necessity of equipment safety and maintenance skills. A broad spectrum of other skills were also seen as important, but without complete agreement across firm categories. Overall, the grand mean rating for basic skills ( $M=4.20$ ) was higher than the grand mean rating for technical skills ( $M=3.57$ ).

Table 3  
Ranking of Importance of Basic and Technical Skills  
by Agribusiness Council Members

Skill Description	n	Overall Ranking	M	SD
<b>Basic Skills</b>				
Positive work attitude	79	1	4.80	0.40
Self motivation	79	2	4.76	0.46
Carry out instructions	79	3	4.75	0.43
Work without supervision	79	5	4.53	0.65
Problem solving	79	6	4.47	0.55
Present verbal information	77	8	4.36	0.60
Work as a team member	78	9	4.33	0.67
Use business math skills	67	11	4.13	0.67
Read measurement scales	71	13	4.08	0.67
Basic computational skills	68	14	3.99	0.74
Personal budget/finance	69	16	3.94	0.87
Interview/job search skills	72	19	3.76	0.82
Use computer software	66	20	3.76	0.87
Write clear/concise reports	65	22	3.75	1.07
Supervise others	69	32	3.61	1.01
Grand Mean Basic Skills			4.20	0.94
<b>Technical Skills</b>				
Safe equipment operation	73	4	4.67	0.47
Equipment maintenance skills	70	7	4.37	0.54
Product salesmanship	66	10	4.20	0.84
Interpreting work plans	70	12	4.10	0.64
Economic principles	68	15	3.97	0.82
Sprayer calibration/utilization	54	17	3.87	0.86
Using wood and maintenance tools	52	18	3.81	0.83
Soil erosion control techniques	53	21	3.75	0.95
Use and storage of grains	48	23	3.75	0.88
Animal handling techniques	48	24	3.75	1.11
Arc and Oxy-acetylene welding	57	25	3.72	0.87
Animal feed storage/processing	46	26	3.72	0.97
Basic animal biology/physiology	49	27	3.71	0.93
Horticultural crop growth factors	45	28	3.71	0.96
Animal production traits	48	29	3.71	1.02
Lawn maintenance	44	30	3.68	0.87
Basic plant biology	55	31	3.64	0.98
Forage crop utilization	43	33	3.58	0.84
Computerized spreadsheets	57	34	3.51	1.01
Interpret soil test results	48	35	3.42	0.93
Partial budgeting	61	36	3.34	1.08
Computerized ration balancing	44	37	3.34	1.02
Animal genetics principles	42	38	3.33	1.08
Animal housing designs/concerns	43	39	3.33	0.98
Proper chain saw use	44	40	3.30	1.22
Landscape design principles	39	41	3.05	1.24
Forest ecosystem structure	38	42	3.00	1.15
Wildlife management principles	38	43	2.95	1.00
Operate a greenhouse	35	44	2.86	1.05
Pruning trees and shrubs	45	45	2.00	0.96
Grand Mean Technical Skills			3.57	0.70

Note:

Calculated mean scores, n, and rankings include the following responses:  
 1 = Strongly Disagree    2 = Disagree    3 = Undecided    4 = Agree  
 5 = Strongly Agree

### Ranking the Importance of Skills by Firm Classification

The second objective was to determine the rank order importance of basic and technical skills by firm classification. When the skill ranking was viewed by individual firm classifications, several points of interest become evident for the rankings given by each group. When ranking the most important skills (mean  $\geq 4.5$ ), respondents from the producer and supplier categories identified the same four skills as most important (see Tables 4 and 5). These same four skills are included in the ranking of most important skills by processors and general organizations, however they include additional skills at this level of importance (see Tables 6 and 7). Writing clear and concise reports and proper chain saw use were ranked in the top 15 by general organizations. Producers were the only category to include sprayer calibration and utilization in the top 15. Math skills were not included in the producer's list and animal handling replaced the product salesmanship found in the top rankings of the other categories.

Table 4

Top 15 Skills as Ranked by Producer Category

Skill Description	n <sup>a</sup>	M <sup>b</sup>	SD
Carry out instructions	28	4.79	0.41
Self motivation	28	4.75	0.51
Positive work attitude	28	4.68	0.47
Safe equipment operation	27	4.67	0.47
Work without supervision	28	4.64	0.48
Present verbal information	28	4.43	0.56
Equipment maintenance skills	27	4.41	0.49
Problem solving	28	4.32	0.60
Animal handling techniques	23	4.26	0.85
Read measurement scales	26	4.26	0.80
Work as a team member	26	4.22	0.83
Sprayer calibration/utilization	24	4.21	0.76
Interpreting work plans	25	4.20	0.63
Personal budget/finance	22	4.14	0.81
Using wood & maintenance tools	25	4.04	0.66

<sup>a</sup> n includes all responses except not applicable

<sup>b</sup> Calculated mean scores include the following responses: 1 = Strongly Disagree 2 = Disagree  
3 = Undecided 4 = Agree 5 = Strongly Agree

Table 5

Top 15 Skills Ranked by Supplier Category

Skill Description	<u>n</u> <sup>a</sup>	M <sup>b</sup>	SD
Positive work attitude	28	4.86	0.35
Self motivation	28	4.75	0.43
Carry out instructions	28	4.71	0.45
Safe equipment operation	26	4.58	0.49
Work without supervision	28	4.50	0.57
Problem solving	28	4.43	0.49
Product salesmanship	26	4.42	0.57
Equipment maintenance skills	25	4.32	0.61
Work as a team member	28	4.25	0.57
Use business math skills	27	4.11	0.57
Present verbal information	27	4.11	0.63
Basic computational skills	27	4.07	0.72
Read measurement scales	26	3.96	0.52
Lawn maintenance	18	3.89	0.87
Interpreting work plans	25	3.84	0.46

<sup>a</sup> n includes all responses except not applicable

<sup>b</sup> Calculated mean scores include the following responses: 1 = Strongly Disagree 2 = Disagree  
3 = Undecided 4 = Agree 5 = Strongly Agree

Table 6

Top 15 Skills Ranked by Marketing and Processor Category

Skill Description	<u>n</u> <sup>a</sup>	M <sup>b</sup>	SD
Self motivation	15	4.87	0.34
Positive work attitude	15	4.87	0.34
Safe equipment operation	15	4.80	0.40
Problem solving	15	4.73	0.44
Carry out instructions	15	4.73	0.44
Work without supervision	15	4.67	0.47
Present verbal information	15	4.60	0.49
Product salesmanship	13	4.54	0.50
Work as a team member	15	4.53	0.50
Use business math skills	13	4.46	0.50
Equipment maintenance skills	14	4.29	0.45
Write clear/concise reports	14	4.29	0.59
Read measurement scales	13	4.23	0.42
Use and storage of grains	9	4.22	0.42
Economic principles	14	4.21	0.67

- <sup>a</sup> n includes all responses except not applicable  
<sup>b</sup> Calculated mean scores include the following responses: 1 = Strongly Disagree 2 = Disagree  
3 = Undecided 4 = Agree 5 = Strongly Agree



Table 7

Top 15 Skills Ranked by General Organizations and Professionals Category

Skill Description	<u>n</u> <sup>a</sup>	M <sup>b</sup>	SD
Positive work attitude	8	4.88	0.33
Safe equipment operation	5	4.80	0.40
Equipment maintenance skills	4	4.75	0.43
Carry out instructions	8	4.75	0.43
Write clear/concise reports	7	4.71	0.45
Interpreting work plans	6	4.67	0.47
Problem solving	8	4.63	0.48
Work as a team member	8	4.63	0.48
Self motivation	8	4.63	0.48
Present verbal information	8	4.50	0.50
Personal budget/finance	7	4.43	0.49
Basic computational skills	7	4.43	0.49
Product salesmanship	6	4.33	0.47
Proper chain saw use	3	4.33	0.47
Partial budgeting	7	4.29	0.45

<sup>a</sup> n includes all responses except not applicable

<sup>b</sup> Calculated mean scores include the following responses: 1 = Strongly Disagree 2 = Disagree  
3 = Undecided 4 = Agree 5 = Strongly Agree

### Demographics

The study's third objective was to determine such demographics as firm classification, size of firm, and mean number of full-time; part-time; and seasonal employees in the firm. Producers and suppliers were at an equivalent representation in the sample with processors, marketing firms, and general organizations at less than half the size of the producer and supplier numbers (see Table 8).

Overall firm size based on full-time employees had a mean of approximately 49 full-time employees, however the deviation at all levels was very large. In examining the data, the firm size of the respondents varies evenly across the range identified in Table 8. There were six firms in the respondents of sizes much larger than the remaining agribusiness council members. These firms were not included in the mean calculations as noted in Table 8.

The final objective of this study was to categorize the entry-level positions available in agricultural firms, mean experience for those positions, and identify employee turnover rates and future hiring needs for those categories.

Table 8

Number of Employees in Each Firm Category

	% of <sup>a</sup> Sample	M <sup>b</sup> Full	M <sup>c</sup> Part	M <sup>d</sup> Seas	<u>Full time</u> Min Max	
Producers	36	17	5	16	1	80
Suppliers	34	60	3	18	2	800
Processors	23	98	8	193	2	500
Gen. Org.	6	89	3.5	0	6	135
Professionals	-	NA	NA	NA	NA	NA
Overall	100	49	4	9	1	800

a Based on full-time responses

b 3200 employee producer, 3000 employee supplier, & a 1070 employee marketer/processor not included in calculations

c One 1000 employee supplier omitted from calculations

d Marketing firm with 525 seasonal workers and producer with 300 seasonal workers not included in calculations

The entry-level positions available were identified using the job description information to categorize the jobs into five groups which include:

Management	-- trainee position
Laborer	-- general physical work and truck drivers
Skilled Operator	-- machine operators and maintenance workers
Sales	-- General sales
Clerk/Office	-- Bookkeeping/secretary/receptionist

Producers and suppliers utilized managers and laborers the most while processors, marketing groups, and industry organizations employed more sales staff and office staff (see Table 9). Processors and marketers hired the largest mean number of full-time and seasonal workers as identified in Table 7. Suppliers were the second most frequent employers of entry-level employers. The mean years of work experience for all categories was in a range between  $M=5.89$  to  $M=8.53$  years, however the managers had been in their jobs a little longer while the laborers did not stay in one job quite that long (see Table 10). The years of experience range was very large for all categories as seen by the standard deviation as well as the maximum and minimum values (see Table 10). Low response rates were partially the cause of such a wide variance. Turnover rate and expected hiring needs data were not provided in a sufficient number of surveys to enable analysis.

Table 9

Job Description Frequencies by Firm Category

	All	Producers	Suppliers & Market	Processors General & Prof.	
No Response	73	28	33	2	10
Management	21	10	10	1	0
Laborer	30	14	8	8	0
Skilled Op	19	5	6	7	1
Sales	6	1	3	2	0
Clerk/Office	16	2	6	1	7

Table 10

Employee Average Years of Work Experience

	<u>n</u>	M	SD	Max	Min
Total	92	6.97	5.48	30	0
Management	21	8.53	5.11	19	1.5
Laborer	30	5.9	3.92	15	1
Skilled Op.	19	7.05	5.74	20	0
Sales	6	7.42	10.2	30	1
Clerk/Office	16	6.67	4.96	20	0

## Chapter 5

### Summary, Conclusions, Recommendations, and Discussion

#### Summary

Employers in all types of businesses require a skilled, well trained workforce to remain competitive. Agricultural firms are no different in this respect. Vocational education, including agricultural education, plays an important role in teaching potential employees the skills needed for success in the workplace. Current literature as well as the recent federal vocational legislation identify the need for improved basic skills education while still maintaining a high level of trade specific education. The purpose of this study was to identify the basic and technical skills needed for entry-level employment of high school graduates as seen by the members of the Virginia Agribusiness Council.

In a review of current literature, there was a trend towards incorporating more basic skills into vocational education instead of concentrating only on trade specific skills. General studies, as well as those specifically looking at agriculture recommend some degree of integrating basic skills into the vocational classroom. Skills related to specific areas of employment were still viewed as

important, but not to the exclusion of basic skills education.

This study was conducted utilizing a survey mailed to the members of the Virginia Agribusiness Council. The categories of membership include: producers, suppliers, processors/marketers, and general industry organizations/professional individuals. The 55 responses from the initial mailing were combined with the 24 follow-up responses. The overall response rate was 15%.

Analysis of the data found that basic skills received a higher overall rating ( $M=4.2$ ) from survey respondents than technical skills ( $M=3.57$ ). Safe equipment operation, equipment maintenance skills, and product salesmanship were the three technical skills listed in the top 10 rated skills and characteristics. The five highest rated skills were listed as most important across all four categories of Agribusiness Council members. The mean years of work experience for all job categories was between  $M=5.9$  and  $M=8.53$ . Several categories of entry-level jobs are available to high school graduates with the required training.



### Objectives

The first objective of this study was to determine the rank order importance of basic and technical skills for high school graduates seeking entry-level employment in Virginia agricultural firms.

This study's second objective was to determine the rank order importance of basic and technical skills by firm classification.

The third objective of this study was to determine such demographics as firm classification, size of firm, and mean number of full-time; part-time; and seasonal employees in the firm.

The final objective was to categorize the entry-level positions available in agricultural firms, mean experience for those positions, and identify employee turnover rates and future hiring needs for those categories.

### Conclusions

1. Both basic and technical skills play an important role in entry-level employment across Virginia's agricultural industries.
2. Basic skills had a slightly higher rating than technical skills, but not a meaningful difference.
3. All firm categories required the same top four most important skills including a positive work attitude; self

motivation; safe equipment operation; and carrying out instructions. Processing, marketing, and general organization firms expanded the number of most important skills required for employment beyond those listed by suppliers and producers.

4. Virginia Agribusiness Council member firms require a diverse range of skills due to the different types of specific skills needed by the various agricultural businesses in Virginia.

5. Processing, marketing, and supply firms are large sources of the entry-level positions available to high school graduates.

6. Positions available to high school graduates looking for entry-level jobs are found across the spectrum of firm classifications.

### Recommendations

1. Agricultural education should incorporate both basic and technical skills into its curriculum.

2. Problem solving, presenting verbal information, and basic math are areas that need to be implemented in applied and integrated context to facilitate improvement in the ability of the high school graduates to utilize these skills once employed in an agricultural firm.

3. Safety and maintenance skills remain critical skills in

the agriculture industry and their emphasis should continue in agricultural education programs as it has in the past.

4. Due to the diverse training needs of the agricultural sector, a differentiation in the curriculum content based on the composition of agricultural businesses surrounding a program needs to be implemented.

5. Skills emphasized by suppliers, processors, and marketers should be considered heavily in curriculum analysis and development for agricultural programs, as those areas of the agricultural industry are a large portion of the potential employers for agricultural education graduates.

6. Training in specific agricultural skills is beneficial to students providing they possess the necessary basic skills.

7. Unclear employment availability of many entry-level positions suggests the need for improved exploratory programs providing a background on the many facets of agricultural industry as well as a career guidance program that would aid in helping students identify jobs with the expectations and rewards desired by the student.

### Discussion

The purpose of this study was to identify the skills important for high school graduates as they apply for employment in the agricultural firms represented by the

Virginia Agribusiness Council. Results of the survey show a strong emphasis on affective skills basic to many employment situations within agriculture. Affective skills such as work attitude, self-motivation, and working safely are difficult to fully incorporate into a traditional classroom/shop setting. The initial framework can be provided, but developing these skills into internalized, automatic attitudes and actions frequently require a clear connection to real world situations. This real world situation may best be provided by the supervised agricultural experience program (SAE) at the high school level. In a supervised work setting, the implications and consequences of a careless attitude or unsafe work habits are readily available. Utilizing a combination of classroom and supervised experiences may aid a student's development of the initial employability skills desired by most employers.

Beyond the affective skills are several basic skills common to many jobs, school courses, college courses, and the home. Areas such as basic math, communicating clearly, problem solving, and working as a team member are important elements in many areas beyond agriculture. Integration of basic skills into agricultural coursework may provide the applied setting that can aid students' understanding and appreciation for many concepts. By increasing the ability

of agricultural education students in basic skills through the use of agricultural topics, students may begin to build the ability to transfer knowledge across subject areas. This also allows basic and technical skills to be taught within the limited instructional time currently available to teachers.

Finding potential solutions to a new problem is an important component of problem solving, and is identified as an important skill for employers responding to the survey. In the area of communication skills, current FFA programs are difficult to improve upon. Complementary skills to the FFA program could be developed by incorporating principles utilized by the FFA in other areas of the classroom. Requiring presentations, written reports, an essay format component in tests, and expecting proper grammar would help to further develop the written and verbal skills that are vital in the employment world.

Skills in safe working habits and equipment operation, as well as basic machine maintenance skills have always been an important part of the agricultural curriculum. This study found a continuing need for these skills, but that is not to say that we continue to teach the same content using the same methods that were used 20 years ago. Safety in agriculture today should deal with electronics, hydraulics, factory specifications, and what maintenance not to do

without advanced training. Safety and maintenance will always be important, but the workplace in which it is used is continually changing.

A second component of this study was the use of firm classifications, firm size, and management level of respondents in the data analysis. There was a diverse range in firm size responding to the survey. Across the firm categories there was overall agreement on the importance of basic skills, but some differences arose when viewing the technical skills. This diversity in responses shows a need for business involvement in the operation of local agriculture programs. For a local program to best serve the community and the students, community members and industry leaders in the area need to be involved in advisory roles in order to keep the program as up-to-date and relevant as possible. Utilizing such resources in program design, special project funding, guest lectures, and field trips. will provide students with an appreciation for the diversity of the community and the many options available to them following graduation. This utilization also maintains a positive relationship between businesses and the local program which can be important when funding and curriculum components of programs are addressed.

From the demographical information collected on the survey respondents, several avenues of development can be

identified. The importance of marketing, processing, and supply firms in the entry-level employment of high school graduates is evident, and should be incorporated into agricultural programs. One area of interest may be the development of an expanded range of SAE experiences to include processing, marketing, and supply firms as well as the traditional production orientation. This increased diversity of offerings may help maintain interest in the SAE programs and would provide additional exposure of the local program to a broader range of agricultural firms in the region. Some of these programs may need to be strictly summer internship situations depending on the distance to nearby processors and agricultural marketing firms. This type of program also requires the teacher to be on an 11 or 12 month contract to provide time for initial coordination and on-site visits. Aspects of processing, marketing, and supply businesses could also be incorporated into a program's courses to reflect the changing faces of agriculture and the vast array of developments occurring in these fields. As these areas of agriculture continue to grow, students should be exposed to the theories, applications, benefits, and drawbacks of new technology and research to aid in their understanding both as consumers and employees in agriculture. Traditional areas of agricultural education such as production agriculture may need a decrease

in emphasis to incorporate processing, marketing, and supply units into the curriculum. The emphasis of classroom instruction, SAE, and FFA programs and contests will need to be revised. This is based on the increasing opportunities in processing, marketing, and supply firms, while employment in production agriculture is not as available. The actual emphasis areas in each local program will depend on the types of agricultural enterprises found in that region.

The final objective of this study was the analysis of entry-level positions available and mean years experience in each position. These data were limited due to the low response rate, however, several observations can be postulated. As discussed in the recommendations, the employment potential of jobs leading to advancement varies from firm to firm. Several positions have a low number of long term employees, while others have personnel in the same job for 20 years. Of those jobs with low levels of experience, few will result in advancement potential when an employee remains there over a period of time. Even many of the positions with employees remaining 20 years do not have an established promotion system evident. For the jobs that do show the possibility of advancement, mastery of the basic and technical skills may play a deciding role in who is accepted for an available position. Agricultural programs may provide this technical knowledge in several ways. Many



technical skills may be integrated into the basic skills instruction so related content such as basic math and algebraic calculations are learned directly in an agricultural context. Other skills may be taught in a laboratory setting with specific tasks and outcomes identified as objectives for the project. There is also a set of skills specific to a certain type of business that may best be learned through apprenticeship programs or on-the-job training. By incorporating several of these elements into an agriculture program, students can have several options available to develop the technical skills that may give them an edge when searching for that first job. A final way to support this advancement potential is to identify the skills needed at the upper levels of the firm, and provide information for advanced technical training if the local program cannot provide the necessary level of expertise. In order for graduates to be successful, they must be aware of the options and opportunities available to them for each career path available to them.

The problems incurred when searching for that first job may be eased by the utilization of a career guidance program oriented specifically at the agricultural education graduate and potential industry employers. Through career exploration segments during a student's agricultural

program, the diversity of opportunities in agriculture can be introduced to the student. In a guidance or placement situation, the interests and strengths of the individual student are identified, and potential fields of employment are chosen and pursued. Depending on the field chosen, entry-level employment may be available, or advanced training in the industry of interest may be required to begin employment in a position with adequate advancement potential for the student's goals.

### Summary

Overall, this study identified several basic skills that are important to employers in the Virginia Agribusiness Council, as well as safety and machine maintenance skills. The 15 basic skills were rated higher overall than the technical skills, however the need for several technical skills was evident across all firm classifications. The specific skills rated as most important varied from category to category. Basic skills are seen as being of primary importance when hiring applicants. The entry-level positions were limited in scope to primarily laborers, mechanics, clerks, and sales staff. In a few cases, supervisory and lower management positions were available in individual businesses.

Affective skills need to be dealt with in all areas of instruction. Broaden the technical areas beyond production and mechanics depending on the regional opportunities. Integrate instruction providing students with an awareness of the possibilities and limitations of career opportunities directly from high school, and the other options of advanced training for alternative careers. Knowledgeable, well prepared students will have more possibilities for success as they make the transition from school to work, and will benefit the industry by providing skilled informed employees.

### Need for Further Research

Although this study identified the need of basic skills for all entry-level employees and technical skills as specified by the type of business a student is interested in, more research needs to be directed at the differences in skills across the agricultural businesses in Virginia. Preliminary data suggest a significant difference in the importance of several skill areas identified in this study when comparing production and supply firms. This difference may be through differences in perceived need by managers or owners of the businesses, or it could reflect a distinct split in the type of skills needed for entry into the different types of firms. This type of information may also become more essential at the local program level as curriculum, equipment, and program philosophy are reviewed.

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**Appendix A**

**Virginia Agribusiness Council Member Questionnaire**

CHARACTERISTICS OF ENTRY LEVEL AGRIBUSINESS EMPLOYEES IN VIRGINIA:

Form #: \_\_\_\_\_

(Please return form as complete as possible, even if it is not fully applicable to your situation)

Your Position title: \_\_\_\_\_ # Employees in your firm: \_\_\_\_\_  
 Full Time (Employed 40 or more hrs/week, 12 mo/yr) : \_\_\_\_\_  
 Part Time (Employed less than 40 hrs/week, 12 mo/yr) : \_\_\_\_\_  
 Seasonal (Employed less than 11 months/year) : \_\_\_\_\_

Select Your Firm's Classification: (from the Virginia Agribusiness Council Categories)

- \_\_\_ Class I: Producers of Agricultural Products
- \_\_\_ Class IIA: Persons Supplying Goods to Producers of Ag. Products.
- \_\_\_ Class IIB: Persons Supplying Services to Producers of Ag. Products.
- \_\_\_ Class IIIA: Persons Who Process Ag. Products.
- \_\_\_ Class IIIB: Persons Who Market Ag. Products.
- \_\_\_ Class IV: General Industry Organizations
- \_\_\_ Class V: Professional Individuals

Basic Skills:

Please use the scale below to rate the importance of each skill for a high school graduate entering your firm.

Please circle your response.

-----  
 NA = Not Applicable                      D = Disagree                      A = Agree  
 SD = Strongly Disagree                  U = Undecided                      SA = Strongly Agree  
 -----

Basic Skills That Are Important To A High School Graduate Entering The Workforce of Your Firm:

- |   |    |    |   |   |   |    |
|---|----|----|---|---|---|----|
| 1. Apply knowledge to solve problems.....         | NA | SD | D | U | A | SA |
| 2. Using computer software systems.....           | NA | SD | D | U | A | SA |
| 3. Carry out written and verbal instructions..... | NA | SD | D | U | A | SA |
| 4. Work without supervision.....                  | NA | SD | D | U | A | SA |
| 5. Reading scales of measurement.....             | NA | SD | D | U | A | SA |
| 6. Supervise other employees.....                 | NA | SD | D | U | A | SA |
| 7. Present verbal information clearly.....        | NA | SD | D | U | A | SA |
| 8. Self motivation.....                           | NA | SD | D | U | A | SA |
| 9. Using basic computational skills.....          | NA | SD | D | U | A | SA |
| 10. A positive attitude towards work.....         | NA | SD | D | U | A | SA |
| 11. Write clear/concise reports and letters.....  | NA | SD | D | U | A | SA |
| 12. Solve problems as a team member.....          | NA | SD | D | U | A | SA |
| 13. Working with business math skills.....        | NA | SD | D | U | A | SA |
| 14. Interview and job seeking skills.....         | NA | SD | D | U | A | SA |
| 15. Personal budgeting and finance.....           | NA | SD | D | U | A | SA |

Technical Skills: Rate the importance of the following skills using the same scale assuming that the basic skills above are already incorporated into both academic and vocational classes. Please circle your response.

Technical Skills/Knowledge That Are Important to Entry Level Employees of Your Firm:

- |  |    |    |   |   |   |    |
|--|----|----|---|---|---|----|
| 16. Partial budgeting.....                           | NA | SD | D | U | A | SA |
| 17. Safe equipment operation.....                    | NA | SD | D | U | A | SA |
| 18. Interpreting soil test results.....              | NA | SD | D | U | A | SA |
| 19. Computerized ration balancing.....               | NA | SD | D | U | A | SA |
| 20. Operating a greenhouse.....                      | NA | SD | D | U | A | SA |
| 21. Correctly felling a tree using a chain saw.....  | NA | SD | D | U | A | SA |
| 22. Basic plant biology.....                         | NA | SD | D | U | A | SA |
| 23. Computerized spreadsheets.....                   | NA | SD | D | U | A | SA |
| 24. Interpreting work plans.....                     | NA | SD | D | U | A | SA |
| 25. Sprayer calibration and utilization.....         | NA | SD | D | U | A | SA |
| 26. Animal feed storage and processing.....          | NA | SD | D | U | A | SA |
| 27. Landscape design principles.....                 | NA | SD | D | U | A | SA |
| 28. Forest ecosystem structure.....                  | NA | SD | D | U | A | SA |
| 29. Basic animal biology/physiology.....             | NA | SD | D | U | A | SA |
| 30. Product salesmanship.....                        | NA | SD | D | U | A | SA |
| 31. Equipment maintenance skills.....                | NA | SD | D | U | A | SA |
| 32. Forage crop utilization processes.....           | NA | SD | D | U | A | SA |
| 33. Animal housing designs/concerns.....             | NA | SD | D | U | A | SA |
| 34. Pruning trees and shrubs.....                    | NA | SD | D | U | A | SA |
| 35. Soil erosion control techniques.....             | NA | SD | D | U | A | SA |
| 36. Economic principles.....                         | NA | SD | D | U | A | SA |
| 37. Arc and Oxy-acetylene welding.....               | NA | SD | D | U | A | SA |
| 38. Use of animal genetics principles.....           | NA | SD | D | U | A | SA |
| 39. Lawn maintenance.....                            | NA | SD | D | U | A | SA |
| 40. Wildlife management principles.....              | NA | SD | D | U | A | SA |
| 41. Using wood and maintenance tools.....            | NA | SD | D | U | A | SA |
| 42. Use and storage of grains.....                   | NA | SD | D | U | A | SA |
| 43. Animal production traits.....                    | NA | SD | D | U | A | SA |
| 44. Factors affecting horticultural crop growth..... | NA | SD | D | U | A | SA |
| 45. Animal handling techniques.....                  | NA | SD | D | U | A | SA |

Open Ended Questions:

75

1. Please list any skills (basic or technical) you feel should be added or deleted to the skills identified in this instrument.

1.

2.

3.

2. Please rank up to five of the skills (basic or technical) that you have circled (SA) strongly agreed as being needed by high school graduates applying for an entry level position at your firm.

RANK: First Second Third Fourth Fifth  
Skill: \_\_\_ \_\_\_ \_\_\_ \_\_\_ \_\_\_

3. For the entry level workers you employ, please provide the following information to assist in the analysis of the data on this questionnaire.

TITLE:	BRIEF DESCRIPTION:	Avg Years Experience for Current Employees	# Hired Over Next 2 YRS		
			FULL	PART	SEASONAL

If you would like a complete copy of the results (nominal charge of \$2), please write your name and address in the space below.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

ALL RESPONSES ARE CONFIDENTIAL. FIRM NAMES AND RESPONSES WILL NOT BE IDENTIFIED IN THE ANALYSIS.

Appendix B  
Initial Newsletter Article

## Appendix B

## Initial Newsletter Article

Virginia Ag-Report. Volume 19 No. 8 October 24, 1990

Do you want quality job applicants for your company? Now is your chance to make a difference. Please fill out the enclosed questionnaire today, and help agricultural education as it works to meet the needs of Agribusiness tomorrow.

Agriculture is Virginia's largest industry. Twenty percent of the total jobs and economic activity are generated by agriculture. One component essential to the strength and continuity of the agriculture industry lies in the quality of entry level employees that enter the agricultural sector.

One potential source of qualified applicants for entry level positions is the agricultural education programs based in high schools across Virginia. The purpose of the enclosed questionnaire is to identify those skills and characteristics that you value most in job applicants. The identified characteristics will be compared to what is currently being taught in agricultural education programs at the secondary level to identify strengths and weaknesses in information being presented as it relates to the elements deemed important by the Virginia Agribusiness Council members.

The agricultural education staff of Virginia Tech, Carlton Courter, and Jeffrey Perry thank you for taking the time to complete the questionnaire, and for helping agricultural education in Virginia as it works to meet the changing needs of agriculture in Virginia. The survey results will be presented in a future issue of the Virginia Agribusiness Council Newsletter. Please direct any questions or comments to Jeffrey Perry (703) 231-9284.

**Appendix C**  
**Follow-up Notice**

Appendix C

Follow-up Notice

Virginia Ag-Report. Volume 19 No. 8 October 24, 1990

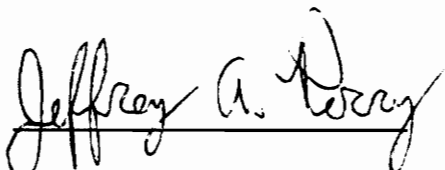
JOB SKILLS SURVEY REMINDER

Please remember to fill out the job skills survey mailed to you in the October issue of the AG-REPORT and return it in the envelope which was provided if you haven't already done so.

The survey is certain to help the entire industry identify job skills needed so that we can produce the kind of educated workforce that will be crucial to our future success. Your help is needed and appreciated! Please call Jeff Perry at Virginia Tech at (703) 381-0474 if you have further questions or concerns.

## VITA

Jeffrey A. Perry was born in Cortland County, New York on July 10, 1967. He attended public schools in New York and Massachusetts and completed his secondary education in 1985, at Jordan-Elbridge High School, Jordan, New York. In 1989 he earned a B. S. Degree in Agriculture from Cornell University with emphasis in Agricultural Education; Dairy Management; and Agricultural Finance. In August of 1989, he was married to Rebecca L. Ireland-Perry, and moved to Christiansburg, Virginia where he began working towards a master of science in education degree at Virginia Tech.



Jeffrey A. Perry