

IDENTIFYING TECHNICAL TEACHER COMPETENCIES
IN AGRICULTURAL EDUCATION

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The study reported on here was conducted to develop a paradigm for the technical component of a competency-based teacher education program in agricultural education. The proposed system provides a method for stating, validating, and testing the technical competencies of teachers.

The Need for Identifying Technical Teacher Competencies

Teacher educators in agriculture are faced with the challenge of preparing teachers for teaching the competencies needed in a myriad of new and changing agricultural occupations. New course offerings at the high school level have been based on the increasingly diverse and specialized nature of our nation's agribusiness. All businesses providing inputs of production, processing, and distribution of agricultural products have been by Davis and Goldberg (1957) as agribusiness.

Today's farmer may artificially breed cows, tune an 80 horsepower tractor in the farm shop, and compute farm business investment alternatives utilizing linear programming techniques. Similarly, the non-farm sectors of agribusiness, including ornamental horticulture, conservation, agricultural mechanics, and agricultural business, have developed new technologies and occupational specialties.

Teachers of vocational agriculture must learn the specialized skills and knowledge of today's agricultural occupations. As agribusiness has become more specialized, the vocational programs serving agriculture have developed new teaching programs. Beginning in the early 1960's, programs in vocational agriculture expanded from the traditional farm production and management to include ornamental horticulture, conservation or natural resources, agricultural mechanics, and agricultural business. Following the expansion of the 1960's, new program areas such as small animal science and horse husbandry were introduced. This wider teaching specialization is requiring systematic planning of the technical component of teacher education programs. For example, a teacher in an urban setting may devote full time in class for 80 weeks over a two year period to a program of floral design, while a rural teacher

updates a traditional farm production program with class sessions on determining the ecological implications of alternate farm development plans.

Teacher educators are challenged to plan and implement programs which prepare future teachers with the technical competence and work experience needed to teach the occupational course specializations of vocational agriculture. In order to provide appropriate teacher experiences, techniques are needed which will enable teacher educators to identify the current technical skills and knowledge essential to successful teaching.

In several states, the installation of teacher preparation programs which specify the behaviors essential to successful teaching have been mandated. These new paradigms are referred to as Competency Based Teacher Education (CBTE).

Purpose of the Study

The purposes of the study were to: (1) develop a method for stating technical competencies, (2) determine if teachers or workers should validate teacher competencies, and (3) propose a system for testing the technical competence of pre-service teachers.

Procedure

Following a task analysis of farm occupations, a competency outline was prepared for teaching farm production and management. The dairy production competency "raising young stock" was selected for a detailed investigation. Behavioral statements of skill¹ and knowledge² were used to state the technical tasks of the competency. A list of 62 behavioral statements of skill and knowledge tasks were developed for the competency "raising young stock."

A random sample of 40 successful teachers and a selected sample of 46 successful farmers was asked to identify a need for each of the 62 tasks. A total of 83 or 97% of the sample returned the questionnaire. In rating knowledges and skills, each participant assigned one of a four-level scale of need to each of the 62 tasks.

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1. Skill - a physical (psychomotor) activity.
 2. Knowledge - an intellectual (cognitive) activity of reason, judgement or comprehension.

Findings

The findings of the study revealed that there were differences between the technical competency needs of beginning teachers and that of beginning workers. The study results supported a documented and supervised work experience program for the preservice teachers of agriculture. This finding should be of particular interest to high school vocational agriculture teachers, state department of education staff, and teacher educators who are in positions of advising the technical preparation of preservice teachers.

One purpose of the study was to develop a method for stating and determining technical teacher competencies. Behavioral task statements were developed from an industry task analysis process and validated by workers and teachers. Sixty of 62 skill and knowledge items were identified by teachers as useful to their teaching. This demonstrated the process of developing behavioral statements from an industry task analysis as a useful method for determining technical teacher competencies.

The question of "Who should determine teacher competency requirements?" was approached by measuring agreement and differences of teacher-worker need level responses to the 62 task statements. A four-level need scale of (1) not needed, (2) useful, (3) important, and (4) essential was collapsed into a two-level scale of (1 + 2) "less important" and (3 + 4) "more important." The collapsed two-level measure of need produced teacher-worker agreement for 53 of the 62 tasks. Forty-four of the 53 tasks were commonly identified as "more important." However, of the 44 "more important" tasks, 30 were more frequently identified at level 4 (essential) by teachers (significant at .05 level), while no tasks were frequently identified as significantly more essential by workers. Level 4 (essential) tasks were those needed to perform the competency and required for beginning employment. Level 3 (important) tasks are those needed to perform the competency that can be learned after beginning employment. Table 1 summarizes the findings.

The results show that the beginning technical skill and knowledge needs of teachers differ from the beginning needs of workers. The answer to the question "Who should determine teacher competency requirements?" was that as beginning teacher needs differ from the needs of workers, teachers should determine the technical components of a competency based teacher education program.

TABLE 1
SUMMARY OF TASK NEEDS FOR BEGINNING TEACHERS AND WORKERS

	Knowledge Statements	Skill Statements
Number of tasks significantly (.05) more essential to beginning teachers	17	13
Number of tasks more essential to beginning teachers	5	4
Number of tasks with equal teaching- worker needs	1	1
Number of tasks more essential to beginning workers	0	3
Number of tasks significantly (.05) more essential to beginning workers	0	0

Conclusions

The conclusions were: (1) that based on measured differences, teacher educators should establish teacher preparation competencies, and (2) that behaviorally-stated skill and knowledge tasks provide a useful method for identifying technical teacher competencies.

In addition to proposing methods of identifying teacher competencies, the study outlined a procedure for testing competencies. The test included a written set of randomly selected questions and a practical demonstration of technical skills. The test guidelines proposed credit for pre-college learning, allowed for individual differences, and provided a basis for performance evaluation.

Summary

The preparation of competent teachers is not a new idea; it is what teacher educators have been attempting to do all

along. However, vocational educators who plan teacher preparation programs do need accurate and current information of the technical competencies required for successful teaching. With the current expansion and specialization of occupational courses taught by teachers of vocational agriculture, such information is critical. A program of competency-based teacher education can provide an organized and up-to-date system for identifying the technical knowledge and skills needed by vocational teachers.

References

Davis, John A. and Ray A. Goldberg. *A Concept of Agribusiness*. Boston: Harvard University, 1957.

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