

A Comparison of Inservice Needs of Middle and High School Agriculture Teachers

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Abstract

Agriculture is a constantly changing field. As such, many believe that agricultural education must also change if it is to remain a vital part of American education. As agricultural education shifts from its traditional focus on *production* agriculture to its new focus on *consumption* agriculture, teachers of agriculture may need to re-tool more frequently than has been done in the past. However, are all agriculture teachers offered the inservice training they need most? Therefore, to ascertain this, the objective of this study was to identify and compare inservice needs of middle school and high school agriculture teachers related to 1) FFA and SAE Supervision, 2) Instruction and Curriculum, 3) Technical Agriculture, 4) Program Planning and Management, and 5) Teacher Professional Development. This study yielded several interesting conclusions. The first is that the inservice needs of middle school teachers are similar in the categories of *FFA and SAE supervision*, *Program Planning and Management*, and *Teacher Professional Development*. However, their needs are considerably different in the categories of *Technical Agriculture* and *Instruction & Curriculum*. When examining specific inservice training items, the greatest inservice training need by both middle school and high school agriculture teachers is writing grant proposals for external funding. In contrast, the lowest needed inservice training items for both middle school and high school teachers were in the agricultural mechanics area.

Introduction/Theoretical Framework

Agriculture is a constantly changing field. As such, many believe that agricultural education must also change if it is to remain a vital part of American education. As agricultural education shifts from its traditional focus on *production* agriculture to its new focus on *consumption* agriculture, teachers of agriculture may need to re-tool more frequently than has been done in the past. However, are all agriculture teachers offered the inservice training they need most?

Evolving changes in educational practices, educational technology, technical agriculture, and FFA events have created a need for agriculture teachers to update their knowledge. Agriculture teachers often use inservice education to accomplish this. Topics of this inservice training have historically been determined by teacher educators in university agricultural education departments (Barrick, Ladewig, & Hedges, 1983). Teacher educators have predominantly used three methods for identifying inservice needs: research (Layfield & Dobbins, 2000; Washburn, King, Garton, & Harbstreit, 2001), their personal experiences (Barrick et al., 1983), and informal inquiries with agriculture teachers (Barrick et al., 1983). Some of those observations have often been less than accurate, however. In a comparison of agriculture teacher needs by teachers and teacher educators and other state program staff, Garton and Chung (1996) found that the topics rated highest by the teachers themselves were different from those topics rated highest by teacher educators and other state program staff. Other researchers have studied factors that affect inservice needs of agriculture teachers. Among these are time, years of teaching experience, and geographic location.

Inservice needs of agriculture teachers change over time. In a 1987 study of beginning agriculture teachers in Missouri, Birkenholz and Harbstreit found the greatest needs for inservice training to be in 1) using a microcomputer in the classroom, 2) developing skills in agribusiness management, 3) developing skills in electricity, 4) training teams for vocational agriculture and FFA contests, and 5) assisting students with SOEP records. Nine years later, Garton and Chung (1996) reported that the greatest inservice needs had changed to 1) completing reports for local/state administrators, 2) motivating students to learn, 3) preparing FFA degree applications, 4) developing an effective public relations program, and 5) preparing proficiency award applications.

Inservice needs of agriculture teachers also change with teaching experience (Birkenholz & Harbstreit, 1987; Claycomb & Petty, 1983; Layfield & Dobbins, 2000; Washburn et al., 2001). Layfield and Dobbins identified 1) utilizing a local advisory committee, 2) developing local adult education programs, 3) organizing fund raising activities for the local FFA chapter, 4) preparing agriculture/FFA contest teams, and 5) developing SAE opportunities for students as being of greatest need for beginning teachers. In contrast, the authors identified 1) using computers in classroom teaching, 2) preparing FFA degree applications, 3) preparing proficiency award applications, 4) using multimedia equipment in teaching, and 5) teaching record keeping skills as the highest ranked needs for experienced teachers.

Finally, inservice needs vary by geographic location. A study by Washburn et al. (2001) revealed that inservice needs varied somewhat between two bordering states in the Midwest.

The authors reported that 33% of the top 15 inservice needs were different between the states. Only three items, 1) writing grants for external funding, 2) modifying curriculum to meet changes in technology, and 3) designing and modifying curriculum and course offerings to attract high quality students, were similarly listed in the top five of both states.

Given that inservice needs can vary with time, years of teaching experience, and geographic location, are there other factors that can affect inservice needs of teachers? Frick (1993) implied that middle school teachers have different needs when he recommended that teacher education programs conduct inservice sessions and modify preservice programs to prepare current and prospective middle school agriculture teachers. However, missing from the research base are studies that identify and compare the inservice needs of agriculture teachers based on grade level taught.

Purpose/Objectives

The purpose of this action research was to determine the current inservice needs of agricultural education teachers in middle and high school agriculture programs. The results of this study will guide decisions for topic selection of inservice sessions offered by the Agricultural Education department of the corresponding land grant university. Ultimately, these inservice sessions will be targeted to specific groups, based upon their needs. To achieve this purpose, the objective of this study was to identify and compare inservice needs of middle school and high school agriculture teachers related to FFA and SAE Supervision, Instruction and Curriculum, Technical Agriculture, Program Planning and Management, and Teacher Professional Development.

Procedures

The instrument used in this study was adapted from the instruments used by Garton and Chung (1996) and Washburn et al. (2001). The instrument contained 80 items and was divided into the following sections: 1) FFA and SAE supervision, 2) instruction and curriculum, 3) technical agriculture, 4) program management and planning, and 5) teacher professional development. Respondents were asked to rate their need for inservice education for each item using a 5-point Likert-type scale. The scale ranged from no need (1) to very strong need (5). The instrument was evaluated for face and content validity by an expert panel of teacher education faculty, graduate students, and teachers not included in the study. Reliability as a measure of internal consistency was established. Cronbach's alpha values ranged from .88 to .95.

The population for this study consisted of agriculture teachers who attended the state FFA convention and/or agriculture teachers' conference ($n= 132$). The researchers administered the instrument on-site.

Since it was reasoned that the teachers who would participate in inservice training were likely those who completed the questionnaire, no effort was made to control for non-response error. According to Miller and Carr (1997), coaxing responses from non-respondents in this situation would likely have skewed the results and affected the inservice training decisions made based upon these results.

Findings

The primary objective of this study was to identify and compare inservice needs of middle school and high school agriculture teachers related to 1) FFA and SAE supervision, 2) instruction and curriculum, 3) technical agriculture, 4) program management and planning, and 5) teacher professional development. Data was collected from 30 middle school teachers and 76 high school teachers (n=106).

In the *FFA and SAE Supervision* category, the needs of middle school and high school teachers were slightly different (see Table 1). The needs ranked highest by middle school teachers were 1) developing SAE opportunities for students, 2) organizing and maintaining an alumni association, 3) preparing for career development events, 4) supervising SAE programs, and 5) preparing POA & national chapter award applications. By comparison, the needs ranked highest by high school teachers were 1) preparing proficiency award applications, 2) preparing for career development events, 3) preparing POA & national chapter award applications, 4) preparing FFA degree applications, and 5) developing SAE opportunities for students. It is interesting to note that preparing proficiency award applications for high school teachers was by far the greatest need (3.78), which was also the overall second highest item for high school on the needs assessment questionnaire. Furthermore, the grand means are considerably different for middle and high school teachers (2.88 and 3.15 respectively).

Table 1
FFA and SAE Supervision Needs Rankings

Item	Middle School (Grand Mean = 2.88)				High School (Grand Mean = 3.15)			
	CR ^a	OR ^b	M	SD	CR ^a	OR ^b	M	SD
Developing SAE opportunities for students	1	15	3.33	1.32	5	35	3.20	1.22
Organizing and maintaining an alumni association	2	29	3.17	1.42	7	62	2.92	1.29
Preparing for Career Development Events	3	35	3.13	1.11	2	13	3.47	1.07
Supervising SAE programs—traditional and non-traditional	3	35	3.13	1.31	6	52	3.05	1.17
Preparing POA & National Chapter Applications	5	42	3.07	1.17	2	13	3.47	1.08
Preparing proficiency award applications	6	59	2.80	1.42	1	2	3.78	1.07
Supervising Show Animal SAE Projects	7	68	2.67	1.30	9	79	2.49	1.24
Preparing FFA degree applications	8	73	2.45	1.27	4	32	3.23	1.19
Supervising CO-OP/OJT programs	9	78	2.17	1.18	8	73	2.74	1.22

Note. 1=no need, 2=some need, 3=moderate need, 4=strong need, and 5=very strong need.

^aRank within category, ^bOverall rank on 80 items

When examining the rankings of inservice needs of agriculture teachers in the *Instruction and Curriculum* category, many similarities existed, yet the two groups ranked several items considerably different (See Table 2). Eight items, 1) changing the curriculum to meet changes in technology, 2) teaching leadership, 3) developing a statewide core curriculum for agricultural education, 4) teaching in laboratory settings, 5) motivating students, 6) designing and modifying curriculum and course offerings to attract high quality students, 7) integrating science into agriculture instruction, and 8) motivating students, ranked in the top ten for middle school and

high school teachers. However, designing programs for non-traditional & urban students (3rd for middle school and 13th for high school), integrating state performance tests and benchmark standards into the curriculum (13th for middle school and 1st for high school), and using computer technology and computer applications (12th for middle school and 4th for high school) ranked very differently for the two groups. Nevertheless, the grand means for the two groups were very similar (3.05 and 3.10, respectively).

Table 2
Instruction and Curriculum Needs Rankings

Item	Middle (Grand Mean = 3.05)				High (Grand Mean = 3.10)			
	CR ^a	OR ^b	M	SD	CR ^a	OR ^b	M	SD
Changing the curriculum to meet changes in Technology	1	8	3.41	1.32	2	9	3.53	.97
Teaching leadership	2	12	3.37	1.13	7	25	3.32	1.13
Designing programs for non-traditional & urban Students	3	17	3.30	1.24	13	66	2.83	1.19
Developing a statewide core curriculum for Ag. Education	4	18	3.27	1.17	8	30	3.24	1.09
Teaching in laboratory settings	4	18	3.27	1.26	10	36	3.19	1.17
Designing and modifying curriculum and course offerings to attract high quality students	6	25	3.21	1.18	5	17	3.45	1.08
Integrating science into agriculture instruction	6	25	3.21	1.24	6	22	3.33	1.18
Motivating students—teaching techniques and ideas	6	25	3.21	1.35	3	12	3.48	1.13
Modifying Lessons for special needs and ESOL Students	9	29	3.17	1.23	14	67	2.80	1.19
Developing critical thinking skills in your students	9	29	3.17	1.26	11	37	3.18	1.05
Integrating math into agriculture instruction	11	34	3.14	1.30	9	34	3.22	1.15
Using computer technology and computer Applications	12	45	3.03	1.19	4	13	3.47	1.08
Integrating State Performance Tests and Benchmark standards into the curriculum	13	48	3.00	1.14	1	8	3.55	1.10
Teaching problem-solving and decision making Skills	13	48	3.00	1.25	12	40	3.17	1.15
Managing student behavior	15	52	2.97	1.30	16	75	2.66	1.21
Developing a magnet program or academy	16	65	2.73	1.55	19	78	2.53	1.42
Testing and assessing student performance	17	69	2.57	.90	15	74	2.68	1.17
Understanding learning styles	18	70	2.50	.97	17	76	2.63	1.07
Planning and effective use of block scheduling	19	72	2.47	1.36	18	77	2.60	1.32

Note. 1=no need, 2=some need, 3=moderate need, 4=strong need, and 5=very strong need.

^aRank within category, ^bOverall rank on 80 items

Middle school and high school agriculture teachers had very different needs in the *Technical Agriculture* category (See Table 3). Only advances in biotechnology (3rd for middle school and 1st for high school), agricultural sales & marketing (5th for middle school and 8th for high school), animal health (8th for middle school and 7th for high school), and record keeping

skills (9th for both middle school and high school) appeared in the top ten for both groups. Greenhouse operation & management (1st for middle school and 19th for high school), food science & food safety (2nd for middle school and 20th for high school), plant identification and use (3rd for middle school and 22nd for high school), genetic engineering (23rd for middle school and 2nd for high school), animal reproduction (17th for middle school and 3rd for high school), global positioning systems (22nd for middle school and 4th for high school), aquaculture (13th for middle school and 5th for high school), landscaping (5th for middle school and 16th for high school), floriculture (9th for middle school and 29th for high school), and tissue culture (15th for middle school and 6th for high school) were ranked noticeably different by both groups. Interestingly, both groups expressed similar needs (3.70 for middle school and 3.72 for high school) for their highest ranked item. Furthermore, the grand means were similar (3.03 and 3.14 respectively).

Table 3
Technical Agriculture Needs Rankings

Item	Middle (Grand Mean = 3.03)				High (Grand Mean = 3.14)			
	CR ^a	OR ^b	M	SD	CR ^a	OR ^b	M	SD
Greenhouse Operation & Management	1	2	3.70	1.34	19	45	3.11	1.15
Food Science & Food Safety	2	3	3.60	1.33	20	48	3.09	1.12
Plant Identification and Use	3	4	3.53	1.36	22	51	3.07	1.14
Advances in biotechnology	3	4	3.53	1.36	1	3	3.72	1.01
Agricultural Sales & Marketing	5	6	3.43	1.22	8	22	3.33	1.12
Landscaping	5	6	3.43	1.25	16	43	3.13	1.15
Plant Propagation	7	10	3.40	1.52	14	37	3.18	1.05
Animal Health	8	15	3.33	1.35	7	22	3.33	1.20
Forestry	9	18	3.27	1.23	18	45	3.11	1.13
Floriculture	9	18	3.27	1.23	29	68	2.79	1.19
Record Keeping Skills	9	18	3.27	1.26	9	26	3.29	1.14
Animal Nutrition	12	23	3.23	1.25	12	29	3.25	1.16
Aquaculture	12	23	3.23	1.41	5	19	3.37	1.20
Global Agriculture Issues	14	28	3.20	1.19	10	27	3.28	1.07
Tissue Culture	15	29	3.17	1.42	6	21	3.34	1.11
Soil Science	16	35	3.13	1.31	26	61	2.95	1.10
Natural Resources Management	17	39	3.10	1.29	17	44	3.12	1.09
Water Quality/Water Regulations	17	39	3.10	1.32	14	37	3.18	.99
Animal Reproduction—A.I. And Embryo Transfer	17	39	3.10	1.45	3	10	3.50	1.23
Financial Management	20	42	3.07	1.20	13	30	3.24	1.11
Meat Science	21	45	3.03	1.27	21	50	3.08	1.18
Global Positioning Systems (GPS)	22	48	3.00	1.36	4	19	3.37	1.19
Genetic Engineering	23	52	2.97	1.25	2	6	3.58	1.05
Restricted Pesticide License Training	24	59	2.80	1.49	10	27	3.28	1.26
Waste Management	25	63	2.77	1.33	27	63	2.89	1.02
Turfgrass	25	63	2.77	1.38	23	53	3.04	1.15
Forages	27	67	2.72	1.13	24	59	2.97	1.01
Ag. Mechanics—Small Project Construction	28	70	2.50	1.33	25	60	2.96	1.18
Small Engine Technology	29	74	2.37	1.38	30	69	2.78	1.27
Electricity and Controls	30	76	2.34	1.40	28	64	2.85	1.21
Tool and Machine Conditioning and Repair	31	77	2.33	1.40	33	72	2.76	1.17
Oxy-Acetylene Welding and Plasma Cutting	32	78	2.17	1.18	31	70	2.77	1.20
Ag Mechanics—Large Project Construction	33	80	1.97	1.19	31	70	2.77	1.16

Note. 1=no need, 2=some need, 3=moderate need, 4=strong need, and 5=very strong need.

^aRank within category, ^bOverall rank on 80 items

The *Program Management and Planning* category revealed little difference in the needs of middle school and high school agriculture teachers (See Table 4). The top three items, writing grant proposals for external funding, recruiting and retaining quality students, and building the image of agriculture programs and courses were the exact same for both groups. While establishing a public relations program, developing business/community relations, and

establishing a working relationship with local media all appeared in the top six needs for both groups. Noticeably, one item, writing grant proposals for external funding was the highest ranked item in the category and the highest item overall for both groups. Additionally, the grand means were only slightly different (3.04 and 3.17 respectively).

Table 4
Program Management and Planning Needs Rankings

Item	Middle (Grand Mean = 3.04)				High (Grand Mean = 3.17)			
	CR ^a	OR ^b	M	SD	CR ^a	OR ^b	M	SD
	Writing grant proposals for external funding	1	1	4.07	1.39	1	1	3.93
Recruiting and retaining quality students	2	10	3.40	1.38	2	4	3.67	1.12
Building the image of agriculture programs and Courses	3	13	3.34	1.20	3	11	3.49	1.21
Establishing a public relations program	4	30	3.17	1.21	5	32	3.23	1.18
Developing business/community relations	5	38	3.13	1.20	6	40	3.17	1.11
Establishing a working relationship with local Media	6	42	3.07	1.44	4	18	3.45	1.20
Fundraising	6	42	3.07	1.48	13	58	3.00	1.27
Conducting needs assessments and surveys to assist in planning middle and secondary agriculture programs	8	55	2.93	1.31	14	64	2.85	.97
Completing reports for local and state Administrators	8	55	2.93	1.39	11	56	3.01	1.13
Utilizing a local advisory committee	10	57	2.90	1.42	10	53	3.04	1.17
Managing learning labs	10	57	2.90	1.37	6	40	3.17	1.11
Evaluating the local agriculture program	12	59	2.80	1.24	11	56	3.01	1.02
Planning and maintaining a school land lab	13	62	2.79	1.35	9	48	3.09	1.18
Building collaborative relationships	14	65	2.73	1.11	8	45	3.11	1.07
Developing an adult program	15	74	2.37	1.35	15	80	2.31	1.12

Note. 1=no need, 2=some need, 3=moderate need, 4=strong need, and 5=very strong need.
^aRank within category, ^bOverall rank on 80 items

The *Teacher Professional Development* category yielded nearly identical rankings by both middle school and high school teachers (See Table 5). However, it is interesting to note that for the category, middle school teachers had a lower grand mean than the high school teachers (3.18 and 3.42, respectively).

Table 5
Teacher Professional Development Needs Rankings

Item	Middle (Grand Mean = 3.18)				High (Grand Mean = 3.42)			
	CR ^a	OR ^b	M	SD	CR ^a	OR ^b	M	SD
	Managing and reducing work-related stress	1	8	3.41	1.35	2	7	3.57
Time management tips & techniques	2	13	3.34	1.59	1	5	3.61	1.24
Professional growth and development	3	48	3.00	1.34	3	13	3.47	1.08
Becoming a member of the total school community	4	54	2.96	1.37	4	53	3.04	1.20

Note. 1=no need, 2=some need, 3=moderate need, 4=strong need, and 5=very strong need.

^aRank within category, ^bOverall rank on 80 items

Conclusions/Recommendations/Implications

This study provides several interesting conclusions. The first is that the inservice needs of middle school teachers are similar in the categories of *FFA and SAE supervision*, *Program Planning and Management*, and *Teacher Professional Development*. However, their needs are considerably different in the categories of *Technical Agriculture* and *Instruction & Curriculum*. When examining the *Technical Agriculture* category, a pattern emerges from the data. That is that middle school teachers had the greatest need in areas that dealt with broad content areas and agricultural literacy topics. While in contrast, high school teachers had the greatest needs in highly specific, technical areas. This is not surprising, given that the curriculums taught by each group mirrored their expressed needs for inservice training. This finding alone warrants a new approach to inservice training for agriculture teachers in the state of this study.

Given the extensive amount of time and effort required to offer exceptional inservice training sessions, it is recommended that when selecting topics for sessions in the categories of *Technical Agriculture* and *Instruction & Curriculum* that different sessions are directed specifically to middle or high school teachers based on the findings in this study. Furthermore, the findings of this study could suggest that middle school and high school teachers require different academic content relating to technical agriculture, curriculum development, and instructional techniques during their preservice teacher education.

When examining specific inservice training items, the greatest inservice training need by both middle school and high school agriculture teachers is writing grant proposals for external funding. This conclusion is consistent with the findings of Washburn et al. (2001). Therefore, it is recommended that inservice training sessions relating to this topic be conducted at various locations throughout the state in this study. Additionally, the unanimous selection of this item as having the greatest need indicates that curriculum related to grant writing should be incorporated into the preservice teacher program at the land grant institution in the state of this study.

Individual items related to advances in technology and science (computers, biotechnology, genetic engineering, etc.) are needed by both groups. Again, this conclusion is consistent with Washburn et al. (2001). Current inservice offerings in the state of this study are addressing some of these needs. Consequently, it is recommended that these inservice sessions are continued and expanded to reflect the findings of this study.

In contrast, the lowest needed inservice training items for both middle school and high school teachers were in the agricultural mechanics area. This was not a surprising finding, however, given that Camp, Broyles, and Skelton (2002) reported that there were no programs in the state being surveyed with a primary focus on agricultural mechanics. The low need for inservice training in this area likely confirms the notion that most teachers in this state do not teach a great deal of agricultural mechanics content. Furthermore, these findings indicate that the agricultural mechanics instruction that preservice teachers received in the state of this study either meets or exceeds the knowledge needed to be an agriculture teacher.

Statewide testing and school grading has affected the inservice needs of high school agriculture teachers as indicated by the inservice item, integrating state performance tests and benchmark standards into the curriculum, ranking first in the *Curriculum and Instruction* category. Therefore, it is recommended that inservice training be offered related to this topic to high school teachers. Moreover, it is recommended that this topic be addressed in the preservice teacher education program in the state of this study.

As indicated by Washburn et al. (2001), identified inservice needs in one state are not necessarily the same in a similar state. Hence, it is recommended that this study be replicated in other states that have similar populations of middle school agriculture teachers.

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