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INFORMATION TECHNOLOGY RELATED PROFESSIONAL DEVELOPMENT NEEDS OF LOUISIANA AGRISCIENCE TEACHERS

Joe W. Kotrlik, Professor
Donna H. Redmann, Associate Professor
Betty C. Harrison, Professor
Cindy S. Handley, Research Assistant
Louisiana State University

Abstract

This study addressed the information technology related professional development needs of Louisiana agriscience teachers. The study found that Louisiana's agriscience teachers value information technology, however, they have inadequate general and software specific knowledge and shill. This is especially true with the newer technologies such as Internet/World Wide Web, video conferencing, and compressed video. Teachers' perceived that information technology in program and instructional management was of moderate usefulness. The studyfound that, over the past three years, either agriscience teachers have placed less reliance on information technology training offered by universities than by other providers, and/or universities have not offered information technology training desired by teachers. There is a continuing trend toward teachers' dependence on self-directed learning as a primary source of information technology training. Most agriscience teachers have computers available in their office or classroom. However, most do not have the latest information technology resources such as multimedia capabilities, World Wide Web, andelectronic mail. There was a lowpositive relationship between teachers' perceivedvalue of information technology and the following variables: availability of computer technology, whether the teacher teaches at the middle/junior high school level, information technology knowledge and skills, software knowledge and skills, whether school is connected to the Internet, training received on information technology, and participation in the AVA convention. There is a low negative relationship between teachers' perceived value of information technology and four variables, namely, number of state vocational conferences attended age, years teaching experience, and whether the respondent taught at the high school level only.

Introduction

Many changes have taken place in the structure of agriscience education over the past decade, especially in the area of information technology. In-service training is especially critical in the area of information technology because this technology changes rapidly and many experienced teachers may have very limited or no training in this area.

Several researchers have documented the need for in-service training. Garton and Chung (1996) reported that in-service training on the use of computers in classroom teaching was ranked 6th out of 50 in-service needs of agriscience teachers. It is interesting to note that the use of multimedia equipment in teaching ranked 45th. In discussing this finding, Garton and Chung asked, "Is it possible that the low acceptance of the use of videotapes and interactive television was due to teachers being unfamiliar with the technology and its capabilities? This issue of using these education technologies should be further investigated' (p. 57). It is interesting to note that nine years earlier, Birkenholz and Harbstreit (1987) had studied the in-service needs of beginning agriculture teachers and found that the areas of greatest need for in-

service training included using computers in the classroom. Their findings were similar to those in a report published the next year by the Office of Technology Assessment (1988), which stated that the use of microcomputers and software cannot be fully effective unless teachers receive adequate training and support.

In 1989, Birkenholz, Stewart and Craven studied the extent to which instructional technology had been adopted in secondary programs of agricultural education. The study documented the rapid increase in the use of technology in agricultural education and found that teachers supported the development of technological advances for use in their curriculum. However, in a 1996 study of Idaho teachers, Mathews, Davis and Hamilton found that up to one-half of all teachers never actually used technology for any instructional purpose. Over half rated themselves as novices in all areas studied.

Zidon and Miller (1990), in a national study of the perceived value of computer use in secondary agriculture programs, reported that "Most teachers rated themselves no higher than just able to get by in their ability to use specific programs" (p. 236). They concluded that more education on the use of computer technology was needed for agriscience teachers.

In a national study of technology in the classroom, a study for the National Education Association (Princeton Research Associates, Inc., 1993) reported that schools have been slow to replace outmoded technology. One in four teachers had used instructional laser discs/videodiscs, hypermedia/multimedia software, and CD-ROM discs. They also reported a lack of access to essential resources; only 16% had computers in the classroom and only 18% had access to computer networks.

McCaslin and Torres (1992) found that three factors accounted for 54% of the variance in agriscience teachers attitude toward using microcomputers during in-service training: their educational value, confidence in their use, and apprehension about their use. McCaslin and Torres' findings are supported by research in the area of agriscience teachers' computer anxiety. Fletcher and Deeds (1994), and Kotrlik and Smith (1989) found that agriscience teachers' computer anxiety ranged from mild to severe with regard to the aspects of computer anxiety measured by Oetting's Computer Anxiety Scale (COMPASS). Chin and Hortin (1994) found that " . . . numerous recent studies have shown that most teachers want to use the newest technology and to prepare their students for the world of technology outside of the school. Apparently, what teachers really need is more time to acquire the knowledge and understanding of technology, and to absorb what instructional technology can do for them" (p. 87).

Several studies have been conducted that addressed relationships between selected demographic variables and computer use. Zidon and Miller (1990) found that weak relationships existed between demographic variables such as age, gender, and years of teaching with perceptions of computer use. They concluded that "such demographic variables need not be considered when planning in-service training or planning to include computers in a secondary agriculture curriculum" (p. 237). This opinion was not voiced by other authors.

The National Education Association study (Princeton Research Associates, Inc., 1993) found that almost two-thirds (59%) ofteachers under 35 years of age believed computers in the classroom were essential, while only 29% of teachers over age 55 shared this belief Half of the teachers in low technology schools had home computers.

In a study of computer utilization in Kansas vocational agriculture programs, Raven and Welton (1989) found that there was a

moderate positive correlation between respondents' years of teaching experience and the number of computers in the agriculture department. Mathews et al. (1996) found that degree held was the best predictor (R=.39) of teachers' perceptions of their ability to use technology in preparation of instructional materials, with higher levels of technology use being reported by teachers with the Bachelor's degree. They also found that grade level taught (additional R^2=.01) significantly contributed to this prediction. Fletcher and Deeds (1994), and Kotrlik and Smith (1989) also reported that younger teachers were more likely to have higher levels of computer literacy and that computer anxiety decreased as computer literacy increased. No studies were found that documented a significant relationship between participation in professional conferences and conventions, and the value placed on information technology by teachers.

The literature shows that the use of information technology is dependent on knowledge and skill level, and the availability of training and technology. No recent study had been conducted of the information technology needs of agriscience or vocational teachers. This study was designed to determine these needs for Louisiana's agriscience teachers. The results will be useful in planning pre-service and in-service training programs for agriscience teachers.

Purpose and Objectives

The purpose was to determine the information technology related professional development needs of Louisiana agriscience teachers. The objectives were to determine: (1) their demographic characteristics (degrees held, age, gender, ethnicity, years teaching experience, area where school is located [rural, urban or suburban], school level [high school, junior/middle school, or both], participation in professional associations); (2) the value of information technology as perceived by teachers; (3) the general information technology knowledge and skill levels possessed by teachers; (4) software specific knowledge and skills possessed by teachers; (5) teachers' perceptions of the potential usefulness of information technology in program and instructional management; (6) the availability of information technology to teachers; (7) the source ofinformation technology training received by teachers; and (8) if relationships exist between selected variables and the value placed on information technology by teachers.

Procedures

The population for this study included all 243 secondary (grades 7 12) agriscience teachers in Louisiana during the 1997-1998 school year. This study was part of a larger study of secondary vocational teachers in which a stratified random sample was taken of each distinct vocational teacher population. The minimum returned sample size for the agriscience teacher population was determined to be 101 using Cochran's sample size formula. The sample size used for the agriscience teacher group was 201 teachers. After two mailings and a phone follow-up of non-respondents, responses were received from 131 teachers (65.2% response rate).

The instrument was developed based on the study's objectives. The scales and items used in the instrument were selected after a review of the literature. The face and content validity was evaluated by an expert panel of university vocational education faculty and doctoral level graduate assistants. As a part of the larger study, the instrument was field tested with 40 vocational teachers. Five of these teachers were agriscience teachers who had not been selected in the sample for the study. Minor changes suggested by the validation panel and from the field test results were made. These changes occurred in the wording of items and in the instructions for completing the instrument. Internal consistency coefficients for

the research sample data for the four scales in the instrument were as follows (Cronbach's alpha): Value of Information Technology in Instruction - .87, General Information Technology Knowledge and Skill - .95, Software Specific Knowledge and Skill - .94, and Usefulness of Information Technology in Program and Instructional Management - .93.

To determine if the sample was representative of the population and to control for non-response error, the scale means for the four primary scales were considered to be the primary variables in the study and the scale means were compared by response mode (mail versus phone) as recommended by Borg (1987) and Miller and Smith (1983). There were no statistically significant differences between the means for the four scales in the instrument by response mode. It was concluded that no differences existed by response mode and the data were representative of the population. The mail and phone responses were combined for further analyses. Data analyses consisted of descriptive statistics for objectives 1 - 7 and correlation coefficients for objective 8 (based on variable type). The alpha level for the study was set a priori at .05.

Findings

Objective one was to determine the demographic characteristics of the teachers. Less than half of the respondents (42%) possessed a bachelor's degree, 30% had a master's degree, and 28% had a master's + 30 hours or the education specialist certificate. None had doctoral degrees. Almost all (94%) were male. Most of the teachers were white (94%), while 5% were black, and 1% were Hispanic. Their average age was 42 years (range= 23 -74) and the average years teaching was 18. Most (8 1%) taught in rural areas, 10% in urban areas, and 9% in suburban areas. Most (72%) taught at the high school level, 5% taught at the junior/middle school level, and 22% taught at both the high school and junior/middle school level. Almost all (95%) had attended the state vocational association convention at least once in the past three years while only 29% had attended a regional or national vocational association convention in the past three years. Over half (57%) of the teachers' schools were connected to the Internet.

Objective two was to determine the value of information technology as perceived by Louisiana's agriscience teachers. The respondents rated each statement on the following scale: 1 = strongly disagree, 2 = disagree, 3 = undecided, 4 = agree, and 5 = strongly agree. The data revealed that agriscience teachers placed a high value on information technology by strongly agreeing ($\underline{M} \geq 4.5$) that teachers should know how to use computers and that teachers and students should have computers available for instruction. The respondents agreed ($\underline{M}$ =3.5-4.49) or strongly agreed ($\underline{M} \geq 4.5$) that all of the technology listed should be available. The respondents agreed ($\underline{M}$ =3.5-4.49) with all of the positive worded statements regarding the value of information technology in the instructional program. They were undecided ($\underline{M}$ =2.5-3.49) as to whether information technology is too expensive to be cost effective, and disagreed ($\underline{M}$ =1 .5-2.49) with all of the other negatively stated value statements. These data are presented in Table 1.

Objective three was to determine the general information technology knowledge and skill possessed by Louisiana agriscience teachers. The respondents rated each statement on the following scale: 1 = I don't know enough to respond, 2 = My knowledge/skill in this area is below average, 3 = My knowledge/skill in this area is average, 4 = My knowledge/skill in this area is above average, and 5 = My knowledge/skill in this area qualifies me as an expert. The data revealed (Table 2) that the teachers rated themselves average ($\underline{M}$ =2.5-3.49) on the first eight areas listed in the table. All of the first eight areas listed

Table 1. Value of Information Technoloav as Perceived by Louisiana Anriscience Education Teachers

Value of Information Technology	M	SD
Teachers should know how to use computers.	4.58	0.67
Teachers should know how to use the Internet.	4.22	0.88
Programs should have the following technology available for use in instruction ...		
computers for teachers	4.60	0.68
computers for students	4.50	0.75
Internet connections for teachers	4.36	0.78
multimedia computers for teachers[a]	4.29	0.84
multimedia computers for students[a]	4.14	0.94
Internet connections for students	4.01	1.02
laser disc players for teachers	3.91	0.98
satellite downlink capability for teachers	3.91	0.97
video conferencing capability for teachers[a]	3.83	0.98
compressed video capability for teachers	3.71	0.98
laser disc players for students	3.67	1.02
Information Technology ...		
helps individuals apply knowledge	4.31	0.75
can improve the quality of programs	4.27	0.70
is a useful instructional tool	4.25	0.74
adds interest in instruction	4.21	0.69
can improve teacher effectiveness[a]	4.16	0.77
enhances student learning[a]	4.16	0.74
is essential to prepare students for the workplace.	4.14	0.83
encourages teacher innovation[a]	4.10	0.71
is important in instruction.	4.05	0.72
promotes self-directed learning	3.99	0.72
is necessary for the success of students in the workplace	3.95	0.91
allows teachers flexibility in planning their instruction[a]	3.95	0.78
is too expensive to be cost effective.	2.81	1.10
will limit student-teacher interaction.	2.46	1.02
creates problems for the teacher	2.45	1.01
makes learning too mechanical	2.40	0.91
will isolate teachers from one another.	2.29	1.04
causes more problems than it solves.	2.24	1.00
has an adverse effect on teachers[a]	2.13	0.97
has little value in vocational education.	1.84	0.88

Note. N=131. The respondents rated each statement on the following scale: l=strongly disagree, 2=disagree, 3=undecided, 4=agree, and 5=strongly agree.

Table 2. General Information Technology Knowledge and Skill as Reported by Louisiana Agriscience Education Teachers

General Information Technology Knowledge and Skills	M	SD
Know the major components of a computer[a]	2.94	0.88
Know how to operate a computer	2.93	0.79
Can integrate computer-based teaching materials into instruction	2.77	0.95
Can evaluate software for instruction	2.75	0.93
Know how to select information technology that tits program needs (computers, modems, printers, laser disc players, etc.)	2.71	0.93
Can locate computer-based teaching materials for use in instruction	2.70	0.91
Can evaluate software for program management[a]	2.64	0.93
Know how to prepare students to use information technology[a]	2.61	0.91
Know how to use . . .		
multimedia computers	2.20	0.97
Internet e-mail	2.09	1.02
laser disc players	2.09	0.98
World Wide Web	2.06	1.02
compressed video	1.74	0.78
videoconferencing	1.72	0.71
satellite downlinks	1.67	0.67

Note. N=131. The respondents rated each statement on the following scale: 1=I don't know enough to respond, 2=My knowledge/skill in this area is below average, 3=My knowledge/skill in this area is average, 4=My knowledge/skill in this area is above average, and 5=My knowledge/skill in this area qualifies me as an expert.

represent technology that has been available for at least a decade and they did not rate themselves above average on any of them. On knowing how to use the newer technology listed in the last seven items, the respondents rated themselves as below average (M =1.5-2.49).

Objective four was to determine the software specific knowledge and skill possessed by Louisiana agriscience teachers. The respondents rated each statement on the following scale: 1 = I don't know enough to respond, 2 = My knowledge/skill in this area is below average, 3 = My knowledge/skill in this area is average, 4 = My knowledge/skill in this area is above average, and 5 = My knowledge/skill in this area qualifies me as an expert. The data in Table 3 show that the teachers rated themselves average (M =2.5-3.49) or below average (M =1.5-2.49) in all software areas, with the lowest ratings typically being in the area of newer types of software (such as World Wide Web browser, Internet e-mail, file transfer, and presentation software).

Objective five was to determine Louisiana agriscience teachers' perceptions of the potential usefulness of information technology in program and instructional management. The respondents rated each statement on the following scale: 1 = not useful, 2 = low usefulness, 3 = undecided, 4 = moderately useful, and 5 = highly useful. The data revealed that agriscience teachers perceived that

Table 3. Software Specific Knowledge and Skill as Perceived by Louisiana Agriscience Education Teachers

Software Specific Knowledge and Skill	M	SD
Word Processor *(Examples: WordPerfect, Microsoft Word, Microsoft Works, Appleworks, etc.)*	2.91	1.05
Windows *(Examples: Macintosh, Windows 3. I, Windows95, Windows NT)*	2.45	1.01
Grade Book	2.44	1.11
Instructional Software *(Examples: My Resume, Injured Engine, livestock feed ration formulation, personal or business finance, loan amortization, nutrition, house design, health diagnostics, etc.)*	2.40	0.95
Graphics *(Examples: Corel, Paintbrush, MacPaint, Harvard Graphics, Freehand, Print Shop, etc.)*	2.35	0.98
Spreadsheet *(Examples: Lotus l-2-3, Excel, Microsoft Works, Quatro Pro, etc.)*	2.30	0.99
Database *(Examples: Approach, dBase, Access, Microsoft Works, etc.)*	2.15	0.88
Desktop Publishing *(Examples: Pagemaker, Ventura, desktop publishing capabilities of WordPerfect or Microsoft Word)*	2.01	0.94
Presentation Software *(Examples: PowerPoint, WordPerfect Presentations, Freelance Graphics, Harvard Graphics, etc.)*	1.97	0.84
World Wide Web browser *(e.g.: AOL, Netscape, Prodigy, Compuserve, Internet Explorer, etc.)*[a]	1.92	1.01
Internet E-mail *(Examples: America On-Line, Netscape, Prodigy, Juno, Compuserve, Eudora, etc.)*	1.91	0.96
Utilities *(Examples: Norton, PC Tools, virus protection, Windows uninstaller, etc.)*	1.87	0.87
Lesson Planning *(Examples: 4MATION, PET, etc.)*	1.87	0.82
File Transfer to and from Other Computers Using. a Modem (FTP)	1.79	0.81

Note. N=131. The respondents rated each statement on the following scale: 1=1 don't know enough to respond, 2=My knowledge/skill in this area is below average, 3=My knowledge/skill in this area is average, 4=My knowledge/skill in this area is above average, and 5=My knowledge/skill in this area qualifies me as an expert.

information technology was moderately useful (M =3.5-4.49) in each of the program and instructional management areas listed (Table 4).

Objective six was to determine the availability of information technology to agriscience teachers. Just over half had computers at home while over three-fourths had computers in their office or classroom and less than one-third had a computer lab available in their department. Almost two-thirds had multimedia computers in their school while just over one-third had multimedia capacity in their classroom and less than one-fourth had multimedia capacity at home. Less than one-fourth had the World Wide Web or Internet e-mail available at home, in their office or classroom, or in a computer lab in their department. These data are presented in Table 5.

Objective seven sought to determine the source ofinformation technology training received by Louisiana agriscience teachers. The teachers were asked to circle "yes" or "no" if they had ever received training from the source listed, and then to place a check mark (√) beside each source of training if they had received training from this source in the last three years. The percentages of teachers who reported they had received training from selected sources and the percentage who have received this training within the last three years are as follows: university/college course - 46.5%/8.5%; university/college workshop - 36.7%/11.7%; industry workship- 17.3%/10.2%; professional conference - 3 3.6%/ 15.6%; self-directed learning/personal experience - 69.8%/40.3%; suppliers of equipment and software - 30.7%/19.7%; school, parish, or state

Table 4. Usefulness of Information Technology in Program and Instructional Management as Reported by Louisiana Anriscience Education Teachers

Usefulness of Information Technology	M	SD	N
Instructional Management *(Grade Reports, Student Records)*	4.09	1.02	128
Instructional Evaluation *(resting, Assessment)*	4.10	0.87	130
Program Planning, Development and Evaluation *(Examples: youth organization activities, program reports, budget, equipment/maintenance, long-range planning, funding requests, fund raising, instructional material, equipment purchases, etc.)*	4.08	0.91	126
Instructional Planning *(Lesson/Unit/Curriculum Planning)*	4.04	0.94	130
Student Vocational Organizations	4.02	0.91	130
Student Guidance and Career Development	3.97	0.94	130
Professional Role and Professional Development	3.98	0.93	130
Instructional Execution *(Presentation of Instruction)*	3.89	0.87	129
Coordination of Cooperative Programs	3.85	0.97	130
School Community Relations *(Public Relations)*	3.75	0.99	130

Note. N=131. The respondents rated each statement on the following scale: l=not useful, 2=low usefulness, 3=undecided, 4=moderately useful, and 5=highly useful.

Table 5. Availabilitv of Information Technology in Louisiana Agriscience Program

Information technology	Have now		Don't have	
	#	%	#	%
Computer at home	67	51.9	62	48.1
With multimedia capabilities	25	21.4	92	78.6
With World Wide Web	16	13.9	99	86.1
With Internet e-mail	15	14.3	90	85.7
Computer available in office or classroom	98	79.0	26	21.0
With multimedia capabilities	47	38.8	74	61.2
With World Wide Web	16	13.4	103	86.6
With Internet e-mail	19	15.8	101	84.2
Computer lab in department	38	30.4	87	69.6
With multimedia capabilities	15	12.6	104	87.4
With World Wide Web	4	3.4	113	96.6
With Internet e-mail	4	3.6	108	96.4
Video conferencing/compressed video in school	18	13.8	112	86.2
Satellite downlink in school	45	34.6	85	65.4
Laser disk players in school	40	30.8	90	69.2
Multimedia computers in school	82	63.1	48	36.9

Note. N=131

sponsored in-service training - 49.6%/31.8%; and written materials such as information booklets, training manuals, etc. - 68.0%/40.5%.

It is interesting to note the gap in the percentage who have received training from university/college courses (46.5%) versus the percentage who received training from this source in the past three years (8.5%). Self-directed learning/personal experience were reported most often as a training source, which is logically supported by the fact that written materials were the second highest source.

Objective eight sought to determine if relationships existed between selected variables and the value placed on information technology by Louisiana's agriscience teachers. The data in Table 6 shows that seven variables had a low positive relationship and three variables had a low negative relationship with the value of information technology. The highest relationship ($r=.25$) was between the availability of computer technology at school and home and the value teachers placed on information technology.

Conclusions, Recommendations and Implications

Conclusions. (1) Louisiana's agriscience teachers value information technology. However, they have inadequate general and software specific knowledge and skill. This is especially true with the newer technologies such as Internet/World Wide Web, video conferencing, satellite downlinks, compressed video, and laser disc players and is supported by teachers' self-ratings of their software skills. Louisiana agriscience teachers' perceive that information technology in program and instructional management is of moderate usefulness. (2) Over the past three years, agriscience teachers have placed less reliance on information technology training offered by universities than by other providers, and/or universities have not offered information technology training desired by teachers. (3) There is a continuing trend toward teachers' dependence on self-directed learning as a primary source of information technology training. (4) Four out of five agriscience teachers have computers available in their office or classroom. However, most do not have the latest information technology resources such as multimedia capabilities, World Wide Web, and electronic mail. (5) There is a low positive relationship between teachers' perceived value of information technology and the following variables: availability of computer technology, whether the teacher teaches at the middle/junior high school level, information technology knowledge and skills, software knowledge and skills, whether school is connected to the Internet, training received on information technology, and participation in the AVA convention. There is a low negative relationship between teachers' perceived value of information technology and four variables, namely, number of state vocational conferences attended, age, years teaching experience, and whether the respondent taught at the high school level only.

Recommendations

(1) The State Department of Education, university teacher education programs, professional associations, and other service providers should place a high priority on increasing the information technology knowledge and skills of pre- and in-service teachers. (2) University teacher education programs should investigate why such a low percentage of teachers reported that they had received information technology related training in university courses and workshops. If the available offerings do not meet the needs of agriscience teachers, teacher educators should work with agriscience teachers to modify these offerings to meet the needs of teachers. At the same time, teacher educators should determine whether they are offering adequate opportunities for teachers to improve their information technology knowledge and skills.

Table 6. Relationships Between Perceived Value of Information Technology and Selected Variables

Variable	Corr.	Interpretation[a]
Availability of computer technology at school and home[b]	.25*	Low
Teaches at both junior/middle and senior high school level (O=no, 1=yes)	.22*	Low
Information technology knowledge/skills scale grand mean[b]	.19*	Low
Software knowledge/skills scale grand mean[b]	.18	Low
Whether school is connected to the Internet (O=no, 1=yes)	.16	Low
Training received on information technology[bd]	.12	Low
Numbers of regional or national AVA Conventions attended during past three years[b]	11	Low
Teaches at the junior/middle school level only (O=no, 1=yes)	.06	Negligible
Degree held (1=bachelor's, 2=master's, 3=above master's)	.04	Negligible
Number of state vocational conferences attended during past three years[e]	-.10	Low
Age[b]	-.14	Low
Years teaching experience[b]	-.17	Low
Teaches at high school level only (O=no, 1=yes)[c]	-.22*	Low

Note: N=131. The scale used for the value of information technology is shown in Table 1. "Correlation coefficients interpreted according to Davis (1971): .01-.09=negligible association, .10-.29=low association, .30-.49=moderate association, .50-.69=substantial association, .70 or higher=very strong association. [b]Pearson Product Moment Correlation Coefficient. "Point Biserial Correlation Coefficient. [d]Calculated from the data presented under objective seven. Respondents received one point for each source of training and an additional point if training was received within the last three years. "Spear-man Correlation Coefficient

*$p<.05$

Teachers should also assume their professional responsibility by being proactive in communicating their needs to the university as well as other appropriate service providers. (3) Pre-service programs should strengthen their emphasis on preparing new teachers to be self-directed learners, especially in the area of information technology knowledge and skills. However, in the area of pre-service teacher education, universities should not abandon their responsibility to provide information technology knowledge and skills training. (4) In concurrence with Zidon and Miller's recommendation (1990) and the low or negligible correlations with the value of information technology, it appears teacher educators should be cautious when using demographic variables such as age, years teaching experience, degree held, and level at which one teaches when planning in-service training activities. (5) Since low or negligible correlations existed between teachers' perceived value of information technology and the variables selected for study, additional research should be conducted to identify those variables that are related to teachers perceived value of information technology.

Implications

The implications of this study are simple. This study documents the fact that agriscience teachers need and value increased knowledge and

skills in the area of information technology. If agriscience programs are going to prepare students for the workplace, both now and in the future, teachers must have information technology knowledge and skill if they are to be successful in its transfer to their students. Certainly, if the United States is to remain competitive in the world marketplace, this foundation consisting of information technology knowledge and skill is a necessity if the U. S. expects to have a well trained workforce that will create and maintain a competitive edge.

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