USE OF THE INTERNET IN GEORGIA'S AGRICULTURAL EDUCATION PROGRAMS

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Abstract

The main purpose of this study was to determine the use of the Internet in Georgia's Agricultural Education Programs, which included looking at the factors that would encourage use of the Internet and at the demographic and school-related characteristics of these educators. This was a descriptive study of attitudes and perceptions of teachers of agriculture in Georgia. It was based on a national study by Layfield (1998), whose instrument was adapted to reflect Georgia's Agricultural Education Program. A stratified, random sample of programs was selected from the 1998 Agricultural Educators Directory. Head teachers from 56 departments (62% of the sample) provided responses. Literature on the use of the Internet in Agricultural Programs is limited; therefore, this study may be used as a benchmark for further research on Internet use in Georgia. The demographic data indicated that, typically, agricultural teachers were male with an average age of 40 years, 15 years teaching experience and 5 years of experience working outside of teaching. A majority (67%) of the Agricultural Educators held a graduate degree, while 33% held only a bachelor degree. All areas of Georgia's Agricultural Education regions were represented in this study with 67% being from rural, small town communities. A diversity of agricultural curricula were also represented, with Horticulture, Agricultural Mechanics and Natural Resources being the main subjects taught. A majority of the respondents (80%) taught in the high school (grades 9 -12) and reported that the school library (78%) was the most available site for Internet access. Home (35%) and the school computer lab (35%) were other sites for accessing the Internet. About one-third (37%) of the respondents reported using the Internet, while 63% reported not using it. The major uses of the Internet/World Wide Web were: FFA information, agricultural research, references, current events/global awareness, and downloading educational programs. The uses of e-mail were similar, with correspondence being most mentioned. These data indicate that the Internet is being used, but only to limited degree in Georgia's Agricultural Education programs. As to concerns about the Internet, a majority of the teachers agreed that the Internet will have an effect on their program and that they would like to know how the Internet could be used. Respondents said that they had the staff but needed more access to training and equipment for effective use of the Internet in their programs. Respondents indicated that they had basic computer competence, but that their students knew more about the Internet than they did. Thus, adoption of the Internet is likely to be slow until teachers feel more comfortable about using the new technology. Recommendations were made for improved pre-service and in-service training of Georgia's Agricultural Education personnel in use of the Internet.

Introduction

With technology advancing and improving rapidly in the world, educators need to make an effort to keep up with the new technology. One of the fastest growing areas of technology is in communication, where the Internet has grown exponentially over the past decade. The Internet is a "network of networks" across the United States and throughout the World. It is a combination of the E-mail system and World Wide Web's multimedia browsing system (Provenzo, 1998). The use of the Internet has the potential to bring extraordinary information and communication resources to the classroom while it removes the confines of the classroom and local community to gather information and see the world (Provenzo, 1998). The Internet has also been indicated as a means of breaking the barriers of economic inequity, rurality, ethnicity, social and cultural issues. Integration of technology could change traditional teaching methods such as the lecture format, thus adding value to K-12 programs. With the availability of this new technology, teachers need to be trained to integrate and use it in the curriculum.

In his 1996 State of the Union Address, President Clinton (1996, [online]) issued a challenge that Americans be provided with educational opportunities needed to face the next century, and that every classroom be connected to the information superhighway, with computers, software and well trained teachers. In a related background document, the government's educational technology initiative was described as having four "pillars": 1) modern computers and learning devices will be accessible to every student; 2) classrooms will be connected to one another and to the outside world; 3) the development of educational software will be an integral part of the curriculum; and 4) teachers will be ready to use and teach technology (U.S. Department of Education, 1998, [online]).

The government has set goals to encourage programs to help fund projects, create new teacher education classes and make better equipment available to the schools. President Clinton, in his 1997 State of the Union address, outlined a ten-point plan for improving schools through his Call to Action for American Education, which included the connection of all schools with the Internet (Clinton, 1997). To meet these national goals, some states have taken up their own initiatives. The State of Pennsylvania, for example, established an initiative promoting the adoption of the Internet in the classroom. Link-to-Learn, a three-year, $132 million project, is intended to expand the use of technology in the classroom. The project is expected to provide funds for new and upgraded computers for schools

and technology training for teachers (About Link-to-Learn, 1998). Another state with an initiative is in Georgia. Governor Zell Miller had already developed and executed a plan to help raise money for education. The Georgia Lottery for Education Act, passed in 1992, specified that the proceeds from the sales be spent in three educational areas: capital outlay projects for educational facilities; tuition grants, scholarships or loans to college students and teachers; and voluntary pre-kindergarten programs (Georgia Lottery Corporation, 1998, [online]). Six years later, the voters of Georgia overwhelmingly approved an amendment to Georgia's Constitution, which states that the Georgia Lottery proceeds will be earmarked for educational programs. Since the beginning of the lottery, the Georgia Lottery Corporation has transferred $ 2.85 billion to the Lottery for Education Account (Georgia Lottery Corporation, 1998). Since the start of the program, the money allotted to technology in Georgia schools has been approximately $606 million with a $124 million being budgeted for K-12 classroom computers for the four-year period. An important part of the Lottery law prohibits the General Assembly from reducing or removing funds from the General Budget allotments for education.

Recently, the CEO Forum on Education and Technology -- a group of industry and education leaders formed to help meet the goals of the four pillars -- proposed requiring that teachers obtain technology training in college before starting to teach. The group pointed out that, "Simply using computers to drill students doesn't raise achievement. But students who use the computers in more complex ways – for example, to stimulate science experiments – do have higher test scores" (Associated Press, 1999). Clearly, having the technology and funds available are important, but teachers need to learn how to use the equipment and be able to integrate it into their classroom.

Encouraging teachers to learn how to use the new technology is often difficult. The important factor is understanding teachers' attitudes and skills when planning workshops, in-services, courses and other materials for integrating the Internet into the curriculum (Layfield & Scanlon, 1998). Teachers must also understand that "employers tell us that nearly all workers entering the job market in this next century need to have expanded sets of technical skills in communication, problem-solving and production. Productivity and profit will both be linked to workers' effective uses of new technologies" (Gaines, Johnson, & King, 1996). The new technologies can be time savers, but if the teacher doesn't understand how to use and teach with the technology, student won't learn the most efficient uses of the technology.

Use of technology allows individuals to use new tools that are productive, motivational and empowering. These tools make learning more fun, especially when they allow the users to both access and develop new realms of knowing and doing (Gaines et al, 1996). The use of the Internet allows a teacher to reach students in three main ways. The use of e-mail, web site, and newsgroups can effectively develop and improve a course (Partee, 1996). Adapting new teaching methods for the Internet is necessary for successful use of the new technology (Forsyth, 1996). The Internet has proven to benefit teachers and students. The teachers are less likely to be the center of the class activities, and more likely to: link subject matter to student interest, use the technology as a means rather than the end for classroom and student activities, and believe that their students will succeed (Garner & Gillingham, 1996). Several teachers reported in Rogan's (1996) study that they had the "exhilarating experience" of having access to unlimited information and resources, a sense of excitement and renewal for new ideas and resources, and a sense of becoming a part of the global community. Another benefit described in Garner and Gillingham's (1996) case studies was the improvement of the social and cultural understanding, when the lessons were treated as social activities. These activities allowed the students to select their topics when contacting students in a distant state. This selection allowed the students to practice reading and writing skills with other students while the teacher acted in an advisory capacity.

Even though many benefits have been noted, some obstacles also occurred. With subject and curriculum requirements, many teachers do not have the time to plan for use of new technology. Another obstacle is that classroom management may be more difficult. Other problems relate to the technology's limitations for access at certain times of the day. The fact that the information on the Internet is not censored, and may be completely inaccurate, is also a serious concern. Perhaps the greatest obstacle, however, is the teacher's management of time. With more being required of teachers -- including family and civic duties -- time management becomes a very important factor to consider. The Internet can also become somewhat addictive, with the interest and links taking the teacher further into the subject matter (Rogan, 1996). Many teachers and professors, whether through fear, lethargy and ignorance, prefer familiar teaching methods to spending precious hours learning the new technology. Similarly, many students in the secondary schools, and even those who enter the university system, may not have been exposed to other uses of the computer (Partee, 1996). Consequently, the need to learn about the Internet and other technologies is growing. Knowing about these benefits and obstacles will help with the implementation of the new technology in the school.

The integration of the Internet into the curriculum has strong potential to improve classroom learning. However, studies need to be conducted on how to integrate this technology into the curriculum. Therefore, it is important to determine current use in order to understand the factors that will encourage Agricultural Educators to use the Internet and other technology in their program.

Purpose and Objectives of the Study

The primary purpose of this study was to determine the use of the Internet in Georgia's Agricultural Education programs. Specific objectives were to:

1. Describe demographic and school-related characteristics of Georgia Agricultural Educators.

2. Determine how the Internet was used in Georgia's agriculture programs.

3. Identify factors that encouraged or discouraged use of the Internet in Georgia's Agricultural Education programs.

Methods and Procedures

This was a descriptive study involving attitudes and perceptions of teachers of agriculture. The instrument for this study was adapted from Dr. Dale Layfield's doctoral research, "Factors encouraging use of the Internet by secondary agriculture teachers: A national perspective" (1998). The instrument had three parts which were developed to determine the use of the Internet, factors that encouraged use and integration of the Internet, and the demographics and characteristics of the schools and programs involved. The basic form of Layfield's instrument was followed, but with modifications for additional demographic information related to Georgia's Agricultural Education program. Four professors in the Department of Agricultural Leadership, Education and Communication reviewed the instrument for face and content validity. After revision, a field test was conducted in an Occupational Studies Foundations of Education class. Based on this field test, the instrument was finalized and printed.

The population for the study consisted of head teachers of Agricultural Education employed at secondary schools, middle schools, and in young farmer programs across the State of Georgia. With 182 programs in Georgia, a decision was made to do a stratified random sample. The sample was determined using a formula for a 90% confidence level, which required that 90 schools be surveyed. A coin toss was used to determine a starting point, and every other program was selected from the 1998 <u>Agricultural Educators Directory</u> (Henry, 1998) for the State of Georgia which resulted in 91 programs being selected. The study was reviewed for human subject use and approved by the Institutional Review Board. Data were collected from September 1 through December 4, 1998. Post cards, phone calls, and a reminder sent through the State Agricultural Education listserve were used to obtain more returns. A total of 56 responses were received for a return rate of 62%.

Of the 56 returns, a total of 54 contained useable data; two were telephone interviews that contained insufficient information for data analysis. A Cronbach's Alpha was calculated to determine reliability of the three major constructs. The Concerns construct had an alpha of .86; the Staff Development construct yielded an alpha of .81; and the Adoption construct had an alpha of .54. The medium reliability of the latter construct may have been caused by the low number of items tested. An overall alpha of .80 -- moderately high -- was found for all 33 Likert-type items. Mainly descriptive statistics – means, frequencies, percentages, standard deviations and range – were used to analyze the data. However, early and late responses were compared on the Likert-type items using Chi-square and t-test; no significant differences were noted. This was also an indication that missing respondents were similar to those studied (Miller & Smith, 1983).

The Chi-square and t-test were used to determine differences among the 33 Likert-type items when cross-tabulated with demographics. However, only four items were significant at the 0.05 level, which was set *a priori*. These may have occurred by chance alone; for when the .05 alpha was divided by the number of items tested, $p \leq .005$ would be required in order to be statistically significant. Since no items tested at $p \leq 0.005$, no differences by demographics are reported.

Findings

<u>Demographics</u>

Referring to the data in Table 1, it was found that 91% of respondents were males with nearly two-thirds holding a graduate degree. One-third held the bachelor's degree. A majority of the respondents (76%) were between 31-50 years of age, with a mean age of 40 years. The non-teaching experience ranged from 0 –10 years for the majority (85 %) for a mean of 5 years, while the two largest groups in teaching experience had from 0-10 years and 21 or more years, for a mean of 15 years. All six administrative areas of the State of Georgia were represented in this study. For community attributes, more than two-thirds of the schools were located in rural or small town communities (67%), while suburban schools and urban schools were represented by smaller numbers of respondents. Horticulture (33%) and Agricultural Mechanics (33%) were indicated to be the main subjects taught, with Agriscience and Career Exploration (8%), and Natural Resources (4%) reported as other subjects. When the secondary subject was requested, Horticulture (22%) was first, with Natural Resources (20%) second; Agricultural Mechanics (19%) came in third. For school level taught, most (80%) of the respondents indicated that they taught in the high school (grades 9-12); junior high school, middle school, and young farmer programs were represented by smaller numbers of respondents.

Table 1
Demographic Characteristics of Respondents (N=54)

Characteristic	N	%	M	SD
Gender				
Male	49	91		
Female	5	9		
Age				
Less than 30 years	7	13	40.2	10.54
31- 40 years	17	32		
41- 50 years	24	44		
51- 60 years	5	9		
61or later years	1	2		
Years taught				
0 - 10 years	20	37	15.2	8.71
11- 20 years	14	26		
21 or more years	20	37		
Years worked (non-teaching)				
0-10 years	46	85	4.8	6.46
11- 20 years	5	9		
21 or more years	3	6		
Highest degree earned				
Bachelors	18	33		
Masters	23	43		
Specialists	9	17		
Doctorate	4	7		
Georgia Region and Area				
North Region, Area 1	13	24		
North Region, Area 2	6	11		
Central Region, Area 3	12	22		
Central Region, Area 4	8	15		
South Region, Area 5	8	15		
South Region, Area 6	7	13		
Community Type				
Urban	7	13		
Suburban	11	20		
Rural / Small Town	36	67		
(less than 5,000)				

Access to and Use of the Internet

In Table 2, teachers indicated that the school library (78%) was a common location to access the Internet. Some respondents had access to the Internet: at home (33%), in the computer lab (33%), and in their classroom (33%); 17% reported having access to Internet in a community library.

In order to determine the possible number of Internet-accessible computers, the educators were asked about accessibility in their departments. Respondents reported the number of computers with Internet accessibility ranged from 0 to 60 computers, but one computer (6%) was the most-reported number. These figures can be seen in Table 2.

The operating system reportedly used the most was the PC version and/or in combination with the network or Unix system, for a total of 29 or 53%. The most reported provider for Internet access was an Internet Service Provider, such as America Online, Planttel, or MSN, while a Regional Educational Service Agency (RESA) was the next highest reported provider (20%).

In Table 3, it can be seen that only about four in ten (37%) said that they used the Internet in their program. However, seven teachers who said "no" indicated that they would be using the Internet in the future. When asked how often their students used e-mail, 22% responded that students were not using e-mail, while 7% responded that they used it daily. The main reasons for using e-mail were for FFA correspondence (13%), agricultural research (11%), and teacher correspondence (6%). Students' use of the World Wide Web was low; weekly (9%) and monthly (7%) frequency of use were reported. Reasons for using the World Wide Web were for: agricultural research (26%), references (22%), and FFA information (20%). However, the teachers may have responded for themselves instead of indicating their students' use. The educators were also surveyed about having a web page on the National FFA Website and /or local web page on their school website. The data indicated that only 6% had a web page on the National FFA Site and just 2% had a local website.

Table 2.
Internet and Computer Access in Georgia Schools (N=54)

Characteristic	N	%
Internet Access Location*		
School library	42	78
At home	19	35
Computer lab	19	35
In your classroom	19	35
Community library	9	17
Laptop computer	2	4
Number of Internet accessible		
Computers in department		
0	30	56
1	13	6
2	3	4
3	2	4
5	1	2
8	1	2
10	1	2
14	1	2
60 (likely included entire vocational department)	1	2
Computer's Operating System*		
PC	18	33
Unix (Network)	11	20
Mac	3	4
No response	26	43

Table 2. (Continued)

Characteristic	N	%
Source of Internet Access		
Internet Service Provider (ISP)	15	28
Regional Educational Service Agency (RESA)	11	20
Other:	7	13
No Response	21	39

*Some respondents checked more than one choice.

Factors and Concerns for Encouraging Internet Use

It can be seen in Table 4 that users and non-users were similar in their ratings of 33 statements about the Internet. In the category of Concerns about Using the Internet, just two items, "I have limited knowledge¼" and "My school has a policy¼" had significantly different means when analyzed by t-test. Means for the user group indicated that they had superior knowledge and a policy at their school that promoted use of the Internet. Logically, this would be expected in user schools. In the category of Staff Development and Equipment, users clearly had the equipment to access the Internet in their classrooms; oddly, users rated the item, "I have had the necessary training¼" significantly lower (disagreed more) than the non-user group. This may indicate a greater capacity on the part of the user group for self-help in using the Internet. In the Adoption and Integration category, only one item was rated significantly different by the two groups; users rated the statement, "I am computer literate enough to use the Internet" significantly higher (were more in agreement) than non-users. Composite scores for each of the three constructs were also analyzed by t-test; only the Staffing construct had significant differences between users and non-users (p=.042). However, it should be noted that the power of the t-test is affected by low numbers of cases; the small number of cases (54) may have adversely affected the results of the test.

Table 3.
Program Use of the Internet in Georgia (N=54)

Characteristic	*f*	%
Program uses Internet		
No	34	63
Yes	20	37
Student's use of E-mail (n =18)		
None	12	22
Weekly	4	7
Daily	1	2
Monthly	1	2
Reasons for using E-mail* (n =18)		
FFA correspondence	7	13
Ag research	6	11
Teacher correspondence	3	6
Visiting with resource person(s)	1	2
Mail lists	1	2
Global awareness activity	0	0

Table 3. (Continued)

Characteristic	*f*	%
Student's use of World Wide Web (n = 20)		
Weekly	9	17
Monthly	7	13
Daily	2	4
None	2	4
Reasons for using World Wide Web* (n =20)		
Ag research	14	26
References	12	22
FFA information	11	20
Awareness of current events	6	11
Global awareness activity	3	6
Downloading educational programs	3	6

* Note: Some respondents checked more than one choice.

Table 4.
User and Non-User Ratings of Attitudinal Statements about the Internet (N=54)

Category		Users (N=20)		Non-Users (N=34)	
Statement		<u>M</u>	S.D.	<u>M</u>	S.D.
Concerns About Using Internet					
1.	I am concerned about student's attitudes toward using the Internet.	3.10	1.021	3.12	1.274
2.	I can use the Internet for several different purposes in my program.	4.25	0.716	4.09	0.965
3.	I have very limited knowledge of the Internet.	2.35	1.182	3.23	1.350*
4.	My school has a policy regarding the use of the Internet.	4.65	0.587	3.71	1.425*
5.	I am concerned about how the Internet might affect my students.	3.15	1.182	3.18	1.167
6.	I would like to know what resources are available if the Internet is to be integrated into my program.	4.55	0.759	4.29	0.8359
7.	I would like to know how my teaching will change because of Internet use in my program.	4.20	0.616	4.29	0.836
8.	I am concerned that I do not have enough computers with Internet access in my classroom to use the Internet efficiently.	3.95	1.503	4.41	0.925
9.	I would like to know how my role in the classroom will change when I am using the Internet.	4.05	0.605	3.85	0.958
10.	I would modify our use of the Internet based on the experience of our students.	4.00	0.649	3.91	0.753
11.	I am concerned that the students will spend more time at "cool sites" than "on-task" with an assignment.	3.80	0.894	3.79	0.978
12.	I would like to know what other people are doing in relation to the Internet.	4.35	0.671	4.12	0.844
13.	I am concerned that students will try to access "inappropriate" web sites on the Internet.	4.10	0.718	4.09	1.055
14.	I would like to know how the Internet is better than the methods I use or plan to use to do my job.	4.05	0.759	3.94	0.851
15.	I would like to excite my students about my program through the use of the Internet.	4.40	0.598	4.09	0.712
16.	I would like to use feedback from my students to change the use of the Internet.	3.85	0.813	3.79	0.880
17.	I am concerned about the time needed to learn about the Internet and about the time missed from my job.	2.60	1.231	3.23	1.156
Staff Development & Equipment					
1.	I have the equipment needed in my classroom to access the Internet.	3.30	1.525	2.32	1.471*
2.	I have access to funds to purchase needed equipment for Internet access.	2.60	1.231	2.44	1.307
3.	I have had the necessary training to use the Internet.	2.35	1.182	2.41	1.282*
4.	My school district has an ongoing plan for staff development on the Internet.	3.40	0.940	2.82	1.141
5.	I have access to a computer lab with Internet capabilities.	3.50	1.192	2.82	1.466
6.	I have access to funds for purchasing upgrade equipment for Internet access.	2.55	1.191	2.62	1.371
7.	My school district provides incentives to participate in Internet training.	2.45	0.825	2.35	1.070
8.	I have technical support staff knowledgeable of the Internet at my school.	3.95	0.825	3.76	0.855
9.	I have administrative support to attend an in-service on the Internet.	3.55	0.759	3.29	1.168
10.	I work with colleagues who use the Internet in their classroom.	3.40	0.882	2.85	1.258

Table 4. (cont)

Category		Users (N=20)		Non-Users (N=34)	
Statement		M	S.D.	M	S.D.
Adoption & Integration					
1.	I have opportunities to attend in-service on using the Internet.	3.75	0.786	3.26	0.963
2.	My administrators provide time for me to learn about using the Internet.	2.95	0.944	2.91	0.933
3.	Well-designed curriculum resources are not available on the Internet.	3.15	0.933	2.82	0.999
4.	I am concerned that the computer will be corrupted by viruses, etc. due to Internet access.	2.90	1.021	3.32	1.036
5.	I am computer "literate" enough to use the Internet.	4.25	0.716	3.59	0.988
6.	I believe my students know more about the Internet than I do.	3.90	1.021	4.03	0.999

* Significant p £ .05

Conclusions

Demographics

This study covered personnel in the six administrative areas of Georgia and included the three main types of communities. The rural/small town was highly represented in this study, consistent with the fact that most of Georgia's programs are located in this type of community. Even though most of the respondents were male, females were also represented in close approximation to the proportion found in the state's distribution. Many types of agricultural programs were also represented, from horticulture to career exploratory. In Layfield's (1998) national study, a smaller percentage of educators were teaching horticulture and natural resources.

Access to and Use of the Internet

Georgia's Agricultural Education programs have limited Internet access and use. This is similar to the national findings of Layfield (1998), who concluded that teachers who do not have direct and easy access to the Internet would not adopt or try to integrate the Internet into their program. With support from colleagues and administrators, the adoption and integration of the Internet into the curriculum would be easier to accomplish. A motivated person will likely be more open to make the extra effort to use the Internet in his/her program if it is readily available in the school.

Factors Encouraging Internet Use

Agricultural Educators in Georgia were similar in attitudes toward the Internet, regardless of whether or not they were users; they differed significantly only in perceived knowledge level, school policy, equipment availability, training and computer literacy. They were generally positive toward and interested in using the Internet in their classroom. However, the teachers had concerns related to students using the Internet, as well as their own ability to integrate the Internet into their programs. Still, they were generally willing to go to courses, workshops, and other training opportunities. In their study of vocational teachers in Idaho, Thompson and Connors (1998) reported that the teachers with personal concerns would ignore learning new technology until their concerns were addressed. Meeting the concerns of the teachers of Agriculture in Georgia should encourage them to become more objective in integrating the Internet into their programs.

Recommendations

The state should set up model Internet demonstration programs for teachers to observe. These model classrooms, where the Internet is integrated into the program, can help ensure that the technology is used effectively. A transitional model, such as that developed by Ronald Havelock, is a means of encouraging teachers to adopt new technology. This model postulates that technology should be adopted slowly over time so that teachers would integrate the new technology willingly into their classroom (Terrell, Dringus, & Rendulic, 1995).

A long-term approach should be taken in providing in-service education that deals with personal concerns of teachers regarding use of the Internet. Thompson and Connors (1998) indicated that the Idaho teachers' personal concerns must be satisfied before they would be ready to integrate the new technology into their programs. Concerns of Georgia teachers of agriculture must be addressed in order to make optimum use of the Internet in Agricultural Education classrooms.

Georgia's Agricultural Education State Staff should provide leadership in funding and maintaining Internet access to programs across the state. This assistance should be part of staff development courses, workshops, and other training opportunities used to instruct the Agricultural Education teachers on how to use the Internet in their programs.

Internet use should be incorporated into the teacher education programs provided by the state's universities, in order to prepare pre-service students for using the Internet in their future programs.

Suggestions for Further Research

1. Additional research should be generated to investigate the effectiveness of the Internet in the classroom, especially focused on student responses.

2. Studies should be conducted on developing and maintaining websites and other learning materials related to the Internet for the FFA and the agricultural program.

3. Future studies should be completed on the potential of the Internet for program-related activities outside of the classroom.

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