Technology Access and Use in North Dakota Family and Consumer Sciences Classrooms

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The purpose of this study was to examine what technology is available in the North Dakota family and consumer sciences (FCS) classroom, how technology is being used, and whether select demographic characteristics of family and consumer sciences teachers have an effect on the access to technology. An online survey tool was used to gather data. Over half (52%) of the approximately 180 FCS teachers in North Dakota completed the survey, with a total of 93 respondents. Descriptive statistics were calculated for the demographic questions (age, years teaching FCS, years teaching, grade level, and school size) and how technology was being used. Descriptive statistics were calculated along with multiple regression analysis on the questions dealing with technology access.

Technology is part of everyday life for most Americans. Many of today's students could be called "digital natives," having grown up surrounded by technology. These students do not even necessarily see technology as "technology;" they see it as a normal part of life. Jukes, McCain, and Crockett (2010) stated that digital natives "use digital technology transparently, without thinking about it, marveling at it, or wondering about how it works" (p. 15). One of the roles of family and consumer sciences (FCS) education is to prepare students for life. As technology is found in almost every home and workplace in the form of computers, cell phones, televisions, cars, and even kitchen appliances, it makes sense that FCS classrooms include technology as well. Manley, Sweaney, and Valente stated it is important that FCS teachers technologically prepare students for the future, as technology is becoming more pervasive in the school, home, and work environments (2000).

Several state and national entities have pointed out the importance of technology in FCS education, requiring that prospective FCS teachers be prepared to use technology. The National Council for Accreditation of Teacher Education (NCATE) states that all teacher candidates should be able to "present the content to students in challenging, clear, and compelling ways, using real-world contexts and integrating technology appropriately" (NCATE, 2008, p. 17), and "to select and develop instructional strategies and technologies, based on research and experience, that help all students learn" (NCATE, 2008, p. 17). The Interstate Teacher Assessment and Support Consortium (InTASC) incorporates technology within eight of their ten standards (InTASC, 2011). Specific to FCS, the National Standards for Teachers of Family and Consumer Sciences state prospective FCS teachers should be able to "facilitate students' critical thinking and problem solving in family and consumer sciences through varied instructional strategies and technologies" (NATEFACS, para 4, 2004). Lastly, many states require teacher preparation programs to include training in instructional technology. For example, the North Dakota Teacher Education Program Approval Standards for Family and Consumer Sciences requires that FCS teacher preparation programs include "the study of current, appropriate instructional technologies" and that the "program uses varied performance assessments of

candidates' understanding and abilities to apply that knowledge" (ND ESPB, 2005, p. 30). Even practicing FCS teachers themselves promote the use of technology in the FCS classroom. According to Harrison, Redmann, & Kotrlik (2000), FCS teachers feel that information technology is important.

Need for the Study

Technology for educational use is rapidly increasing and changing. Due to this change, it is important to continually explore where and how current technology is being used within the FCS classroom. Additionally, although research on technology use in the FCS classroom has been conducted in states such as Arkansas, Louisiana, Kentucky, New Mexico, and Mississippi, (Croxall & Cummings, 2000; Harrison, Redmann, & Kotrlik, 2000; Jenkins, Mimbs, & Kitchel, 2009; Loken, Cheek, & Hastings, 2003; Redmann, & Kotrlik, 2009; Rogers, Thompson, Cotton, & Thompson, 1993), there is no known publication of technology use in the northern plains states.

Purpose of the Study

The purpose of this study was to examine technology availability in the FCS classroom, how technology is being used, and whether select demographic characteristics have an effect on the access to technology. The objectives were to: a) describe selected demographic characteristics (age, years teaching, years teaching FCS, grade level taught, and school size) of FCS teachers in North Dakota, b) describe ND FCS teachers' access to various technology equipment, c) describe how technology is being used in the ND FCS classroom, and d) explore whether the demographics of FCS teachers in ND affect their technology access.

Literature Review

Digital Natives

The prominence of technology in education, and everyday life in general, is evidenced in many ways throughout American society. Many are "wired-in" or otherwise tethered to at least one piece of technology most of the time. Youth are particularly likely to exhibit this type of connectedness. Perhaps the most ubiquitous distinction relative to technology usage and familiarity amongst youth today comes with the emergence of the term "digital natives." Digital natives are comfortable with and used to being completely immersed in technology on various levels. "Kids growing up today live in a 600-channel television universe. It's a 10,000-station radio universe accessible online" (Jukes, McCain, & Crockett, 2000, p. 13). A 2010 study, the third of its kind conducted by the Kaiser Family Foundation, noted that children ages 8 to 18 spent an average of almost 10 combined hours a day engaged in activities involving television, music/audio, computer, or video gaming. The notion of combined consumption is based on the fact that for a substantial amount of the total time spent "connected," they were multi-tasking and, therefore, were occupied by two or more of these mediums at once (Rideout, Foehr, & Roberts, 2010).

There are distinctions in how technology is used, however, that often go unrecognized. The assumption that youth are adept at navigating all forms of technology equally is a common misperception. Just because youth send hundreds of texts, update social website profiles, and download music, sometimes simultaneously, does not mean those skills are similarly demonstrated when using technology for educational purposes such as research or problem solving. What is uncovered upon a closer look is that, often times, digital natives are "native" to

using technology only for entertainment purposes and as a tool for communication and other social aims (Brown, 2007).

Technology in Schools

Just as is the case within everyday life, technology has become a powerful and omnipresent tool within classrooms. Technological abundance has changed what tools are used in the classroom. Gone are the days of "chalkboards" and "blackboards." They are considered relics of yesteryear. A personal "notebook" in 2014 means something totally different than it meant in 1994. Technology as a learning tool involves the active use of technology by students in an exploratory and application-based manner, such as student-produced videos (Morgan, 2012), using wikis for peer editing (Kawahata & Chung, 2013), and student use of cell phones in the classroom (Thomas, O'Bannon, & Bolton, 2013). The vast availability of technology in classrooms has spread throughout the country. In 2009, the National Center for Educational Statistics (NCES) reported that "ninety-seven percent of teachers had one or more computers located in the classroom every day, while 54 percent could bring computers into the classroom" (Gray, Thomas, & Lewis, 2010, p. 3). In addition to having access to computers, the majority of teachers indicated their school or district had established networks that allowed them to utilize those computers for entering and monitoring data such as grades, assessment results, and attendance.

Due to the flexible nature and the myriad ways technology can be utilized, technological adoption and inclusion within schools is moving consistently and rapidly. Although extensive and sometimes complex in its variety of deliverable formats, technology usage has been grouped into three main categories. According to Inan and Lowther (2009), those categories are "technology for instructional preparation, technology for instructional delivery, and technology as a learning tool" (p. 138). These groupings are general enough that irrespective of the various and specific technological mediums, their uses are able to be described as fitting within one of the three categories. Technology use for instructional preparation might include activities such as using internet resources to research content matter and exchanging ideas with colleagues near and far. Using technology for instructional delivery might include using various mediums to construct and store content for future presentation and dissemination to students. Technology as a learning tool involves the active use of technology by students in an exploratory and application-based manner.

Technology in FCS Education

Technology has had a place in family and consumer sciences classrooms for as long as technology has been a part of daily life. Gaining computer access was one of the first hurdles to cross. According to Daulton (1997), 5% of Kentucky FCS teachers were using computers for educational purposes in 1982. Just 11 years later, in 1993, 83% of FCS teachers in Kentucky were reporting educational use of computers (Daulton, 1997). By 2007, 100% of FCS teachers in Kentucky had access to a desktop computer (Jenkins, Mimbs, & Kitchel, 2009). In 1989, Rogers, Thompson, Cotton, and Thompson found that FCS students spent much more time using a computer when the computer was located in the FCS classroom rather than a computer lab (1993). Harrison, Redmann, and Kotrlik (2000) found that Louisiana FCS teachers very strongly agreed that "teachers should know how to use computers and that teachers should have computers available for instruction" (p. 4).

Internet and email access became more widely available in the late 1990's and early 2000's. In 1998, Croxall and Cummings (2000) found that fewer than 25% of FCS teachers in

New Mexico had internet access in their classrooms and almost half had never used the internet in their teaching. At this point in time, word processing was the most common use of the classroom computer (Croxall & Cummings, 2000). Just a few years later, Manley, Sweaney, and Valente (2000) found that 93.8% of Georgia FCS educators used the internet, and 86.2% used email. In 2007, Jenkins, Mimbs, and Kitchel (2009) reported that 97.8% of FCS teachers in Kentucky had access to the internet at school, and 97.8% of FCS teachers used computers to access email. Internet and email access within schools has varied by state, as Redmann and Kotrlik (2009) found that 96.8% of Louisiana FCS teachers had a computer with internet access available at school, and 95.7% had an email account.

Additional technology has been showing up in FCS classrooms in the past few years, including electronic textbooks, interactive white boards, mp3 players, tablet computers, netbooks, digital cameras, and document projectors to name a few. When computer programs, internet applications, and apps for cell phones and tablets are added to this list, the possibilities for implementing technology in the classroom are endless and overwhelming.

Methods

Procedure

Data were gathered through an online survey tool. All persons teaching FCS in the state of North Dakota belong to the ND FCS listserv. An email inviting FCS teachers to participate in the online survey was sent over the ND FCS listserv, followed by three reminders over the next three weeks. Through this method, all FCS teachers in both funded and non-funded programs across the state were contacted. Ninety-three FCS teachers completed the survey, which is slightly over half (52%) of the approximately 180 FCS teachers in North Dakota. All respondents were female and were licensed to teach FCS at the middle school and/or high school level.

Instrument

The first section asked for demographics including age range, years teaching, years teaching FCS, grade level taught, and average graduating class size. The second section asked the participants to describe their access to 12 types of technology equipment in their classroom and asked how they and their students use 36 specific technology items (equipment, programs, online tools, etc.).

The questionnaire was reviewed for content and face validity by a panel of experts. These experts included state supervisors for FCS, current FCS teachers who had taken a course in using technology in the classroom during the previous summer, a university instructor, and a current undergraduate student majoring in FCS education. Each group brought a different yet important perspective. Each of these groups also checked for questionnaire readability and clarity. Approximately seven people provided feedback on the questionnaire.

Data Analysis

Descriptive statistics were compiled for the demographic questions (age, years teaching FCS, years teaching, grade level, school size). For the questions on access, descriptive statistics were calculated along with multiple regression analysis. Descriptive statistics were calculated for the question on use of technology tools by FCS teachers and their students.

As only 52% of the possible participants responded to the study, the researchers considered the possibility of a non-response bias. The answers to selected questions from the first third of the respondents were compared to answers to the same questions from the last third

of the respondents (Lindner, Murphy, and Briers, 2001), which improved the power of statistical comparison. The Cronbach's alpha for the first third was .367, and the Cronbach's alpha for the last third was .441, which indicated that there was no significant difference between the groups.

Findings

Demographics

The respondents were classified based approximately on their generational group. As there are many interpretations of how to define each generation, the following was used: those who were born after 1975 were classified as Generation Y, those born between 1961 and 1975 were classified as Generation X, and those born before 1961 were classified as Baby Boomers. Nearly two-thirds of the participants (63.4%) were Baby Boomers. Teaching experience ranged from zero to over 26 years. Almost half of the respondents (49.5%) were teaching at both the middle school and high school level. Forty-four respondents (47.8%) were at schools with fewer than 100 graduates per year, while 52.2% of the respondents were at schools with more than 100 graduates per year.

Access to Technology

The participants used a four-point scale to describe access in their classroom to each of 12 types of technology equipment (see Table 1) in which 1 = no access, 2 = potential access, 3 = limited access, and 4 = easy access. Scores were averaged to find the mean (*M*) and standard deviation (*SD*) for each item. Almost all FCS teachers had easy access to a computer for instructor use in their classroom (*M*=3.99) as well as internet access in their classroom (*M*=3.88). The items to which they had least access included netbooks (*M*=1.42) and tablets such as iPads (*M*=1.27).

Table 1

Access to Types of Technology Within the FCS Classroom, Arranged by Mean

Type of Technology Equipment	*n*	*M*	*SD*
Computer for instructor in classroom	93	3.99	.104
Internet access in classroom	91	3.88	.513
Computer lab you can reserve	92	3.51	.671
Digital camera	90	3.33	.960
Digital video camera	91	2.93	1.083
Document projector	92	2.82	1.309
Interactive white board	92	2.82	1.382
Portable laptops for classroom	92	2.76	1.142
Color copier/scanner	92	2.65	1.296
Cell phone/smartphone use by students in class	93	1.73	1.044
Netbooks	89	1.42	.877
Tablets such as iPads	89	1.27	.735

A one-way between-subject ANOVA was conducted to compare the effect of generation (IV) on access to various technologies (DV). Post Hoc comparisons using the Tukey HSD test were subsequently conducted. Comparisons are listed in Table 2. The comparison found that those in Generation Y were significantly more likely than Baby Boomers to have access to digital video cameras (p=.023).

Table 2

Access to Technology Compared to Generation

	Baby Boomer (*n*=19)		Generation X (*n*=15)		Generation Y (*n*=59)				
Technology	*M*	*SD*	*M*	*SD*	*M*	*SD*	*F*(2,89)	*p*	η2
Copier/scanner	2.73	1.298	2.00	1.254	2.94	1.211	2.543	.083	.054
Tablets	1.34	.815	1.29	.825	1.05	.229	1.085	.342	.025
Cell/smart phone use	1.83	1.162	1.47	.743	1.63	.831	.832	.439	.018
Instructor computer	4.00	.000	3.93	.258	4.00	.000	2.696	.073	.057
Computer lab	3.52	.707	3.47	.640	3.53	.612	.039	.961	.000
Portable laptops	2.90	1.05	2.40	1.242	2.63	1.300	1.287	.281	.028
Netbooks	1.48	.953	1.43	.938	1.21	.535	.678	.510	.015
Digital Cameras	3.31	1.046	3.50	.519	3.28	.958	.254	.777	.000
Digital video cameras	2.72*	1.152	3.21	.893	3.37*	.831	3.239	.044	.068
Document Projector	2.67	1.356	3.40	.986	2.79	1.316	1.882	.158	.040
Interactive board	2.97	1.364	2.43	1.399	2.63	1.422	1.069	.348	.023
Internet access	3.85	.582	3.87	.516	4.00	.000	.584	.560	.013

Note: The value of *p* was set a priori at the .05 level.
*Post hoc comparisons using the Tukey HSD test indicated that the mean scores were significantly different.

To compare the effect of years teaching FCS (IV) on access to various technologies (DV), a one-way between-subject ANOVA was used. Post Hoc comparisons using the Tukey HSD test were conducted. Comparisons are listed in Table 3. The findings showed that those who had taught FCS longer were more likely to have access to color copiers or scanners, digital cameras, and tablets such as iPads.

Table 3

Access to Technology Compared to Years Teaching FCS

	1-10 Years (*n*=33)		11-20 Years (*n*=26)		Over 20 Years (*n*=34)				
Technology	*M*	*SD*	*M*	*SD*	*M*	*SD*	*F*(2,89)	*p*	η2
Copier/scanner	2.69	1.330	2.15*	1.255	3.00*	1.206	3.319	.041	.069
Tablets	1.06*	.246	1.12*	.600	1.59*	1.012	5.390	.006	.111
Cell/smart phone use	1.52	.795	1.58	1.027	2.06	1.205	2.767	.068	.058
Instructor computer	4.00	.000	4.00	.000	3.97	.171	.865	.424	.019
Computer lab	3.42	.663	3.52	.714	3.59	.657	.498	.610	.011
Portable laptops	2.55	1.201	3.08	1.164	2.73	1.039	1.618	.204	.035
Netbooks	1.33	.758	1.23	.710	1.64	1.055	1.788	.173	.040
Digital Cameras	3.06*	1.124	3.20	1.080	3.68*	.535	3.863	.025	.082
Digital video cameras	2.94	1.162	2.77	1.177	3.06	.933	.521	.596	.012
Document Projector	2.82	1.310	2.56	1.417	3.00	1.231	.811	.448	.018
Interactive board	2.75	1.368	2.42	1.474	3.18	1.267	2.308	.105	.049
Internet access	3.84	.638	3.92	.272	3.88	.537	.189	.828	.000

Note: The value of *p* was set a priori at the .05 level.
*Post hoc comparisons using the Tukey HSD test indicated that the mean scores were significantly different.

The one-way between-subject ANOVA and Post Hoc Tukey HSD test were also used to compare the effect of years teaching any subject (IV) on access to various technologies (DV). Comparisons are listed in Table 4. Those who had taught over 20 years, like those who had taught FCS longer, were more likely to have access to digital cameras than those who had taught 11-20 years (p=.026). They were also more likely to have access to an interactive white board than those who had taught 11-20 years (p=.028) and were more likely to have tablets than the other groups.

Table 4

Access to Technology Compared to Total Years Teaching

	1-10 Years (*n*=26)		11-20 Years (*n*=28)		Over 20 Years (*n*=39)				
Technology	*M*	*SD*	*M*	*SD*	*M*	*SD*	*F*(2,89)	*p*	η2
Copier/scanner	2.60	1.323	2.25	1.323	2.97	1.203	2.667	.075	.056
Tablets	1.04*	.200	1.11*	.577	1.54*	.960	4.733	.011	.099
Cell/smart phone use	1.50	.762	1.57	.959	2.00	1.214	2.323	.104	.049
Instructor computer	4.00	.000	4.00	.000	3.97	.160	.688	.505	.015
Computer lab	3.35	.689	3.48	.700	3.64	.628	1.561	.216	.034
Portable laptops	2.65	1.198	2.86	1.208	2.76	1.076	.210	.811	.000
Netbooks	1.21	.509	1.32	.863	1.62	1.037	1.892	.157	.042
Digital Cameras	3.17	1.049	3.04*	1.126	3.64*	.668	3.889	.024	.082
Digital video cameras	3.04	1.136	2.71	1.182	3.03	.972	.831	.439	.018
Document Projector	2.88	1.336	2.44	1.368	3.03	1.224	1.647	.198	.056
Interactive board	2.81	1.386	2.30*	1.489	3.18*	1.211	3.432	.037	.072
Internet access	3.92	.400	3.93	.267	3.82	.683	.441	.645	.000

Note: The value of *p* was set a priori at the .05 level.
*Post hoc comparisons using the Tukey HSD test indicated that the mean scores were significantly different.

Again, the one-way between-subject ANOVA and Post Hoc Tukey HSD test were used to compare the effect of grade level taught (IV) on access to various technologies (DV) (see Table 5). The largest statistically significant differences in technology access were related to having access to an interactive board. Those who taught at both the middle school and high school levels had greater access to interactive white boards than those who taught at either the middle school (p=.001) or high school level (p=.000). In contrast, those who taught at both the middle school and high school levels had less access to document projectors than who taught at either the middle school (p=.020) or high school levels (p=.033).

Table 5

Access to Technology Compared to Grade Level Taught

	Middle School (*n*=17)		High School (*n*=29)		Middle and High School (*n*= 45)				
Technology	*M*	*SD*	*M*	*SD*	*M*	*SD*	*F*(2,89)	*p*	η2
Copier/scanner	3.00	1.225	2.36	1.311	2.64	1.300	1.327	.271	.029
Tablets	1.20	.775	1.07	.258	1.43	.900	2.261	.110	.050
Cell/smart phone use	1.65	.996	1.62	1.015	1.78	1.064	.233	.792	.000
Instructor computer	4.00	.000	4.00	.000	4.00	.000	.000	-	-
Computer lab	3.18*	.529	3.45	.827	3.69*	.557	4.057	.021	.084
Portable laptops	2.82	1.074	2.83	1.037	2.77	1.217	.025	.975	.000
Netbooks	1.56	1.094	1.38	.862	1.40	.828	.239	.788	.000
Digital Cameras	3.50	.730	3.28	.996	3.32	1.029	.290	.749	.000
Digital video cameras	3.31	.946	3.14	1.026	2.70	1.112	2.586	.081	.057
Document Projector	3.35*	1.057	3.14*	1.187	2.38*	1.353	5.274	.007	.107
Interactive board	2.19*	1.276	2.00*	1.336	3.51*	1.058	16.638	.000	.277
Internet access	3.82	.529	3.96	.192	3.84	.638	.545	.582	.012

Note: The value of *p* was set a priori at the .05 level.

*Post hoc comparisons using the Tukey HSD test indicated that the mean scores were significantly different.

Finally, a one-way between-subject ANOVA and Post Hoc Tukey HSD test were used to compare the effect of the size of a typical graduating class (IV) on access to various technologies (DV). Comparisons are listed in Table 6. Those who taught at larger schools were more likely to have access to digital video cameras and document projectors, while those who taught at smaller schools were more likely to have access to computer labs and interactive white boards.

Table 6

Access to Technology Compared to Typical Size of Graduating Class

	Under 100 Grads (*n*=44)		Over 100 Grads (*n*=48)				
Technology	*M*	*SD*	*M*	*SD*	*F*(2,89)	*p*	η2
Copier/scanner	2.78	1.263	2.51	1.334	.949	.333	.010
Tablets	1.40	.876	1.12	.504	3.433	.067	.038
Cell/smart phone use	1.88	1.130	1.57	.925	2.059	.155	.022
Instructor computer	3.98	.143	4.00	.000	.897	.346	.010
Computer lab	3.71*	.582	3.30*	.701	9.500	.003	.095
Portable laptops	2.77	1.242	2.75	1.037	.008	.931	.000
Netbooks	1.37	.799	1.47	.960	.262	.610	.000
Digital Cameras	3.34	1.006	3.33	.919	.005	.942	.000
Digital video cameras	2.69*	1.095	3.21	1.013*	5.528	.021	.058
Document Projector	2.33*	1.342	3.34	1.055*	15.824	.000	.149
Interactive board	3.37*	1.185	2.19	1.332*	20.270	.000	.183
Internet access	3.86	.612	3.90	.370	.192	.661	.000

Note: The value of *p* was set a priori at the .05 level.

*Post hoc comparisons using the Tukey HSD test indicated that the mean scores were significantly different.

Use of Technology by FCS Teachers and Students

The participants identified if and how they use each of a list of 36 types of technology, as well as how their students were using technology in their FCS class or in Family, Career, and Community Leaders of America (FCCLA), the student organization related to FCS. Descriptive statistics were compiled for this question. Participants were given the options of: "I do not use this," "I use this for things other than teaching," "I use this as an instructor/advisor," "my students use this as part of my class," and "my students use this as part of FCCLA." Participants were instructed to mark all options that applied. The percentage of answers in each category, along with the number of participants marking that choice, can be found in Table 7. The items with the highest percentage in each column are bolded. FCS teachers were most likely to use word processing (75%) and Power Point (72.9%) in their teaching or advising. YouTube (43.5%), interactive white boards (43.5%), and digital cameras (42.4%) were next likely to be used. FCS teachers reported students as mostly using word processing (59.5%), Power Point (49.4%) and digital cameras (34.1%) as part of class; and FCCLA students as using word processing (33.3%), Power Point (24.7%), and digital cameras (23.5%) as part of FCCLA. Students were reported as more likely to use cell phones, Facebook, Shutterfly and other photo sharing, texting, and Twitter as part of FCCLA than as part of class.

Table 7

Use of Technology by FCS Teachers and Their Students, as Reported by FCS teachers (n=93).

	Teacher Use			Student Use	
Technology (n)	% Use as instructor/ advisor (n)	% Non-teaching use (n)	% Do not use (n)	% Part of class (n)	% Part of FCCLA (n)
Animoto (86)	4.7 (4)	9.3 (8)	86.0 (74)	2.3 (2)	1.2 (1)
Blogs (85)	3.5 (3)	16.5 (14)	77.6 (66)	2.4 (2)	0.0 (0)
Cell/Smart Phone (86)	16.3 (14)	67.4 (58)	23.3 (20)	2.3 (2)	7.0 (6)
Class web page (85)	27.1 (23)	1.2 (1)	68.2 (58)	5.9 (5)	4.7 (4)
Digital cameras (85)	42.4 (36)	55.3 (47)	9.4 (8)	34.1 (29)	23.5 (20)
Doodle (85)	0.0 (0)	3.5 (3)	94.1 (80)	2.4 (2)	0.0 (0)
Edmodo (86)	4.7 (4)	2.3 (2)	93.0 (80)	1.2 (1)	0.0 (0)
Facebook (86)	4.7 (4)	58.1 (50)	36.0 (31)	0.0 (0)	5.8 (5)
Glogster (85)	5.9 (5)	2.4 (2)	82.4 (70)	9.4 (8)	1.2 (1)
Googledocs (86)	40.7 (35)	14.0 (12)	40.7 (35)	8.1 (7)	1.2 (1)
Google sites (85)	23.5 (20)	15.3 (13)	60.0 (51)	14.1 (12)	2.4 (2)
Interactive board (85)	43.5 (37)	4.7 (4)	44.7 (38)	30.6 (26)	8.2 (7)
Jing (84)	2.4 (2)	3.6 (3)	95.2 (80)	0.0 (0)	0.0 (0)
Mindmo (85)	0.0 (0)	2.4 (2)	97.6 (83)	0.0 (0)	0.0 (0)
Online role play (82)	0.0 (0)	1.2 (1)	**98.8 (81)**	0.0 (0)	0.0 (0)
Oovoo (85)	1.2 (1)	1.2 (1)	97.6 (83)	0.0 (0)	0.0 (0)
Photo sharing (85)	11.8 (10)	52.9 (45)	40.0 (34)	2.4 (2)	4.7 (4)
Podcasts (83)	2.4 (2)	8.4 (7)	89.2 (74)	1.2 (1)	0.0 (0)
Power Point (85)	72.9 (62)	16.5 (14)	7.1 (6)	49.4 (42)	24.7 (21)
Prezi (85)	7.1 (6)	1.2 (1)	88.2 (75)	5.9 (5)	2.4 (2)
Schooltube (84)	10.7 (9)	3.6 (3)	84.5 (71)	2.4 (2)	0.0 (0)

Shutterfly (86)	5.8 (5)	38.4 (33)	54.7 (47)	2.3 (2)	3.5 (3)
Skype (86)	4.7 (4)	34.9 (30)	58.1 (50)	3.5 (3)	1.2 (1)
Spreadsheets (85)	58.8 (50)	45.9 (39)	18.8 (16)	17.6 (15)	10.6 (9)
Survey Monkey (81)	30.9 (25)	33.3 (27)	38.3 (31)	6.2 (5)	3.7 (3)
Tablets (85)	8.2 (7)	12.9 (11)	80.0 (68)	4.7 (4)	0.0 (0)
Teacher Tube (85)	14.1 (12)	3.5 (3)	80.0 (68)	3.5 (3)	0.0 (0)
Texting (84)	14.3 (12)	**67.9 (57)**	23.8 (20)	8.3 (7)	13.1 (11)
Toondoo (84)	0.0 (0)	1.2 (1)	97.6 (82)	1.2 (1)	0.0 (0)
Twitter (85)	1.2 (1)	7.1 (6)	91.8 (78)	0.0 (0)	2.4 (2)
Virtual worlds (85)	0.0 (0)	1.2 (1)	**98.8 (84)**	0.0 (0)	0.0 (0)
Voki (85)	1.2 (1)	1.2 (1)	97.6 (83)	0.0 (0)	0.0 (0)
Wikis (85)	9.4 (8)	17.6 (15)	75.3 (64)	5.9 (5)	1.2 (1)
Word Processing (84)	**75.0 (63)**	52.4 (44)	1.2 (1)	**59.5 (50)**	**33.3 (28)**
Wordle (84)	17.9 (15)	8.3 (7)	75.0 (63)	10.7 (9)	2.4 (2)
YouTube (85)	43.5 (37)	43.5 (37)	29.4 (25)	18.8 (16)	10.6 (9)

Note. Some rows may add up to more than 100%, as participants were instructed to mark all answers that apply. Arranged alphabetically by type of technology. Highest number in each column is bolded.

Discussion

The purpose of this study was to examine what technology was available in the FCS classroom, how technology is being used, and whether select demographic characteristics have an effect on the access to technology. The 93 respondents described the access to technology in their classrooms and how technology is being used. Data from the previous tables will be summarized and discussed in this section, and comparisons will be made to previous studies.

Access to Technology

Almost all teachers had access to a computer within their classroom, as well as access to the internet. This is similar to the findings of Redmann and Kotrlik (2009) and Jenkins, Mimbs, and Kitchel (2009). Although they almost all had access to a computer and the internet, it was not determined whether any websites were blocked, thus limiting this access. Teachers reported least access to netbooks and tablets such as iPads.

Experience, but not necessarily age, seemed to correspond with easier access to technology. However, it is unknown as to whether there was increased use along with this easier access. Of the comparisons with significant difference, FCS teachers with 21 or more years of teaching FCS and/or other subjects had higher access to technology in each comparison while those with 0-20 years of teaching experience never had higher access to technology among the comparisons. Interestingly, Baby Boomers did not have significantly greater access to any technology tool, which highlights the difference between experience and age.

Teachers in large schools had easier access to two technology items (document projectors and digital video cameras) and teachers in small schools had easier access to two different technology items (computer labs and interactive white boards). This corresponds to an extent with the grade levels taught. Typically, FCS teachers in large schools teach only high school or middle school courses, while teachers in smaller schools teach both high school and middle school courses. Those who taught only middle school or high school had easier access to document projectors, similar to those who taught at large schools. Those who taught both middle school and high school reported easier access to interactive white boards, similar to those who taught at small schools.

Use of Technology by FCS Teachers and Students

Overwhelmingly, the most-used technology tools by both teachers and students were word processing and Power Point. Although many new types of technology have been developed in the past 14 years, this is in agreement with Croxall and Cummings's (2000) findings that word processing was the most-used computer technology in the FCS classroom. The results were also similar to that of Hirose (2011) in that 50% or more of teachers used word-processing, spreadsheets, and presentation software; and approximately 50% or more of teachers reported that students use word processing and presentation software in the classroom. Mindmo, online role play, and virtual worlds were not used by any instructors or students within the FCS classroom or FCCLA.

Limitations and Recommendations

This study is not without its limitations. It is possible that those who completed the questionnaire are more interested in and more comfortable with technology, although a Cronbach's alpha test was run to check for non-response bias. This study is also limited to one state and to the FCS content area. Additionally, this study only looked at what technology was being used in the FCS classroom and within FCCLA. It did not explore how FCS teachers could increase their use of technology nor search for specific examples of how technology could be used in the FCS classroom. This would be an excellent area for further study.

Additional research into technology use in other content areas and other states would be beneficial. However, with the constantly changing nature of technology, identical replications using the same instrument would not be feasible, as there are already new technologies on the market and in the classroom since this study was conducted. Also, as the Common Core State Standards focus on reading and writing, including choosing and referencing appropriate sources, another area for further study is whether youth are able to use technology appropriately for research and problem solving. A third area for further study is the ways in which students use technology in their relationships with family and friends, and whether curriculum on this topic should be included in FCS classrooms.

Implications

Although a variety of technology is present in FCS classrooms of all types across North Dakota, there is some concern as to whether the technology is being used to its fullest potential. Except for Power Point, spread sheets, and word processing, the technology tools listed within this survey were used by less than half of the FCS teachers and/or students in a classroom or FCCLA setting, with three-fourths of the tools being used by less than 25% of the teachers. Although technology should not be used simply for technology's sake, it is important to look at what teachers may need to more fully incorporate technology into their curriculum in ways that are meaningful and appropriate. It is also important to search out examples of the effective use of technology in FCS and other content areas and share these examples.

Additionally, to keep up with the society in which their students are living, FCS teachers may want to investigate possibilities for incorporating cell phone or smart phone use, as well as netbooks and tablets, into their curriculum. This is technology that students will most likely use in their everyday lives, both now and in the future, and they do need to learn to use them effectively and appropriately.

As technology is continually changing, there is a continual need for pre-service and in-service education on technology. As well as training on how to use the technology itself, FCS teachers need examples of how technology can be authentically used in the classroom. FCS

teachers also need to know how technology is being used within FCS-related careers so they can properly prepare their students for the workplace.

Conclusion

It is often said that FCS courses prepare students for life, so it is important that we prepare students for living in the current and future society, including the environments of school, home, and the workplace. Technology has become an integral part of these environments, and student must learn how to use technology effectively. "Our students have grown up in the technology age, as teachers we need to embrace and incorporate technology into the classroom to enhance the lesson by applying the content to real life without stepping outside the classroom" (Arnett & Freeburg, 2008, p. 54).

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Citation

Borr, M., Napoleon, L., & Welch, A. (2013). Technology access and use in North Dakota family and consumer sciences classrooms. *Journal of Family and Consumer Sciences Education, 31*(2), 11-24. Available at http://www.natefacs.org/Pages/v31no2/v31no2Borr.pdf.