JOURNAL OF THE NACAA

ISSN 2158-9429

VOLUME 4, ISSUE 1 - JUNE, 2011

Editor: Donald A. Llewellyn

IMPACT OF CAREER STAGE ON USE OF WEB 2.0 TECHNOLOGIES BY AGRICULTURAL AND NATURAL RESOURCE MANAGEMENT EXTENSION PROFESSIONALS IN NEW JERSEY

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ABSTRACT

A 2008 survey of county-based agricultural and resource management personnel in New Jersey was conducted to determine based on career stage barriers to using Web 2.0 technologies, use of and contributions to Internet-based communication, hardware devices used, and use in programmatic activities. Data were sorted by career stage [early-career (<10 years), mid-career (10-20 years), and late-career (> 20 years)]. Early-career personnel are more frequently using a wider range of hardware technologies (such as computers at home, iPod/MP3) and Web 2.0 technologies (blogs, podcasts, web feeds, video) than their mid- and late-career colleagues. They also are contributing to a greater extent to Web 2.0 technologies (such as blogs, social networks, podcasts). Mid-career respondents expressed the greatest lack of time to learn these technologies (67%), as well as had the greatest perception that clientele are not up-to-speed on how to use them (44%). Late-career personnel are less likely to use computers at home, technologies such as instant messaging or podcasts, and prefer face-to-face interactions with clientele when compared to their early- and mid-career colleagues; however they reported the least lack of knowledge about (29%) or how to use (39%) Web 2.0 technologies. This study and the findings of others indicate career stage or age may correlate to use or lack of use of Web 2.0 technologies. More research needs to be conducted to understand the root causes of why Web 2.0 technology use is low in some groups, and how to best encourage and sustain use overall. This will aid in the development of relevant training for Cooperative Extension personnel to build capacity to meet the needs of our changing, technology-driven society.

INTRODUCTION

Web 2.0 is the term given to describe a second generation of the World Wide Web that enables people to collaborate, interact and share information online via communication within communities of users. Blogs, wikis and message boards are examples of components of Web 2.0 (O'Reilly, 2007). Web 2.0 technologies have been adapted for educational use by Extension professionals across the country; eXtension (http://www.extension.org/) is an example of a national effort to increase interactivity of educators and learners.

The use of Web 2.0 technologies requires knowledge, skills and adaption to traditional methods for both teacher and student. Are there differences in the use of these technologies based on the age of the user? Prensky coined the phrase 'digital natives' to describe learners with a lifetime of exposure and reliance on computer technology and related media, versus 'digital immigrants' who are older and who have learned to ingrate these technologies into their skill set (Prensky, 2001). Therefore there are assumptions that age or career stage may correlate to use of these technologies.

In late 2008, a survey of Rutgers Cooperative Extension (RCE) county-based agricultural and natural resource management personnel was conducted to: 1) quantify their use of Web 2.0 technologies; 2) determine their level of interest and proficiency in Web 2.0 technologies as well as use and contributions; and, 3) determine if there are differences in use and contributions based on career stage.

METHODS

County-based field faculty and staff in the Department of Agricultural and Resource Management Agents (ARMA), Rutgers Cooperative Extension, were surveyed. A survey instrument of 9close and open-ended questions was developed to quantify respondent's career stage, and their interest in, proficiency and frequency of using Web 2.0 technologies as part of their Extension programming efforts. The survey also included a series of questions designed to quantify the barriers to using these technologies. The survey was distributed electronically using web-based survey tool SurveyMonkey® (www.surveymonkey.com) in December 2008 over a period of three weeks. The data were sorted by career stage [early-career (<10 years), mid-career (10-20 years), and late-career (> 20 years)].

RESULTS AND DISCUSSION

Response Rate: The overall survey response rate was 48%. This rate is considered acceptable according to standards published in the literature (Parsons, 2007). Survey respondents self-identified as faculty (74%) and staff (26%). This ratio of respondents closely reflects the makeup of the department at the time of the survey (82% faculty vs. 18% staff). There was a good distribution of survey participants by career stage, but more late-career personnel responded to

the survey than did early-career or mid-career personnel. Twenty-nine percent (29%) indentified their career stage as early-career, 29% as mid-career, and 42% as late-career (n=31).The percentage of respondents by career stage mirrors the distribution of the population: 35% early-career, 22% mid-career, and 43% late-career personnel.

Internet Connection Speed at Home and Office: A majority of respondents indicated they have access to a computer with Internet connectivity at home (90%) and work (96%). More than 80% indicated they have moderate (DSL/cable) or fast (T1 or better) Internet speeds at home and 100% at work (Table 1). Regardless of career stage, a majority of personnel have the functionality to upload and download data quantities often required to utilize Web 2.0 technologies. Therefore it is assumed that accessibility and data transmission speeds are not an issue impacting their use of Web 2.0 technologies.

Table 1. Internet access speed at home and work for ARMA personnel by career stage, 2008.

Location	Slow (Dial up)			Moderate (DSL/Cable)			Fast (T1 or better)		
	% respondents								
	Early	Mid	Late	Early	Mid	Late	Early	Mid	Late
At Home	0	0	16.7	77.8	71.4	75.0	22.2	28.6	8.3
At Work	0	0	0	66.7	37.5	53.8	33.3	62.5	46.2

Current Hardware Technology Use: In order to determine overall use of various hardware technologies, respondents were asked to indicate their frequency of use of a list of specific hardware technologies (Table 2) over the past year. Early-career personnel more frequently utilize a wider range of technologies (computer at home, laptop, PDA, Smart phone, iPod/MP3) than mid- and late-career colleagues. For example, early-career personnel are the highest users of computers at home (100%) on a daily, weekly or monthly basis, while late-career employees use rate is the lowest (77%). Mid-career personnel also utilize some technologies (computer at home, laptop, TiVO and Game box) more frequently than their late-career colleagues. A great percentage of late-career personnel have never used TiVO or Gamebox (tied at 97%[1]) compared to early- and mid-career personnel, although two-thirds or more of early- and mid-career personnel have never used these hardware technologies either. Overall, personnel appear to be frequently using common or mainstream hardware technologies while others are infrequently or never used.

Table 2. Frequency of use of various hardware technologies by career stage of ARMA personnel, 2008.

Technology	Frequent Use (Daily, Weekly or Monthly) (%)			Less Frequent Use (Use Less than Monthly or Rarely) (%)			Never Used (%)		
	Early	Mid	Late	Early	Mid	Late	Early	Mid	Late
Computer home	100	87.5	76.9	0	0	15.4	0	12.5	7.7
Computer work	100	100	100	0	0	0	0	0	0
Laptop	77.8	75.0	66.7	11.1	12.5	33.3	11.1	12.5	0
PDA	33.3	25	25	22.2	0	16.7	44.4	75.0	58.3
Cell phone	100	100	100	0	0	0	0	0	0
Smart phone	22.2	12.5	16.7	0	0	8.3	77.8	87.5	75.0
TiVO	11.1	12.5	8.3	11.1	0	0	77.8	87.5	91.7
Gamebox	0	25	0	11.1	0	8.3	88.9	75.0	91.7
iPod/MP3	44.4	12.5	23.1	11.1	0	23.1	44.4	87.5	53.8
Slingbox	0	0	0	0	0	0	100	100	100

Current Use of Web 2.0 Technologies: In order to determine overall use or non-use of various Web 2.0 technologies, respondents were asked to indicate their frequency of use of specific listed Web 2.0 technologies over the past year. "Use" was defined as reading, viewing or subscribing. Early-career personnel more frequently and to a greater extent utilize a wider range of technologies (9 of 18, including on-line purchasing, product reviews, video, social networking, calendars, blogs and podcasts) than mid- and late-career colleagues (Table 3). In addition, late-career personnel also utilize some technologies (11 of 18, including interest groups, product reviews, on-line purchases, video, calendars and wikis) more than their mid-career colleagues. Social bookmarking ranks highest as never used regardless of career stage by 85 to 100% of the respondents, while professional networks are never used by 75% of the early-career personnel versus 44% by mid-career and 46% by late-career personnel. A great percentage of late-career personnel have never used instant messaging (77%) and chat rooms (68%) compared to 56% use of both technologies by early and mid-career personnel.

Table 3. Impact of career stage on use frequency of various Web 2.0 technologies by ARMA personnel, 2008.

	Frequent Use	Less Frequent Use	Never Used

	(Daily, Weekly or Monthly) (%)			(Use Less than Monthly or Rarely) (%)			(%)		
Technology	Early	Mid	Late	Early	Mid	Late	Early	Mid	Late
E-mail listserves	100	100	84.6	0	0	15.4	0	0	0
Video	44.4	33.3	38.5	33.3	44.4	46.2	22.2	22.2	15.4
IM	22.2	11.1	23.1	22.2	33.3	0	55.6	55.6	76.9
Chat room	0	22.2	7.7	44.4	22.2	23.1	55.6	55.6	69.2
Message board	11.1	11.1	8.3	66.7	66.7	58.3	22.2	22.2	33.3
Product reviews	55.6	12.5	50.0	44.4	75.0	33.3	0	12.5	16.7
Auctions	44.4	22.2	7.7	11.1	44.4	61.6	44.4	33.3	30.8
Purchases	66.7	33.3	41.7	33.3	66.7	41.7	0	0	16.7
Social networks	44.4	11.1	0	22.2	22.2	41.7	33.3	66.7	58.3
Professional networks	12.5	22.2	23.1	12.5	33.3	30.8	75.0	44.4	46.2
Video conferencing	0	11.1	30.8	44.4	66.7	30.8	55.6	22.2	38.5
Interest Group	22.2	22.2	61.5	33.3	44.4	7.7	44.4	33.3	30.8
Calendar	33.3	11.1	30.8	33.3	33.3	30.8	33.3	55.6	38.5
Blog	55.6	11.1	30.8	44.4	55.6	30.8	0	33.3	38.5
Podcast	33.3	22.2	23.1	33.3	33.3	23.1	33.3	44.4	53.8
Wiki	11.1	22.2	38.5	55.6	55.6	38.5	33.3	22.2	23.1
Web feed	25.0	11.1	23.1	12.5	22.2	30.8	62.5	66.7	46.2
Social bookmarking	0	0	0	0	0	15.4	100	100	84.6

Contributions via Web 2.0 Technologies: Respondents were asked to indicate what frequency of contributions they made using Web 2.0 technologies, meaning that they were deliberately sharing information via these methods rather than seeking information (Table 4). Early-career personnel are more likely to contribute frequently (daily, weekly or monthly) than their mid-career and late-career colleagues to e-mail listserves, on-line purchases, social networks, online calendars, blogs and podcasts. Early-career personnel are more frequently contributing to instant messaging (22%), while 75% of mid-career and 83% of later career personnel never do so. Late-career personnel are more likely to contribute to interest groups (25%) than their early-career (12.5%) or mid-career (0%) peers, while mid-career personnel are more frequently contributing via video (25%) and web feeds (12.5%) than their colleagues. In addition, late-career personnel never contribute to chat rooms, on-line auctions, social networking, calendars and blogs at a rate greater than their other career stage peers.

Table 4. Impact of career stage on contribution frequency to various Web 2.0 technologies by ARMA personnel, 2008.

	Frequent Use (Daily, Weekly or Monthly) (%)			Less Frequent Use (Use Less than Monthly or Rarely) (%)			Never Used (%)		
Technology	Early	Mid	Late	Early	Mid	Late	Early	Mid	Late
E-mail listserves	77.8	50.0	50.0	11.1	50.0	50.0	11.1	0	0
Video	22.2	25.0	9.1	44.4	50.0	27.3	33.3	25.0	63.6
IM	22.2	12.5	0	11.1	12.5	16.7	66.7	75.0	83.3
Chat room	0	12.5	0	22.2	25.0	16.7	77.8	62.5	83.3
Message board	0	0	8.3	25.0	62.5	25.0	75.0	37.5	66.7
Product reviews	0	0	0	33.3	25.0	41.7	66.7	75.0	58.3
Auctions	11.1	12.5	0	33.3	37.5	25.0	55.6	50.0	75.0

Purchases	55.5	12.5	16.7	11.1	37.5	41.7	33.3	50.0	41.7
Social networks	44.4	25.0	0	0	0	18.2	55.6	75.0	81.8
Professional networks	0	0	8.3	11.1	25.0	25.0	88.9	75.0	66.7
Video conferencing	0	0	0	12.5	37.5	45.5	87.5	62.5	54.5
Interest Group	12.5	0	25.0	0	37.5	16.7	87.5	62.5	58.3
Calendar	22.2	12.5	16.7	22.2	25	16.7	55.6	62.5	66.7
Blog	44.4	0	0	33.3	37.5	25.0	22.2	62.5	75.0
Podcast	11.1	0	0	0	25.0	16.7	88.9	75.0	83.3
Wiki	0	0	0	11.1	12.5	33.3	88.9	87.5	66.7
Web feed	0	12.5	0	0	0	0	100	87.5	100
Social bookmarking	0	0	0	0	0	0	100	100	100

Barriers to Using Web 2.0 Technologies: Although few respondents are regularly using or contributing via a majority of the Web 2.0 technologies listed, there appears to be interest among respondents to utilize these technologies in future programmatic efforts (Table 5). However, mid-career personnel expressed they had the greatest lack of time to learn Web 2.0 technologies (67%) versus early-career (56%) and late-career (54%) personnel. Early-career personnel were the group that indicated the greatest lack of interest on their part (22%) in using Web 2.0 technologies and the greatest lack of knowledge about Web 2.0 technologies (44%), despite their reported high use of and contributions to Web 2.0 technologies earlier in the survey. In addition, over 22% of early and mid-career personnel, and 31% of late-career personnel, prefer face-to-face over virtual interactions with clientele, but only 11 to 23% indicated a lack of interest in their clientele about use of virtual interactions.

Table 5. Impact of career stage on barriers to using Web 2.0 technologies, 2008.

	Career Stage		
	Early	Mid	Late
Total Respondents (n)	9	9	13
Lack of time to learn and use (%)	55.6	66.7	53.8
Lack of interest on my part (%)	22.2	0	7.7
Lack of interest from clientele	11.1	22.2	23.1
Lack of knowledge about Web 2.0 technologies (%)	44.4	33.3	28.5
Lack of knowledge how to use Web 2.0 technologies (%)	55.5	55.5	38.5
Prefer face to face over virtual interactions with clientele (%)	22.2	22.2	30.8
Clientele are not up to speed on use (%)	22.2	44.4	0

CONCLUSIONS

Early-career agricultural and natural resource management field faculty and staff in New Jersey are generally using a wider range of hardware technologies and Web 2.0 technologies than their mid- and late-career colleagues. They also are contributing to a greater extent. However, early-career personnel indicated the greatest lack of interest on their part (22%) in using Web 2.0 technologies and the greatest lack of knowledge about Web 2.0 technologies (44%), despite their reported high use of Web 2.0 technologies. Perhaps questions that asked about personal and professional use skewed the response data; it is hard to distinguish if they have knowledge of how to use these technologies in their personal life but not how to make professional applications of these technologies. This may mirror research by Caruso and Kvavik (2005) who studied the use of Web 2.0 technologies by college students. The students cited convenience as the primary reason for use of various Web 2.0 technologies in their studies rather than to improve learning or communication with peers and teachers. Perhaps early career agents, often younger in age and raised as ‘digital natives’, see the practical uses of these technologies in their personal lives, but not the practical applications to enhance their teaching or communication as extension professionals.

Mid-career respondents expressed the greatest lack of time to learn these technologies (67%), as well as had the highest perception that clientele are not up-to-speed on how to use them (44%). These factors may lead to the circuitous situation of a lack of incentive. This, as well as the mindset that teaching skills are based on practical experience and not through learned, research based skills and methodologies, or an absence of vision on how to incorporate these technologies into their teaching (OECD/CERI, 2008) may be playing a part in their lower rates of hardware use compared to early-career agents, or their lesser use of Web 2.0 technologies compared to their late-career colleagues. This survey did not significantly research why these differences in use and contribution are occurring.

It is assumed that accessibility and data transmission speeds are not an issue impacting use of Web 2.0 technologies as over 90% of respondents have moderate or fast-speed access at work and home. The survey did not address the question of permission to access various Web 2.0 technologies at the place

of work. Anecdotally some employees have indicted their offices may have limits on permission to access social networking sites, etc. This lack of access might contribute to lower use and contribution rates. In addition, questions about the usefulness of these technologies in their work may have an impact, or impact people differently based on their age, values or perception (Davis, 1989).

These findings suggest employee training should occur to improve knowledge and utility of these tools in the context of the mission of each person and collectively of the department, and focus on both operational and educational methodologies. Our study and the findings of others indicate career stage or age may correlate to use or lack of use of Web 2.0 technologies. More research needs to be conducted to understand the root causes of why Web 2.0 technology use is low in some groups, and how to best encourage and sustain use overall. This will aid in the development of relevant training for Cooperative Extension personnel to build capacity to meet the needs of our changing, technology-driven society.

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[1]Dense ranking used throughout. In dense ranking, items that compare equal receive the same ranking number, and the next item(s) receive the immediately following ranking number.

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