2-28-2015

Full Issue, Volume 3, Number 1

Journal of Human Sciences and Extension

Recommended Citation

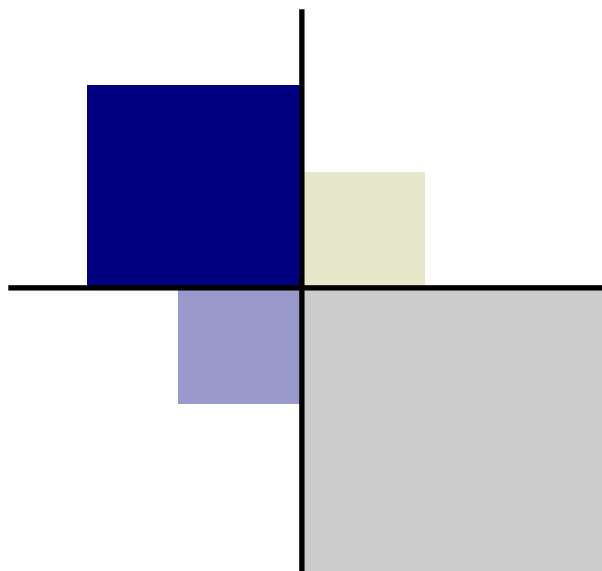Journal of Human Sciences and Extension. (2015). *Journal of Human Sciences and Extension, 3*(1),12. https://scholarsjunction.msstate.edu/jhse/vol3/iss1/12

Journal of Human Sciences and Extension

Volume 3, Number 1

February 2015

ISSN 2325-5226

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Solutions to Burnout and Retention as Perceived by County Extension Agents of the Colorado State University Extension System

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This study explored solutions to the issue of burnout and retention of Extension agents. Extension agents experience burnout for reasons such as long hours, stress, and organizational factors. As Extension administration addresses job satisfaction and performance of Extension employees, burnout and retention issues identified in this study can facilitate efforts to enhance the effectiveness of a statewide Extension program. Herzberg's Motivation-Hygiene Theory was the theoretical framework for this study. Researchers used the constant-comparative method of analysis to identify recurring themes from the open-ended items of an online-administered survey. Twelve primary themes emerged, including (a) compensation, (b) hiring practices, (c) promotion and advancement within Extension, (d) organizational support regarding agent development, (e) organizational support regarding administration, (f) organizational support regarding colleagues, (g) reporting, (h) recognition, (i) resources, (j) personnel and staffing, (k) evaluation of administration and specialists, and (l) workload. Results suggest that Extension administration should focus on the maintenance factors of compensation, workload, and internal promotion and advancement, as well as motivating factors, to improve retention of Extension agents.

Keywords: Extension, burnout, retention, solutions

Introduction

The Cooperative Extension Service (CES) is an agency for change and problem solving. Extension brings the rewards of higher education and turns them into educational programs for anyone wishing to participate. The educational programs of Extension are research-based and teach people to identify problems, analyze information, decide among alternative courses of action for dealing with those problems, and locate the resources to accomplish the preferred course of action (Rasmussen, 1989; Seevers & Graham, 2012).

Although Extension agents provide invaluable knowledge and skills to clientele, they face numerous challenges, such as stress, burnout, long hours, and turnover (Ensle, 2005). Cooperative Extension must strive to reduce these challenges and retain agents. High-quality agents are leaving the Extension system due to organizational factors, such as a lack of professional development opportunities and adequate training (Kutilek, Gunderson, & Conklin, 2002b).

Organizational efforts need to be directed at understanding the recruitment and retention of Extension agents. Chandler (2005) estimated replacing Extension agents could cost Extension from $7,185 to $30,000 per agent. The cost of turnover can be extremely high, and the highest turnover rates within an organization are found among the newly hired employees (Kammeyer-Mueller & Wanberg, 2003).

According to Arnold (2007), "the ability to retain long-term, high-quality professionals is a direct reflection of a successful organization and must be a priority for Extension to remain a viable educational outreach system" (p. 18). Few studies have investigated potential solutions to Extension agent burnout and retention as perceived by the Extension agents themselves. Retaining new professionals is a key research question of the National Research Agenda of the American Association of Agricultural Scientists (Doerfert, 2011). This research was conducted to address that critical gap in what is understood about retention in Extension.

Literature Review

Burnout and agent turnover remain causes of concern among Extension administration and researchers (Bradley, Driscoll, & Bardon, 2012). Ensle (2005) described burnout as "the result of overwork, not dislike of the work itself" (para. 2). Factors leading to increased burnout and turnover in Cooperative Extension were identified as low salaries, downsizing, and increased workload (Extension Committee on Organization and Policy's Leadership Advisory Council, 2005). Other burnout factors include lack of time with friends and families, unrealistic due dates and expectations, little or too much supervision, roadblocks, and lack of resources and staffing (Bradley et al., 2012; Ensle, 2005; Peters, Zvonkovic, & Bowman, 2008).

Staff turnover and burnout also raise many issues for the Extension organization. Friedman, Galinsky, and Plowden (1992) estimated an organization can spend as much as 150% of an exiting employee's salary to refill the same position. In addition to this financial burden, "turnover of local Extension educators often leads to a loss of accumulated knowledge and experience, loss of valuable relationships in the community, temporary voids in programming and volunteer participation, and additional strain on the remaining staff" (Bradley et al., 2012, Introduction, para. 1).

Kutilek (2000) conducted exit interviews of employees of The Ohio State University Extension. Interviews and questionnaires were used to gather data covering five different categories: (a) positive aspects of Ohio State University Extension, (b) supervision and support, (c) working conditions, (d) benefits and salary, and (e) career development. Participants reported that job stress, low pay, and concern about lack of supervisory support were reasons for leaving the organization (Kutilek, 2000).

In a follow-up study, Kutilek, Conklin, and Gunderson (2002a) surveyed The Ohio State University Extension agents regarding work/life issues. Some of these issues were workload, control and balance, family needs, work spillover at home, inadequate training, and poor supervision. Participants also reported solutions for these work/life issues: flexible working arrangements, reduction of workload, and administrative support. Similarly, Riggs and Beus (1993) found Extension agents reported the following factors of job satisfaction and coping strategies: (a) salary with fringe benefits, (b) authority to run Extension programs to meet clientele needs, (c) liked by supervisors, (d) opportunity for growth, (e) Extension as an organization, and (f) helpful colleagues.

Young, Stone, Aliaga, and Shuck (2013) examined job embeddedness theory, which explains why employees stay with an organization. Extension agents from two states were surveyed on whether specific job embeddedness factors could predict their intent to stay with an organization. Sacrifice organization, which is the perceived cost of material or psychological benefits forfeited by leaving one's job, had the highest predictive ability. Young et al. (2013) explained Extension administrators should focus on successful hiring and emphasize the following regarding potential employees: (a) health benefits, (b) professional development, (c) respect that Extension agents receive, and (d) prospects for continuing employment.

Arnold (2008) explored the motivational factors of Extension agents to remain in a career within the Extension organization. In-depth interviews were conducted with eight Florida Extension agents at different career stages. Arnold (2008) reported seven categories identified by agents regarding their motivation to remain in the Extension organization: (a) internal satisfaction, (b) community leadership, (c) career benefits, (d) external motivators, (e) change agents, (f) network of support, and (g) Extension work environment.

Strong and Harder (2009) investigated the determining factors of why Extension agents leave the Extension organization by reviewing literature related to Extension agent turnover, identifying motivator and maintenance factors affecting job satisfaction. Strong and Harder (2009) reported agents left the Extension organization due to a lack of job satisfaction and job dissatisfaction. Extension agents were dissatisfied with salary and work/life balance. Former agents cited low salaries, downsizing, and increased workload as factors leading to agent turnover. Factors that

motivated agents to stay employed within Extension were a rewards system, job satisfaction, and mentoring (Strong & Harder, 2009).

Significant attention has been and continues to be placed on Extension agent burnout and retention. The cost to replace an Extension agent can be high and is a financial burden to the Extension organization. Job satisfaction and dissatisfaction factors directly impact an employee's work motivation and intent to remain employed in Cooperative Extension. These factors include (a) internal satisfaction, (b) salary and benefits, (c) support network, (d) work environment, (e) professional development, and (f) supervision.

Theoretical Framework

The Motivation-Hygiene Theory explains the motivating factors of an employee's level of satisfaction and dissatisfaction with his or her job (Herzberg, 1968). Job satisfaction and dissatisfaction function separately, and motivating factors influence employees more than maintenance factors (Herzberg, Mausner, & Synderman, 1959). Motivation factors, which affect Job satisfaction, are characterized by achievement, receiving recognition, nature of the work, responsibility, advancement, awards, and individual development (Hackman & Oldham, 1976; Herzberg, 1968). When these basic needs of personal growth are met, the employee will experience positive feelings and improved work performance.

Job dissatisfaction results from different factors affecting the context of the work place. Maintenance factors, which affect job dissatisfaction, are characterized by the employee's position, company's policies and administrative practices, physical working conditions, employment, income, and benefits (Hackman & Oldham, 1976; Herzberg 1968). According to Herzberg (1968), an organization must focus attention on its employees' maintenance factors in order to decrease turnover. Employees will leave the organization if maintenance factors such as salary are not satisfied. Strong and Harder (2009) stated, "Satisfying employee maintenance factors will enable them to develop motivation via their position" (Introduction/Theoretical Framework, para. 4).

Purpose and Objective

The purpose of the study was to explore possible solutions to Extension agent burnout and retention as perceived by Extension agents. The objective of the study was to identify common themes of retention solutions to burnout as described by Extension agents.

Methods

The findings presented in this article are part of a larger study investigating agent retention in Colorado. In March 2013, a census was conducted of county Extension professional staff. The survey population was all county-based Extension agents, Extension associates, and county program coordinators in Colorado. The term "Extension agent" was used in this study to pertain to the entire study population. IRB approval was obtained from both universities involved in the research. At the time of the study, there were 140 potential participants.

A researcher-developed questionnaire was administered online through Qualtrics. Statements were derived from several sources, including previous related research (Benge, Harder, & Carter, 2011), a focus group of agents within Colorado, and the researchers themselves. The entire questionnaire contained 87 questions, the majority of which were summated rating scale items related to motivation and factors affecting job satisfaction. Several open-ended questions solicited more detailed input from respondents. Responses to the prompt "As you think about some of the issues that might affect agent burnout/retention, also think about solutions to these issues. Please offer your thoughts about possible solutions to address retention issues" formed the basis of the study data reported here.

Dillman, Smyth, and Christian's (2009) Tailored Design Method was followed to collect data. Potential participants ($N = 140$) were contacted using the e-mail feature within Qualtrics. All e-mail addresses were valid. There were 115 questionnaires submitted, for a final response rate of 82.14%. The data being considered in this paper are qualitative in nature, and therefore, ability to generalize is not a pressing concern. However, it is worth noting that there is generally believed to be minimal threat of nonresponse bias when response rates exceed 80% (Moore & Tarnai, 2002).

Respondents for the survey reported having an appointment in the following program areas: 4-H ($n = 97$), agriculture ($n = 37$), family and consumer science ($n = 27$), horticulture ($n = 27$), natural resources ($n = 30$), administration ($n = 26$), and other ($n = 16$). Professionals in Colorado often have split appointments between program areas, with 4-H being a program area commonly included in split appointments. Thirty-one (27%) respondents were county or area directors. Ninety-nine (88%) respondents were Extension agents/associates, while 13 (12%) respondents self-identified as county 4-H coordinators/4-H program assistants. The majority ($n = 77$, 68%) of respondents had children; 41 (36%) respondents reported having children who did not live with them. Most ($n = 82$, 71%) respondents were married, and many ($n = 72$, 64%) respondents lived in a multiple-income household. There were more female respondents ($n = 73$, 66%) than male respondents ($n = 37$, 34%). Respondents tended to be older ($M = 45.3$ years) but with few years of Extension experience. Forty-three (38%) respondents reported fewer than 5 years of experience, while only 11 (10%) respondents had over 20 years of experience. Respondents

tended to work in offices with approximately eight coworkers; although working in smaller offices was frequently reported, as well.

One of the three researchers conducted the initial analysis of the data using the constant comparative method (Merriam, 1998). The constant comparative method is used to reduce data into identifiable, recurring themes (Lincoln & Guba, 1985). Trustworthiness was addressed in several ways. The full team of researchers collaborated on the final interpretation of the data in a form of triangulation. The final interpretation of data was then shared with a small group of agents in Colorado for their confirmation as a member check. An audit trail was maintained throughout the data analysis, while direct quotes from respondents were used to create a thick description of the findings.

Bias from the researchers can affect the way qualitative data is analyzed and interpreted (Shenton, 2004). All of the researchers for the study reported here are Extension professionals. The first researcher is an agent in Florida. The second researcher is a state specialist at the University of Florida who has prior experience as an agent in Colorado. The third researcher is a program leader in Colorado with prior experience as a state specialist and agent in two other states. All three researchers had 4-H responsibilities at the time of the study. The researchers acknowledge a "pro-agent" bias inherent to their viewpoints. An effort to control this bias was made by conducting a peer debriefing with a university professor without an Extension background.

Findings

Twelve primary themes emerged from the open-ended answers provided by participants. Summaries of each theme are provided, and respondents were coded to ensure confidentiality. To help the reader understand the findings, an overview of the organizational context of Colorado State University Extension has been provided prior to the presentation of the themes.

In November of 2012, during the course of an annual information exchange between the Colorado Extension Director and the representatives of the Extension employee professional associations (Colorado Association of Extension 4-H Agents, Colorado Association of Agricultural Agents, Colorado Association of Family and Consumer Sciences Agents), the issue of agent burnout and retention was expressed as a major topic for Colorado Extension administration to address. Based on that input, Extension administration took the first action step to conduct a statewide survey of county Extension agents on the topic. To operationalize this effort, an agent retention committee of seven county Extension agents and one Extension administrator was established. Committee membership was representative of all Extension program areas and also provided equal representation of the three Extension regions of the state.

As appropriate, findings of the study have been shared with all Extension employees in an effort to address identified burnout and retention issues.

Compensation

Respondents (R) identified higher salaries (R13, R51, R79, R82, R99), merit raises, and bonuses (R23) as solutions to agent turnover. In addition, wage compaction (R36) and salary compression (R40, R47) were identified as causes for turnover. Respondent 102 bluntly stated, "Bottom line: pay more. Retaining young people with a master's in an organization with no pension and no social security, why would they stay in a stressful, lower-paying job?" Extending campus benefits to all Extension employees (R22, R29) and equal benefits for county-funded positions (R27) were identified as solutions by respondents. Respondent 97 explained that small incentives, such as an iPad or a bonus, would bring up morale.

Promotion and Advancement Within Extension

Opportunities for promotion and advancement within Extension were reported as a solution to Extension agent turnover (R47). Internal promotion was embraced (R13). According to Respondent 115, "Agents should be promoted to management positions instead of being passed over for outsiders hired all the time." Advancement allows Extension professionals to grow and change (R52) and should be set in place rather than agents having to move to gain advancement (R39). Respondent 52 stated, "Give an opportunity for all employees to grow and change their positions within Extension," and Respondent 55 stated, "Figure out a path to help agents advance their careers and position."

Workload

Reducing the workload of Extension agents was identified by respondents as a key theme in the retention of Extension agents. Unrealistic and stressful workloads (R22, R87), coupled with working many nights and weekends (R24, R79), make it very difficult for Extension agents to be successful. Respondent 19 reported:

> Campus staff continually add to agent responsibilities, especially in 4-H. Things that have been added are Cowboy Ethics, truck raffle, and more state fair contests. There is pressure to do these things and still continue everything else we are expected to do.

Agents are expected to work too many hours on a regular basis without proper professional scheduling (R67). Less committee work (R87), less traveling (R46), and keeping the work level more consistent (R17) were equated with increased retention by respondents.

Reporting

Respondents indicated reporting was a burden and a factor of Extension agent burnout. R106 stated, "the reporting system seems to be the biggest frustration for most people." The reporting system should be more user-friendly and highlight the actual work that is done (R25), and it should be easier to input data (R87). Respondent 106 recommended Extension administration "find a way to make reporting less intrusive and more accurate. If we do not feel like what we do counts, it makes us feel undervalued." Respondent 102 stated:

> CPRS is a systemic source of frustration. Figure out the core info [*sic*] needed from that and ask for no more. It is a labyrinth to navigate. Make sure new staff know that it is a small part of their output and value to Colorado.

Resources

Respondents identified resources as important for curtailing Extension agent turnover. An increase in 4-H projects, curriculum, and STEM programming resources (R46) was needed at the county level. Respondent 61 stated, "Give us the specialists that we need for our subject area. Don't cut them from the budget and then expect us (county agents and volunteers) to have to cover the cost." The amount of resources Extension agents have access to was perceived to be impacting turnover. Respondent 19 provided an explanation to help resolve this issue: "We are continually being asked to do more with less. There needs to be a good look at what we do now that we will no longer do in the future."

Hiring Practices

Job qualifications were reported by respondents as an important solution regarding Extension agent turnover (R2, R8, R51, R82, R108). Respondent 2 explained:

> I think we need to be more patient in selecting county directors and work harder at hiring people who have a background in Extension into those positions. I'm not seeing many positives when we get tired of looking and hire the best of a bad pool, or think we can teach them what they need to know. It isn't working.

In addition, filling vacant positions with larger pools and qualified applicants (R53, R90), providing accurate job descriptions (R91, R109), and involving Extension staff in the search and screen committee process (R68) were suggested to improve hiring practices. Respondent 2 stated:

I think working with county directors to make sure, especially when they have no background in Extension, what Colorado Extension expects in terms of agents' time is important. The message needs to come down from above that there is not an expectation for agents to be on call 24/7, and when we are off, let us have the time and not still be tied to work.

Personnel and Staffing

Personnel and staffing were identified by respondents as instrumental for Extension agents "to do a good job" (R98). An increase in staffing would alleviate the workload among Extension agents, especially in single-agent counties (R41, R62, R82), and R82 stated, "We need more staff badly, but it cannot be inexpensive, undereducated staff. We need more people with master's degrees and doctorates in the area that they will be teaching." The Extension organization must strive to find alternative funding sources (R52) and permanent funding sources (R46), and to hire more staff that are qualified and experienced (R82). Respondent 92 stated, "Funding for additional staff [is necessary] so that we don't kill the good agents that we have."

Recognition

Recognition of Extension agents was reported by respondents as a factor for increasing retention (R70). Respondent 56 stated Extension should "recognize agents for their time, energy, and accomplishments more frequently and with things they can use." Recognition should focus on building morale (R96), be for doing good work (R97), and not for overworking (R24). Respondent 84 stated, "Just a simple thank you and job well done from regional and state staff would be enough." Alternative recognition other than Colorado awards should be provided (R20). Respondent 115 specified, "Agents should be recognized for their work and not just 'punished' all the time for their work."

Evaluation of Administration and Specialists

Respondents suggested modifying the evaluation process for Extension administration and specialists as a solution to Extension agent turnover. Respondent 47 stated, "Having more input into State Specialist performance evaluations might get them working with us, helping us be successful, instead of chasing their own tenure goals while ignoring our requests." Extension agents and staff should be able to provide input in the evaluation of Extension administrators, supervisors, directors, and specialists (R23, R74, R66).

Organizational Support: Extension Agent Development

Revising the onboarding (i.e., orientation) process was reported by respondents as an important solution regarding Extension agent turnover. Increased (R8, R33, R39, R41) and specific (R2)

new agent training was suggested by respondents. Respondent 60 reported, "New agents are basically left to the wolves with the direction they get at the moment. They are free to go program as they would like, but finding the need upon arriving is difficult and some direction would be helpful." New agents also experience the "sink or swim" (R102) phenomenon, and an orientation should occur immediately after being hired (R20).

Regarding mentoring, Respondent 16 stated that having "time to problem-solve with our mentors and other agents is never a waste of time." The current mentor system needs to be improved (R2), and mentor relationships should be better paired "based on skill and program" (R56), rather than personal preference.

Providing more professional development and training opportunities was cited as another solution to Extension agent burnout (R79). An increase in funds (R95), conducting meetings via distance (R61), and better scheduling for Extension agents (R50, R74) were also suggested by respondents. Areas of training needs were cited as well: volunteer management (R59), leadership development for county and district directors (R100), and conflict resolution (R59). Teaching skills were also cited as an important area for training: "We hire people with subject matter expertise/knowledge—and expect them to be good educators of people without any education training" (R110).

Organizational Support: Administration

Increased support from Extension administration was reported as a solution to Extension agent turnover (R59, R85, R115). Respondents indicated a need for increased trustworthiness (R34), for clear leadership (R47), and for administration to take active interest in the county programs (R34). Respondents indicated shared governance and an increase in dialogue (R111) would be beneficial to Extension agents and the Extension organization. Respondent 66 acknowledged, "Helping agents feel they are a valued part of the system in decision-making is a very difficult thing to do."

Increased support from supervisors and directors was also reported as a solution to Extension agent turnover. Agents complained, "It is pretty obvious that a couple of directors are on a power trip" (R55) and "directors and Colorado campus Extension admin [*sic*] for the most part have very little concern for agents in the field" (R60). Supervisors and directors need to be more relational (R111), supportive (R105), and creative (R91) when interacting with county staff.

Administration, supervisors, and directors need to have a better understanding of the work Extension agents do. Respondent 82 shared the viewpoint, "The constant calls from our administrators to 'do more with less' has become a bad joke, and another example of how out of touch and insensitive they are," while Respondent 36 noted a need to "try to get campus

[administrators] to understand life in the field." Furthermore, respondents explained that administrators, supervisors, and directors "are reluctant to admit there are burnout and morale issues" (R75). The depth of frustration was evidenced by Respondent 61, who simply said, "I don't feel that our Extension Directors have a clue."

Organizational Support: Colleagues

Collegial support was indicated by respondents as necessary to alleviate Extension agent turnover. The organization needs to increase support for collaboration and program sharing (R20). Motivation would increase if there were stronger relationships with campus departments and colleges (R47). Coping with the stresses of the job would be decreased with more support from peers and colleagues (R71). Respondent 2 stated:

> New agents come on without any sort of life raft. In most offices, no one knows really what the person before did, because they are too busy doing their own job. That support and insight from other agents in other counties is critical.

Conclusions and Implications

Respondents provided many observations, opinions, and solutions to reduce the current burnout and turnover of Colorado Extension agents. The key themes identified by respondents were (a) compensation, (b) hiring practices, (c) promotion and advancement within Extension, (d) organizational support regarding agent development, (e) organizational support regarding administration, (f) organizational support regarding colleagues, (g) reporting, (h) recognition, (i) resources, (j) personnel and staffing, (k) evaluation of administration and specialists, and (l) workload. It is important to note that the qualitative nature of the data provided means the conclusions are not intended to be generalized beyond the respondents; however, a concerted effort to provide a detailed account of the context and responses has been made to assist the reader in determining the transferability (Lincoln & Guba, 1985) of results to his or her own Extension context.

Solutions addressing both motivational and maintenance factors were offered. Maintenance solutions related to compensation (increased salaries, merit raises, and bonuses), decreased workload, hiring practices, personnel and staffing, resources, and internal promotion and advancement. Many motivational solutions to job satisfaction were identified by Extension agents, including organizational support (agent development, administration, and collegial), recognition, reporting, and the evaluation of administration and specialists.

Herzberg (1968) explained an organization must first focus its attention on its employees' maintenance factors in order to decrease turnover. Strong and Harder (2009) explained that

satisfying maintenance factors would increase motivation for their job. Extension administrators should be concerned about agents leaving the organization due to unsatisfied maintenance and motivational factors.

Wage compaction and salary compression are important to the livelihood of Extension agents, and an increase in compensation would alleviate this maintenance factor. Increased compensation would be a financially burdensome solution to the organization. Though compensation enhancement would have a high financial cost to Colorado State University Extension, Extension agents leaving the organization due to turnover is also a financial burden to the organization (Chandler, 2005). According to Herzberg (1968), increasing compensation would decrease agent turnover. Internal promotion and advancement should be given careful attention by Extension administration. The cost of promotion and advancement would not have an increased financial cost to the organization; however, the most important aspects of filling a position are the qualifications and fit of the applicant in the applicant pool.

Decreasing workload and improving available resources could decrease the burnout of Colorado Extension agents. Agents currently work long hours and many nights and weekends with limited and decreasing resources. Improving the available resources, such as providing specialist support, program resources, and more staff, would decrease the workload of agents and may improve the quality of Extension programs. A major factor to Extension agent burnout is time away from friends and family (Bradley et al., 2012). Decreasing Extension agent workload would enable employees to pursue a healthier work/life balance.

Satisfying motivating factors increases job performance but does not decrease agent burnout and turnover (Herzberg, 1968). Satisfying the identified motivating factors could be more easily managed by Extension administration because they are less financially constraining than satisfying maintenance factors. Every function of business has an associated cost; however, satisfying motivating factors would require less of a financial burden than satisfying maintenance factors. The identified solutions to motivating factors require more attention from administrators, as well as administrators' time away from the office and into the field. Agent development, such as training for both new and seasoned agents, professional development, and more effective mentorship programs could be essential steps to decreasing burnout.

Extension professionals have access to professional associations to provide additional support for their programmatic areas. These associations offer professional development opportunities, mentoring, recognition, and awards for their members. Extension administration should continue to support these opportunities, as well as provide recognition and awards outside of the professional associations. Extension also needs to explore new and innovative methods to increase the professional development opportunities of its agents in order to increase the job satisfaction and retention of its employees. It must also be noted that the professional

associations in Colorado provided the impetus for this study to be conducted by providing input to Extension administration, which was then acted upon.

Colorado Extension agents identified the evaluation of administration and specialists as a motivating factor solution. Accountability is an important and highly regarded attribute of Cooperative Extension, both at the state and county levels of Extension personnel. Agents expect their administrators to understand life in the field and to know the issues in the counties.

A limitation of the study is that county-level Extension agents and program assistants were the only personnel included in the population. Input from state-level and regional Extension administrators was not gathered, limiting the perspectives provided.

Recommendations

Extension administration should continually strive to offer support to Extension agents. Extension administration should be visible in the counties. Administrators can increase their visibility by attending programs and events, as well as conducting needs assessments of county Extension agents. This study was conducted because of the action of Extension administration in Colorado and is a positive indicator of their commitment to addressing retention issues. Extension administration and Extension agents are also to be commended for the creation of agent action teams to help drive solutions to the issues identified in this study. Examples include teams created and empowered to improve the reporting system and the new staff orientation process. These actions were implemented shortly after results of the study were made public.

Maintenance factors are the most important factors and directly impact the turnover of employees (Herzberg, 1968). Securing and stabilizing the financial assets of the Colorado Extension organization is extremely important in today's uncertain economic fluctuations. A single departing Extension agent can cost the organization significant money. Reducing agent turnover and burnout will improve the organization financially, which will increase the financial resources available to support current agents. The Colorado Extension Service must make compensation a high priority in order to increase the retention rate of Extension agents in Colorado. Providing promotional and advancement opportunities, increasing staffing and resources, improving hiring practices, and decreasing workload will provide a better work environment and improve the retention and burnout of Extension agents.

Increased membership, participation, and encouragement in professional associations can decrease stress and increase collegial support. Additional opportunities for collaboration and partnerships would also provide additional support among colleagues, and the current mentor system should be evaluated or restructured to provide ample collegial support for new agents.

An evaluation of administration and specialists should be established. This would increase the accountability of administration and specialists to Colorado Extension agents.

Future research should examine the potential costs and benefits of implementing specific solutions proposed by agents in this study. An economic analysis can help Extension determine which solutions offer the highest return on investment, thus helping the organization allocate limited resources in the most efficient manner. The widespread prevalence of burnout throughout all Extension systems—not just in Colorado—also indicates there would be value in replicating this study elsewhere and using those results to conduct a broader-scale quantitative study that would allow for generalization across a larger population. Such efforts may help Extension overcome its long struggle retaining high-quality personnel.

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Walking the Pens: A Case Study of Secondary Agriculture Teachers' Experiences Using a Serious Digital Game in an Introductory Animal Science Course

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In a world where knowledge is a click away, today's students need information delivered in ways that meet their expectations as digital natives. Serious digital games are one way to meet the demand. This particularistic case study sought to understand agriculture teachers' experiences using a serious digital game in an introductory animal science course. Three themes emerged from the data collected: 1) the real-world context provided by the game; 2) the game's potential to promote students' agricultural awareness; and 3) teachers' positioning of the game as a secondary teaching approach. Based on these findings, it can be recommended that professional development opportunities be created for teachers to learn how to use serious digital games more effectively in other situations. In-service workshops focused on using digital games as a primary approach to teaching secondary agricultural education curricula, especially when simulations are necessary for teaching content. Because agricultural literacy was an unintended outcome, future research should focus intentionally on the impact serious digital games have on agricultural literacy.

Keywords: serious digital game, agriculture teachers, animal science, secondary classroom

Introduction

In a world where knowledge is just a click away, today's students need information delivered in ways that meet their expectations as digital natives (Prensky, 2001). One way for educators to provide high-quality content that meets students' desires for receiving information is through the use of serious digital games (Huang, Huang, & Tschopp, 2010). Serious digital games provide an incredible learning environment for students (Oblinger, 2004) because they simulate facets of the real world. "Educational games and simulations, unlike direct forms of instruction, are

experiential exercises" (Gredler, 1996, p. 521) that provide a context for applying concepts to the real world (Huang et al., 2010). Serious digital games are platforms for delivering content as fun, engaging, and motivational learning experiences for students (Franciosi, 2011; Kiili, 2005). The phrase coined to represent the pedagogy of serious digital games is digital game-based learning (DGBL) (Prensky, 2001). Ultimately, the goal of DGBL "is to engage learners in the experiential learning process" (Franciosi, 2011, p. 12). DGBL promotes active learning through constant reflection (Papastergiou, 2009) and is grounded in *real-life* problems that students must work to resolve (Franciosi, 2011; Oblinger, 2004).

Because of its bent on experiential learning and solving problems in real-world contexts, DGBL has value for agricultural education teachers (Bunch, Robinson, Edwards, & Antonenko, 2014). The purpose of agricultural education is to teach students about agriculture in preparation for careers and post-secondary education (Roberts & Ball, 2009). To accomplish that, agricultural education has always attempted to be experiential in nature (Baker, Robinson, & Kolb, 2012; Cheek, Arrington, Carter, & Randell, 1994; Hughes & Barrick, 1993; Knobloch, 2003; Randell, Arrington, & Cheek, 1993; Stewart & Birkenholz, 1991) and grounded in real-world problems (Knobloch, 2003; Splan, Porr, & Broyles, 2011). When delivered well, every aspect of the program is experiential for students, including the classroom (Baker et al., 2012), where technologies such as serious digital games are being implemented more so now than ever before (Stewart, Antonenko, Robinson, & Mwavita, 2013).

One of the greatest attributes of game-based simulations is that they help students apply the theory of what they learn (Boyd & Murphrey, 2002; Leggette et al., 2012). This is important because "students are consistently looking for practical applications of their studies in a real-world context" (Windham, 2005, p. 5.8). Unfortunately, many of the games played today were not designed for educational purposes. Instead, they were created solely to entertain (Oblinger, 2006). Therefore, questions exist regarding how educators can use games to teach students content that can be applied in various real-life contexts.

Teachers from all disciplines have begun considering the digital gaming phenomenon as a viable instructional delivery mechanism (Huang et al., 2010). However, because agricultural education teachers rely on experiential learning (Baker et al., 2012), they must be cautious not to utilize games that are focused entirely on *drill and practice* (Kiili, 2005). Instead, these games should provide a context in which instructors can teach valuable skills about the agricultural industry. One game that seeks to accomplish this goal is Pfizer's *Virtual Walking the Pens®*. *Walking the Pens* focuses on the swine industry and is used to teach entry-level employees about swine health and management (S. Miller, personal communication, July 1, 2011). Based on face value, this game has the potential to increase instructors' abilities to provide a solid context to their content regarding the swine industry in animal science courses. This is beneficial because the greatest challenge for agricultural education teachers today "is to move beyond the 'doing' and ensure

that all learning is connected to thinking and knowledge that will be easily remembered and applied later in life" (Knobloch, 2003, p. 31). Therefore, agricultural education teachers must continue to ground their pedagogies in a context with experiences that support students' learning of agriculture (Roberts & Ball, 2009) so that it can be transferred to various situations involving the agricultural industry (Bunch et al., 2014).

Conceptual Framework

The framework that undergirded this study was contextual teaching and learning (CTL) (Parr, Edwards, & Leising, 2006). The idea behind CTL is that educators can help students better understand how their specific content relates to and transfers to a different context. Specifically, Parr et al. (2006) used CTL to help students learn mathematics in the context of agricultural power and technology (APT) courses. Essentially, the APT courses provided students with a context in which they could learn mathematics content better.

CTL is a seven-element approach to teaching in which educators teach their content by providing examples that are relatable to students (Stone, Alfeld, Pearson, Lewis, & Jensen, 2005). Once the examples have been rooted firmly and students begin to grasp the content, educators stretch students outside of their original context (in this case, agriculture) until they are learning another subject area altogether. Finally, the educator brings students back into the agricultural context by providing another example to which students can relate and identify fully. This contextual experience method of teaching enables students to transfer information more easily from one context to another (Stone et al., 2005). Because DGBL simulates aspects of the real world, it appears to be a pedagogy that has the capability of serving as a context in which students can transfer their learning to various real-world contexts.

Although digital games have numerous positive qualities and appear to be a strong pedagogical tool for educators (Kiili, 2005), they are met with mixed emotions and resistance (Garris, Ahlers, & Driskell, 2002). Part of the dilemma is that there is no clear-cut agreement on how games are defined (Garris et al., 2002). On one side of the debate, games are perceived as violent and full of negative images. On the other side of the debate, games are perceived as positive instructional methods that are fun and engaging (Garris et al., 2002; Kiili, 2005). Because it is important to evaluate agricultural education teachers' beliefs toward integrating technology (Stewart et al., 2013), this study focused on teachers' experiences of teaching a unit on swine health and management while using DGBL as the primary instructional approach.

Purpose and Objectives

The purpose of this study was to understand agriculture teachers' experiences using a serious digital game in an introductory animal science course. Two objectives guided the study:

1. To understand teachers' overall perceptions of using serious digital game-based learning in an introductory animal science course.

2. To describe teachers' perceptions of a serious digital game for student learning.

Because serious digital games have been identified as engaging (Franciosi, 2011; Oblinger, 2004; Papastergiou, 2009; Prensky, 2001), this research study addresses Research Priority 4, "Meaningful, Engaged Learning in All Environments," of the American Association for Agricultural Education Research Agenda for 2011–2015 (Doerfert, 2011).

Methods

Case study methods (Merriam, 2001) were used to collect and analyze data to better understand agriculture teachers' experiences using a serious digital game in an introductory animal science course. Focusing on the particularistic nature of a case is an effective method for exploring practical issues. The specific focus of particularistic case study exposes what the phenomenon— teachers' use of a serious digital game—might represent about everyday occurrences. The cases were bound by time (10-day instructional unit), and the serious digital game was used. The cases were identified as particularistic because they allowed us to enhance our understanding of a particular phenomenon: teachers' use of a serious digital game (Merriam, 2001).

This study focused on four agriculture teachers who used a serious digital game developed by Pfizer Animal Health® to teach an instructional unit regarding swine health and management. The teachers who participated in this study were chosen purposively because we perceived these teachers to be technologically savvy and willing to attend a 2-day professional development workshop focused on digital game-based learning as an instructional approach. Profiles of participating teachers follow; each was given a pseudonym to maintain anonymity.

Fred is a traditionally certified secondary agriculture teacher in a rural school district. He is 24 years of age and has been teaching agriculture for 2 and a half years. Fred holds a bachelor's degree in agricultural education. Outside of agriculture, Fred has no other teaching certifications. Fred has used digital games as a teaching approach in his classroom. In fact, he has been using serious digital games for 2 years now.

Mark is 57 years of age and a veteran teacher as a result of his 30 years in the secondary agriculture classroom. Mark teaches in an urban school district. His classroom is considered technology-enhanced because of a large grant awarded to the school district. Mark holds a bachelor's degree in agricultural education and a master's degree in educational leadership, and he is traditionally certified. In addition to agriculture, Mark is science certified. Although his

classroom is considered technology-enhanced, Mark has never used serious digital games as a teaching approach.

Suzy is 28 years of age and has taught secondary agriculture in a rural setting for 3 years. Suzy has earned a bachelor's degree in agricultural economics and a master's degree in agricultural education. Suzy completed a traditional teacher preparation program while working on her master's degree; thus, she is traditionally certified. She has not had experience using serious digital games as a teaching approach in the past.

Misty has taught secondary agriculture in rural and urban settings for 8 years. She is 31 years of age and holds a bachelor's degree in agricultural education. Misty is a product of a traditional teacher preparation program. She has no other teaching certifications outside of agriculture. Misty has not used serious digital games as a teaching approach in the past. In fact, she was not aware of serious digital games focused on agriculture before this study.

Data Collection

The primary data collected for this study were interviews. We conducted one 1-hour semi-structured interview with each of the teachers involved, totaling four interviews. The use of semi-structured interviews was important because it gave us the opportunity to ask probing questions based on the teachers' responses to the questions. For consistency, the interviews were audio recorded and transcribed verbatim. Member checks were utilized by sending the transcriptions, via e-mail, to the teachers to ratify the creditability of the information given to us in the interview process (Creswell & Miller, 2000; Dooley, 2007). In addition to the interviews, teachers completed two weekly reports to ensure fidelity of their use of the game. These reports were used as one means of triangulating the data with what was received through the interviews. Further, during each interview, we took pictures of the technology used in the classroom/laboratory as a means to understand more fully the teachers' climate and environment in regard to technology usage.

Data Analysis

To ensure trustworthiness, we independently coded and triangulated all interviews, weekly reports, and pictures to identify initial codes. One week later, we met to negotiate and deliberate disconfirming evidence. Negotiation of disconfirming evidence allowed us to reexamine all data to approve or reject identified codes and themes (Creswell & Miller, 2000). Further, peer debriefing was used to discuss data collection procedures and identify themes. We used external candidates, two colleagues, and two graduate students to assist us in the accuracy of our data collection procedures and our identified themes. The external candidates were charged with challenging our assumptions and interpretations. According to Creswell and Miller (2000), "a

peer review or debriefing is the review of the data and research process by someone who is familiar with the research or the phenomenon being explored" (p. 129). It should also be noted that the biases we each brought to the interpretation of the findings were accounted for during the peer debriefing process. This was accomplished through team reflection. We reflected on our backgrounds as previous secondary teachers and identified possible biases.

Context

The serious digital game used for this study was *Virtual Walking the Pens*®, developed by Pfizer Animal Health®. This game provides a 3-D virtual world in which Pfizer's entry-level employees can experience the daily operations of a 2,400-head swine operation as a training simulation. Because agricultural education exists, in part, to prepare students for entry-level careers in various sectors of the agricultural industry (Roberts & Ball, 2009), *Virtual Walking the Pens*® was deemed a viable curriculum for this study.

The virtual world affords students the opportunity to become a farm manager for a day. Embedded within the game are 10 scenarios; each scenario exposes students to a different swine disease that pork producers face daily. As a farm manager, students make decisions that are crucial to production and profitability. Students must be able to identify unhealthy animals, make decisions to treat an individual pig or the whole herd, and control the environment. The decisions made by the student affect not only the animals, but also the livelihood of the farm. In our findings that follow, we will refer to *Virtual Walking the Pens*® as "the game."

Limitations

Because the purpose of particularistic case studies is to enhance the understanding of a specific phenomenon and shed light on what that phenomenon might represent about everyday occurrences, the reader should be cautioned against generalizing the results of this study; however, the reader may transfer learning in the event of similar cases. In addition, the small sample size and the specificity of the serious digital game used in this study may impede the reader's ability to generalize (Merriam, 2001).

Findings

The findings and conclusions presented here represent the agriculture teachers' experiences using the game in an introductory animal science course. Profiles of the participants have been offered previously, so our findings focus on the major themes across their experiences implementing the game. The major themes discussed below include (a) the real-world context provided by the game, (b) the game's potential to promote students' agricultural awareness, and (c) teachers' positioning of the game as a secondary teaching approach.

"I feel like I'm in a hog barn."

Consistent with previous literature (Franciosi, 2011; Huang et al., 2010; Oblinger, 2004), all four teachers, to varying degrees, acknowledged and appreciated the real-world context represented in the game. They recognized students could connect to the real-world context and valued that the game provided students with learning experiences that even field trips could not. As Fred said, "I think that games became more popular and more useful in my mind because we can have those experiences and never leave my classroom." He later emphasized, "It brings real-life experiences to the classroom…It's more learning because it's not just a tour of some facilities. It's an actual; they get to be the worker for the day."

The game contains real-life sights and sounds that are consistent with raising swine in a confinement operation. The virtual sights and sounds represented in the game expanded students' learning experiences, enabling them to see, rather than read or hear about, a swine operation in action. Misty highlighted this notion, saying:

> To me, it was a virtual way they could actually see it. My kids, they even said, 'I feel like I'm in a hog barn.' You know, so I think it's the closest way a student can learn about that specific subject without actually going to the hog barn or actually doing it themselves. I mean, it's the closest thing to reality they can get to in the classroom.

Student experiences with the sights, sounds, and inner workings of a swine operation were crucial to the applications of student understanding presented in the game. This contextualized feature of understanding through scenarios was especially important for students unfamiliar with farms or swine operations, as Suzy illustrated. She said:

> For some of the kids who had never been on a farm or been to a swine operation, they were able to kind of see it through the game, and I think that helped kind of make the concept more real for them.

A safe, low-risk space.

That students could see and experience the inner workings of a swine operation while testing their knowledge of relevant swine health and management concepts positioned the game as a safe, low-risk space for students to connect concepts and apply their knowledge. As Mark described:

> The benefits that I see is again taking something you've learned and seeing how it can be really applied. Too many times kids will [say], 'Well, I'm never going to use that.' Well, here's where you use it. Here's why it's important for you to understand. When you're

doing the crop scene, here's what you see. Here's how you can, okay, you look at a pig and realize they've got some type of disease and what do you need to do correct it or prevent it? Do you need to get on a phone with a veterinarian and say, 'Hey, here's what I got; help.'?

The opportunity for students to diagnose and act on such problems, as well as decide on the day-to-day happenings of the swine operation, allowed them to apply their knowledge and test their conjectures in a low-risk environment where no swine (or students) were harmed, yet where the students could see their decisions play out. Within the context of the game, students were able to see the outcomes and consequences of their decisions unfold. This is consistent with research suggesting games provide a context in which students can learn to solve career-related (agriculture) problems (Oblinger, 2004). As Fred explained:

> You're the hired hand. You're in charge of taking care of these animals. So, day to day, 'What would you do?' What practices would you use? What management practices would you use here and there? I think, yes, they didn't get the actual 'on-the-farm experience,' but they probably learned more from it because they were allowed to take more steps and be more involved in the management process.

The real-world context depicted in the game, coupled with the safe, low-risk space it provided for learning, was relevant and effective, even for students with little to no previous experiences with farms or swine operations. As they progressed through the scenarios of the game and had opportunities to apply and test their knowledge, the students began to develop a working understanding of a swine operation. Misty illustrated this best, saying:

> The further we went along, the more they were getting the hang of it, because this was totally foreign to these kids. Like I said, none of them come from an [agricultural] background, all ten of them, and the more they went through this, they were beginning to understand. Okay, this animal needs this to be healthy, and this is what we've got to do if this animal's dying, or we've got to separate it. And so I think as it progressed, they were beginning to understand swine husbandry.

Further, the safe, low-risk space afforded by the game not only allowed students to test their knowledge, but it likewise increased their agricultural awareness. Mark hinted at this perhaps unintended outcome, saying:

> Also, they learn to check the feeders every day, check the water. That's one of the first things they got. 'Hey, if we don't check those things, we can really get in trouble, can't we?' Well, you know, you guys look and see what's happening. And I think that created a little bit of awareness for them.

These findings support Boyd and Murphrey (2002) and Leggette et al. (2012), who surmised that games provide a virtual world for students to apply what they have learned.

"We're so far removed from the farm."

The teachers in this study recognized that today's students are not as connected to the farm as students of past generations. Despite this, they realized the game held the potential to reconnect students with agriculture, thereby fostering students' agricultural awareness. As Mark said, "Some of the best things in the world happen on a farm. But people don't understand that." Even students with agricultural backgrounds can become disconnected, and as Fred indicated, the game can serve to reestablish their connections with agriculture:

> It was very beneficial to take something that's very [agriculturally] related that a traditional [agriculture] student might know a lot, but as we go through the years and these students get more urbanized as we go, [the game] was a way to take some things from off the farm and bring them back to the students and relate it in a way, with the use of a game, that every kid could understand.

Not only did the game have the potential to reconnect students with agriculture, but it also held potential as the context for discussing negative portrayals of swine operations in the popular media. If faced with negative portrayals of swine operations, Misty anticipated that her students would not have a similar negative reaction to swine operations. She maintained:

> I don't think they would have a negative reaction. I think they could say, 'Oh, yeah, we talked about that in class,' and 'We did a game,' you know? I don't think they would say one negative thing about it. Because it was kind of like they understood, you know, that things can happen and these are the things you've got to do to prevent that, you know, that bad things can happen. And that didn't seem to faze them at all…

This situation actually arose in Mark's class. While his students were playing the game, an animal rights activist filed an exposé on a swine facility for euthanizing pigs inhumanely. As he described:

> Well, the pigs were sick and instead of giving them an injection and euthanizing them, they just took a shovel and took care of it. Anyway, they said, 'Well, what's happening? They shouldn't take care of an animal that way.' And I said, 'Well, how would you do it, then?' And we talked about different ways of euthanizing animals. We talked about efficiency. We talked about how expensive it was. Then we got to talking about, well, should you have to euthanize? Should you just let the pig die on its own? And we talked about those things. And then we talked about suffering, etc.

Discussing the exposé in the context of the game enabled Mark to cover numerous concepts related to swine health and management and the ethics of animal care. Students were able to ground these discussions in their experiences working through the scenarios of the game. This finding supports the assertion that games provide an active learning environment (Papastergiou, 2009). These discussions helped students separate fact from fiction of swine operations and increased their agricultural awareness. Mark continued to describe the ways in which the game promoted students' agricultural awareness:

> And if we don't have farms like that, are we willing to have a pig farm in our own backyard and take them to the local market and let them slaughter them there, or are you going to slaughter them yourself? And they go, 'Oh, maybe we do need those markets. Maybe we do need those things out there for us.' Because they don't want to spend the time or the effort. They sure don't want to have to go out there and kill the hog and clean it and dress it and butcher it. You know, that's pretty well gone by the wayside. And then my comment is, 'We're so far removed from the farm that people don't understand what it's like to take care of animals.' And I always tell them no farmer that I know of is ever going to mistreat an animal. Because they can't afford to…So, they're not going to go out there and just abuse or misuse any animal.

"It's a nice break."

Despite recognizing the real-world context provided by the game and realizing the game offered a context for promoting students' agricultural awareness, teachers in this study positioned the game as a supplemental, rather than primary, teaching approach. As Mark described, the game was "just an extension of what [students] already learned." He and other teachers in the study "pretty well covered most of the content before I ever introduced the game" (Mark's interview). Teachers described the game as "a follow up to have some hands-on to what [students] already learned" (Mark's interview). In addition, the game was used to "break up the monotony of the basic classroom" (Fred's interview), was "more relaxing for the teacher" (Fred's interview), and served as "a nice break, and it provides a variety in the classroom for [students]" (Suzy's interview).

The game's secondary status as a teaching approach was emphasized further as Fred discussed using it as a reward for good student behavior. As Fred explained:

> [The game] was something that I could kind of hold over their head as, 'Hey, you know, in a couple of weeks, or if you guys work hard these four days, then I'll be gone and you can play the game.'

This positioning of the game as secondary and supplemental mirrored the ways in which other inquiry-focused, student-centered teaching approaches, such a project-based learning, have been similarly considered as dessert, rather than the main course for student learning (Larmer & Mergendoller, 2011).

Conclusions and Recommendations

The game provides a real-world context for student learning. The game's contextualization of student learning affords a safe, low-risk space in which students explore the concepts beyond what they could in everyday life. In this way, the game appears to satisfy the same goals as contextual teaching and learning (Stone et al., 2005). In this space, students are free to apply their knowledge and test their conjectures related to swine health and management. Consequently, the safe, low-risk space of the game also provides a context for fostering students' agricultural awareness.

Although an unexpected finding of this study, the real-world context of the game enables discussion of relevant and timely agricultural issues and representations of agriculture in the popular media. This prompts students to think about the validity of claims based on their experiences working through the scenarios of the game, thereby promoting agricultural literacy.

Having the platform to discuss agricultural literacy topics that are relevant and meaningful to students is necessary because people are illiterate about agricultural practices (Blackburn, 1999; Hess & Trexler, 2011; National Research Council, 1988; Powell, Agnew, & Trexler, 2008; Terry, Herring, & Larke, 1992), even those who are incoming freshmen at land-grant institutions, where agriculture is a major component of the institution's mission (Jones, 2013). To take advantage of the game's real-world context and its potential to promote students' agricultural awareness, teachers need to reposition the game from a secondary to a primary teaching approach. Without doing so, the teachers failed to utilize the full potential of the game.

Professional development opportunities should be created for teachers to learn how to use serious digital games effectively. It could be implied that the teachers in this study viewed the game as a *dessert* rather than the main course (Larmer & Mergendoller, 2011); yet through professional development, the game could be repositioned as a primary instructional approach to increase student learning and effectiveness of this type of contextualized, game-based learning. Sustained professional development on the effective use of serious digital games would provide teachers with a dedicated time and space to share stories of successful integration and to brainstorm ideas for overcoming barriers to implementation collaboratively (Guzey & Roehrig, 2012). In this context, teachers can discuss ways for and derive support for using serious digital games as a primary instructional approach. For example, professional development providers should consider delivering in-service workshops focused on using digital games as a primary

pedagogy for student-centered learning. Efforts should allow students to learn through the game's scenarios (primary approach) instead of teaching content and then allowing students to play the game at the conclusion of an instructional unit (supplemental approach).

This approach poses questions for teachers to consider regarding their course design. Understanding what (i.e., content) to teach and how (i.e., media and methods) to teach it effectively is imperative for teachers. Therefore, efforts should be devoted to aiding teachers in constructing the game around content in meaningful ways so that both student engagement and success are optimized. Teacher educators might consider introducing the use of serious digital games to pre-service teachers and providing opportunities for pre-service teachers to engage with and teach using serious digital games via teaching methodology courses.

As researchers, we have further questions based on the results of this study. Principally, are our results common of serious digital games implemented in the context of agriculture education? This study should be replicated using other serious digital games focused on agricultural content and those results compared to the findings of this study. Additionally, because agricultural literacy was an unintended outcome, future research should focus intentionally on the impact serious digital games have on agricultural literacy. Finally, as a result of the game providing a real-world context, future research should be conducted to determine if skills and knowledge learned through the game could be transferred to real-life situations.

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Reducing Risky Driving Behavior: The Impact of an Adolescent Driver Intervention Program With and Without Mandatory Parental Attendance

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The United States is a vehicle-dependent society and allows adolescents to obtain driver's licenses at age 16 or younger. This study examined the impacts of a driver intervention program on reducing risky driving behaviors among youths who had received their first traffic citation, as well as parental management of driving practices. Participants consisted of 243 youths ages 16 and 17 who were court-ordered to attend the Ohio 4-H CARTEENS (CAR = Caution and Responsibility and TEENS = Teens who volunteer as teachers) program with and without parents. Results indicated that risky driving behavior decreased significantly for both groups after the intervention program. Parental management practices, however, increased only for youths attending without parents. Regression analysis indicated that risky driving behavior at Time 1 and levels of parental management (parental control) at Time 2 predicted risky driving behavior after completion of the program. Implications of this study include the importance of adolescent driver intervention and prevention programs to teach youths about unsafe driving practices before licensure.

Keywords: adolescent driving, parental management, traffic citation, intervention program, risky driving behaviors

Introduction

The United States is a highly vehicle-dependent society with a long tradition of allowing adolescents to obtain a driver's license at age 16 or younger in most states (Simons-Morton, Hartos, Leaf, & Preusser, 2006). With that dependence, inexperienced adolescent drivers demonstrate risky driving behaviors, such as speeding, inattentiveness, and loss of control, which put themselves, their passengers, other motorists, and personal property at risk. The consequences are serious. Motor vehicle crashes are the major cause of death and disability among young people ages 16 to 20, accounting for more than 5,000 U.S. deaths annually (Hartos, Beck, & Simons-Morton, 2004; National Highway Traffic Safety Administration,

2005). Furthermore, those who engage in high levels of risky driving during the first 6 months of licensure are likely to continue to engage in high-risk driving (Simons-Morton, Cheon, Guo, & Albert, 2013). Therefore, it is critical that effective efforts are in place to improve driver safety for the adolescent population.

As a result of risky driving behaviors, many adolescents who receive a driving citation receive a monetary fine, loss or suspension of a driver's license, and/or required attendance at a driver intervention program. This paper focuses on the impacts of one such program, the Ohio 4-H CARTEENS (CAR = Caution and Responsibility and TEENS = Teens who volunteer as teachers) program (Cropper, 1999). Established in 1987, the program is implemented in 48 of Ohio's 88 counties and is a collaboration among The Ohio University Extension, county juvenile court judges, and the Ohio Highway Patrol. The 2-hour program is led by youth facilitators, with technical assistance from the Ohio Highway Patrol and an Ohio State University Extension educator or program assistant. Youth leaders prepare lesson plans, educational activities, and demonstrations on driver safety topics. In some counties, youths are court-ordered to attend CARTEENS, while in others, participation is voluntary. Since CARTEENS is a unique program, knowing more about the effectiveness of such a model can be helpful to other states as they plan and implement programs for young drivers.

There is growing interest in understanding the role of parents in adolescent driving behavior. Parents are gatekeepers for deciding when their son or daughter receives driving privileges, and they set restrictions once the license is received (Hartos et al., 2004). However, after their child obtains a traffic citation, parents may need to change their perceptions of risky driving behavior, their understanding of the benefits of adolescent driving, and their parental management practices (Simons-Morton et al., 2006). Parental attendance at driver intervention programs may be helpful to foster greater understanding of driving practices and encourage more careful monitoring.

This study examined the impact of the 4-H CARTEENS program on reducing risky driving behaviors by adolescents who had received their first traffic citation. Furthermore, it examined changes in parental management of adolescent driving behavior and compared youths attending the program with parents to those attending without parents. As adolescent driver programs are established across the country in response to safety concerns (Hassan & Abdel-Aty, 2013; Iliescu & Sârbescu, 2013), more information is needed about the impacts of such programs, as well as the possible benefits of parental attendance, on reducing risky driving behaviors.

Risky Driving Behaviors Among Adolescents

Risky driving behaviors include but are not limited to speeding, general tailgating, running red lights or stop signs, frequent lane changes, failure to yield, failure to control, and having no

driver's license (Dula & Geller, 2003). These behaviors endanger the safety of both the driver and other road users. They are different from both aggressive driving and negative cognitive/emotional driving because they may occur without any intention to harm and without the presence of negative emotions (Iliescu & Sârbescu, 2013).

Adolescents are thought to take more chances than adults in general (Steinberg, 1987) and when driving (Simons-Morton et al., 2013; Williams, 2003). On average, adolescents report relatively high levels of risky driving but with notable variability (Simons-Morton et al., 2006). Reasons include their inexperience, acceptance of higher levels of risk, sensation seeking, prestige seeking, underestimation of danger, alcohol use, in-vehicle distractions (e.g., cell phone use while driving or presence of teen passengers), and their desire to reach the destination more quickly (Groeger, 2006; Hassan & Abdel-Aty, 2013; Lee & Abdel-Aty, 2008; Lin & Fearn, 2003). Also, younger drivers have rated hazardous situations as less risky than older drivers (Ferguson, 2003). In addition, the adolescent brain is still developing and does not reach maturity until the early 20s. One particular area of the brain developing during adolescence is the prefrontal cortex, which helps control impulses and emotions that may lead to risk-taking behaviors (National Institute of Mental Health, 2011).

Some adolescent drivers develop risky behaviors long before they reach the age of legal driving. For example, they may accept dares and be willing to take unsafe challenges from peers. The relationship between friends who take risks and hazardous driving may reflect social influence, which can occur directly in the form of peer pressure or indirectly in the form of social norms (Simons-Morton et al., 2013). Indeed, risky driving may be influenced by adolescent drivers' perceptions that their friends engage in precarious behaviors, even if they actually do not (Fleiter, Lennon, & Watson, 2010).

Studies of adolescent driving have indicated that during the first 18 months of licensure, adolescents with high rates of kinematic risky driving—those whose general style of driving included a high rate of hard stops and sharp turns—were more likely to be involved in vehicle crashes than adolescents with low rates of kinematic risky driving rates (Simons-Morton et al., 2011). In addition, crash rates were higher among adolescent drivers with friends who engaged in high rates of hazardous driving and other behaviors, such as substance use.

In studies of gender analysis, adolescent males score significantly higher than females with regard to dangerous and risky driving (Iliescu & Sârbescu, 2013). Males may be more likely to speed and engage in other risky driving behaviors, reduce safety margins, and increase the likelihood of crashes (Simons-Morton, 2007).

Parental Management

Parental management is comprised of monitoring (i.e., parents knowing where their children are and what their children are doing) and behavioral control (i.e., having rules and expectations about behavior). Both are believed to influence adolescents' responsible driving (Hartos, Eitel, & Simons-Morton, 2002). Although studies have examined effects of parenting style on youth development outcomes (Hartos et al., 2004; Simons-Morton 2007), little is known about the role of parental management on adolescent driving behavior.

Parents are involved in their children's driving before and after licensure. They teach them to drive, regulate access to vehicles, and establish rules for driving behavior (Hartos et al., 2004). Driver education and parent-supported practice have been shown to be useful for novice drivers to learn to manage a vehicle and develop an appreciation of the risks involved (Simons-Morton, 2007). Furthermore, a review by Simons-Morton and Ouimet (2006) concluded that risky driving, traffic violations, and crashes are lower among adolescents whose parents set limits on initial driving privileges. Thus, parental management practices can be protective during the first years of unsupervised driving (Hartos et al., 2002). However, once they have some experience behind the wheel of a vehicle, they may develop driving habits risky both to themselves and others on the road (Donovan, 1993; Vingilis & Adlaf, 1990).

4-H CARTEENS

The 4-H CARTEENS program was established in 1987 by a county juvenile court judge who was concerned about the increasing number of juvenile traffic offenders and a high rate of recidivism citations (Cropper, 1999). Since that time, the program has expanded to over half of Ohio's counties in both urban and rural areas. Past efforts to evaluate the program have focused on the use of peer teachers (Hoover & Weisenbach, 1999; Jordan, 2008) and retention of program content (Lee & Murdock, 2001). Adolescents as peer teachers to deliver the content was found to be effective, as was the use of guest speakers who talked directly with the youth participants about driving situations that had changed their lives. These speakers included adolescents who committed vehicular homicide or vehicular assault and were required by juvenile court judges to speak about their experiences as part of a community service requirement, as well as parents whose children had died in accidents.

Purpose of the Study

The purpose of this study was to examine the impacts of the 4-H CARTEENS program on reducing risky driving behaviors among adolescents who had received their first driving citation, as well as changes in parental management of driving practices before and after the program. The study also assessed differences in risky driving behaviors and parental management

practices between youths attending with parents and those attending without parents. In addition, a model was tested to predict risky driving behaviors after completion of the program.

The following research questions were addressed:

1. What is the impact of the 4-H CARTEENS program on reducing risky driving behaviors and increasing parental management of driving practices?

2. What are the impacts of parental attendance? Can differences in risky driving behaviors and parental management practices be identified for youth attending with parents compared to youth attending without parents?

3. What predicts risky driving behaviors upon completion of the CARTEENS program?

Methods

Participants and Procedures

The participants consisted of youths ages 16 and 17 who had been court-ordered to attend the 4-H CARTEENS program after receiving their first traffic citation. The study utilized a quasi-experimental design conducted in four Ohio counties with similarly designed 4-H CARTEENS programming. In two counties, youths were court-ordered to attend the program with their parents; in the other two counties, youths attended without parents. The quasi-experimental design was distinguished from "true" experiments primarily by the lack of random assignment of subjects to an experimental and a control group (Ary, Jacobs, & Razavieh, 2002; Fraenkel & Wallen, 2003). A total of 344 youths were invited to participate in the study. This group consisted of all youths who had been court-ordered to attend the CARTEENS program in the four counties during a 2-month period in fall 2009.

The selection of the four counties in the study was based on similar county population and demographics, number of participants in the 4-H CARTEENS program each month, mode of delivery of the 4-H CARTEENS program, and use of youth volunteers as teachers. The program was delivered in three stages in a similar manner at each location: (a) review of court-mandated rules and a presentation by a state highway patrol representative about driver safety, (b) skill station educational programming performed by youth volunteer teachers, and (c) guest speakers talking about their family's loss as a result of a traffic accident. Both study and comparison groups had a metropolitan and nonmetropolitan county.

The study's initial questionnaire was administered prior to the start of the program (Time 1). One month after completing the program, participants were sent a follow-up questionnaire to

complete and return by mail (Time 2). As an incentive to complete the survey, participants were offered a gas card ranging from $10 to $25 depending on when the returned survey was postmarked. Higher valued cards were given to those who returned the survey earlier. The study was approved by the university Institutional Review Board.

Measures

Demographics. Demographics consisted of sex, race/ethnicity, and current age. Additional background variables included age at licensure, length of licensure, number of round trips driven per week, age at first citation, type of first citation (assuring clear distance, failure to control, failure to yield, no driver's license, improper lane use, running through a stop sign or red light, violating traffic signs, no seat belt, speeding, and other), and whether or not their license had been suspended.

Risky driving behaviors. Risky driving behaviors were measured before and after the Ohio 4-H CARTEENS program using an instrument adapted from Donovan (1993) and Hartos et al. (2002). This self-report measure asked participants to estimate the number of times in the past month they participated in 33 risky driving behaviors. Behaviors were grouped into 10 categories of violations based on Donovan (1993) and included speeding, passing, following other vehicles, lane use, right of way, turning, control, reckless driving, substance abuse, and distractions. Examples of items include driving 10–19 miles per hour over the posted speed limit, passing in a no passing zone, driving through a red light, tailgating a slow car, making unsafe lane changes, cutting in front of vehicles, passing two or more cars at once, driving without seat belts, driving after using alcohol or other drugs, and using a cell phone or other inattentive behaviors. Cronbach's alpha was 0.78 at Time 1 and 0.80 at Time 2. Items were summed for a total risky driving behavior score that could range from 0 to over 300.

Parental management. Youths were asked to assess parental management of their driving behavior over the past month using a measure developed by Hartos et al. (2002) before and after attending the Ohio 4-H CARTEENS program. Seven items examined parental control of driving, such as "my parent has carefully monitored my driving activity," "my parent set up consequences for breaking the rules related to my driving privileges," and "my parent tried to keep track of whether I was driving safely." Five items measured parental restrictions, including "my parent restricts where I can go in the car" and "my parent restricts who can ride with me in the car." Responses were on a 4-point scale ranging from strongly disagree to strongly agree and were summed for a total score for parental control ranging from 7 to 28 and for parental restrictions ranging from 5 to 20. Cronbach's alpha for parental control was 0.84 at Time 1 and 0.86 at Time 2. Cronbach's alpha for parental restrictions was 0.79 at Time 1 and 0.81 at Time 2.

Analysis

Using SPSS 16.0, independent and paired samples *t*-tests were run to identify differences between groups attending with and without parents and to examine changes in risky driving behavior and parental management of driving before and after the Ohio 4-H CARTEENS program. A standard multiple regression model was used to identify predictors of risky driving behavior after completion of the program. All variables of interest were entered simultaneously.

Results

Participants

A total of 243 youths completed the pre-test (Time 1) survey, with 152 attending with parents and 91 attending without parents, for an overall response rate of 70.6%. Ages ranged from 15 to 19 years with an average of 16.71 years. About half were male (51%) and half were female (49%); 92% were white. Of these youths, 187 (77.0%) completed the post-test (Time 2) survey. A total of 132 were from the group with mandatory parental attendance, and 55 were from the group attending without parents. Youths were given the same questionnaires to complete, whether or not they attended with parents.

Approximately 86% of participants received their license at age 16. Youths drove an average of 15.05 round trips per week (*SD* = 11.98). Length of licensure at the time of first citation ranged from 1 to 5 months. The most common citations were speeding (40%), failure to maintain an assured clear distance (18%), failure to control vehicle (12%), and failure to yield (10%).

CARTEENS Program Impact

A paired samples *t*-test indicated a reduction in risky driving behavior from Time 1 to Time 2 [$t(174) = 3.23$, $p < .001$], with mean scores decreasing from 59.47 (*SD* = 59.93) to 43.95 (*SD* = 56.73) (*d* = 0.27), a small to medium effect size. There was a significant ($p < .05$) reduction from Time 1 to Time 2 in five of the 10 violation categories, with effect sizes ranging from 0.18 to 0.28. These violations involved speeding, lane use, turn, control, and distractions.

A paired samples *t*-test also indicated a reported change in parental management control practices from Time 1 to Time 2 [$t(174) = -2.87$, $p < .01$], with mean scores increasing from 22.92 (*SD* = 4.34) to 23.73 (*SD* = 4.20) (*d* = 0.19). Changes were also identified for restrictions [$t(178) = -2.35$, $p < .05$], with mean scores increasing from 16.01 (*SD* = 3.31) to 16.55 (*SD* = 3.39) (*d* = 0.16).

Table 1. Differences in Risky Driving Behavior and Parental Management Scores Before and After Attending CARTEENS

	Time 1		Time 2					Cohen's
Variable	*M*	*SD*	*M*	*SD*	*df*	*t*	*p*	*d*
Risky driving behavior	59.47	59.93	43.95	56.73	174	3.23	.001	0.27
Speeding violations	8.64	14.44	5.08	10.43	179	3.52	.001	0.28
Passing violations	0.50	1.18	0.61	1.95	180	-0.71	.479	
Following violations	1.83	3.55	1.88	4.18	180	-0.15	.879	
Lane use violations	6.24	8.75	4.13	7.62	179	2.78	.006	0.26
Right of way violations	1.80	4.22	1.32	2.43	180	1.65	.101	
Turn violations	1.22	2.66	0.80	2.04	180	2.03	.044	0.18
Control violations	17.48	22.54	12.37	16.43	179	2.91	.004	0.26
Reckless violations	4.27	7.99	4.12	12.13	179	0.16	.870	
Substance abuse violations	0.34	1.67	0.22	0.98	179	0.86	.393	
Distractions violations	16.97	22.18	12.97	23.27	176	2.04	.043	0.18
Parental management								
Control	22.92	4.34	23.73	4.20	174	-2.87	.005	0.19
Restrictions	16.01	3.31	16.55	3.39	178	-2.35	.020	0.16

Parental Attendance

Further analyses of scores were conducted to identify if changes in driving behaviors and parental management practices occurred for youths attending with and without parents from Time 1 to Time 2. Paired *t*-tests indicated that both groups experienced a significant ($p < .05$) reduction in risky driving behaviors. However, increases in parental management practices for control and restriction occurred only for the group attending without parents. Independent samples *t*-tests indicated that youths attending with parents reported significantly higher levels of parental management at Time 1 than did those attending without parents. These differences were no longer significant at Time 2. The effect size for risky driving behavior was slightly greater for the group attending without parents.

Table 2. Differences in Risky Driving Behavior and Parental Management Based on Parental Attendance

Variable	Time 1		Time 2		df	t	p	Cohen's d
	M	SD	M	SD				
Risky driving behavior								
Parents not attending	70.33	63.52	53.03	55.86	66	2.62	.011	0.29
Parents attending	53.44	58.10	39.16	57.98	102	2.05	.043	0.25
Parental management – Control								
Parents not attending	21.23	4.94	23.20	4.19	65	-3.97	.000	0.43
Parents attending	24.01	3.48	24.15	4.16	102	-0.42	.674	
Parental management – Restrictions								
Parents not attending	14.87	3.72	16.03	3.49	67	-2.98	.004	0.32
Parents attending	16.82	2.78	16.98	3.20	104	-0.56	.579	

Predicting Risky Driving Behavior

Pearson correlation coefficients indicated significant ($p < .05$) relationships between risky driving behavior at Time 2, parental management practices at Time 2, and other background variables. Current age was positively related to risky driving behavior ($r = 0.22$) and age at first citation ($r = 0.19$) and negatively related to parental control ($r = -0.20$) and parental restrictions ($r = -0.35$). Risky driving behavior was negatively related to parental control ($r = -0.31$) and parental restrictions ($r = -0.32$). It was positively related to frequency of driving per week ($r = 0.21$) and risky driving behavior at Time 1 ($r = 0.41$).

A multiple regression model incorporated variables of sex, current age, age of first citation, parental attendance at CARTEENS, number of driving trips per week, risky driving behavior at Time 1, and parental control at Time 2 to predict risky driving behavior at Time 2. Due to the high correlation between parental control and parental management ($r = 0.80$), only parental control was included in the model. Results indicated that the model significantly predicted risky driving behavior at Time 2 [$F(7, 150) = 6.35$, $p < .001$]. Adjusted R^2 for the model was 0.23. Significant relationships were found for risky driving behavior at Time 1 and parental control at Time 2. Youths with higher levels of risky driving behavior at Time 1 had higher levels of risky driving behavior at Time 2, and youths with higher levels of parental control had fewer risky driving behaviors.

Table 3. Regression Analysis Results for Risky Driving Behaviors After Completion of the CARTEENS Program

Variable	B	SE B	β	t	p
Sex	-5.02	8.44	-0.04	-0.59	.550
Age	12.18	7.33	0.13	1.67	.098
Age at first citation	1.17	3.13	0.03	0.37	.710
Parental attendance at CARTEENS	-3.83	8.86	-0.03	0.43	.667
Frequency of driving	0.47	0.36	0.10	1.30	.199
Risky driving behavior Time 1	0.28	0.08	0.28	3.62	.000
Parental control Time 2	-2.81	1.04	-0.20	-2.71	.008
Model Statistics					
Intercept	120.52	123.77			
F Value	6.35				
R²	0.23				

Note: *n* = 158

Discussion and Conclusions

This study examined the impacts of an adolescent driver intervention program, the Ohio 4-H CARTEENS program, for youths who have received their first traffic citation. Inexperienced drivers often engage in risky driving behaviors, and the goal of this program is to help young drivers understand the responsibilities of driving and learn safe practices. Of particular interest is the role of parental attendance at the program. Does mandatory parental attendance make a difference in reducing risky driving behaviors?

Overall, the participating youths reported a reduction in hazardous driving practices, particularly control violations, speeding violations, lane use violations, and distracted driving (e.g., cell phone use and text messaging). These were the most common violations reported by the youths. Thus, it appears that this program may be one component that helps reduce those risky driving behaviors adolescents are most likely to commit.

The findings with parents were not as expected. While risky driving behaviors decreased for youths attending with and without parents, slightly stronger effects were found for those attending without parents. Furthermore, parental management practices significantly increased only for youths attending without parents. It was expected that if parents were exposed to the program content, they would increase their awareness of driving risks and modify their practices of monitoring and controlling their children's driving behavior.

Several possibilities may explain these findings. First, there may have been an influence of parental attendance on the reporting of management practices. The practices were self-reported

by the adolescents, not the parents. Given that parents were present in the room when the initial survey was completed, there may have been a tendency to overestimate—or report more frequently—oversight by parents. Indeed, those attending with parents reported significantly higher management practices than those attending without parents at Time 1. The surveys at Time 2 were mailed to the youths and may or may not have been completed in the presence of a parent. Second, the program was designed to focus on changing youth attitudes and behaviors, not those of parents. Perhaps intentional content or instruction for parents was needed to provide an effect for this group. Third, since the program is designed to be peer-led by adolescents for other adolescents, it is unknown how the dynamics of the program may change when parents are present. Fourth, participants with parents who attended 4-H CARTEENS reported higher levels of parent management at Time 1 than participants with parents not attending. Therefore, one is less likely to see a difference in parent management between the two groups, and an increase in parent management may simply be a result of their teen driver getting a traffic violation.

The regression model predicting risky driving behaviors at Time 2 explained a modest amount of the variance with an R^2 value of 0.23. Understandably, the amount of risky driving behaviors at Time 1 had a significant influence, as did parental control at Time 2. Age, age at first citation, sex, parental attendance, and the amount of driving did not have a significant impact. One implication would be the importance of teaching youths and their parents more about unsafe driving practices before licensure. Another implication is to explore how to enhance parental controls of driving, such as monitoring and keeping track of safe driving (Hartos et al., 2002).

Limitations

There are several limitations to this study. First, sample size was limited, and not all participants completed the follow-up survey. All youths participated in the program (i.e., there was no comparison group that did not participate); thus, we do not know if the decrease in risky driving behaviors was due to the program, receiving the citation, or other factors. Without a comparison group of first-time traffic offenders who did not participate in CARTEEENS, this study was not able to control for the likely situation that parents are upset with the teen driver for getting a ticket, having to pay a fine, and increasing insurance rates.

Other limitations include that the data were self-reported by the youths and that there were possible inaccuracies in estimates of behaviors over the past month. This method was used in past research (Donovan, 1993) and deemed acceptable for the purposes of this study. In the future, other recording methods could improve accuracy. Follow-up over longer periods of time and using recidivism data for second or third citations would be beneficial.

Future Directions

For future studies, additional post-tests can help delineate whether program effects are retained over time. The two post-test evaluations could be used to demonstrate the information and methods taught and the retention of the materials by the teens required to attend the 4-H CARTEENS program.

This study indicates promise for adolescent driver intervention programs. The role of parents in such a program needs further investigation, as does understanding what predicts and prevents risky driving behaviors among youths.

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Acknowledgements

Using Social Marketing Principles to Understand an Extension Audience's Landscape Water Conservation Practices

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A substantial amount of water is applied to Florida landscapes, and encouraging water conservation through irrigation practices has been identified as a priority programming area where there is great opportunity to positively affect the state's water resources. Florida Extension addresses this priority area through educational programming. Social marketing has been identified as a promising approach to changing behaviors that influence environmental issues, such as water-saving irrigation technologies and practices. This approach recognizes that there are barriers that prevent individuals from engaging in positive behavior changes. This study evaluated an irrigation seminar using a retrospective pretest-posttest design that incorporated elements of a social marketing intercept survey. Thirty-four attendees participated and primarily represented green industry professional and government sectors. Study objectives were to evaluate the workshop and describe the audience using social marketing principles for future program planning based on audience research. The audience rated their descriptive norms, a strong predictor of behavioral change, lower than their injunctive norms, a less robust predictor. The majority planned to adopt at least one water-conservation best management practice as a result of the workshop. We make recommendations for applying social marketing principles to Extension programming.

Keywords: behavior change, irrigation, water conservation, social marketing, normative beliefs, barriers

Introduction

Florida withdraws an incredible 6.341 billion gallons of fresh ground and surface water per day, with water directed to public consumption making up approximately 35% of this usage (U.S. Geological Service, 2013). In a typical central Florida landscape with homeowner-controlled irrigation, an average of 64% of residential water usage is applied in the landscape and often exceeds the amount needed by plants (Haley, Dukes, & Miller, 2007). This usage represents a substantial opportunity for conservation by residents, green industry professionals, and property managers throughout the state, as many have previously recognized.

Irrigation and Environmental Impact

Research indicates that a significant portion of Florida's water usage is directed toward landscape irrigation. Thus, landscape water conservation has been identified as a priority area. There are a number of means to conserve water in the landscape through appropriate landscape practices and irrigation technologies. These include smart irrigation controllers that use soil moisture sensors or evapotranspiration data (Dukes, 2012; Haley & Dukes, 2012), the reduction of turfgrass in the landscape, the use of plant material with low water requirements, and the use of rainfall-activated irrigation shutoff devices. Florida Extension professionals incorporate these practices and technologies into programming to encourage landscape water conservation.

Extension Education on Sustainable Landscaping Practices

Florida Extension seminars have successfully increased the use of appropriate irrigation practices (Israel, Easton, & Knox, 1999), and there is a substantial amount of training available for homeowners on landscape water use and conservation (Shober, Denny, & Broschat, 2010). However, raising awareness of the relationship between landscape practices and environmental impact remains an area of educational need. Research has shown that the majority of homeowners want to protect water quality but believe that their irrigation practices do not impact the environment (Blaine, Clayton, Robbins, & Grewal, 2012). Most green industry professionals have not had formal training in irrigation management (Shober et al., 2010). These indicators reveal the great need for education in this area.

Florida Extension regularly offers seminars about water-saving technologies and practices to address the overuse of water in the landscape. Local county Extension faculty members apply current research and customize these programs to meet the needs of local clients (Israel et al., 1999). In the program under study, Extension faculty from three adjacent counties collaborated on a seminar to meet the needs of mixed local clientele comprised of landscape professionals, local government staff, and homeowners. This study sought to explore audience characteristics using social marketing principles and to evaluate the 1-day program for audience behavioral intentions and increased awareness of water issues.

Measuring Impact of Extension Programs

Extension programming provides major value to the public in the form of community good, narrowing of information gaps, fairness in resource distribution, and reducing costs or increasing benefits for stakeholders (Kalambokidis, 2004). Extension program evaluation is a critical component of accountability and is tied to maintaining current funding allocations (Lamm & Israel, 2013). Evaluation is also an important means for Extension faculty members to generate accountability, and this activity offers the opportunity to redirect programming efforts to better

serve Extension clients (Boone, Safrit, & Jones, 2002). Knowledge gain is frequently used as an evaluation measure, but this outcome cannot be assumed to generate behavior change (Frisk & Larson, 2011; Kollmuss & Agyeman, 2002). There is value in knowledge gain as an outcome; however, in the case of many human-environmental issues, such as water quality and human-impacted nonpoint source pollution, it is essential that behavior changes occur in order to improve the problem. Behavior change is highly valued as an outcome, and Extension professionals have been encouraged to incorporate this measure into their evaluation plans (Boone et al., 2002; Rennekamp & Engle, 2008). One approach to creating behavior change is *social marketing*. This approach to changing behaviors is relatively underused in Extension and "holds great promise for extending Extension's outreach on old and new issues" (Skelly, 2005, Conclusion, para. 1).

Overview of Social Marketing

Social marketing is a distinct discipline that applies traditional marketing principles to create voluntary behavior change that benefits society (Kotler & Lee, 2008). A key distinction of social marketing is the focus on the benefit to society, whereas in traditional marketing, financial profit is the primary objective (Kotler & Lee, 2008). Social marketing incorporates (a) a research-based understanding of a targeted audience, (b) tailored message development based on a segmented group's characteristics and needs, and (c) the use of strategies designed to remove or reduce an audience's perceived barriers and enhance perceived benefits to change (Andreasen, 2006; Kotler & Lee, 2008; Lefebvre, 2011; McKenzie-Mohr, 2011). An audience's perceived barriers to change contribute to their perceived cost of making practice changes. When applying the social marketing approach, Extension professionals work to reduce this perceived price (barrier) and to increase the value of adopting the behavior, similar to traditional marketing of commercial products (McKenzie-Mohr, Lee, Schultz, & Kotler, 2012). A number of social marketing models describe the process of this approach to change. A social marketing campaign, as described by McKenzie-Mohr et al. (2012), incorporates the following major steps: (a) selecting behaviors to promote among a target audience, (b) identifying barriers and benefits to making the selected behavior changes, (c) developing strategies to reduce barriers and increase benefits to changing the behaviors, (d) pilot testing the strategy, and (e) implementing on a broad-scale implementation and evaluating.

Social Marketing Principles and Extension Programs

Despite the promise social marketing provides in achieving behavior change outcomes through Extension programs (Rogers, 2003; Skelly, 2005), this approach is used minimally in our field. Extension professionals who engage in audience analysis and take the time to understand their normative beliefs, perceived barriers and benefits, and motivators are better equipped to bring about behavior change than those who focus solely on knowledge gain. Thoughtful audience

analysis allows Extension educators to use tools and strategies to encourage the adoption of practices that benefit the communities they serve.

Social marketing may be applied to programs as a strategy to influence behaviors for the good of the broader community (Andreasen, 1994). Many Extension professionals already use some social marketing principles, albeit unintentionally (Warner, 2014), and the tools of social marketing can be used to impact the community in a positive way. Social marketing campaigns have been successfully used to encourage environmental behavior changes such as recycling, water conservation, and sustainable landscape management practices (McKenzie-Mohr, 2011; McKenzie-Mohr et al., 2012). Extension professionals working to promote a specific behavior—the adoption of water-saving techniques and technologies—used this study to explore an audience's social norms, perceived barriers and benefits to practice and technology adoption, and knowledge gain related to the objectives of the training. When viewing Extension programming through the lens of social marketing, an understanding of clients' behavioral intentions, norms, barriers, and benefits can allow an Extension professional to use strategies to increase the likelihood that individuals will adopt a behavior (McKenzie-Mohr, 2011).

Audience Characteristics and Behavior Change

While social marketing prescribes specific behavior change as a final outcome, the Theory of Planned Behavior (TPB) is an indicator of change prior to its occurrence. The TPB defines behavioral *intention* as a product of *attitude*, *perceived behavioral control*, and *subjective norms*. The TPB may be applied to behavioral outcomes of Extension programming. The *intention* to perform some behavior suggests the effort one is likely to put into practice change or behavior adoption. When a target audience's intent to perform a behavior is understood, their future behaviors may also be understood, as "the stronger the intention to engage in a behavior, the more likely should be its performance" (Ajzen, 1991, p. 181). Therefore, educational professionals are able to project actual behavior when they measure audience intentions.

Barriers are the target audience's concerns regarding a specific behavioral change; they include the reasons people feel they cannot make some practice change and the costs they perceive to be associated with the practice change (Kotler & Lee, 2008). *Benefits* are the things people perceive they will gain if they make the specified behavior change; people factor in the likelihood they think they are to receive them (Kotler & Lee, 2008). An Extension faculty member using social marketing would approach behavior change by first identifying the audience's perceived benefits and barriers, and then working to enhance the former and reduce the latter.

Normative beliefs refer to the "likelihood that important referent individuals or groups approve or disapprove of performing a given behavior" (Ajzen, 1991, p. 195). *Injunctive norms* refer to

perceptions of whether the behavior ought to be done, and *descriptive norms* refer to behaviors in which those around an individual are engaged (McKenzie-Mohr, 2011). Research has demonstrated a relationship between normative beliefs about a behavior with intentions to act (Ajzen, 1991; McKenzie-Mohr, 2011). Based on TPB, if a target audience believes that using water savings practices and techniques are both approved of (injunctive norm) and being done by others (descriptive norm), they are more likely to adopt the behavior (Ajzen, 1991; McKenzie-Mohr, 2011). Norms have been demonstrated to be good predictors for whether someone will make a particular behavior change (Ajzen, 1991; McKenzie-Mohr, 2011; Shaw, Radler, Chenoweth, Heiberger, & Dearlove, 2011). In short, if individuals think that the people around them approve of and are engaging in some behavior, they are more likely to do so themselves. It is important to conduct thoughtful research on the target audience to understand the characteristics that will support or discourage their adoption of some behavior change (McKenzie-Mohr, 2011). Barriers, benefits, normative beliefs, and behavioral intentions are some of the key indicators that can inform Extension professionals about their audiences and help them develop strategies that will effectively change behaviors.

Research Objectives

The objectives that guided this study were to

1. Describe an Extension audience using the social marketing concepts of intentions, barriers, benefits, and normative beliefs; and

2. Evaluate program outcomes through the use of a retrospective pretest-posttest.

Methods

Seminar Design

A one-day irrigation workshop was developed and held in Palm Beach County, Florida, to educate green industry professionals, municipal and county staff, property managers, and volunteers about irrigation best management practices. The objectives of this educational workshop were to raise awareness of the need to conserve water and preserve water quality and to encourage participants to adopt water-saving practices and technologies.

The workshop's content included water-saving practices and technologies, such as smart irrigation controllers and appropriate irrigation scheduling, techniques for improving irrigation systems, tools and resources that can support more efficient irrigation practices, and types of shoreline vegetation that can positively impact water quality. The workshop lasted for a full day and included 380 total minutes of instruction, as well as several breaks and demonstrations.

Study Design and Program Delivery

A research protocol for this study was submitted to the University of Florida's Institutional Review Board. These documents described the voluntary study, explained how much time it would take to complete the instrument, and acknowledged known risks and benefits. Approval to conduct this research was received in September 2013 (Protocol #2013-U-0967).

This seminar was conducted in October 2013. At the conclusion of the program, the research protocol was explained, and participants were advised that involvement in the study was voluntary. Those who agreed to participate were asked to complete the survey instrument.

Sample Population

Sixty-nine individuals participated in this workshop, and 35 opted to complete the survey. We found 34 of the surveys to be usable, resulting in a 49.3% response rate.

Instrumentation

The survey instrument combined elements of a traditional retrospective pretest-posttest survey design and a community-based social marketing intercept survey design.

The first segment of the instrument was qualitative and incorporated an *intercept survey*. Intercept surveys are short surveys useful in identifying an audience's perceived barriers and benefits with a limited time investment; they can be used when focus groups and more detailed surveys are not plausible (McKenzie-Mohr, 2011). Intercept surveys ask two questions: *What makes it challenging or difficult for you to do this behavior?* and *What are the benefits to doing this behavior?*, effectively identifying an audience's barriers and benefits associated with a specific practice change (McKenzie-Mohr, 2011).

The second segment of the instrument collected data used to describe audience characteristics. We asked participants to identify themselves as a homeowner, green industry professional, city/county/government staff member, or other category. We sought to describe normative beliefs by asking participants to rate their agreement with three statements: (a) *I believe I should conserve water in the landscape*, (b) *The people who are most important to me believe I should conserve water in the landscape*, and (c) *Many of my peers are adopting new water-saving technologies to conserve water in the landscape*. These statements were rated on a 5-point Likert scale (from *Strongly disagree* to *Strongly agree*). In this segment, we also asked participants to rate their perceived importance in the role of both conserving water in the landscape and persuading others to conserve water in the landscape on a 5-point Likert scale (from *Very unimportant* to *Very important*).

The third segment of the instrument incorporated elements of a retrospective pretest-posttest. A retrospective pretest-posttest instrument is administered one time following an intervention, such as a workshop (Nielsen, 2011). This instrument asks a respondent to refer to a specific point in time, such as before the workshop, and compare characteristics with their current state (Nielsen, 2011). This method of evaluation is beneficial as it is less time-consuming for both evaluators and program participants (Davis, 2003). Further, respondents are often better able to accurately gauge how their behavior has changed or their knowledge increased, after they have participated in a program (Davis, 2003). In other words, prior to an educational training, participants may not be clear on how much or little they know about the subject being taught. Participants were asked to rate their pre- and post-seminar knowledge on a 5-point Likert scale (from *Very unknowledgeable* to *Very knowledgeable*). They were also asked to rate their awareness of the need to conserve water, the tools and resources that they can access to get help and information about using more efficient irrigation practices, and the techniques that can be used to improve irrigation efficiency on a 5-point Likert scale (from *Very unaware* to *Very aware*). We also asked participants if they were familiar with the water-saving technologies we presented prior to the program and if they planned to adopt new water-saving best practices as a result of the workshop.

A Cronbach's alpha test for reliability resulted in a coefficient of .84 for the complete survey instrument, indicating that this tool had a satisfactory level of internal consistency (Fraenkel & Wallen, 2008). We also ran the Cronbach's alpha test for reliability of the two individual quantitative parts of the instrument. This resulted in coefficients of .69 for the normative beliefs scale (second segment) and .81 for the retrospective pretest-posttest items (third segment). Given that the reliability coefficient for the second segment was approaching the .70 benchmark, and the reliability coefficients for the overall instrument and the third segment exceeded it, we determined that the instrument was suitable for this study (Fraenkel & Wallen, 2008).

Data Analysis

Data collected from this study were analyzed using Statistical Package for the Social Sciences (SPSS Version 20; SPSS, Chicago). Descriptive statistics, one-way analysis of variance (ANOVA), and paired *t*-tests were used to analyze the data.

To analyze data associated with Objective 1 (Describe an Extension audience through the use of social marketing concepts), we first calculated the frequencies of participants' self-reported roles and descriptions. These frequencies were used to compute the mean score and standard deviation of all items to measure normative beliefs. We coded each of the qualitative responses associated with participants' barriers and beliefs several times in order to identify common categories (Glaser, 1965) and then calculated the frequency for which each category occurred.

We used paired *t*-tests to measure Objective 2 (Determine program impact through the use of a retrospective pretest-posttest). For each of the items in the pretest-posttest, we computed the mean pretest score and compared it to the mean posttest score. We calculated effect size using Cohen's *d* when *t*-tests produced significant results (Cohen, 1988). We report on effect size to allow the reader "to appreciate the magnitude or importance" (American Psychological Association, 2010, p. 34) of the results. Effect size is a measure of practical significance, or "whether the result is useful in the real world" (Kirk, 1996, p. 746).

Results

Objective 1: Describe an Extension Audience Through the Use of Social Marketing Concepts

The majority of workshop attendees described themselves as either green industry professionals or local government staff, with less than one-fifth identifying as homeowners (Table 1). Nearly three-quarters of the sample had previously heard about the new technologies and practices presented, and nearly all indicated that they planned to adopt practices and technologies presented in the workshop.

Table 1. Distribution of Self-Reported Role and Description for Audience of a One-Day Irrigation Symposium

	Green industry professional	City/county/other government staff	Homeowner/resident	
n	16	12	6	
%	47.1	35.3	17.6	

	Familiar with the technologies/ practices	Not familiar with the technologies/ practices	Plan to adopt practices/ technologies*	Do not plan to adopt practices/ technologies*
n	25	9	29	4
%	73.5	26.5	87.9	12.1

*Calculated based on *n* = 32 responses

Workshop attendees indicated that they viewed their role in both conserving water in the landscape and persuading others to conserve water in the landscape (Table 2) as falling between *Important* (4) and *Very important* (5). We found no significant difference between participants' self-described role at *p* = .05 (data not presented).

On the normative beliefs scale, participants rated their personal norms (*I believe I should conserve water in the landscape*) and injunctive norms (*The people who are most important to me believe I should conserve water in the landscape*) fairly highly (Table 2); both of these values

fell between *Agree* (4) and *Strongly agree* (5). Participants rated their descriptive norms (*Many of my peers are adopting new water-saving technologies to conserve water in the landscape*) lower than their injunctive norms (Table 2); this value fell between *Neutral* (3) and *Agree* (4).

Table 2. Summary of Evaluation of a Tri-County Irrigation Symposium

Variable	M	SD
How important is your role in: [a]		
Conserving water in the landscape?	4.35	.85
Persuading others to conserve water in the landscape?	4.35	.92
Please indicate how much or how little you agree with the following statements: [b]		
I believe I should conserve water in the landscape.	4.68	.54
The people who are most important to me believe I should conserve water in the landscape.	4.24	.92
Many of my peers are adopting new water-saving technologies to conserve water in the landscape.	3.74	.89

[a] 1 = *Very unimportant*; 2 = *Unimportant*; 3 = *Neutral*; 4 = *Important*; 5 = *Very important*.

[b] 1 = *Strongly disagree*; 2 = *Disagree*; 3 = *Neutral*; 4 = *Agree*; 5 = *Strongly agree*.

Participants provided a number of perceived barriers and benefits to adopting the practices and technologies presented in the workshop (Table 3). The most common barrier identified was the cost associated with adopting new technologies, followed by convincing clients to make changes and the politics associated with making changes. A few respondents indicated that there were no barriers to changing their practices. The most common benefits mentioned to adopting the practices and technologies presented in the workshop were water conservation, money savings, and environmental health.

Table 3. Summary of Barriers and Benefits Perceived by Participants in a Tri-County Irrigation Symposium

	Barrier	Frequency
What makes it difficult or challenging for you to adopt water-saving practices and technologies that you learned about today?	Costs	17
	Difficulty convincing clients or decision-makers	7
	None/no barrier	3
	Accessing a knowledgeable contractor	2
	Not currently in a water shortage	1
	Amount of landscaping I manage	1
	Benefit	**Frequency**
What do you see as beneficial or rewarding about adopting water-saving practices and technologies that you learned about today?	Water conservation	15
	Money savings	9
	Environmental health/sustainability	6
	Landscape appearance	3
	Landscape health	2
	It is a necessity	1

Objective 2: Determine Program Impact Through the Use of a Retrospective Pretest-Posttest

We measured a significant increase on each of the three items on the retrospective pretest-posttest (Table 4). Participants reported a substantial change in their understanding of the need to conserve water, their awareness of the knowledge and tools available to help improve irrigation efficiency, and their understanding of the techniques that can be used to improve efficiency. The Cohen's *d* measure of effect size for the *awareness of the need to conserve water* analysis was 0.64, which we interpreted as an indication of a medium magnitude of relationship (Cohen, 1988). The Cohen's *d* measure of effect sizes for the *knowledge and tools available to help improve irrigation efficiency* and the *knowledge of the techniques that can be used to improve efficiency* were 1.39 and 1.28, respectively (Cohen, 1988). The effect sizes show that these increases have practical significance beyond statistical changes, and the results can be applied to real programming (Kirk, 1996).

A majority of respondents (73.5%; *n* = 25) indicated they were already familiar with the water-saving technologies and practices discussed in the workshop. The most common sources of this information were other professional organizations and our own university system through other workshops, newsletters, and media. A total of 85.3% (*n* = 29) of participants indicated they planned to adopt new water-saving technologies as a result of attending the workshop. When asked what technologies they planned to adopt, participants most frequently indicated they would make use of plants that require less water, install soil moisture sensors and smart irrigation controllers, and use more efficient irrigation heads.

Table 4. Summary of Results and Paired t-Tests for a Retrospective Pretest-Posttest Used to Evaluate a Tri-County Irrigation Symposium

Variable	M	SD	p	t	d
Please rate your awareness of the need to conserve water.[a]					
Pretest	4.09	.81	<.001	-4.658	0.64
Posttest	4.71	.98			
Please rate your knowledge of the tools and resources that you can access to get help and information about using more efficient irrigation practices.[b]					
Pretest	3.44	.98	<.001	-8.609	1.39
Posttest	4.63	.49			
Please rate your knowledge about techniques that can be used to improve irrigation efficiency.[b]					
Pretest	3.41	.88	<.001	-.814	1.28
Posttest	4.50	.57			

[a] 1 = *Very unaware*; 2 = *Unaware*; 3 = *Neutral*; 4 = *Aware*; 5 = *Very aware*.

[b] 1 = *Very unknowledgeable*; 2 = *Unknowledgeable*; 3 = *Neutral*; 4 = *Knowledgeable*; 5 = *Very knowledgeable*.

Conclusions

Our team found the three-part instrument to be reliable and relatively easy to use. We liked the single administration of this tool as compared to a standard pretest-posttest design, and our audience appeared to like it as well. This Extension seminar was designed to address our local and widespread need to conserve water in the landscape, and we hoped to increase awareness of conservation issues and encourage irrigation practice changes. Given that the majority of the audience intended to make behavior changes, we determined that they may be likely to make changes (Ajzen, 1991). A follow-up evaluation should be conducted to measure actual change. We consider this program to be successful in that most participants indicated that they would adopt a new best management practice as a result of the program. We were not surprised that most of our audience had previously heard about the practices and technologies we presented, as water conservation is a widespread and public issue in our state.

Our audience's familiarity with the issues could be further explained in that more knowledgeable clients may be prone to attend a program that covers issues they are already familiar with, and possibly be more likely to seek out opportunities to conserve and protect water. In other words, the individuals who are unaware of these issues and who potentially waste more water may be less likely to attend a program that encourages them to conserve. This reflects Rogers' (2003) innovativeness-needs paradox in that those who need the benefits of an idea the most are the last to adopt it. Based on recommendations for addressing this paradox, we suggest that Extension professionals consider using a strategy that targets those who "would ordinarily be the last to adopt" (Rogers, 2003, p. 296). For example, in repeating this program, we would consider targeting those who are least aware of local water issues or least likely to conserve. One way to identify this target audience is through observation of current behaviors or water use records in a community.

Our audience reported their perceived role in conserving water and encouraging others to conserve water as fairly high. Participants' injunctive normative beliefs toward irrigation conservation behavior were rated more highly than descriptive normative beliefs, meaning that our audience felt strongly that they should conserve water in the landscape but were not convinced that their peers were doing so.

This audience viewed costs as the primary barrier to making behavior changes in irrigation water-saving technologies and practices. Additionally, the primary motivator to practice changes was saving water, with saving money also identified as a chief benefit.

Implications and Recommendations

We suggest that others consider using evaluation tools similar to the one we used in this study. The retrospective pretest-posttest format saves time by allowing for the capture of outcomes of the program with a single instrument. The incorporation of the intercept survey to gauge audience barriers, benefits, and normative beliefs provides the practitioner with a better understanding of the audience. These data are invaluable in assessing needs and planning future programs. While it "is tempting to skip barrier and benefit identification when you have limited time or financial resources […], failing to conduct [this] research dramatically reduces the likelihood that your program will be successful" (McKenzie-Mohr, 2011, p. 37). As the use of intercept surveys is recognized as a mechanism for understanding benefits and barriers of one's audience with minimal time, and when more detailed survey research is not practical (McKenzie-Mohr, 2011), we suggest that other Extension professionals consider this efficient method for audience research. It is much preferred to conduct this research ahead of time in order to design sets of Extension activities that meet the needs of the clients and help them to overcome barriers to change.

The knowledge gained from this study will help to guide more in-depth target audience analysis in the future. The value of understanding an Extension audience's real reasons for not adopting a particular behavior cannot be overemphasized; these barriers can inform how to most effectively connect with an audience segment and better meet their needs (Kotler & Lee, 2008). Social marketing incorporates the concept of *audience segmentation*, where audiences are divided in meaningful ways and targeted based on their unique characteristics and needs (Andreasen, 2006). Audience segmentation allows the Extension practitioner to deliver the most fitting messages based on characteristics of the audience.

A major challenge to encouraging sustainable behaviors is the very nature of many conservational practices. As with many environmental behaviors, a person's water conservation activities are not always apparent and not necessarily visible to peers. A target audience's perceived norms are not often incorporated into program planning, and this is unfortunate given how strongly norms influence behavior (McKenzie-Mohr et al., 2012). In our study, participants rated their descriptive normative beliefs lower than their injunctive normative beliefs; they did not feel as strongly that their peers were adopting the water-saving technologies and practices of interest. This finding suggests that our audience was made up of innovators and early adopters, and it could indicate that participants are simply not aware of their peers who are using the technologies. Since descriptive beliefs are better predictors of practice changes, behavior change goals would be better accomplished through a focus on enhancing descriptive norms, and we urge others to consider the norms of their target audience members.

We encourage other Extension educators working on water conservation and related initiatives to increase target audiences' awareness of peers' water-saving activities by using strategies to make norms noticeable (McKenzie-Mohr, 2011). Showcasing individuals and firms that use water-saving technologies and practices and publicly communicating about the people in the community who are engaging in specific water-saving practices are two ways to use norms to encourage water conservation behaviors. Frequently, recognition programs, announcements, mass media, stickers, and signs are used to emphasize norms and communicate what others in the community are doing. Additional educational programming targeting key audiences could also be helpful in making conservational behaviors more visible.

We did not identify knowledge as a barrier to behavior change among audience members. With this in mind, a social marketing approach to creating behavior changes in landscape irrigation conservation dictates that an Extension program's focus would concentrate on reducing the perceived barriers and emphasizing the benefits of these practice changes over providing knowledge alone (Kotler & Lee, 2008; McKenzie-Mohr, 2011). As financial costs of the behavior were identified as a major barrier, and financial savings identified as a major benefit, a strategic approach would emphasize the financial savings and deemphasize the costs to making the desired changes. Providing water-saving technologies to the audience at a reduced cost would help to decrease that particular barrier. That approach may not be feasible if funds are not available to purchase the items. In such a case, we recommend that educational programming be used to emphasize ways to reduce startup costs and achieve financial savings. One method to do this would be to provide data about the amount of time in which a system would pay for itself, which could help to enhance the perceived financial benefit. For example, when introducing new irrigation technologies, the audience may likely want to know the cost of installation and maintenance, but this information should be provided along with the estimated savings they could expect to see on their water or pump electricity bills. Likewise, since it is known that water savings is a major driver for irrigation behavior changes for this audience, it would be advantageous for Extension professionals to emphasize the amount of water each technology or practice could save.

Social marketing is a highly valuable approach to community change but is not appropriate for every situation. Social marketing principles are most helpful when they are used from the very beginning of the program planning process. This approach should be used when voluntary behavior change of a large number of people is the goal, and it is appropriate to focus on a targeted audience. Because it takes time to create change, social marketing may not be the right choice for situations where immediate change is necessary. Extension agents also need to have the skills, understanding, and resources to develop a program based on an audience's needs. This means that they have defined a specific problem and defined their audience and goals. It also means that they fully understand their audience members or have the time and resources to research them. The Extension agent should be willing to segment the audience and develop

specific messages for different groups (Kotler & Lee, 2008; McKenzie-Mohr, 2011). When these requirements are met, social marketing is a highly valuable means for creating behavior change that benefits the community.

We acknowledge a number of limitations to this study that are common to self-reported evaluation methods used in Extension programming. This study used a convenience sample of individuals who participated in an Extension workshop and opted to complete the voluntary questionnaire. This could have resulted in a nonrepresentative sample, and there is a possible difference between the people who opted to participate and those who did not. Because of these limitations, generalizations of the results of this study to the nonrespondents and to other Extension audiences should be made with caution. Further, potential biases may occur in social science research, especially when relying on self-reported measures (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003), which is common in Extension evaluation. Consistency or social desirability biases may occur because individuals "have a desire to appear consistent and rational in their responses [… and] present themselves in a favorable light, regardless of their true feelings about an issue" (Podsakoff et al., 2003, p. 881).

The data gleaned from this study indicate that the workshop was successful in that it increased the audience's intention to make behavioral changes and raised their awareness and knowledge of water conservation behaviors and technologies. According to the TPB (Ajzen, 1991), it is likely that these intentions will lead to actual change. We recommend that long-term follow-up evaluation measures be conducted with these participants to measure actual behavior change and to determine if the audience needs additional information or assistance in overcoming barriers to adopting new practices. Through an investigation of social marketing principles, we explored and documented our audience's behavioral intentions, normative beliefs, and perceived barriers and benefits to a specific behavior change. This new knowledge provided a better understanding of this audience. As normative beliefs, barriers, and benefits are proven predictors of behavior (Ajzen, 1991; Cialdini, 2003; McKenzie-Mohr, 2011), this information about a specific audience provides practical implications for future Extension programming in water conservation with this audience and similar groups. We recommend that others consider using audience analysis to identify benefits and barriers to behavioral change and use this research to inform and guide a social marketing approach that results in more effective Extension programs.

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Agriculture Teachers' Use of Interactive Whiteboards (IWBs): Teachers' Perceptions of Innovativeness and Technology Integration

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The purpose of this descriptive-correlational study was to assess the level of innovativeness of Oklahoma secondary agricultural education teachers regarding their use of the interactive whiteboard (IWB). The study also sought to determine if relationships existed between teachers' IWB innovativeness scores and selected personal and professional characteristics. The findings of this study revealed that as a teacher's age and years of teaching experience increased, his or her perceived level of innovativeness regarding use of interactive whiteboards (IWBs) decreased. Therefore, younger and less experienced teachers were further advanced in Rogers's (2003) innovation-decision process. In addition, this study found that a majority of the agriculture teachers were in the implementation and confirmation stages of the innovation-decision process. Implications and recommendations point to creating professional development experiences for teachers in the knowledge and persuasion stages of the innovation-decision process to learn about effective use of IWBs, to acquire procedural or "how-to" knowledge of the IWB, and to have opportunities to practice using it. Additional research should examine how the use of IWBs affects student learning and achievement in school-based agricultural education.

Keywords: adoption; agriculture teachers; innovativeness; interactive whiteboard; STEM

Introduction

Technology has transformed the world in which we live now and will continue to transform the world of the future. The use of instructional technologies (ITs) in today's schools may be more important to student success than in previous years. The pupils of today are much different from former generations of students regarding their expectations for the use of technology while

learning (Brown, 2000; Prensky, 2001; Spires, Wiebe, Young, Hollerbrands, & Lee, 2012; Tapscott, 1998), especially concerning their receipt and use of information. These students have spent their entire lives immersed in technology (Oblinger, 2004; Oblinger & Oblinger, 2006; Prensky, 2001). In fact, technology is assumed to be an important aspect of their everyday lives (Oblinger, 2004), in part, because this new generation of learners thinks and processes information much differently than did previous students (Brown, 2000). According to Oblinger (2004), by the time a student reaches the age of 13, he or she has spent more hours interacting with digital media, such as computers, Internet, and videogames, than watching television.

Numerous researchers have examined differences between generations in regard to their members' use of digital devices (e.g., Carlson, 2005; Howe & Strauss, 2000; Oblinger & Oblinger, 2006; Prensky, 2001). These researchers categorized the *older* generations as *Traditionals/Matures/Baby Boomers/Digital Immigrants* and the *younger* generations as *NetGens/Millenials/NeXt/Digital Natives*. This divide in generations has garnered much attention from educators and researchers (Bennett, Maton, & Kervin, 2008). Therefore, considering these generational differences, are instructors prepared properly to implement ITs in their teaching practices? Research suggests that deficits exist regarding teachers' abilities to use technology in their classrooms effectively (Chen, Lim, & Tan, 2010). Teachers, therefore, regardless of subject or content area, should improve their *technological fit* regarding technology integration (Brown, Baker, Edwards, & Robinson, 2011; Otrel-Cass, Khoo, & Cowie, 2012; Wachira & Keengwe, 2011; Young, Young, & Shaker, 2012).

One effort to bridge this gap between teachers and students is the use of interactive whiteboards (IWBs). IWBs, according to Lewin, Somekh, and Steadman (2008), are extra-large touch screen whiteboards, joined to a classroom computer and visible to the entire class. IWBs allow teachers to access still and moving imagery coupled with sound. In addition, IWBs present a multimedia approach to address the needs of entire classes or individual students. IWBs "are used to challenge pupils to think by using a variety of verbal, visual, and kinesthetic stimuli" (Glover, Miller, Averis, & Door, 2007, p. 11). Incorporating the use of IWBs into classrooms may assist teachers in engaging this new technology-savvy generation of students cognitively and affectively. Researchers (e.g., Croninger & Lee, 2001; Greenwood, Horton, & Utley, 2002; Klem & Connell, 2004) have shown that students who are engaged actively in the learning process learn more effectively and perform better on tests.

Because computerized ITs are integrated increasingly in education, teachers have been faced with new challenges of technical aptitude, knowledge, and expertise regarding their use (Levin & Wadmany, 2008). ITs generate new possibilities and encourage teachers to use such to make teaching and learning even more significant and gratifying (Levin & Wadmany, 2008). Further, Levin and Wadmany (2008) claim that ITs have become the literacy of the 21st century. Numerous teachers, however, have been unhurried about adopting ITs as a pedagogical practice

(Levin & Wadmany, 2008). One reason may be their overall lack of self-efficacy in regard to teaching (Tschannen-Moran, Hoy, & Hoy, 1998). Bunch, Robinson, and Edwards (2012), however, found that agriculture teachers who integrated instructional technology in their teaching, by way of IWBs, expressed higher self-efficacy more frequently when using technology in their classrooms.

Apprehension of adopting IT by teachers is not a new phenomenon (Zhao & Frank, 2003). Numerous research inquiries (Berge, Muilenburg, & Haneghan, 2002; Gammill & Newman, 2005; Gu, Zhu, & Guo, 2013; Hope, 1998; Levin & Wadmany, 2008; Murphrey & Dooley, 2000; Nelson & Thompson, 2005) provide a substantial list of barriers that affect teachers' use of ITs. These barriers include a lack of time to plan lessons properly involving the use of technology, a dearth of administrative support, and insufficient expertise (Handal, Campbell, Cavanagh, Petocz, & Kelly, 2013; Osman & Bakar, 2012). According to the National Research Council (NRC, 1999), "[m]any who currently use information technology have only a limited understanding of the tools they use and a (probably correct) belief that they are underutilizing them" (p. 1). However, the main reason teachers do not integrate technology is their lack of prior experience in using technology as an instructional tool (Hope, 1998).

Kotrlik, Redmann, and Douglas (2003) found that agriscience teachers' perceptions of barriers were strong predictors of whether they would integrate instructional technologies into their pedagogical practices. But what may be the best ways to assist teachers in overcoming the barriers? Nelson and Thompson (2005) noted that teachers often instruct students in ways similar to their own pedagogical preparation. However, if teachers were not exposed to ITs during teacher preparation programs or through professional development thereafter, their lack of experience may lead to adoption and integration issues. To that end, Brown et al. (2011) asserted that "[i]t is essential that teacher educators take responsibility for training future teachers in a way that equips them with the resources to teach today's digital natives" (p. 1).

Significance of the Study

Today's students are natives of a digital world (Prensky, 2001). They need to perceive a sense of autonomy and be challenged at an appropriate level (Shernoff, Csikszentimihalyi, Schneider, & Shernoff, 2003). The increasing prevalence of technology in U.S. schools is an initiative to which the federal government has committed effort and resources (Lawless & Pellegrino, 2007). To help schools keep up with technological advancements, the federal government has increased its funding efforts to equip schools with technology and make it accessible to students across the country (Lawless & Pellegrino, 2007). This initiative was implemented, in part, because of the view that students need to be engaged at higher levels in the classroom to reach their optimal learning capacity (Marks, 2000).

One way teachers can engage today's learners is by employing technologies such as IWBs (Kennewell & Beauchamp, 2007; Stewart, Antonenko, Robinson, & Mwavita, 2013). IWBs allow teachers to develop interactive lessons to augment student learning (Miller, Glover, & Averis, 2004). The interactivity fostered by IWBs creates a classroom environment in which students interact with each other (pupil-to-pupil) and the teacher (pupil-to-teacher), model abstract ideas, and become actively involved in learning (Cakir, 2008; Glover & Miller, 2001; Mayer, 2004; Minner, Levy, & Century, 2010).

What is unclear is whether school systems will have teachers who understand how to use the technology appropriately in their classrooms such that student learning is enhanced (Lawless & Pellegrino, 2007). Thus, the digital divide could actually widen over time with the increased investment of technology in schools unless urban and rural K-12 educational settings attract and maintain a teaching force equipped to use technology effectively in support of student learning (Lawless & Pellegrino, 2007, p. 578). It is imperative, therefore, to determine the factors that prevent teachers from using IWBs, because the integration of technology is an innovative process (Lowry, 1997) and will take time to diffuse in classroom learning environments (Lawless & Pellegrino, 2007).

Because agricultural education teachers have access to IWBs (Bunch et al., 2012), this study focused on the factors that impacted their adoption of IWBs. Although research on technology adoption among teachers in agricultural education has been conducted before, the technology being studied and adopted is relatively new and changing rapidly (Murphrey, Miller, & Roberts, 2009). Further, only a small number of studies have been conducted on teachers' use of IWBs in the agricultural education classroom (Bunch et al., 2012). Encouraging teachers to use IWBs requires an understanding of their innovativeness or the likelihood of adopting such practices; therefore, studies should be performed to describe teachers' perceptions of innovativeness regarding their use of IWBs.

Theoretical Framework

The theoretical framework undergirding this study was based on Rogers's (2003) innovation-decision process. According to Rogers (2003), diffusion scholars have noted that a person's decision to adopt an innovation is not an immediate act; rather, it is a *process* that consists of a sequence of choices and events over a period of time in which an individual examines a new idea and chooses whether to integrate the innovation into his or her existing practice (Rogers, 2003). The innovation-decision process is defined by five stages that include (a) the knowledge stage, (b) the persuasion stage, (c) the decision stage, (d) the implementation stage, and (e) the confirmation stage (Rogers, 2003).

Knowledge is the first stage of the innovation-decision process and is categorized into three types: (a) awareness knowledge, (b) how-to knowledge, and (c) principles knowledge (Rogers, 2003). Awareness knowledge pertains to an individual's cognizance of the innovation's existence and may motivate a person to pursue the other two types of knowledge (Rogers, 2003). How-to knowledge is the understanding required to use an innovation properly; it is linked strongly to the perceptions of complexity associated with an innovation (Rogers, 2003). Finally, principles knowledge includes the foundational aspects or technical principles undergirding the workings of an innovation (Rogers, 2003).

An individual's information-seeking behaviors are crucial during the persuasion stage, because he or she is forming perceptions of the innovation leading to its adoption or rejection (Rogers, 2003). The persuasion stage is a period of uncertainty that causes individuals to seek confirmation of their thinking and to form either a favorable or unfavorable attitude toward the innovation (Rogers, 2003). An innovation's perceived attributes play a key role during the persuasion stage, especially as they relate to relative advantage, compatibility, complexity, observability, and trialability (Rogers, 2003). Rogers (2003) maintained that these five attributes explained roughly one-half or more of the variance in rate of adoption for most innovations. Therefore, understanding agriculture teachers' perceptions of the attributes of IWBs should assist change agents in impacting the innovation's rate of adoption.

The decision stage occurs next and is when the individual decides to adopt or reject an innovation (Rogers, 2003). A major attribute linked to the decision stage is trialability. Often, individuals are able to make an adoption decision by trying the innovation as long as an acceptable level of relative advantage is perceived to exist.

The next stage is implementation, which is when an individual has begun to use an innovation (Rogers, 2003). Change agents must provide technical support as the client starts to use the innovation (Rogers, 2003). Depending on the innovation, the length of its implementation stage may linger or it may quickly become a regular part of the adopter's operations or routine behaviors (Rogers, 2003). This point may mark the end of the innovation-decision process for some individuals, while others may continue to the confirmation stage.

During the confirmation stage, an adopter "seeks reinforcement for the innovation-decision already made" (Rogers, 2003, p. 189). It is important for change agents to realize a decision reversal is possible during the confirmation stage. Reversal happens, typically, when conflicting messages are received by the adopter (Rogers, 2003). In this stage, adopters are searching for evidence that they made the correct decision and seeking a reduction in their level of dissonance regarding the adoption decision (Rogers, 2003). Developing a better understanding of where teachers are in the innovation-decision process may be helpful for designing effective strategies to encourage their adoption of the IWB.

Using technology, including IWBs, in the classroom is not an entirely new phenomenon; however, "much more needs to be done to encourage and support agriscience teachers in the integration of technology in the teaching/learning process" (Kotrlik et al., 2003, p. 88). Therefore, this study sought (a) to understand the degree to which teachers had adopted IWBs, (b) to identify where teachers were in the innovation-decision process, and (c) to describe their innovativeness regarding the use of educational technologies.

Purpose and Objectives

The purpose of this descriptive-correlational study was to assess the perceived levels of innovativeness of secondary agricultural education teachers regarding their use of the IWB. The study also sought to determine if relationships existed between teachers' IWB innovativeness scores and selected personal and professional characteristics. Three research objectives guided this study:

> 1. Describe the agricultural education teachers' perceived levels of innovativeness regarding their use of IWBs;

> 2. Describe relationships between the agricultural education teachers' perceived levels of innovativeness and their selected personal and professional characteristics; and

> 3. Describe agricultural education teachers' perceived levels of innovativeness regarding the integration of technology in their classrooms.

Methods

Population and Sample

This study was part of a larger descriptive-correlational investigation (Bunch et al., 2012). As reported in the larger study (Bunch et al., 2012), the target population consisted of the secondary agricultural education teachers in Oklahoma ($N = 437$). The sampling frame used for this study was a list of the electronic mail addresses of all Oklahoma agricultural education teachers, as provided by the Oklahoma Department of Career and Technology Education. A random sample of 205 agricultural education teachers was selected using Krejcie's and Morgan's (1970) required sample size table. To address frame error (e.g., teacher relocation or individuals no longer in the profession), 18 teachers were removed from the study. In addition, another 18 teachers had incorrect or otherwise unreliable e-mail addresses, and they were also removed from the study. As a result of frame error, the original sample of 205 teachers was adjusted to an accessible sample of 169 teachers. Completed questionnaires were received from 81 of the 169 teachers for a 48% response rate.

An overwhelming majority of the teachers were male, held only a bachelor's degree, and were traditionally certified. This was consistent with the teacher population of Oklahoma (K. Murray, personal communication, September 22, 2010). In addition, a majority of the teachers in this study had taught from 0 to 5 years. For the purpose of interpreting the study's results, it was assumed the teachers who reported 0 years of teaching experience based their perceptions on student teaching experiences with IWBs, as well as experiences that occurred during their initial year of teaching.

Instrumentation

The Interpersonal Technology Integration Scale (ITIS), as developed by Niederhauser and Perkmen (2008), was used in the larger study (Bunch et al., 2012). The original 21-item ITIS asked the teachers to indicate their levels of agreement with each statement using a 5-point, summated-rating scale. The ITIS includes three constructs: (a) Self-Efficacy, (b) Outcome Expectation, and (c) Interest. However, these constructs were not included in the analyses reported here. Rather, this study focused on the 18 professional and personal characteristics questions added to the instrument to describe the sample and make possible the study's correlational analyses.

As a part of the professional and personal characteristics section, two items were added to measure teachers' levels of innovativeness regarding the use of IWBs and their levels of innovativeness for integrating technology in their classrooms in general. The items were modified from a study conducted by Li and Lindner (2007) that assessed the perceptions of Chinese university faculty on the use of Web-based distance education. These statements included:

- "I know as a teacher, technology use is limited in my classroom. Using an IWB may be a solution to this problem."
- "I know as a teacher, technology use is limited in my classroom. Using an IWB is a good solution to this problem."
- "I know as a teacher, technology use is limited in my classroom. I know the benefits of using IWBs, and will try it in my own teaching soon."
- "I am currently using an IWB, and it helps me to increase technology use in my classroom."
- "I have used an IWB for more than 1 year, and plan to continue using it."

Each statement aligned with stages in Rogers's (2003) innovation-decision process. In addition, respondents were asked to indicate on a scale of 1 (*least innovative*) to 5 (*highly innovative*), "How would you rank your innovativeness regarding the integration of technology into your classroom?"

A panel of four experts in agricultural education reviewed the instrument to establish its content and face validity. Based on the recommendations of the panel, minor revisions were made to the instrument. The instrument was also pilot-tested with 36 Oklahoma agricultural education teachers to ensure its readability and clarity. The teachers who participated in the pilot test were excluded from the study reported on here.

Data Collection

Data were collected through an Internet questionnaire using the Tailored Design Method, as developed by Dillman, Smyth, and Christian (2008). All teachers were contacted via an e-mail message describing the purpose of the study and including a link to the questionnaire. At the conclusion of weeks 1, 2, and 3, reminder messages were sent to the nonrespondents. To ensure the results were representative of the target population, an independent samples t-test was used to compare early and late respondents (Lindner, Murphy, & Briers, 2001) based on perceived level of innovativeness regarding use of IWBs and perceived level of innovativeness regarding the integration of technology in the classroom. No statistically significant differences were found at an alpha level of .05; therefore, the results of this study were deemed representative of the target population.

Data Analysis

The data collected were analyzed using SPSS® version 17.0 for Windows™. Responses were coded for computer analysis. Research objectives 1 and 3 were analyzed using descriptive statistics—specifically, frequencies and percentages. Research objective 2 was achieved by computing Spearman rank order correlation coefficients, because the variables of interest were not interval data (Creswell, 2008). The strength of relationships was described using Davis's (1971) conventions: $.01 \geq r \geq .09 = Negligible$; $.10 \geq r \geq .29 = Low$; $.30 \geq r \geq .49 = Moderate$; $.50 \geq r \geq .69 = Substantial$; and $r \geq .70 = Very\ Strong$.

Limitations of the Study

This study sought to describe how agriculture teachers used IWBs, levels of teacher innovativeness in regard to ITs, and selected relationships. As mentioned previously, no statistically significant differences were found between early and late respondents (Lindner et al., 2001) regarding the variables of interest. However, the 81 respondents represented only 17.7% of the target population, and the majority of the respondents reported having 5 or fewer years of teaching experience. It is possible that different results may have been found if a larger number of the respondents had more years of teaching experience. Further, limitations to the instrument used existed; specifically, the item used to measure teachers' attitudes toward IWBs did not include an option for *decision reversal* or a *no knowledge* option. According to Rogers (2003),

decision reversal can occur during the confirmation stage of the innovation-decision process. It also should be noted that this item did not undergo test–retest reliability analysis. As such, readers are cautioned against generalizing the results of this study beyond its 81 respondents.

Results

Objective 1 sought to describe the teachers' levels of innovativeness regarding their use of IWBs. To achieve this objective, the researchers had respondents select the one statement that described best their attitude toward IWBs. Eleven (13.6%) of the respondents indicated technology use was limited in their classroom and using an IWB may be a solution to this problem (knowledge) (see Table 1). Seven (8.6%) reported that technology use was limited in their classroom and using an IWB was a good solution to this problem (persuasion), and seven (8.6%) perceived that technology use was limited in their classroom, knew the benefits of using an IWB, and would try it in their own teaching soon (decision). In addition, 29 teachers (35.8%) expressed that they were using an IWB currently, and it helped them to increase technology use in their classrooms (implementation), and 25 (30.9%) of the respondents indicated they had used an IWB for more than 1 year and planned to continue using it (confirmation). Two (2.5%) participants did not respond to this item (see Table 1).

Table 1. Agricultural Education Teachers' Perceived Levels of Innovativeness Regarding Their Use of IWBs (n = 81)

Rogers's (2003) Stages of the Innovation-Decision Process	*f*	*%*
Knowledge	11	13.6
Persuasion	7	8.6
Decision	7	8.6
Implementation	29	35.8
Confirmation	25	30.9
No Response	2	2.5

Objective 2 sought to describe relationships between teachers' levels of innovativeness and selected personal and professional characteristics. The relationship between teachers' levels of innovativeness and access to IWBs was very strong and positive ($r_s = .70$); it had the highest correlation coefficient of the associations measured (see Table 2). The variables "IWB use per week" ($r_s = .62$) and "using the IWB increases how much students learn in my class" ($r_s = .55$) demonstrated a substantial and positive relationship with teachers' levels of innovativeness. The variable "how frequently a respondent uses information technology (IT) personnel to support their use of IWBs" ($r_s = .41$) was found to have a moderate and positive association with teachers' levels of innovativeness. The analyses also revealed the variables "if training was received" ($r_s = .28$), "problems encountered while using IWBs" ($r_s = .26$), and "access to IT personnel" ($r_s = .24$) expressed low and positive relationships with teachers' levels of

innovativeness. Teachers' ages (r_s = -.39) and years teaching (r_s = -.36) had inverse (i.e., negative and moderate relationships with their levels of innovativeness (see Table 2).

Table 2. Relationships Between Agricultural Education Teachers' Perceived Levels of Innovativeness and Selected Personal and Professional Characteristics (n = 81)

Variables	Levels of Innovativeness
Access to IWBs	.70[*]
IWB use per week	.62[*]
Using the IWB increases how much students learn in my class	.55[*]
Frequent use of IT personnel	.41[*]
Where training was received	.28[*]
Problems encountered while using IWBs	.26[*]
Access to IT personnel	.24[*]
Age	-.39[*]
Years of teaching experience	-.36[*]

Note: Spearman rank order correlation coefficient: [*]$p < .05$

Objective 3 sought to describe Oklahoma agricultural education teachers' levels of innovativeness regarding the integration of technology in their classrooms. The descriptive analyses revealed that the composite mean of the sample was 3.16 with a standard deviation of 1.0, indicating the respondents had an average level of innovativeness regarding the integration of technology into their classrooms. Four (4.9%) of the respondents reported a score of 1, seven (8.6%) reported a score of 2, 43 (53.1%) reported a score of 3, 22 (27.2%) reported a score of 4, and five (6.2%) reported a score of 5.

Conclusions and Implications

This study revealed that a majority of the teachers surveyed indicated they were using IWBs. Further, these teachers perceived IWBs assisted them in increasing technology use in their classrooms, and they planned to continue using IWBs. It was concluded that these teachers were in the implementation and confirmation stages of the innovation-decision process (Rogers, 2003). A majority of teachers involved in this study had adopted the IWB, used it in their teaching practice, and were seeking confirmation that they had made the correct decision. On the other hand, because not all teachers had adopted IWBs, this finding also supports Rogers's (2003) assertion that not all individuals adopt innovations at the same rate. What is more, in Oklahoma, agriculture teachers have the opportunity to apply for a $5,000 technology grant each year through the Oklahoma Department of Career and Technology Education. As a result, many teachers who were awarded grants had purchased IWBs (K. Murray, personal communication, September 22, 2010). The grant could be considered an incentive to adopting IWBs. According to Rogers (2003), incentives increase the perceived relative advantage of an innovation and encourage behavioral change, thus increasing the rate of adoption.

In addition, teachers who perceived the use of IWBs increased how much their students learned were advanced farther in the innovation-decision process. This finding was consistent with Rogers's (2003) theory in regard to relative advantage (i.e., the more an individual perceives an innovation to be better than what it superseded, the more likely he or she is to adopt the new innovation). Therefore, if a teacher perceived that using the IWB would increase student achievement, the teacher may have been more likely to adopt it.

Further, as a teacher's age and years of teaching experience increased, his or her perceived level of innovativeness regarding the use of IWBs decreased. Younger and less experienced teachers, therefore, were more advanced in Rogers's (2003) innovation-decision process. Were the older, veteran teachers digital immigrants who lacked technological confidence (Prensky, 2001)? If so, this may have added to their perceptions of *complexity* regarding the use of IWBs. According to Rogers (2003), if an individual perceives an innovation to be complex, the rate of adoption is affected negatively. In addition, teachers with access to IWBs who used the IWBs more per week were in the later stages of the innovation-decision process. This finding also resonates with Rogers (2003), who maintained that when an individual has the opportunity to try an innovation (i.e., the attribute of *trialability),* perceptions of uncertainty may be diminished, which is related positively to increasing an innovation's rate of adoption.

Finally, this study revealed that more than three-fourths of the responding teachers reported their levels of innovativeness regarding the integration of technology in their classrooms as *average* to *highly innovative*. This may imply these teachers had completed the knowledge and persuasion stages of the innovation-decision process, as described by Rogers (2003). Further, they were aware of other educational technologies and planned to implement them in their classrooms. Given that more than 75% of the respondents reported an *average* to *highly innovative* score (see Table 1), it was concluded these teachers were *earlier adopters* of IWBs (i.e., they populated the early majority, early adopter, and innovator categories) (Rogers, 2003). According to Rogers (2003), however, earlier adopters usually make up only about 50% of the population in most social systems. Again, the role of incentives may account for this contradiction to Rogers's (2003) posit, and the influence of incentives may warrant further study as well as consideration by policymakers.

Recommendations for Practice

As an *older* generation of instructors, who are considered digital immigrants (Prensky, 2001), encounter the barriers associated with a *digitally programmed* generation of students, they should reexamine their methods of instruction and identify teaching practices more relevant to today's pupils (McAlister, 2009). In fact, according to Prensky (2001), students of the digital generations perceive the educational system has taken in *outsiders* to teach them.

Brown (2000) opined that this phenomenon is the result of a shift in learning. Further, Prensky (2005) attributed this shift from the *old* to the *new* differences in learning media. Digital media, communication, and limitless amounts of information via the Internet have captivated today's students. As such, digital generations have also transitioned from expecting (or even *accepting*) a teacher-centric instructional style to *demanding* a more student-centric style or approach (Brown, 2000). Because the teachers in this study perceived using the IWB increased how much their students learned, the instructional tool held *relative advantage* (Rogers, 2003). Professional development opportunities, therefore, should be created for in-service teachers to learn how to use IWBs effectively to assist in increasing student achievement. In addition, the professional development workshops should focus on using interactive educational technologies, including IWBs, in student-centric ways (Cakir, 2008; Glover & Miller, 2001; Mayer, 2004; Minner et al., 2010).

Approximately one-fourth of the teachers studied populated the knowledge and persuasion stages of the innovation-decision process (Rogers, 2003) regarding the adoption of IWBs. Is it possible that these teachers did not perceive the relative advantage of IWBs, viewed them as too complex, or had not experienced opportunities to try using them in the classroom? According to Rogers (2003), the attribute of *complexity* decreases the likelihood that an innovation will be adopted. And if teachers lacked experience with using or *trying* the IWBs, the need for more *observability* and *trialability* may have existed (Rogers, 2003). It is recommended, therefore, that in-service workshops and related professional development offerings for these teachers include topics demonstrating (*observability*) the effective use of IWBs and provide opportunities for practice (*trialability*) with this instructional tool.

Further, in regard to the study's theoretical framework, Rogers (2003) asserted that individuals who are in the persuasion stage are formulating attitudes toward the innovation. These individuals develop attitudes through their communication with near peers (Rogers, 2003). To that end, the professional development offerings should facilitate communication between teachers and their peers (Guzey & Roehrig, 2012) regarding the use of IWBs. The opportunities to communicate with near peers may increase the likelihood of teachers' transitioning from the persuasion stage to the decision stage (Rogers, 2003) and deciding to adopt the use of IWBs as part of their teaching practice.

Recommendations for Additional Research

Because more than three-fourths of the respondents indicated an innovation score of average and above regarding the integration of technology in their classrooms, future research should be conducted to determine which interactive technologies teachers may be using other than IWBs. This inquiry could provide insight on these teachers' in-service needs regarding their use of educational technologies, such as wireless slates, iPads, and digital game-based learning tools, to

name a few. Further, because teachers perceived that using the IWB increased how much their students learned, inquiries should be conducted to determine how the use of IWBs affects student learning and achievement in agricultural education. For instance, do students who receive lessons taught using IWBs perform better on end-of-instruction tests than those who do not? What is the impact of the use of ITs on students' critical thinking skills? Is the "decay," or lack of learning retention over time, reduced if ITs are used during students' learning experiences? Finally, experimental studies should be used to investigate this phenomenon with the aim of generalizing the results to similar populations.

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An Examination of Extension Professionals' Demographic and Personal Characteristics Toward Fostering Diversity-Inclusive 4-H Programs

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4-H youth professionals' attitudes about the perceptions of diversity inclusion in their programs are variables that may have an influence on the number of youths that enroll in 4-H. This study examines the impact of Extension professionals' demographic and personal characteristics on their perceptions of the benefits of diversity inclusion, perceived barriers to diversity inclusion, and proposed solutions to increase diversity inclusion in 4-H youth programs. Using a web-based questionnaire, the researchers employed a nonproportional stratified random sampling technique, and 117 Extension professionals participated. Through comparative analysis, the researcher found statistically significant differences existed in professionals' perceptions toward the benefits of diversity inclusion, the perceived barriers toward diversity inclusion, and the proposed solutions to increase diversity inclusion in 4-H programs. Additional research should be conducted to understand better why these differences exist.

Keywords: diversity, inclusion, multicultural education, minority, Extension, 4-H

Introduction

As the makeup of America's youth continues to increase, so do the calls for 4-H programs to recruit and retain youth from various ethnicities, cultures, and abilities. Current demographic numbers indicate that while 34% of all 4-H youths are persons of color, the same population makes up over 44% of eligible 4-H youth participants (4-H National Headquarters, 2012; Snyder & Dillow, 2011). Furthermore, America's youth of color population has risen to 43% (from 38.5%) in only eight years (Johnson & Lichter, 2010). Population projections indicate that by 2050, more than 62% of America's child population will be comprised of children of color (U.S. Census Bureau, 2009). To put the rising growth of youth of color in perspective, the total population gain (80%) of youths 19 and younger was of Hispanic descent (U.S. Census Bureau, 2009). From a geographic perspective, 16% (504) of America's 3,077 counties now have youth of color populations larger than their White counterparts, with another 9% nearing a demographic shift (Johnson & Lichter, 2010). In comparison, 1990 summations of the same data reveal only 11% of America's counties having youth of color populations larger than their White

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counterparts, with only 7% nearing a demographic shift (Johnson & Lichter, 2010). Even in parts of the country where populations are homogenized, youth diversity greatly exceeds adult diversity (U.S. Census Bureau, 2009).

In addition to the growing youth of color population, one less-often recognized trend is that of the declining number of White youth. In a demographical analysis of youth in America, Johnson and Lichter (2010) reported that, between 2000 and 2008, the number of White youths declined by nearly 2.6 million, proportionally making their overall population decrease by 4%. Orfield, Kucsera, and Siegel-Hawley (2012) reported that, between l970 and 2009, White student enrollment fell by nearly 25% in the nation's public schools. Hussar and Bailey (2013) reported that, between 2010 and 2021, enrollment in public elementary and secondary schools is projected to decrease by 2% for White youth (18% increase for youth of color). The 2009–10 first-grade enrollment of future 4-H-eligible youth shows that Whites make up only 52% of public student enrollment – the lowest in 40 years (Orfield et al., 2012).

In regards to membership numbers among White 4-H youth, a linear demographic analysis reveals unstable enrollment fluctuations across the country (Research, Education, & Economics Information System, 2013). A 6-year membership enrollment analysis shows that, between 2005 and 2010, 4-H membership of White youth decreased by slightly over 7%, while membership for youth of color increased at an average rate of 7% (Research, Education, & Economics Information System [REEIS], 2013). Incidentally, not only do 4-H Extension professionals have to be concerned about recruiting and retaining nontraditional youth, but they must also address the societal appeals that many traditional 4-H youths are now moving toward, such as new opportunities for participation in sporting events and other youth organizational groups. Newby and Sallee (2011) stated that "no matter how successful 4-H programs are in providing quality education for today's youth, these programs are of little influence unless the child is a member of 4-H" (p. 41). With the current decline of White youth, the fundamental issue facing the 4-H profession is the need to expand the purpose of 4-H in order to retain traditional members while simultaneously recruiting the growing population of ethnically and culturally diverse youth.

As the United States becomes more ethnically and culturally diverse, the number of youths with disabilities also remains a critical issue. As Stair, Seevers, and Moore (2012) reported, 4-H programs have seen a substantial increase in youths with disabilities, and adequate training is needed for 4-H programs to accommodate the diversity of this population. Public school enrollment data reveal that the number of 4-H-eligible youths with disabilities represents over 13% of the total enrollment in public schools, with 32 states having an overrepresentation percentage greater than the national average (Scull & Winkler, 2011). Coincidentally, over 50% of the total 4-H youth enrollment is made up of youth residing from those same states (REEIS, 2013; Scull & Winkler, 2011). Brault (2012) reported that nearly one of every five people in the United States, ages five and older, have some form of disability, with people of color having

larger proportions as compared to White Americans. From a geographic perspective, Bajema, Miller, and Williams (2002) reported higher concentrations of youths with disabilities in rural communities. Coincidently, 47% of 4-H members reported residing in rural farm/nonfarm areas (REEIS, 2013). Although 4-H and Extension have made strides in accommodating the changing makeup of clients, increasing the diversity of 4-H youth programs should be of high priority. For 4-H professionals to recruit and retain diverse youth, the trials, concerns, and opportunities related to marginalized groups must be addressed.

Demographic and Personal Characteristics in Extension Research

Demographic and personal characteristic variables in 4-H/Extension research have historically been used as descriptive-only items highlighting those variables deemed important by the study's researchers. In the context of 4-H/Extension, researchers have often overlooked the potential impact that demographic and personal characteristics may have on their ability to deal with diverse populations. With a population of adults professionally similar to 4-H/Extension professionals, LaVergne, Jones, Larke, and Elbert (2012) examined the effect of agricultural education teachers' demographic and personal characteristics on their perceptions of the benefits, perceived barriers, and proposed solutions to increasing diversity inclusion in agricultural education programs. The researchers discovered statistically significant differences in the teachers' perceptions toward the benefits of diversity inclusion (teaching region), perceived barriers toward diversity inclusion (race), and the proposed solutions (gender, race, and school setting). Kessell, Wingenbach, and Lawver (2009) discovered statistically significant relationships between student teachers' confidence levels and selected demographics. The researchers reported that female student teachers had more knowledge about disabilities and special education laws, and as participants' age and time spent with a special needs person increased, knowledge of disabilities and knowledge of laws pertaining to students with disabilities increased.

Given the homogenous makeup of 4-H Extension professionals, coupled with the rapidly changing makeup of 4-H-eligible youths, 4-H Extension professionals must be prepared to build equitable programs free of ambivalence. A lack of direction about the best way to diversify 4-H youth programs can exacerbate the difficulties that many 4-H professionals have with the recruiting and retaining of marginalized populations in 4-H youth programs. The ability of 4-H Extension professionals to direct a variety of youths is vital to the success of the profession. As Walter and Grant (2011) state, "the lack of confidence and skills youth professionals have, paired with the changing demographics in communities, results in a significant number of young people being excluded…" (p. 3). The demographic and personal characteristics chosen for this study accurately represent the composition of 4-H Extension professionals in West Virginia. As previously mentioned, whereby the demographic and personal characteristics data collected in previous studies have focused on highlighting descriptive-only content, this study aims to

determine if these individual factors affect the reality of diversity inclusion among 4-H Extension professionals.

Conceptual Framework

Based on the concepts that (a) adolescents participating in youth programs demonstrate increased personal and social skills (Lee, Olszewski-Kubilius, Donahue, & Weimholt, 2008; Wolchik, Schenck, & Sandler, 2009) and (b) 4-H youth programs and the National FFA Organization share an interdisciplinary vision (Ricketts & Bruce, 2009; Sulser, Greenhalgh, Parent, & Sagers, 2012), the conceptual framework for this study was rooted in LaVergne's (2008) educational model of diversity inclusion. According to this model, diversity inclusion is an educational belief that accepts all learners by engaging them in learning programs regardless of their race, ethnicity, or exceptionality (LaVergne, 2008). Within the model (see Figure 1), the principles of multicultural education (Banks, 2008), culturally responsive teaching (Gay, 2000), and inclusion (Salend, 2008) are used to create professionals who (a) understand the benefits of inclusion, (b) accept the fact that negative perceptions may influence marginalized group participation in agriculturally-based programs, and (c) have an awareness of possible solutions to increase marginalized group participation. LaVergne (2008) further stresses that professionals need to recognize their strengths and weaknesses when it comes to diversity-inclusive topics and to understand how these suppositions influence their expectations for the interactions with, and achievement of, the individuals in their programs. LaVergne (2008) states, "they recognize that the ultimate goal of a diversity-inclusive program is not to achieve the cliché of a 'one program fits all' model, but to create a program where their kids have equal opportunities to benefit from everything that the program has to offer" (p.49). The researcher also calls for individuals to constantly seek strategies and solutions to increase underrepresented-group participation while becoming supporters of those who understand that, ultimately, successful programs will be determined by how prepared individuals are in teaching youths of color and youths with disabilities. The ultimate goal of a diversity-inclusive program is to develop an organization where all youths, regardless of their individuality, experience social equity and equitable education.
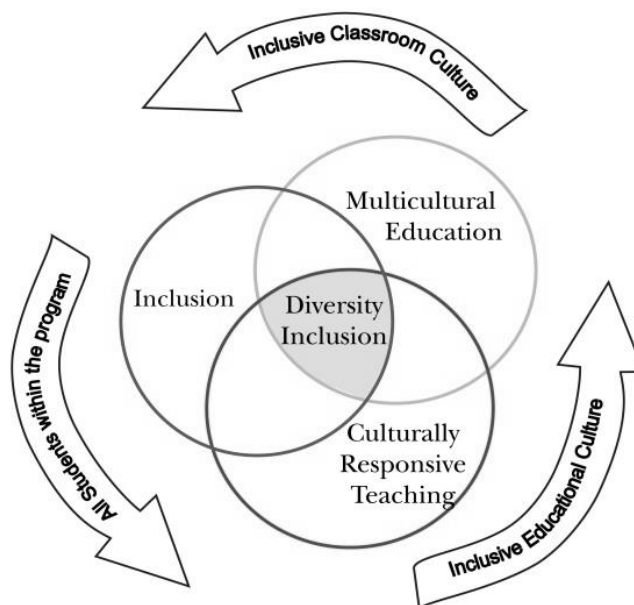
Figure 1. The Diversity Inclusive Program Model (LaVergne, 2008, p.44). Within the model, the principles of multicultural education (Banks, 2008), culturally responsive teaching (Gay, 2000), and inclusion (Salend, 2008) are used to create an all-encompassing program.

As Extension professionals continue to explore the needs of nontraditional youths, they must also create 4-H programs that accept and promote diversity inclusion at all levels. Maintaining an effective organization that provides America's youth with meaningful activities will require Extension professionals to have a greater awareness and understanding of the rich experiences and perspectives that youths of color and youths with disabilities bring. As Schauber and Castania (2001) state, "Extension educators need to establish open lines of communication with prospective audiences and become attuned to how they can meet the needs of all people" (p. 1).

Purpose and Objectives

This study sought to examine the impact of West Virginia 4-H Extension professionals' demographic and personal characteristics on their perceptions of the benefits of diversity inclusion, perceived barriers to diversity inclusion, and proposed solutions to increase diversity inclusion in 4-H youth programs. Based on consulted literature, the following hypotheses were developed to be tested *a priori* at the .05 level.

Null Hypotheses

H_{o1}:   No difference exists in 4-H Extension professionals' perceptions of the benefits of diversity inclusion in the presence of any of the following demographic and personal characteristics: years of service (adult), age, gender, high school/college diversity/multicultural training, career-work diversity/multicultural training, race/ethnicity, work setting (county), age range most confident to work with, or years of membership as a youth.

H_{o2}:   No difference exists in 4-H Extension professionals' perceptions of the barriers of diversity inclusion in the presence of any of the following demographic and personal characteristics: years of service (adult), age, gender, high school/college diversity/multicultural training, career-work diversity/multicultural training, race/ethnicity, work setting (county), age range most confident to work with, or years of membership as a youth.

H_{o3}:   No difference exists in 4-H Extension professionals' perceptions of proposed solutions to increase diversity inclusion in the presence of any of the following demographic and personal characteristics: years of service (adult), age, gender, high school/college diversity/multicultural training, career-work diversity/multicultural training, race/ethnicity, work setting (county), age range most confident to work with, or years of membership as a youth.

Methods and Procedures

The West Virginia University Institutional Review Board approved this study (via exemption). As such, informed consent was obtained through returned e-mails from individuals willing to participate in the study. Following Dillman's (2007) *Tailored Design Method* for survey implementation, the researcher implemented a questionnaire using a series of e-mails utilizing SurveyMonkey.com as the host website. The questionnaire was based on previous work by LaVergne et al. (2012) regarding Texas agricultural education teachers' perceptions of proposed solutions to increase diversity inclusion in agricultural education programs. Researchers acquired permission to use and slightly modify the instrument to have language appropriate for Extension audiences. Part 1 (Benefits) consisted of 12 statements designed to gauge participants' perceptions of the benefits of diversity inclusion in 4-H youth programs. Part 2 (Barriers) consisted of 12 statements designed to measure participants' perceptions of the perceived barriers to diversity inclusion in 4-H youth programs. Part 3 (Solutions) consisted of 12 statements designed to gauge participants' perceptions of possible strategies or solutions that would promote diversity inclusion in 4-H youth programs. Participants responded to each question using a four-point Likert-type scale wherein 1 = *strongly disagree (SD)*, 2 = *disagree*

(*D*), 3 = *agree* (*A*), and 4 = *strongly agree* (*SA*) (Table 1). Part 4 consisted of nine items designed to collect demographic information on respondents. Faculty and administrators from the state land-grant university formed the panel of experts and reviewed the instrument for face and content validity. Construct validity confirmed the questionnaire's scores did reflect the conceptual areas it was intended to measure. Evidence of construct validity was collected from the responses, suggestions from the panel of experts, and a pilot test of 10 Extension professionals not included in the survey population. The groups provided input regarding the content and direction of the statements, which improved the accuracy and precise construction of the questionnaire. Internal consistency was established using a pilot test that yielded the following Cronbach's alpha (Gliem & Gliem, 2003) for each of the constructs: benefits = 0.94, barriers = 0.80, and solutions = 0.82. Post-hoc reliability analysis was also conducted, resulting in the following Cronbach's alphas: benefits = 0.97, barriers = 0.82, and solutions = 0.88.

Table 1. Individual Statements for the Benefits, Barriers, and Solutions Scales (n = 117)

Scale	Item
Benefits	
	-There are benefits for the inclusion of youth of color in 4-H programs.
	-Providing youth of color with 4-H leadership opportunities will have a positive impact on 4-H programs.
	-Diversity inclusion can improve social relationships between White youth and youth of color in 4-H programs.
	-Providing youth of color with career exploration opportunities will have a positive impact on 4-H programs.
	-I believe 4-H can help youth of color improve academically.
	-There are benefits for the inclusion of youth with disabilities in 4-H programs.
	-Diversity inclusion can improve social relationships between youth with and without disabilities in 4-H programs.
	-Providing youth with disabilities career exploration opportunities will have a positive impact on 4-H programs.
	-Providing youth with disabilities 4-H leadership development opportunities will have a positive impact on 4-H programs.
	-I believe 4-H can help youth with disabilities improve academically.
	-The inclusion of diverse populations in 4-H youth programs is a benefit for the entire community.
	-Diversity inclusion in 4-H youth programs can have a positive impact on other youth programs in the state.
Barriers	
	-The lack of information about 4-H youth programs have an impact on youth of color participation in 4-H.
	-A lack of role models hinders the participation of youth of color in 4-H programs.
	-The perception of 4-H alone influences the participation of youth of color in 4-H programs.

-Rejection by peers is a barrier to diversity inclusion by youth of color in 4-H.
-Negative stereotypes of people of color are a primary reason why youth of color do not participate in 4-H programs.
-The lack of information about 4-H youth programs have an impact on youth with disabilities participation in 4-H.
-A lack of role models hinders the participation of youth with disabilities in 4-H programs.
-The perception of 4-H alone influences the participation youth with disabilities in 4-H programs.
-Improper program materials is a barrier to diversity inclusion for youth with disabilities in 4-H youth programs.
-Rejection by peers is a barrier to diversity inclusion by youth with disabilities in 4-H.
-Negative stereotypes of people with disabilities are a primary reason why youth with disabilities do not participate in 4-H programs.
-Parental attitudes about 4-H play an important role in diversity inclusion among all youth.

Solutions

-4-H youth instructional materials should reflect the diverse society that 4-H youth programs have.
-County 4-H youth personnel need training in multicultural education.
-Colleges and universities should incorporate more multicultural education classes in their preservice Extension preparation curriculums.
-A multicultural education training workshop should be utilized to promote an attitudinal change toward diversity inclusion in 4-H youth programs.
-All 4-H youth personnel should strive to increase a diverse membership in their 4-H youth programs.
-All 4-H youth personnel should be required to have some type of diversity training prior to working with youth.
-County 4-H youth personnel should become familiar with the youth with disabilities - represented in their counties in order to promote an atmosphere of acceptance and cooperation.
-County 4-H youth personnel should become familiar with the youth of color represented in their counties in order to promote an atmosphere of acceptance and cooperation.
-Peer mentoring is a strategy that could be utilized to assist all 4-H youth personnel in increasing diversity inclusion in 4-H.
-An increase in the recruitment efforts of underrepresented groups by 4-H personnel would enhance diversity inclusion in 4-H.
-For youth to become interested in joining 4-H, parents, 4-H youth personnel, and policymakers must develop strategies to address the different learning styles of all youth.
-A statewide support network designed to assist county 4-H youth personnel in working with diverse audiences would enhance diversity inclusion in 4-H.

Note: 1.00 to 1.49 = *SD*, 1.50 to 2.49 = *D*, 2.50 to 3.49 = *A*, 3.50 to 4.00 = *SA*

The target population consisted of all West Virginia 4-H youth Extension professionals, as listed through the West Virginia University Cooperative Extension Office from 2011 to 2012. Because of the unavailability of accurate personal information (e.g., missing e-mail addresses, incorrect home/work addresses) from the three sources, access to all professionals was not feasible. The accessible population of the study consisted of all Extension professionals who had e-mail addresses listed through the West Virginia University Cooperative Extension Office ($N = 1,400$). Using a sampling formula from Bartlett, Kotrlik, and Higgins (2001), researchers randomly selected 276 participants ($n = 276$).

Participants received a prenotice/introductory mailed letter outlining the purpose of the study and informing them that they would receive an e-mail in one week with instructions on how to complete the Internet-based questionnaire. From the preliminary selection, 24 e-mail addresses were invalid. To obtain valid e-mail addresses and to maintain number of participants, the researchers randomly selected additional participants from the total population pool. After this update, the e-mail addresses were deemed valid. For the data collection phase, the researchers sent reminder e-mails once a week until the study was concluded. During the 6-week study, 117 (42.3%) professionals responded.

Results

Nonresponse error was addressed by comparing respondents' questionnaire return rate prior to the closing date ($n = 93$) with respondents' questionnaire return rate after the closing date ($n = 24$) (Lindner, Murphy, & Briers, 2001). Using the closing date as the independent variable and mean scores as the dependent variable, independent sample t-tests revealed no statistically significant difference ($p < .05$) existed between respondents' mean scores on the three scales. Null hypothesis 1 was tested using a combination of independent sample t-tests and the ANOVA procedure. Only those characteristics for which a statistically significant difference existed ($p < .05$) are reported.

High School/College Diversity/Multicultural Education Training

The t-test procedure was used to determine if differences existed in the perceptions of the benefits to diversity inclusion based on participants' receiving or not receiving diversity and/or multicultural training in high school or college. A statistically significant difference ($t(106) = 3.51$, $p < .01$, $r = .10$) existed between mean scores of Extension professionals who had received diversity/multicultural education training ($M = 3.75$, $SD = .33$) and those who had not ($M = 3.43$, $SD = .62$) on the perceptions of the benefits to diversity-inclusive 4-H programs. Because of statistically significant differences found for the personal variable, High School/College Diversity/Multicultural Education Training, H_{o1} was rejected (Table 2).

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Table 2. Comparison of Benefits Scale by High School and/or College
Diversity/Multicultural Training Received (n =117)

Did you receive any diversity/multicultural training in high school and/or college?	n^*	M	SD	t	p	Cohen's d
Yes	65	3.75	.33	3.51	.001[**]	.10
No	43	3.43	.62			

Note: 1.00 to 1.49 = *SD*, 1.50 to 2.49 = *D*, 2.50 to 3.49 = *A*, 3.50 to 4.00 = *SA*
[*]Nine participants chose not to respond to this question.
[**]$p < .01$

Null hypothesis 2 was tested using a combination of independent sample *t*-tests and the ANOVA procedure. Only those characteristics for which statistically significant differences existed ($p <$ .05) are reported.

Years of Service

A one-way ANOVA was used to compare participants' perceptions of the perceived barriers to diversity inclusion in 4-H programs by years of service to the organization. Table 3 indicates that a statistically significant difference existed among participants ($F(5, 102) = 2.59$, $p < .05$, $r =$ .11). A Tukey–Kramer post-hoc analysis showed that participants with less than 12 months to 5 years of service ($M = 2.73$, $SD = .52$) had statistically significant higher mean scores on Part 1 (Barriers) than participants with 11–15 years of service ($M = 2.28$, $SD = .51$). Because of statistically significant differences found for the personal variable, Years of Service, H_{o2} was rejected.

Table 3. ANOVA Table of Overall Barriers Scores by Years of 4-H Service (n = 117)

Years of Service	n^*	M	SD	F	p	Cohen's d
0 (< 12 months) – 5 years	19	2.73	.52	2.594	.030[**]	.11
6 – 10 years	21	2.50	.34			
11 – 15 years	19	2.28	.51			
16 – 20 years	9	2.65	.30			
21 – 25 years	14	2.55	.33			
25+ years	26	2.50	.32			

Note: 1.00 to 1.49 = *SD*, 1.50 to 2.49 = *D*, 2.50 to 3.49 = *A*, 3.50 to 4.00 = *SA*
[*]10 participants chose not to respond to this question.
[**]$p < .05$

Null hypothesis 3 was tested using a combination of independent sample *t*-tests and the ANOVA procedure. Only those characteristics for which a statistically significant difference existed ($p <$ .05) are reported.

Career/Work-based Diversity/Multicultural Education Training

The *t*-test procedure was used to determine if differences existed in the perceptions of the proposed solutions to increase diversity inclusion based on participants' receiving or not receiving diversity and/or multicultural training at the career/work-based level. A statistically significant difference ($t(105) = 2.19$, $p < .05$, $r = .04$) existed between mean scores of Extension professionals who had received diversity/multicultural education training at the career/work level ($M = 3.00$, $SD = .41$) versus those who had not ($M = 3.22$, $SD = .42$). Because of statistically significant differences found for the personal variable, Career/Work-based Diversity/Multicultural Education Training, H_{o3} was rejected (Table 4).

Table 4. Comparison of Solutions Scale by Career/Work-based Diversity/Multicultural Training Received (n =117)

Have you had any diversity/multicultural education training at the career/work-based level?	n^*	M	SD	t	P	Cohen's d
Yes	84	3.00	.41	2.19	.031**	.04
No	23	3.22	.42			

Note: 1.00 to 1.49 = SD, 1.50 to 2.49 = D, 2.50 to 3.49 = A, 3.50 to 4.00 = SA
*10 participants chose not to respond to this question.
**$p < .05$

Conclusions and Recommendations

Respondents' indication of receiving diversity/multicultural education training during their high school/college matriculation had a statistically significant difference on the Part 1 (Benefits) scale score. This finding indicated that those individuals who received some form of diversity/multicultural education during their high school/undergraduate matriculation agreed more with the perceptions of the benefits of diversity inclusion in 4-H programs than did respondents who did not receive any training. Given that one of the vital goals of diversity/multicultural education training is to create individuals who recognize that every child has a right to equal and equitable access, this finding supports the need to ensure that preservice Extension programs consider incorporating some form of diversity/multicultural mentorship experience within the undergraduate/graduate curriculum (LaVergne, 2008). Current practitioners who are successful at modeling diversity-inclusive programs could provide valuable insight to preservice practitioners. Furthermore, as preservice Extension programs incorporate these practices, they should also consider the addition of a field-based component that would provide preservice Extension professionals the opportunities to witness the implementation/operation of inclusive practices firsthand (Talbert & Edwin, 2008). This will give students many opportunities to gain practical experience in the field while being exposed to issues of diversity in everyday activities.

Results of the study reveal that participants with less than 12 months to 5 years of service agreed more with the perceived barriers to diversity-inclusive 4-H programs than did participants with 11–15 years of service. First, the findings could indicate that early-career Extension professionals are more aware of the barriers that youths of color and youths with disabilities experience when attempting to join 4-H programs. Second, the findings could indicate that, because of their experience within the profession, experienced Extension professionals may perceive other factors as reasons for which marginalized groups are not participating in 4-H programs. One implication of this finding is that respondents agree that barriers to 4-H participation do exist. As such, empirical research indicates that (a) the number of youths of color and youths with disabilities are increasing at historic rates (Johnson & Lichter, 2010; REEIS, 2013); (b) 4-H professionals still lack the ability to promote all-inclusive 4-H environments (Mpofu, Ingram, & Radhakrishna, 2010; Peterson et al., 2012); and (c) the barriers to inclusion remain unresolved (Peterson et al., 2012; Russell & Van Campen, 2011). Based on the findings, the researchers recommend that research of a qualitative nature be implemented to determine the multilayered barriers to increasing diversity inclusion in 4-H programs. Whereas the results of this study should certainly be viewed as graphic indicators of the effect that personal and demographic characteristics have toward diversity inclusion in 4-H programs, the actual barriers causing these groups to continue to be underrepresented can only be determined by those who are involved at the ground level.

A statistically significant difference existed between respondents who had received diversity/multicultural education training at the career/work-based level as opposed to respondents who did not receive training at the career/work-based level on the proposed solutions to increase diversity inclusion in 4-H programs. Perhaps this difference can be attributed to the type of training that was received among participants. For example, could inadequate diversity training have had an adverse effect on participant perceptions of diversity and inclusion in 4-H programs? In order to ensure that Extension professionals are receiving the training needed to accommodate the influx of diversity within their programs, reexamining training materials is critical. Based on these findings, continuous efforts should be made to determine the most effective methods (collaborative partnerships, field experiences, etc.) of fostering diversity-inclusive 4-H programs.

Finally, the effect sizes in results have been interpreted as having small relationships (strength) between the magnitudes of the observed effects. The purpose for reporting the effect size is to provide readers with a logical measurement of the strengths of associations (Cohen, 1988), and it should be noted that a small effect size is rather important. Trusty, Thompson, and Petrocelli (2004) noted that small effect sizes for critical outcomes can be important, as long as they are replicable. Additionally, because of the unavailability of previous research data concerning personal and demographic effects on diversity inclusion, the researcher recommends that this

study be replicated so that comparative analyses can be made to determine the study's applied context.

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Examining the General Global Competence of Students Enrolled in an International Dimension Course: An Attempt to Internationalize Undergraduate Education in a College of Agriculture

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Many U.S. colleges and universities are concerned with how best to prepare students to become globally competent citizens. Therefore, the need existed to examine the general global competence of students enrolling in international dimension (ID) courses at Oklahoma State University. This investigation was a census study; the target population included all undergraduate students (N = 147) enrolled in three ID courses offered in the College of Agricultural Sciences and Natural Resources (CASNR) during the fall semester of the 2010–2011 academic year. General knowledge instruments were used to gather pretest and posttest data to measure differences. Although students' post-course scores were higher than pre-course scores, their overall performance was below 60%. This difference in knowledge gain connoting general global competence was statistically significant (p < .05), but the corresponding effect size was small, which signaled little practical significance. Whether ID courses are an efficacious way of achieving substantial change in students' general global competence remains an open question. A more appropriate method to assess change in general global competence may be writing assignments. Faculty are encouraged to improve their ID courses by infusing learning experiences that stand to enhance students' general global competence while complementing content-specific objectives.

Keywords: global competence, globalization, infusion approach, internationalizing undergraduate curriculum

Introduction

An urgency exists to adequately prepare university students for the emerging global challenges they are likely to face (Bok, 2006). This phenomenon, frequently framed as *globalization*, has inspired higher education institutions to transform themselves in an effort to prepare graduates capable of competing globally (Friedman, 2005). To this end, van der Wende (2007) described a

world becoming increasingly more interconnected; because of this "growing interdependence and convergence, globalization affects higher education in various dynamic ways" (p. 274), including the methods by which it educates undergraduate students.

Many U.S. colleges and universities have used a variety of methods to prepare their students and help them develop the ability to understand emerging global challenges and opportunities (McGowan, 2007; Moriba, 2011). The College of Agricultural Sciences and Natural Resources (CASNR) at Oklahoma State University has taken actions to achieve this goal by offering three international dimension (ID) undergraduate courses. The Department of Animal Science offers students the course Agricultural Animals of the World (ANSI 3903), which focuses on "[t]he production and utilization of agricultural animals by human societies" (Oklahoma State University Catalog, 2010–2011, p. 214). The Department of Agricultural Economics provides the course International Agricultural Markets, Trade, and Development (AGEC 4343). The course description is this:

> Contemporary international agricultural trade theory and applications. Tools to identify, evaluate critically, and seek solutions to complex international trade and development problems, such as gains from trade, impacts of trade barriers on social welfare, export promotion effectiveness, trade impacts on environment and land degradation, social benefits and costs of free trade areas, and impacts of genetically modified crops on trade. (Oklahoma State University Catalog, 2010–2011, p. 210)

Students also have the opportunity to take a course in the Department of Agricultural Education, Communications, and Leadership titled International Programs in Agricultural Education and Extension (AGED 4713). The course description at the time of the study was this:

> World hunger and its root causes. The function of international agencies, organizations, foundations, and churches in improving the quality of life for people of the developing nations. Roles of agricultural education and Extension at all levels for enhancing the effectiveness of indigenous programs of rural development and adult education. (Oklahoma State University Catalog, 2010–2011, p. 211)

University students need to gain knowledge that will improve their ability to relate effectively with people of diverse cultural and geographical backgrounds who may hold worldviews different from their own. Individuals who acquire global competence know their own culture and seek to understand those of others, recognize cultural and geographical differences, and strive to function effectively in diverse professional, political, and social settings while pursuing additional competence (Grudzinski-Hall, 2007; Hunter, 2004). ID courses are intended to assist students in acquiring general global competence. However, because little or no data existed,

CASNR faculty and administrators could not be certain if students taking their ID courses were undergoing learning experiences that enhanced their general global competence.

To address this uncertainty, it was important to examine the general global competence of students who participated in the three ID courses offered in CASNR at Oklahoma State University. The results of this study may help faculty and administrators of CASNR, and of similar academic units at other institutions of higher education, determine whether students are being prepared to function as globally competent citizens and employees.

Conceptual Framework

Global competence is critical for meaningful and mature engagement of individuals worldwide. Being globally competent is defined as "having an open mind while actively seeking to understand cultural norms and expectations of others, [as well as] leveraging this gained knowledge to interact, communicate, and work effectively outside one's [usual] environment" (Hunter, 2004, p. 101). Globally competent individuals are knowledgeable about current events and world history; they maintain a positive attitude with others who are different from themselves; they are linguistically competent in at least one language other than their own; and they appreciate the value of other cultures (Lambert, 1996). In as much as they are influenced by the world, globally competent individuals impact the world and recognize their responsibility to make decisions that will positively affect the future, including choices and efforts made in their professional lives (Shams & George, 2006).

Schunk (1989) stated that "[s]ocial, instructional, and other contextual variables associated with the learning context affect students while they are cognitively engaged with academic material" (p. 182). The undergraduate students who participated in this study were enrolled in one of three ID courses intended to assist them in acquiring knowledge on global and cross-cultural issues. The students learned by (a) reading prescribed academic materials on international issues; (b) observing and interacting with guest presenters in their courses, including foreign nationals; and (c) receiving feedback from their instructors through class discussions and assignments. Wingenbach et al. (2003) asserted, "an implication exists that formal education can be used in limited ways to increase students' international knowledge by making stronger connections in 'real world' events and classroom discussions of international agricultural issues" (p. 33). This study tested Wingenbach and colleagues' (2003) assertion by examining the change in undergraduate students' knowledge supporting their general global competence as the result of completing an ID course taught in an agricultural context.

Purpose of the Study

The purpose of this study was to examine the general global competence of students enrolled in the ID undergraduate courses offered in CASNR at Oklahoma State University during the fall

semester of the 2010–2011 academic year. The study examined students' knowledge regarding their general global competence, including aspects of world agriculture. It also compared students' knowledge, pre-course and post-course. Further, the study described selected personal characteristics of the students and examined relationships between those attributes and their knowledge regarding objects of general global competence.

Research Questions and Research Hypothesis

1. What were the selected personal characteristics of students enrolled in the undergraduate courses offered for ID credit during the fall semester of the 2010–2011 academic year?

2. What were students' levels of pre-course and post-course knowledge regarding objects of general global competence?

3. What relationships existed between selected personal characteristics of students enrolled in the ID courses and their general global competence? (*Note:* The purpose of this analysis was to address whether certain independent variables confounded the results associated with research question 2 and the potential for Type 1 error.)

H_o: No statistically significant difference ($p < .05$) existed between students' pre-course and post-course knowledge connoting general global competence after completing an ID course (H_o: $\mu_{1\text{pre-course knowledge}} = \mu_{2\text{post-course knowledge}}$).

Methods and Procedures

The design of this study was nonexperimental, pretest–posttest descriptive and comparative, and it involved the use of knowledge instruments to gather data for the purpose of measuring differences resulting from an intervention effect (Creswell, 2008). This investigation was a census study (Patton, 2002), and its target population consisted of all undergraduate students ($N = 147$) enrolled in the three ID undergraduate courses. The ID courses were worth 3 credit hours each. The measurement of knowledge gain from pre-course to post-course provided data for analyzing the levels of general global competence of students who participated in the three ID courses. Data were collected on or around the first and last weeks of the semester. The study was designed to explore the assumption that students who completed an ID course would experience a positive change in knowledge informing their general global competence.

The research instrument assessed students' knowledge before and after they had completed one of the ID courses. The pre-course instrument also included questions intended to describe selected personal characteristics of the students. Twenty-one items constituted the knowledge portion of the research instruments, which were adapted from two previous studies and content-

relevant websites (i.e., Global Awareness Quiz, 2007, 2008, 2009; Radhakrishna & Dominguez, 1999; Wingenbach et al., 2003). The survey instrument was designed to test the knowledge of students on objects of world geography, international events, and international relations (Global Awareness Quiz, 2007, 2008, 2009), as well as world agriculture (Radhakrishna & Dominguez, 1999; Wingenbach et al., 2003).

The multiple-choice form of assessment was used, in which participants were asked to select the correct answer from four possible choices. Some minor rewording was done to update a few of the test items. For example, one of the items asked students about the projection of world population. That item from a previous study asked students to identify the continent projected to have the largest population by the year 2000. The item in this study asked students to identify the continent projected to have the largest population by the year 2010.

As part of a larger survey instrument, students completed the knowledge test at the beginning of the semester. The students were administered an *alternate* or *parallel form* (Johnson & Weiss, 1979) of the instrument at the end of the semester to measure their learning gain. For example, one of the items examined students' knowledge about the seven continents. The pre-course item asked students to identify the *smallest* of the seven continents, and the post-course item asked students to identify the *largest* of the seven continents.

Rudner and Schafer (2001) wrote that "alternate forms [of a test] are typically matched in terms of content and difficulty" (para. 15). Creswell (2008) stated that an alternate form approach consists of "two instruments, both measuring the same variables and relating (or correlating) the scores for the same group of individuals to the two instruments" (p. 170). An alternate form of a knowledge examination assists in overcoming the problem of *practice effect* [i.e., to reduce "the possibility that a participant's performance in a task may be influenced (positively or negatively) if they repeat the task because of familiarity with the experimental situation and/or the measures being used"] (Field, 2005, p. 742).

Of note, the selected knowledge items were not derived necessarily or intentionally from the content of the three courses under study. Rather the items were *knowledge objects* that other researchers (Radhakrishna & Dominguez, 1999; Wingenbach et al., 2003) and the study's panel of experts (Creswell, 2008) considered appropriate for ascertaining undergraduate students' *general global competence*, including test items with relevance to the agriculture sector. The panel included faculty of the Department of Agricultural Education, Communications, and Leadership and the Department of Agricultural Economics at Oklahoma State University. One of the panelists was also the associate vice-president of the Division of International Studies and Outreach. His extensive teaching and administrative experience involving issues related to internationalizing undergraduate education, including the development of curricula and ID

course delivery in a college of agriculture, increased the likelihood of the study's instruments having sufficient content validity.

Suggestions made by Wiersma and Jurs (1990) were followed to ensure reliability of the study's knowledge instruments. Eight factors that may be used to enhance the reliability of criterion-referenced tests include "homogeneous items, discriminating items, enough items, high-quality copying and format, clear directions to the students, a controlled setting, a motivating introduction, and clear directions to the scorer" (as cited in Pense & Leising, 2004, pp. 89–90). These guidelines were followed to increase the likelihood of the knowledge instrument being sufficiently reliable. In addition, Popham (1993) stated "the Kuder-Richardson (K-R) method focuses on the degree to which the items in the test are functioning in a homogenous (i.e., coherent) fashion" (p. 122). The K-R21 reliability coefficient—as a measure of the internal consistency of this study's pre-test—was .94 or the upper end of its 0 to 1 range.

Descriptive statistics were computed to obtain measures of central tendency, variability, and effect size (*eta* squared). The researchers used inferential statistics, i.e., a paired-samples *t*-test, to determine change in knowledge because the participants were considered representative of students who had taken the ID courses in the past or would take said courses in the future (Oliver & Hinkle, 1982). Bivariate correlation analyses were performed to test relationships between selected personal characteristics of the students and their knowledge of objects connoting general global competence to address the possibility of Type I error.

Results

More male students (45.7%) than female students (37.2%) participated in the study, and the students were mostly seniors (42.6%) and juniors (31.9%) by classification who majored mainly in agricultural education (26.2%), animal science (18.1%), agribusiness (12.8%), or agricultural leadership (12.8%). The students' overall mean grade point average (GPA) was 3.17 with a standard deviation of .437, as self-reported. Most of the students were White (69.1%), non-Hispanic or non-Latino (77.7%), and spoke only English (64.9%). Moreover, nearly three-fourths of the students (74.5%) had *not* participated in a study abroad learning experience before taking an ID course.

Measures of Knowledge Objects Connoting Students' General Global Competence

The students were asked to select the correct answer from four choices for each of the 21 multiple-choice items that constituted the pre-course knowledge test of their global competence. Regarding their overall performance, only 18 students (19.1%) answered 13 (60%) or more of the items correctly (see Table 1). Overall, the students' pre-course knowledge score was slightly below 50% ($M = 10.43$; $SD = 2.316$) (see Table 2).

Table 1. Descriptive Statistics for Pre-Course Knowledge Scores of Students Connoting Their General Global Competence During the Fall Semester of the 2010–2011 Academic Year (n = 94)

Items	Correct Answers	
	f	*%*
A country with a high standard of living, a strong economy, and an array of wealth and skills is:	77	81.9
What are the four main oceans?	76	80.9
The _____ desert is the world's largest hot desert.	76	80.9
Which country is the largest producer of rice in the world?	71	75.5
Which country is the leading exporter of wheat?	69	73.4
What does NAFTA stand for?	69	73.4
What is the world's approximate population?	68	72.3
Two examples of import control include:	60	63.8
What is the primary household fuel in Africa and Asia?	51	54.3
_____ is the smallest of the seven continents:	44	46.8
Which country produces the largest number of swine in the world?	42	44.7
Considering developing and developed countries, the projection of world population for the year 2010 shows the largest segment will be in:	38	40.4
Generally, who carries out most of the fieldwork on an African farm?	37	39.4
The percentage of usable land in the world for food production is:	34	36.2
Which means of communication currently reaches the largest number of people throughout the world?	31	33.0
Although large areas of land are brought into cultivation throughout the world each year, large amounts are also rendered useless or are reduced in productive capacity for each of the reasons below, EXCEPT:	29	30.9
Which term means independence and self-government?	25	26.6
In East Africa, it is expected that everyone will _____ upon greeting one another at meetings, and upon departure from meetings.	23	24.5
Who is the Prime Minister of the United Kingdom of Great Britain and Northern Ireland?	23	24.5
Which country is the United States' largest trading partner?	20	21.3
What is the name of the treaty in which individual countries agreed to reduce greenhouse gas emissions?	17	18.1
Students who answered 13 or more test items correctly	*18*	*19.1*

Three-fourths or more students chose the correct answers for these items: "A country with a high standard of living, a strong economy, and an array of wealth and skills is:" (81.9%); "What are the four main oceans?" and "The _____ desert is the world's largest hot desert" (80.9%); and "Which country is the largest producer of rice in the world?" (75.5%) (see Table 1). On the other hand, only 18.1% of students chose the correct answer to the item, "What is the name of the treaty in which individual countries agreed to reduce greenhouse gas emissions?"

Table 2. Descriptive Statistics for Students' Pre-Course and Post-Course Knowledge Scores Connoting Their General Global Competence During the Fall Semester of the 2010–2011 Academic Year

	Knowledge	n	M	SD
Pair 1	Pre-course	94	10.43	2.316
	Post-course	94	11.15	2.767

The students' post-course knowledge connoting their general global competence was assessed by asking them to select the correct answer from four choices for 21 multiple-choice items, as presented by an alternate form test. Overall, 29 students (29.6%) answered 13 or more items correctly (see Table 3).

Table 3. Descriptive Statistics for Post-Course Knowledge Scores of Students' Connoting Their General Global Competence During the Fall Semester of the 2010–2011 Academic Year (n = 98)

Items	Correct Answers	
	f	%
Which country is the largest consumer of rice in the world?	86	87.8
Which of the following statements best describes a "third world" country?	82	83.7
The North American Free Trade Agreement (NAFTA) is an agreement signed by the governments of the following countries, creating a trilateral trade bloc in North America.	70	71.4
The continent with the fastest growing population is _____.	68	69.4
Which country is the largest beef producer in the world?	66	67.3
Which of the following is not an ocean?	63	64.3
_____ is the largest of the seven continents.	63	64.3
Which of the following is not an example of import control?	63	64.3
Which country is the leading producer of corn/maize in the world?	61	62.2
Generally, _____ do most of the fieldwork on African farms.	59	60.2
Wood is the primary household fuel in _____.	55	56.1
More people in the world are reached by _____ than any other form of communication.	55	56.1
Which of the following is not part of Islamic practices in Muslim countries?	46	46.9
Which countries are the United States' four largest trading partners?	45	45.9
The _____ desert is the world's largest cold desert.	41	41.8
Which of the following is not responsible for rendering large amounts of land useless in productive capacity?	41	41.8
Sovereignty is a term that means _____.	32	32.7
Who is the prime minister of Canada?	28	28.6
According to the United Nations, the world's approximate population in 2025 will be _____.	28	28.6
What percentage of land in the world is not used for food production?	21	21.4
What is the name of the treaty in which individual countries agreed to reduce greenhouse gas emissions?	17	17.3
Students who answered 13 or more test items correctly	29	29.6

The students' post-course knowledge scores ($M = 11.15$; $SD = 2.767$) (see Table 2) were higher than their pre-course scores, but still below 60% correct overall (53.4%). The item, "Which country is the largest consumer of rice in the world?" was answered correctly by 87.8% of the students (see Table 3). More than two-thirds of the students chose the correct answers for four other items: "Which of the following statements best describes a 'third world' country?" (83.7%); "The North American Free Trade Agreement (NAFTA) is an agreement signed by the governments of the following countries, creating a trilateral trade bloc in North America" (71.4%); "The continent with the fastest growing population is _____" (69.4%); and "Which country is the largest beef producer in the world?" (67.3%). However, few students (17.3%) chose the correct answer to the item, "What is the name of the treaty in which individual countries agreed to reduce greenhouse gas emissions?" (see Table 3).

Research Hypothesis

H_o: No statistically significant difference ($p < .05$) existed between students' pre-course and post-course knowledge connoting general global competence after completing an ID course (H_o: $\mu_{1\text{pre-course knowledge}} = \mu_{2\text{post course-knowledge}}$).

A paired-samples t-test was conducted to determine if a statistically significant ($p < .05$) difference existed between students' pre-course and post-course knowledge regarding general global competence after they completed one of the ID courses. Overall, t-test results revealed a statistically significant difference in students' knowledge gain from pre-course ($M = 10.43$; $SD = 2.316$) to post-course ($M = 11.15$; $SD = 2.767$) (see Table 2), $t(93) = 2.256$, $p = .026$ (two-tailed) (see Table 4). The *mean difference* in knowledge scores was .72 with a 95% confidence interval ranging from .087 to 1.360 (see Table 4). The *eta* squared statistic (.052) indicated a small effect size (Cohen, 1988) (see Table 4). Based on this result, the null hypothesis was rejected.

Table 4. Paired Samples t-Test of Students' Pre-Course and Post-Course Knowledge Scores Connoting Their General Global Competence During the Fall Semester of the 2010–2011 Academic Year (n = 94)

	Knowledge	**MD**	**SD**	**95% CI**		**t**	**df**	**Sig.***	**eta²**
				Lower	*Upper*				
Pair 1	Pre–post course	.72	3.109	.087	1.360	2.256	93	.026	.052

Note: CI = Confidence Interval
*$p < .05$

Relationships Between Selected Personal Characteristics of the Students and Their General Global Competence

Selected relationships were tested to examine the role of potentially confounding variables (Campbell & Stanley, 1963). The Pearson product-moment correlation coefficient indicated the

relationship between students' knowledge regarding general global competence and their GPA was negligible, positive, and not statistically significant ($r = .051$; $p = .657$). The point-biserial correlation coefficient revealed a low and negative relationship ($r_{pb} = -.108$) between students' knowledge regarding general global competence and their participation (*yes* or *no*) in a study-abroad learning experience; the relationship was not statistically significant ($p = .174$). Additional point-biserial correlation analysis revealed a negligible and positive relationship ($r_{pb} = .015$) between students' knowledge regarding general global competence and their involvement (*yes* or *no*) in an international experience during the fall semester of 2010; the relationship was not statistically significant ($p = .442$). Because the tests of association between the three independent variables and the dependent variable, general global competence, yielded either low or negligible magnitudes, it was concluded the former did not confound the study's results. The tests of association reduced the likelihood of reporting spurious results due to Type I error.

Conclusions

Less than one-fifth of the students achieved a "passing score" (i.e., 60% or more correct answers) on the pre-course knowledge test of their general global competence. Regarding the post-course knowledge test, less than one-third of the students scored 60% or higher. Although the students' post-course knowledge scores were higher than the pre-course scores, their overall performance was still below 60%. This was a statistically significant difference ($p < .05$) regarding change in students' general global competence from pre-course to post-course, but it held little practical significance. To that end, Wingenbach et al. (2003) asserted formal education can increase the international knowledge of students by helping them understand the relevance of *real world* occurrences and of their classroom learning on issues involving international agriculture. The findings of this study supported Wingenbach and colleagues' (2003) assertion, albeit in a rather limited way. Much room for improvement existed in the students' performance on the test used to measure their general global competence. Whether the ID courses studied were an efficacious way of achieving substantial change in students' general global competence remains an open question. More appropriate methods for measuring such change warrant consideration.

Recommendations

Findings of this study showed that students' performance on the pre-course and post-course knowledge tests of their general global competence was rather poor. To address this shortcoming, instructors who teach ID courses should consider restructuring their courses to include topics that would facilitate improving students' global competence in general, while still stressing course-specific content – i.e., follow a variation of an *infusion approach,* as described by Whalley, Langley, and Villarreal (1997). The infusion approach emphasizes interdisciplinary learning through the internationalization of curricula; this method exposes students to various

fields of study and makes them aware of the important connections existing among topics and subjects with international perspectives (Whalley et al., 1997).

Faculty, departments, and colleges across Oklahoma State University should create a collaborative and interdisciplinary approach to internationalizing the curricula by sharing their skills, knowledge, resources, and ideas (Navarro & Edwards, 2008; Whalley et al., 1997). Faculty and administrators, especially those individuals with international experience, should help promote institution-wide undergraduate curricular reform to meet the needs of students regarding their global competence. Navarro and Edwards (2008) asserted that a multifaceted effort is required for institutions of higher education to successfully internationalize their students' learning experiences, including *but not limited to* the courses in which they enroll.

Faculty who teach ID courses should be motivated by the findings of this study to improve their curricula by creating learning experiences calibrated to prepare students to succeed in an increasingly globalized world in which the demand for general global competence continues to increase. Related literature (Guo & Jamal, 2007; Peelo & Luxon, 2007; Schuerholz-Lehr & van Gyn, 2006) suggests (a) students' learning experiences should be diverse, (b) learning approaches should be more student-centric, (c) faculty should provide a framework for the expectations and requirements of students, (d) sources of information should include national and international viewpoints, and (e) course assessments should be comprehensive and reflect the learning needs of the students.

Other inquiries should be conducted using different ways to measure and operationalize students' knowledge regarding their general global competence, especially regarding facts and understanding that resonate in the 21st century. Finally, similar studies should be conducted that include students who attend other universities.

Implications and Discussion

As students acquire more knowledge of international issues, they become citizens who are more globally competent. Further, they accept the viewpoint that to be knowledgeable of the world is an enduring need for all persons aspiring to become globally and culturally competent professionals (Egan & Bendick, 2008). Shams and George (2006) asserted that

> [a] globally competent person is someone who is *aware of the world* around him and who *knows how to interact with people* from other cultures. A globally competent person *understands the interconnectedness of today's world* and the importance of responsible decision making. (para. 28)

Students who complete ID courses that improve their general global competence increase the likelihood of achieving this aim.

Therefore, the poor performance of undergraduate students on a test connoting their general global competence is a cause for concern. Hunter (2004) also concluded U.S. undergraduate students' knowledge supporting their global competence was unacceptable. However, were the measures of general global competence used in this study appropriate? Could measurement error have been a factor? Or was the students' knowledge of objects reflecting their general global competence simply that poor? Should institutions of higher education be providing learning experiences other than ID courses, including nonformal opportunities for learning, structured and facilitated to assist students in developing a deeper knowledge base to support their general global competence? The experiences may include international library sections, seminars, debates, films, dramas, music, pot-luck dinners, brown-bag lunches, coffee hours, food contests, dances, sports, and camp weekends (Navarro, 2004). These activities would support what Navarro (2004) called "a positive institution-wide attitude toward internationalization" (p. 74).

> Moreover, according to Oklahoma State University's catalog (2013–2014),
>
> [g]oals of "I" [formerly known as "ID"] courses are to prepare students to critically analyze one or more contemporary cultures external to the United States; understand how contemporary international cultures relate to complex, modern world systems; and demonstrate their understanding through written work that provides them the opportunity to enhance their writing skills. (p. 10)

Mindful of the institution's emphasis on students' critically analyzing aspects of their international understanding and doing that by writing, a more appropriate way to assess changes in general global competence attributed to an ID course may be writing assignments rather than multiple-choice tests.

Finally, this paper's findings were derived from a larger study (Moriba, 2011) that included assessments of students' attitudes on the importance of acquiring international awareness regarding issues of significance to the agriculture sector (Moriba, Edwards, Robinson, Cartmell, & Henneberry, 2012). Significant differences with more robust practical significance were found for that part of the investigation (Moriba et al., 2012). Therefore, the salient value of undergraduate students' completing ID courses may lie more with the potential for these learning experiences impacting their attitudes around global topics and issues than improving their general knowledge on the same. This aspect of the global competence phenomenon and educating undergraduate students deserves additional study by scholars and more discussion in academia.

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Documenting Program Outcomes of Relationship Education with Incarcerated Adults

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The current study examined program outcomes for an understudied population of Relationship Education (RE) participants: incarcerated men and women. In addition to relationship functioning, we examined a number of individual and parenting outcomes which had not previously been explored. In a sample of 453 adult inmates, we found improvements in (a) trust, (b) confidence in the relationship, (c) intimacy, (d) individual empowerment, (e) conflict management, (f) help-seeking attitudes, (g) self-esteem, (h) depression, (i) global life stress, (j) faulty relationship beliefs, and (k) parenting efficacy. Tests of moderation by gender and race indicated minimal differences in change patterns between groups; however, we found a significant time by gender interaction on intimacy and a time by race interaction on parenting efficacy. Implications for research and practice are presented.

Keywords: relationship education, incarceration, recidivism, healthy relationships

Introduction

Recent decades have been marked by increased levels of incarceration in the U.S., and many researchers are describing this time as an era of mass incarceration (e.g., Clear, 2007; Garland, 2001; Gottschalk, 2006; Mears, Cochran, Siennick, & Bales, 2012). Incarceration rates and the number of prisoners being released from prison each year continue to rise. Recent estimates suggest that over 1.6 million individuals are incarcerated in U.S. state and federal prisons (West, 2010), and over 735,000 prisoners are released each year (Sabol, West, & Cooper, 2009). It is also estimated that within 2 years of release, 59% of these prisoners will be rearrested, with 19% returning to prison with new sentences (Langan & Levin, 2002). While recidivism has emerged as a well-known social problem and continues to receive a high level of research interest, programming to address recidivism continues to face barriers. For example, although prison populations continue to climb, prisoner programming and services have declined (Mears et al., 2012). As a result, increased attention is being paid to the types of programs offered and their impact on recidivism rates (e.g., Einhorn et al., 2008; Gottschalk, 2006; Mears et al., 2012).

There is a growing body of literature that suggests strong, healthy relationships may be an important factor in successful reintegration (e.g., Berg & Huebner, 2011; Laub & Sampson, 1993; Visher & Travis, 2003). The theoretical framework used in our evaluation study utilizes assumptions from Laub and Sampson's (1993) age-graded theory of informal social control (also Sampson, Laub, & Wimer, 2006), which emphasizes the importance of social relationships in altering the trajectory of offenders (Lilly, Cullen, & Ball, 2007). For example, while marriage does not necessarily increase social control, close emotional ties and mutual investment are likely to increase the social bond between two people. This increase in social bonds could lead to a reduction in criminal behavior (Laub & Sampson, 1993; Shover, 1985). Furthermore, a life course perspective suggests that there is the potential for any specific experience or event (e.g., participation in a relationship education class) to result in a turning point, by offering new information or skills that have the potential to alter an individual's trajectory (e.g., Elder & Johnson, 2003).

A handful of early studies (e.g., Howser, Grossman, & Macdonald, 1984; Kemp, Glaser, Page, & Horne, 1992) indicate prisoners, both male and female, who maintain healthy, close family relationships are better able to cope with prison and exhibit less negative behaviors while incarcerated. In addition to the influence seen while in prison, research consistently shows social ties to family as being particularly important to successful reintegration (e.g., Berg & Huebner, 2011; Laub & Sampson, 1993; Visher & Travis, 2003). During incarceration, family members often become the core of an offender's social network (e.g., Mears et al., 2012; Shapiro & Schwartz, 2001), and most prisoners continue to rely on their family upon release from prison (Berg & Huebner, 2011). These studies indicate that those with stronger family relationships are also less likely to recidivate after release, thus pointing to the potential impact of administering family life education (FLE) in prison facilities. One form of FLE, typically referred to as relationship education (RE), addresses couple and coparenting relationships and focuses on strengthening the quality of these relationships. The training provided through RE offers a potentially untapped resource for addressing recidivism and the unique challenges faced by prisoners and their families.

While there has been an increase in research examining outcomes and impact of RE among more diverse populations (Hawkins & Fackrell, 2010), there remains little empirical attention on these programs serving prisoners even though there have been increased efforts to provide RE to this population (for exceptions, see Accordino & Guerney, 1998; Einhorn et al., 2008). All relationships will encounter stressors that impact both individual and family functioning (Ooms & Wilson, 2004). Prisoners, however, face both common family stressors and unique challenges to relationship quality and stability during incarceration and upon release. Knowledge and skills are needed for staying connected to and for reconnecting with partners, children, and family members after separation, finding jobs, and reintegrating into society (e.g., Einhorn et al., 2008; Mears et al., 2012). One way to ease this stress may be to implement programs that better

prepare prisoners for life outside of prison (Einhorn et al., 2008). Only a handful of these programs exist, and most target educational or vocational skills, which while important, usually do not offer skills needed to deal with individual and family functioning (Haney, 2001).

While FLE with prisoners is more widely used, there is very little empirical evidence evaluating the specific use of RE with this population. To our knowledge, only three published studies have examined the experiences of prisoners participating in RE (Accordino & Guerney, 1998; Einhorn et al., 2008). Accordino and Guerney (1998) implemented a 2-day marriage enrichment program (16 hours total) for Jewish prisoners and their wives and focused on empathic, expressive, and discussion/negotiation skills. The evaluation component focused generally on quality of the program and leaders. Overall, participants found the program to be helpful and felt it was successful.

Einhorn et al. (2008) examined the impact of the Prevention and Relationship Enhancement Program (PREP) with a sample of 254 male and female prisoners who were currently in a relationship. The study used a slightly modified version of PREP tailored to the prisoners' specific needs in prisons, and program classes took place over 6 weeks. They examined a range of relationship outcomes (e.g., satisfaction, dedication, confidence, and communication) and found significant increases in all areas. Additionally, they examined whether gender or race affected the results and found no significant interaction effects.

Shamblen, Arnold, Mckiernan, Collins, and Strader (2013) implemented a modified version of the Creating Lasting Family Connections program with 114 married couples where one spouse had recently been released from prison. Classes were either offered as a weekend retreat (two 8-hour sessions) or as a 10-session format (2 hours per session). Participants completed surveys at three time points (pre-test, post-test, and 3-month follow-up). The study examined a range of relationship and individual skills (e.g., communication skills, conflict resolution skills, emotional expression, and relationship satisfaction) and found that husbands and wives showed similar improvement.

While these three studies offer an initial look at the impact of RE on incarcerated samples, the studies have limited their samples to include only those currently in couple relationships. As such, the studies have focused primarily on outcomes measuring couple relationship skills. Only one (Shamblen et al., 2013) included examinations of individual skills that are necessary for maintaining healthy relationships with others, but it confined the study to those who were currently in a relationship and recently released from prison.

Current Study

In an effort to extend this literature, the current study examined levels of change among male and female prisoners participating in RE classes, regardless of current relationship status. In addition to relationship functioning measures, we examined a number of individual and parental functioning measures, which have not previously been explored as outcomes for RE with prison populations. In addition, we explored moderation of program outcomes by gender and race.

Thus, the current study addressed the following research questions:

> R1: Does participating in RE result in positive change on measures of couple, individual, and parental functioning for a sample of incarcerated adults?

> R2: Does this change differ by gender and racial subgroups? That is, are there interactions of time by gender and time by race?

Method

Sample and Procedure

This research was approved by the Institutional Review Board and conducted in accordance with ethical standards for voluntary participation, informed consent, and confidentiality. Participants in this study were recruited as part of a federally-funded healthy marriage and relationship education initiative. Programs were delivered and data were collected by trained educators from family resource centers (FRC) located in eight counties in a Southern state. The sample was drawn from 502 adult prisoners from seven facilities across the state. Individuals voluntarily signed up for the RE classes after information about the upcoming classes was distributed by the prison and did not receive incentives from the Department of Corrections or the research study. Individuals who participated completed a questionnaire prior to program start of approximately 130 items assessing their behaviors, experiences, beliefs, and attitudes regarding their individual functioning, relationships, and family, in addition to socio-demographic information. The analytic sample was restricted to the 453 adult prisoners who completed a pre-test and post-test

The RE programs included information designed to support and prepare participants to build and maintain healthy couple and coparenting relationships, and to provide a secure, healthy environment for their children. Various RE curricula were implemented and consisted of a minimum of six group education sessions. All curricula were selected based on their inclusion of the seven core components identified by the National Extension Relationship and Marriage Education Network (NERMEN; Futris & Adler-Baeder, 2014) including: (a) *choose* (being intentional in relationships), (b) *know* (having knowledge of one's partner), (c) *care* (being kind,

affectionate, and supportive in relationships), (d) *care for self* (maintaining and enhancing one's own health and wellness), (e) *share* (developing friendship and a sense of togetherness), (f) *connect* (engaging social support, ties to the community, and finding personal meaning), and (g) *manage* (using engagement and interaction strategies to handle differences, stresses, and safety issues).

Forty-nine percent of individuals in the sample identified as African American, 47% European American, 1.5% Latino, and 2.5% "other." The average age of participants was 38. Gender composition was 80% female and 20% male. Participants were asked about their educational attainment. Twenty-four percent did not complete high school, 36% completed high school (or GED) only, 18% completed some college, 17% completed a 2-year college program, 4% completed 4 years of college, and 1% had post-college education. Relationship status was determined by a single question: "What is your current relationship status?" Options for responses were: (a) married, (b) engaged/living together, (c) engaged/not living together, (d) dating someone/living together, (e) dating someone/not living together, or (f) single, no current relationship. Respondents did not complete items that did not pertain to them (i.e., parenting items if they were not a parent; couple items if they were not in a couple relationship). Thirty-eight percent of participants reported being single and not in a dating relationship, while 26% reported being in a marital relationship, 24% reported being in a dating relationship, and 12% reported being engaged. Of the participants, 55% reported being a parent, with 44% reporting having a child under the age of 19. Only those participants who were currently in a relationship answered questions about couple functioning; only those participants who were parents answered questions about parental functioning.

Measures

Along with demographic variables, surveys assessed various aspects of three domains of functioning – couple, individual, and parental. The study assessed change from pre-test to post-test on measures of functioning in each domain. Initially, 24 outcomes were examined using the full sample, yet the following measures provide descriptions of outcomes for which significant change was found following the analysis. Detailed descriptions and references of all measures can be obtained from the first author.

Couple functioning domain. *Trust* was measured with a three-item scale (Rempel, Holmes, & Zanna, 1985) assessing perceptions of a partner's dependability, with items such as "I can rely on my partner to keep the promises he/she makes to me," using a 5-point Likert scale, from 1 (*strongly disagree*) to 5 (*strongly agree*). The Cronbach's alpha reliability for the current study was $\alpha = .84$. *Confidence in the relationship* was measured using three items (Stanley & Markman, 1992). Questions included such items as "I am very confident when I think about our future together." Participants responded using a 5-point Likert scale, from 1 (*not at all*) to 5

(*extremely*). The Cronbach's alpha reliability for the current study was $\alpha = .91$. *Intimacy* was measured using three items. Questions included such items as "I keep very personal information to myself and do not share it with my partner/spouse." Participants responded using a 5-point Likert scale, from 1 (*never*) to 5 (*all of the time*). The Cronbach's alpha reliability for the current study was $\alpha = .73$.

Individual functioning domain. *Individual empowerment* was measured using six items. Published studies utilizing this measure demonstrate reliability (range: $\alpha = .71\text{-}.75$; Adler-Baeder et al., 2010; Lucier-Greer, Adler-Baeder, Ketring, Harcourt, & Smith, 2012). Questions included such items as "I express myself clearly and without fear" and "I have the power to manage challenges in my life." Participants responded using a 5-point Likert scale, from 1 (*I have not thought about this*) to 5 (*I do this on a regular basis*). The Cronbach's alpha reliability for the current study was $\alpha = .76$. *Conflict management* was measured using six items (Buhrmester, Furman, Wittenberg, & Reis, 1988). Questions included items such as "I am able to put bitter feelings aside when having a fight" and "In a fight, I am able to see the other person's point of view and really understand his/her point." Participants responded using a 5-point Likert scale, from 1 (*not at all like me*) to 5 (*very much like me*). The Cronbach's alpha reliability for the current study was $\alpha = .76$. *Help-seeking attitudes* was measured using three items. Questions included such items as "I would want to get help if I were worried or upset for a long period of time." Participants responded using a 5-point Likert scale, from 1 (*strongly disagree*) to 5 (*strongly agree*). The Cronbach's alpha reliability for the current study was $\alpha = .84$. *Self-esteem* was measured using three items (Rosenberg, 1989). Questions included such items as "I take a positive attitude toward myself." Participants responded using a 5-point Likert scale, from 1 (*strongly disagree*) to 5 (*strongly agree*). The Cronbach's alpha reliability for the current study was $\alpha = .64$. *Depressive symptoms* were measured using three items (Center for Epidemiological Studies – Depression Scale; Radloff, 1977). Questions included such items as "I felt depressed" and "I felt sad." Participants responded using a 4-point Likert scale, from 0 (*none*) to 3 (*3+ times*). The Cronbach's alpha reliability for the current study was $\alpha = .86$. One item was used to measure *global life stress* (i.e., "How would you rate your overall level of stress over the past month?") on a 7-point Likert scale, from 1 (*no stress*) to 7 (*high stress*). Faulty relationship beliefs (Cobb, Larson, & Watson, 2003) such as *ease of effort in the relationship* (e.g., "Finding the right person is all about luck") and *cohabitation beliefs* (e.g., "Living together before marriage will make your marriage happier") were assessed on a 5-point Likert scale, from 1 (*strongly disagree*) to 5 (*strongly agree*). The Cronbach's alpha reliability for *ease of effort* in the current study was $\alpha = .70$. The Cronbach's alpha reliability for *cohabitation beliefs* in the current study was $\alpha = .97$.

Parental functioning domain. *Parenting efficacy* was measured using three items (Dumka, Stoerzinger, Jackson, & Roosa, 1996). Questions included such items as "I feel sure of myself as a parent" and "I know things about being a parent that would be helpful to other parents."

Participants responded using a 5-point Likert scale, from 1 (*strongly disagree*) to 5 (*strongly agree*). The Cronbach's alpha reliability for the current study was $\alpha = .65$.

Results

The current study examined differences in changes from pre-test to post-test using paired sample *t*-tests. Repeated measures mixed between–within subject analyses of variance (RMANOVAs) were used to determine whether there were time by gender and time by race interaction effects.

R1: Does participating in RE result in positive change on measures of couple, individual, and parental functioning for a sample of incarcerated adults?

Paired-sample *t*-tests indicated significant change on measures in all three domains (Table 1). In the **couple functioning domain**, analyses indicated change on measures of *trust* ($t(139) = -2.21$, $p < 0.05$), *confidence in the relationship* ($t(138) = -1.94$, $p < 0.05$), and *intimacy* ($t(142) = -2.24$, $p < 0.05$). In the **individual functioning domain**, analyses indicated significant change on measures of *individual empowerment* ($t(275) = -4.29$, $p < 0.05$), *conflict management* ($t(283) = -1.92$, $p < 0.05$), *help-seeking attitudes* ($t(60) = -2.84$, $p < 0.05$), *self-esteem* ($t(40) = -4.09$, $p < 0.05$), *depressive symptoms* ($t(282) = 2.85$, $p < 0.05$), *global life stress* ($t(161) = 2.09$, $p < 0.05$), and faulty relationship beliefs in areas such as *cohabitation* ($t(36) = 3.02$, $p < 0.05$) and *ease of effort in the relationship* ($t(38) = 2.13$, $p < 0.05$). In the **parental functioning domain**, analyses indicated change on measures of *parenting efficacy* ($t(199) = -2.07$, $p < 0.05$). The effect sizes in the current sample ranged from .17 to .90, with an average effect size of .39.

Table 1. Paired Sample t-Tests Examining Changes From Pre- to Post-Assessment

|	Pre		Post				
	M	*SD*	*M*	*SD*	*df*	*t*	**Cohen's *d***
Couple Functioning							
Trust	3.32	1.21	3.49	1.25	151	-1.97[*]	0.27
Confidence in Relationship	3.55	1.25	3.78	1.28	154	-2.22[*]	0.23
Intimacy	3.59	0.88	3.73	0.85	158	-2.19[*]	0.29
Individual Functioning							
Individual Empowerment	3.73	0.84	3.97	0.81	275	-4.29[***]	0.38
Conflict Management	3.31	0.97	3.44	1.02	283	-1.92[*]	0.17
Help-Seeking Attitudes	3.17	0.61	3.39	0.57	60	-2.84[**]	0.52
Self-Esteem	4.28	0.58	4.63	0.51	40	-4.09[***]	0.90
Depression	1.32	0.99	1.15	0.98	282	2.85[**]	0.24
Life Stress	4.61	1.65	4.33	1.68	161	2.09[*]	0.23
Cohabitation	2.46	1.17	1.98	1.03	36	3.02[**]	0.72
Ease of Effort	2.46	0.82	2.24	0.72	38	2.13[*]	0.49
Parental Functioning							
Parenting Efficacy	4.18	0.75	4.30	0.72	199	-2.07[*]	0.22

[*]$p < .05$, [**]$p < .01$, [***]$p < .001$ two-tailed tests

R2: Does this change differ by gender and racial subgroups? That is, are there interactions of time by gender and time by race?

RMANOVAs indicated time by gender interaction effects on *intimacy* (Figure 1) [$F(1,153) =$ 5.38, *p* = .022, *partial eta squared* = .034], with females showing an increase in intimacy and males maintaining lower levels of intimacy, but no interaction effects on other measures.

Figure 1. Differences Between Males and Females on Intimacy Over Time
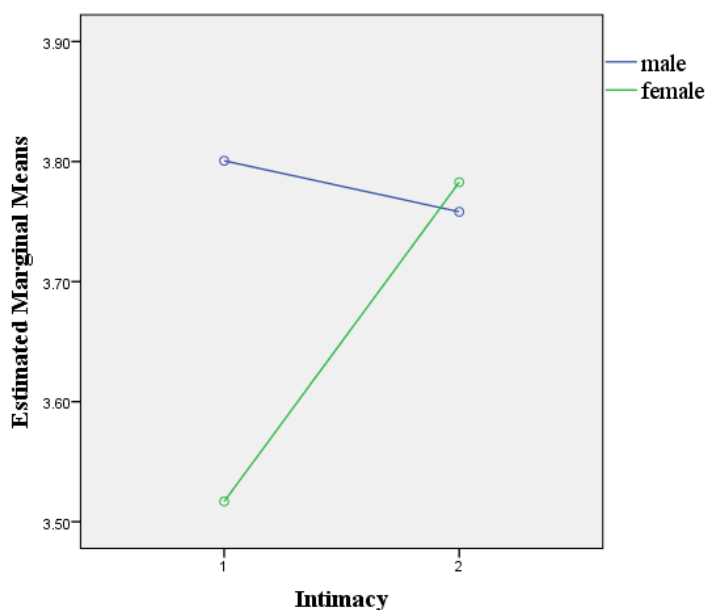
RMANOVAs also revealed time by race interaction effects only on *parenting efficacy* (Figure 2) [$F(5,192) = 3.14$, *p* = .010, *partial eta squared* = .075]. While African Americans indicated higher levels of parenting efficacy at both pre-test and post-test, European Americans showed an increase in this domain from pre-test to post-test.

Figure 2. Differences Between African Americans and
European Americans on Parenting Efficacy Over Time
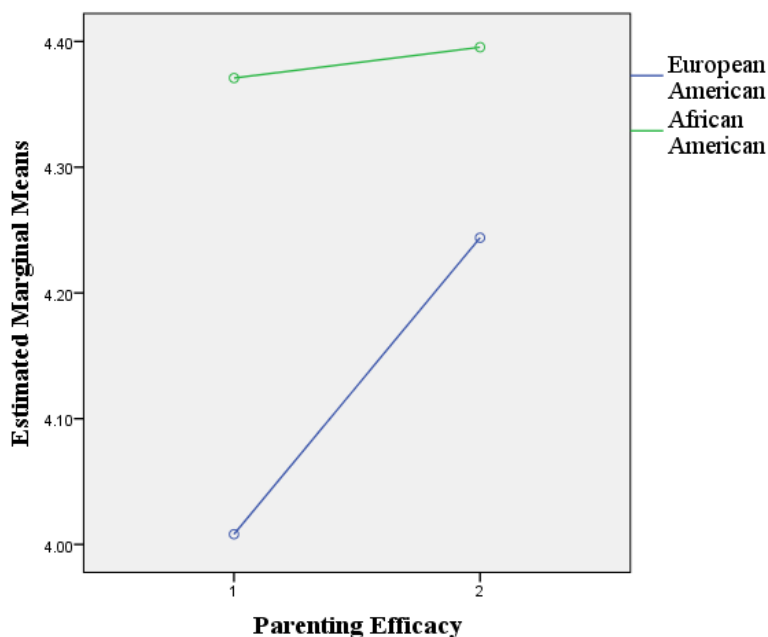
Discussion

The results of this study are consistent with previous results (Accordino & Guerney, 1998; Einhorn et al., 2008; Shamblen et al., 2013) and offer additional outcome information with a larger, more diverse sample. Findings suggest the potential benefit of implementing relationship education classes in prison facilities. The current study found improvement in three distinct domains of functioning (i.e., couple, individual, and parenting). The effect sizes in the current sample ranged from .17 to .90, and most effect sizes were in the small-to-moderate range (Cohen, 1977). The largest effect sizes were seen on measures of individual functioning (e.g., self-esteem, help-seeking attitudes, and faulty relationship beliefs); average effect size across all domains was .39, indicating a level of meaningful change for program effect (i.e., > .25; Wolf, 1986). These are consistent with those reported in a recent meta-analysis that examined the impact of marriage education programs (Fawcett, Blanchard, & Hawkins, 2006) and with those found in the Einhorn et al. (2008) prison study report of effect sizes ranging from .19 to .81. Notably, the three previous studies examining RE in this population included only couples. The results of the current study suggest that RE may be as impactful, even if prisoners attend classes as individuals. In addition, RE may positively influence those not in couple relationships by improving functioning in the individual and parenting domains.

The improvements found in the domains of individual, family, and parental functioning suggest that the impact of RE in prisons may extend beyond couple relationships and contribute to an overall better quality of life for prisoners and their families. It is estimated that more than 50% of incarcerated adults are parents of minor children (Travis, McBride, & Solomon, 2003). While the program content was focused on relationships between couples and coparents, research indicates that improving the couple relationship also positively impacts the children (Grych & Fincham, 2001; Kirkland et al., 2011). Additionally, participants often discussed how their relationship skills can be used in their parenting. Learning to use these skills in multiple domains of functioning improves the quality of relationships within the family and helps overcome some of the barriers (e.g., intimacy and parenting efficacy) to maintaining strong, connected relationships while incarcerated.

We did find a significant gender interaction on measures of intimacy and a significant race interaction on measures of parenting efficacy. Females started at lower levels of intimacy and reported an increase in feelings of intimacy pre-test to post-test, while males maintained similar levels of intimacy pre-test to post-test. This is consistent with previous literature indicating gender differences in reports of relationship quality (e.g., intimacy) and the tendency for men to rate relationships as more satisfactory than women (Fowers, 1991; Jose & Alfons, 2007). African Americans and European Americans both indicated gains in parenting efficacy; however, European Americans showed significantly greater gains over the two assessment points. With the exception of these two outcomes, participants appeared to benefit similarly regardless of gender or race. This is important to note because it offers further evidence of the value of RE with diverse samples.

Limitations

While this study contributes to the literature in many ways, there are also a number of limitations to be considered. Using only a pre-test/post-test design does not allow for the assessment of long-term benefits of the program. Since the post-test is given at the time of class completion, we are assessing change while the participant is still incarcerated. It would be important to examine these areas of change after the participant has been released from prison. Also, since the RE class was implemented only to individuals who were incarcerated, we are unable to assess the impact of these classes, if any, seen by partners or children outside of the facility. This is the initial step in our study, and these follow-ups are planned for future research.

Finally, because comparison groups were not utilized, mostly owing to policies regarding collection of these data that are complicated within prisons, we cannot say definitively that these patterns of change were solely due to program participation. We can, however, note the calculated effect sizes (appropriate formulas for paired comparisons were used). The average effect size was moderate (.39) and well above the level of meaningful/practical differences for an

educational program (i.e., > .25; Wolf, 1986). Because of their magnitude, we can have some confidence that these documented changes over a short period of time are due to program participation. Clearly, participants are receptive to the program, and results from these analyses provide encouragement for continued work in this area.

Conclusions and Future Directions

A potential long-term goal would be to provide prisoners with the knowledge and skills to successfully integrate back into society after release. Given the evidence of change following participation in RE on individual, couple, and parental functioning seen in this study, and the research that links strong relationships to better adjustment outside of prison (Mears et al., 2012), it is important for future research to examine the impact of RE classes on family relationships post-release and on recidivism rates.

While it is important to assess the impact of RE on individuals, we also realize the potential benefit of having classes that include family members. Although it may pose additional challenges to involve family members in the education classes (e.g., long distances, transportation, cooperation of the correctional facility), it would be valuable to assess the impact of these classes on each member of the family and to compare the impact of classes received by individuals versus couples.

Overall, this study adds to the literature in several ways. First, it adds to the overall research on RE and provides an examination of RE in a more diverse setting. While outcomes of RE have been well documented, there is less evidence of program benefits to more diverse, disadvantaged samples (Hawkins & Fackrell, 2010). Additionally, evaluating RE with prisoners is beneficial to researchers, policymakers, and government agencies alike as it offers a potential avenue for improving the well-being of incarcerated adults and their relationships. We know from previous research that incarcerated adults often feel a strain, due to their struggling relationships, during and after incarceration (Mears et al., 2012), which can lead to poor adjustment to life outside of prison and to the risk of recidivism. While most prison programs tend to focus on vocational skills, including relationship education (focusing on individual, couple, familial, and parental functioning) may provide additional skills necessary for successful re-entry into families and society.

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Acknowledgements

Informal, *Non(-)formal*, or *Free-choice* Education and Learning? Toward a Common Terminology for Agriscience and Ag-STEM Educators

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Education professionals must re-examine the use of labels for education and learning in diverse settings in light of new understandings of how people learn and updated goals for broader interdisciplinary work. The varied use of the terms informal education, nonformal education, and formal education draw distinctions that serve to divide, not unite, those working to support a wide variety of learners for similar agriscience education goals. What in Extension education is nonformal learning is informal learning in science education. Juxtaposing informal learning or nonformal learning with formal learning also serves, in the eyes of some outside the profession, to devalue the learning that actually predominates human learning, at least in terms of time and opportunity. Education privileges the facilitator, not the learner. One potential new term for consideration is free-choice learning. By breaking down silos, working across disciplinary boundaries, and embracing common terminology that puts the learner at the center, a profession of educators can better leverage resources, increase visibility, and ultimately, support constituents.

Keywords: informal education, nonformal education, agriscience education, nonformal learning, free-choice learning, science education, agricultural education, Extension education

Science, agriculture, and environmental education professionals must re-examine use of labels for work in diverse settings in light of new understandings of how people learn and updated goals for broader interdisciplinary work. Over 20 years ago, Etling (1993) warned of the dangers of a too-casual use of terminology in the context of agricultural education, including conflicts and struggles for resources within departments that arose from juxtaposing *formal* and *nonformal education*. Heimlich (1993) called for clearer definitions of *informal* and *nonformal* so that environmental educators could use the associated techniques. Researchers in science education began to discuss a need to replace the terms *informal education* and *informal learning*, which had gained favor among museum educators and others (Dierking, Falk, Rennie, Anderson, & Ellenbogen, 2003; Falk, 2001a; Falk & Dierking, 1998), to free informal education from problematic contrasts with formal education. Today, discussion in science education in

particular continues (Tal & Dierking, 2014), but the conversation lacks significant voices from agricultural, Extension, and to a lesser extent, environmental education, even as agricultural educators push for reintegration with science, technology, engineering, and math (Ag-STEM) and recognition of the connections among domains (Hillison, 1996; Thoron & Myers, 2008).

The rise of research around learning in all environments has been dramatic over the last two decades (Bell, Lewenstein, Shouse, & Feder, 2009; Cash, 2001; Falk & Dierking, 2000; Phipps, 2010; Stevenson, Brody, Dillon, & Wals, 2013; Thoron & Myers, 2008) and has given new or renewed direction. Calls within science education urge better contextualization of academic science (Bell et al., 2009; Bransford, Brown, & Cocking, 2000; NGSS Lead States, 2013; Rivet & Krajcik, 2008). Agricultural education lately aims to reintegrate and reiterate science, technology, engineering, and math (STEM) in its programs, bringing together professionals from diverse disciplines for a common goal of improved understanding (Thoron & Myers, 2008). In its second century, the University of Florida's IFAS Land Grant Extension still aims to help state residents address a wide range of public challenges (Univeristy of Florida IFAS Extension, 2013). Learning outcomes improve when varied activities supporting learning in all settings complement rather than compete with one other (Falk, 2001b; Fallik, Rosenfeld, & Eylon, 2013).

Ultimately, the specific labels Ag-STEM practitioners and researchers use within our varied individual settings may be moot. However, we are more and more frequently crossing domain and disciplinary boundaries to create programming and reach publics. We also spend more time interfacing with audiences outside Ag-STEM education that may have different culturally-derived meanings of the terms we use in a professional sense. Taking the time to consider and adopt carefully constructed choices of language about what we do and how and why we do it can facilitate this broader communication.

Without a unified understanding of the affordances and constraints offered by various settings and programs, integrated Ag-STEM education remains largely imaginary, fractured between and among traditional agriculture and STEM education and various settings. Without common terms, we will talk at cross-purposes, thwarting our efforts to embrace commonalities and raise awareness of what we do for our clients and our future partners, funders, and policymakers.

Colliding Worlds

Etling (1993) suggested the main distinctions among the terms *formal*, *nonformal* or *non-formal*, and *informal* education lay in the structure of the curricula in various programs (p. 73) (Table 1). Throughout the rest of this article, *nonformal* includes both versions of the spelling, with and without the hyphen, unless otherwise specified. Etling (1993) argued for the adoption of "nonformal" (p. 73) without a hyphen to professionalize the agriculture Extension experiences while distinguishing them from traditional classroom curricula.

Table 1. Characteristics of Education Settings as Described by Etling (1993)

Setting	Structure	Example
Informal	Little to none	Everyday, incidental
Nonformal	Some	Extension programming
Formal	High	K-12 school classrooms

On the other hand, Etling (1993) suggests that *informal* education is based on experiences that are neither planned nor organized, such as when a child learns to speak, and become education when an outsider interprets or corrects them for the learner. In fact, neuroscientists and educational psychologists now know that learning to speak, even by imitation and trial-and-error, is a highly structured process, though perhaps not a conscious one (Davis & Bedore, 2013). Furthermore, deliberate, reflective trial-and-error forms the basis of inquiry learning suggested by Dewey (Biesta, 2007).

Meanwhile, many other STEM educators and facilitators have adopted *informal* education to describe activities to promote learning outside of the formal school context, in science centers and museums, at camps, with homeschoolers and "unschoolers," and online (Luke, Camp, Dierking, & Pearce, 2001). There is broad recognition of the term *informal science education* (Luke et al., 2001), though environmental educators use *informal* and *nonformal* almost interchangeably (North American Association for Environmental Education, 2009). Informal science education has been characterized, improved, and even formalized (Phipps, 2010) to the point of showing actual learning gains in out-of-the-classroom programs (Ramsey & Edwards, 2004; Rennie, 2007). Each context for learning provides structure in myriad ways and in myriad forms, with a fluid nature of scaffolding when the learner needs and wants it.

Today there are several related concepts that researchers and practitioners of a variety of Ag-STEM-promotion activities draw upon that have yet to be encapsulated in one term free of the connection to *formal* (Fallik et al., 2013; Tal & Dierking, 2014). *Inquiry,* or lately, science and engineering *practices* (Next Generation Science Standards, 2013) describe experiences in authentic science and engineering designed to improve process skills as much as, if not more than, content knowledge, aligning with U.S. K-12 classroom science standards. Formal schools may, on their own or in partnership with other organizations, provide *out-of-school* or *after-school* Ag-STEM or environmental education programs (Kahne et al., 2001). Some practitioners perform *outreach* to communities, especially when helping researchers show broader impacts of their grant projects than the fundamental research knowledge that results from their investigations (National Science Foundation, 2013). Educators also speak of *science, environmental, or agricultural literacy* (Brown, Ryoo, & Rodriguez, 2010; Feinstein, 2011; Lin & Shi, 2014; Miller, 2010a, 2010b; Miller & Pardo, 2000); *communication* (Jurin, Roush, & Danter, 2010; Leeuwis, 2004; Nisbet & Scheufele, 2009); and *public understanding of* and *public engagement with science* (Lehr et al., 2007; Lundy, Ruth, Telg, & Irani, 2006; McCallie et al., 2009; Shirk et al., 2012) to help build meaning among various populations with various

backgrounds. Finally, some characterize education as *lifelong*, *lifewide*, and *lifedeep* (i.e., learning is not a separate thing that is performed at certain times in one's life, in certain activities, or in certain settings, but is rather incorporated in everything we do in a variety of ways) (Falk & Dierking, 2012).

To organize Ag-STEM interests within a larger frame, researchers and practitioners need some sort of taxonomy. Science center professionals struggle for recognition and clear definition of their myriad roles in the education system (Tran, 2007, 2008; Tran & King, 2009). Many are not simply museum educators delivering classroom-style programs. Nor are they only exhibit managers and staff, facilitating learning in the exhibits and in programs for public audiences in addition to keeping the interactive exhibits running. Today, when people ask me what I do, if I say I am a professor of "science education," many ask me what I teach. However, if I say I research "learning," I can open up a broader discussion about the types of audiences, subjects, and settings I explore. Educators and students across the country who seek professional development programs and graduate study in these areas have to do multiple keyword searches to be sure they have captured all the varieties of offerings. An agreement on common terminology would allow us to align ourselves more readily even across institutions with different subject matter but similar underlying educational aims, such as history and art museums.

Even beyond the dilemma of informal or nonformal, *education* and *learning* are sometimes used synonymously, further confounding matters. As Etling (1993) wrote, "teaching, by itself, does not constitute learning" (p. 73). Education in general over the past 20 years has embraced more learner-centric approaches (Bransford et al., 2000; National Research Council, 2012), what Etling (1993) suggested was the hallmark of nonformal education. Falk (2001b) suggests using *education* to refer to contexts and programs for learning and reserving *learning* for the resulting outcomes of educational experiences. *Education* strikes fear of testing, assessment, and judgment into the hearts of many (Luke et al., 2001). *Learning*, however, is something people want to do, and that desire doesn't disappear after leaving the formal school system behind, no matter at what age one leaves. This is evident in the enduring popularity of museums (Center for the Future of Museums, 2014), the abundance of Internet sites dedicated to learning (Forsyth, 2014), and the use of leisure time for educational activities through travel and tourism (Packer, 2006; Rollins, 2010; Van Winkle & Lagay, 2012).

Therefore, consider another term, coined by Falk and Dierking (1998): *free-choice learning*. They defined free-choice learning as voluntary, self-paced, nonsequential, and reflecting learner-perceived choice and control (Falk, 2001b; Falk & Dierking, 1998). Free-choice learning considers the social context and motivation of the learner (Falk, 2001b) in addition to the physical setting and structure implied by *formal, nonformal,* and *informal* as Etling (1993) described them. Falk points out that *free-choice learning* does not exclude the presence of a

teacher or facilitator or even a structured activity, but rather most free-choice learning involves learning through carefully designed experiences with defined outcomes, whether or not someone else guides the activity (Falk, 2001b).

Falk and Dierking convened a free-choice learning conference to begin to "forge collaborations between disparate parts of the science learning community" (Luke et al., 2001, p. 162). Participants remained undecided on whether to use *free-choice* or *informal learning*, with some arguing for retaining informal due to the term's currency in the field (Luke et al., 2001). Others argued a decision could not be made without representatives from certain segments of the nonschool field, namely the media and libraries not present despite invitations to attend. Participants did recognize that the field needed further discussion on terminology, mental models, and research methods for common understanding (Martin, 2001). Efforts at NARST, formerly the National Association of Research on Science Teaching, began in 2002 with a recognition that *informal science learning* was an inadequate term (Dierking et al., 2003). A decade later, the diversity of research perspectives employed has expanded, but no consensus among terms yet exists (Fallik et al., 2013; Tal & Dierking, 2014).

Bridging the Informal or Nonformal and the Formal

Whether or not *free-choice learning* is the answer, the problems with trying to contrast and separate *formal* and either *nonformal* or *informal* go beyond a simple issue of hyphenation. These terms are still all based in a mindset that privileges a standardized, structured school system, by setting *formal* as the standard against which *informal* and *nonformal* are compared (Falk & Dierking, 1998). Understand I am in no way advocating for a dismantling of a free public primary and secondary education in the United States. Yet, I argue that the broader Ag-STEM educational system needs to be equally valued with schools, and the entire system must realign to support each component, with each segment recognizing the contributions and weaknesses, affordances and constraints the others provide. This argument goes back to Mark St. John in the late 1980s and is reiterated by Falk (2001b) in the argument for a reframing around *free-choice learning*. Such a realignment also would ease the burden of each segment, as the responsibility of *education* would not fall to one segment alone.

Thus, ultimately, I exhort Ag-STEM education professionals to involve ourselves more fully in the discussion not only of terminology but also of philosophy of putting the learner at the center, building on natural inclinations for learning, and bringing in context to support learning development across the lifespan in all settings. A learner-centered approach makes the important unit the learner, not the instructor, facilitator, or setting in which learning takes place. This philosophy shift can encompass all forms of and situations for learning, from the most structured learning within the bounds of a controlled standardized curriculum to the least, responding to the curiosity of an unschooler.

Adopting new language across domains and settings will also work to build the larger knowledge base. New terminology paves the way for a more integrated system approach, providing natural context and reinforcement among topics, programs, facilitators, and settings, as well as with the everyday experience (Fallik et al., 2013), for true cradle-to-grave learning support. Environmental, agriculture, and STEM education can be fully integrated rather than parallel. Then *school* does not have to be the only place someone goes to learn; programs do not have to fit a single education context box of formal, nonformal, or informal; and *learning* is truly a lifelong, lifewide, lifedeep undertaking.

Conclusion

The search continues for a term that captures all learning activities in a unified way to express support of innate human desire to continually quest for knowledge, development, and change. Perhaps that is the problem: The quest is so fundamental as to be assumed, and making explicit and obvious all the ways and settings in which learning occurs is difficult. Humans just learn, period. The continued search for a common definition of our work does not diminish that work in the interim (Gold, 2012).

Free-choice learning is admittedly an unfamiliar term to many, and perhaps even awkward, but it is no more awkward than continuing to lump diverse learning settings under the mantle of "not a traditional formal classroom," perpetuating a divide that pits formal instruction against everything else. Rather than trying to enumerate our differences, let us embrace our commonalities that center on assisting learners. While the term *free-choice learning* may not be the ultimate endpoint, consider it a place to move the discussion forward, more aptly than *formal/nonformal/informal education*, capturing the ideals of a variety of contexts, instruction types, outcomes, and educators who work across settings with a range of levels of structure.

With the burgeoning reintegration of agriculture education and science education, the time is right to truly join the broader discussion, exploring alternative descriptors that more adeptly encompass the broad settings in which we work, the diverse clientele we serve—from teachers to policymakers to the general public to schoolchildren—and the range of ways in which we facilitate growth in understanding. As education and Extension professionals, it is our responsibility to engage in this conversation and reach beyond our traditional, isolated, discipline-based education boundaries to do so. If we do not, we face consequences beyond literature searches requiring several different keywords. We risk duplicating efforts, not providing our work to a broader audience, and most importantly, missing important advances in understanding learning that could benefit our constituents. We must all work together to improve communication among and beyond our interrelated domains and disciplines to advance learning for everyone.

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Acknowledgement

Exploring the Use of an Image-Based Approach to Assessing Nutrition Behaviors

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Formative evaluation was conducted for the Personal Health Behaviors Overview (PHBO) survey to evaluate nutrition behaviors with image-based questions in low-income populations. Forty-nine low-income adults from nutrition education classes were invited to participate with n = 42 included in the analysis. Participants completed the PHBO survey while an interviewer recorded observations. Upon completion, participants were asked questions regarding each PHBO survey item. Most participants completed the survey in an average of 4 minutes. The majority said the photographs of food made it easier to answer questions. Less than half indicated that the visuals depicting frequency made questions easier. While participant responses were aligned with the aims of the PHBO question being asked, some suggestions were offered for improvements of photographs. While this formative evaluation research indicates additional validation is necessary before use of these PHBO questions, the image-based simple question technique is a possible solution for efficient and effective nutrition assessments in low-income, limited literacy populations.

Keywords: nutrition assessment; visual aids; low-income population; photo; SNAP-Ed; nutrition evaluation; cognitive interview

Introduction and Background

When attempting to assess food and nutrient intake, researchers commonly use one or more of the following methods: (a) food records, (b) 24-hour recalls, and (c) food frequency questionnaires (Gibson, 2005). Despite the fact that these assessment methods were developed for universal use, they have limitations due to time required, high cost, high respondent burden, or literacy requirements (Gibson, 2005). These limitations pose a challenge when evaluating nutrition education in community-based educational settings where the supporting organization and the population being served have limited resources. For example, Minnesota Supplemental Nutrition Assistance Program Education (SNAP-Ed) settings struggle to effectively use such assessments when working with limited-literacy populations under time constraints. Thus, programs like SNAP-Ed need effective, quick, and inexpensive assessment tools to evaluate key
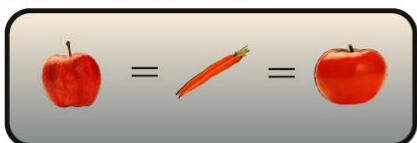
behaviors targeted by the program being delivered. To address these needs, the University of Minnesota Extension Center for Family Development conducted a formative evaluation using visual aids in a brief and easy to comprehend image-based Personal Health Behaviors Overview (PHBO) survey to assess selected eating behaviors in limited-resource populations.

The PHBO survey was designed to parallel existing SNAP-Ed evaluation tools, using a retrospective pre-post format and targeting key messages taught in the program. The PHBO survey was designed using photos and simple text to facilitate understanding, while still in a retrospective pre-post format to address the time and cost constraints of nutrition education classes. Participants were asked 12 questions about eating habits before and after completing the course. This innovative assessment technique uses simply worded statements, realistic photographs (see Figure 1), and visual representations of frequency (see Figure 2) to assist participants in understanding the questions and selecting appropriate answers. The survey design was influenced by a format pioneered at the University of California Cooperative Extension (Townsend, Kaiser, Allen, Joy, & Murphy, 2003; Townsend, Sylva, Martin, Metz, & Wooten-Swanson, 2008a) to evaluate needed on-key messages taught in the SNAP-Ed program based on the 2010 Dietary Guidelines for Americans (U.S. Department of Agriculture [USDA] & U.S. Department of Health and Human Services [USDHHS], 2010). The survey was then tested using the technique of cognitive interviewing. Participants described how they interpreted each question to provide an answer that would allow for further formative evaluation of the survey tool, individual questions, photos, and response-aiding visuals.

Figure 1: Example of Realistic Photographs from Personal Health Behaviors Overview Survey

Figure 1 shows question 10 from the PHBO survey in the retrospective pre-post format with equivalency picture of an apple, carrots, and tomato to better inform participants on the 1-cup measuring cup size. Figure 2 shows question 4 from the PHBO survey with a photo visual of a 1-cup serving of yogurt and calendar-like frequency visuals to help interpret the frequency answer options.

Figure 2: Example of Visual Representation of Frequency from Personal Health Behaviors Overview Survey

The underlying premise of the PHBO is that pictures coupled with low-literacy level text can help facilitate a shared understanding of an idea or message in the Minnesota SNAP-Ed program. The University of California Cooperative Extension first conducted validity testing on 39 text-based Food Behavior Checklist (FBC) questions and found some statistically significant correlations between self-reported FBC intake and 24-hour recalls ($r = 0.20\text{-}0.39$) (Murphy, Kaiser, Townsend, & Allen, 2001). The FBC question, "How many servings of fruit do you eat each day?" correlated with blood serum carotenoid levels ($r = 0.32$) and servings of fruit intake in 24-hour recalls ($r = 0.39$) (Murphy et al., 2001), indicating the FBC yielded similar trends compared to validated dietary intake. From the 22 statistically significant questions, the 16-question pictorial FBC was developed to improve response accuracy in low-literacy populations by providing photos to accompany text questions regarding eating behaviors (Banna, Vera Becerra, Kaiser, & Townsend, 2010; Townsend et al., 2003, 2008a). The FBC did not, however, address retrospective frequency (current strategy used by MN SNAP-Ed evaluation system) or serving size, and it did not provide questions addressing all Minnesota SNAP-Ed key messages, such as whole grain consumption, calcium intake, and physical activity (Sylva, Townsend, Martin, & Metz, 2006; Townsend et al., 2005).

The two fruit and vegetable questions from the FBC were additionally modified to address serving size by replacing "servings" with "cups" and using a measuring cup photograph

(Townsend et al., 2008a, 2008b). Minnesota SNAP-Ed again modified these two questions to address retrospective pre-post frequency by altering the wording in order to align with the current evaluation strategy. The survey tool was offered only one time to increase response rates and decrease response shift bias, where participants respond based on what they think the facilitator would like due to limited understanding of concepts on a pretest (Raidl et al., 2004). These revised questions were then piloted with over 14,000 Minnesota Extension health and nutrition class participants during the 2011 fiscal year. Based on observation data collected from educators facilitating the course, these questions could be administered quickly and showed retrospective incremental increases in fruit and vegetable intake, prompting further exploration of the use of picture-based nutrition questions.

The PHBO survey was developed to include additional pictorial questions addressing the 2010 Dietary Guidelines for Americans (USDA & USDHHS, 2010), such as increasing consumption of low-fat dairy, calcium-rich foods, whole grains, and fruits and vegetables; increasing physical activity; and increasing use of the nutrition facts panel when shopping. For formative evaluation, multiple questions were developed to assess Minnesota SNAP-Ed key messages. Questions on dairy fat content, food labels, fruits, and vegetables were modified from the pictorial FBC (Sylva et al., 2006; Townsend et al., 2005). Eight questions were modified from previously used Minnesota SNAP-Ed evaluations or were written de novo based on commonly eaten foods that might address a key behavior on whole grain consumption, calcium intake, or physical activity. Although physical activity may not be considered in some nutrition assessments, it was included in this assessment as it relates to the Dietary Guidelines and SNAP-Ed key messages (USDA & USDHHS, 2010). All questions were modified into the retrospective pre-post survey format to provide simplified wording, multiple amount or frequency options, and realistic visuals. Figures 1 and 2 show the format used in this stage of development. The Flesch-Kincaid equation (Flesch, 1948) was used to determine reading level of each question. The questions averaged a third-grade reading level. One question on physical activity was at the eighth-grade level, while all other text was below the fifth-grade reading level. Table 1 illustrates not only the subject matter of each question but also the USDA key message it was intended to address.

Table 1. Personal Health Behaviors Overview of Question Content Related to USDA Messages

USDA Key Message Addressed	Question Number (Question Content)
Low-fat dairy consumption	#1 (Fat content of dairy)
Calcium-rich food consumption	#2 (Milk intake)
	#3 (Calcium-fortified orange juice intake)
	#4 (Yogurt intake)
	#5 (Cheese intake)
Nutrition facts panel use	#6 (Use of nutrition facts panel)
Whole grain food consumption	#7 (Whole grain bread intake)
	#8 (Whole grain foods intake)
	#9 (Brown rice intake)
Fruit and vegetable consumption	#10 (Vegetable intake)
	#11 (Fruit intake)
Leisure time physical activity	#12 (Frequency of leisure time physical activity)

Development of Questions

This article will explore the utility and viability of the developed PHBO survey for community nutrition education programs, such as SNAP-Ed, using cognitive interviews. In order to explore whether the photos and simple text used in the PHBO survey facilitate understanding and address some of the limitations of traditional tools, we explored the following questions:

- Can the tool be completed quickly in a classroom setting?
- Do SNAP-Ed participants understand the intended meaning of the questions, answers, and visuals in the tool?
- Based on feedback of the survey, what changes to the survey would be necessary to make it more effective?

Methods

Recruitment

The aim was to recruit at least 40 adults participating in a Minnesota Extension SNAP-Ed program. Five SNAP-Ed classes from four sites were selected for recruitment. The classes were selected in part to assure a diverse set of participants with respect to age, race, ethnicity, and population density. The classes included a Head Start parent class in rural Minnesota, an all-male and an all-female substance abuse recovery class from an urban area, a senior living facility, and an emergency food shelf in a suburban metropolitan area. Because participants were recruited from these settings, each participant had been a part of at least one Extension nutrition or cooking class. All of these participants were recruited by a SNAP-Ed educator with whom

they were familiar. They were told about the study and invited to participate; if they agreed, they met with an interviewer to give informed consent. Since they were in different programs and at different points of education, the response sample varied on knowledge of basic nutrition information. Participants received a $20 incentive for participating in the study, with inclusion criteria being all adults (18 or older) without language barriers.

In the senior living facility, the Head Start program, and the emergency food shelf, all participants in attendance on the recruitment day were invited to participate. The recovery classes were much larger in participant numbers and had rolling enrollment. To keep recruitment even, with approximately 6 to 10 participants from each class, the course instructor invited all of those graduating during that class session to participate. Approximately 3 to 5 people graduated each session, and interviewers were present at two different sessions for both the male and female recovery classes.

Of the 49 adults invited to participate, 5 declined participation and 2 were excluded based on selection criteria (1 was under 18, and 1 had a language barrier). Forty-two participants completed the interview process and were included in the analysis.

Data Collection

Prior to data collection, all potential participants were given a written copy of consent including the purpose and use of this study. Interviewers reviewed the contents of the consent aloud to additionally ensure participant understanding, and participants signed if they consented to participate. Participants were instructed to complete the PHBO survey and ask any questions they may have while completing it. One of two trained Master of Public Health student interviewers was present to individually record and answer questions asked during the PHBO survey. The time it took participants to complete the survey was recorded to the nearest minute using a watch or laptop clock. Additionally, the interviewer observed participants individually taking the survey to determine if they were completing it in a linear or nonlinear format (i.e., skipping questions or referring back to previous questions may signal confusion or lack of clarity).

After participants completed the survey on their own, cognitive interviews were individually conducted using a verbal probing technique. A set list of questions and probes were used to determine participants' understanding of the questions and to gather input on specific features of the survey such as photographs of food (Nápoles-Springer, Santoyo-Olsson, O'Brien, & Stewart, 2006). A standard interview question was, "How did you come up with an answer for this question?" followed by a potential probe such as, "Did you think about different ways that you drink milk?" Interviewers also spontaneously reworded probes to ensure the maximum amount of information was captured (Nápoles-Springer et al., 2006). Those conducting the cognitive

interviews typed participants' responses into a Word document on a laptop computer during the interview.

Data Analysis

The data from the cognitive interviews were qualitatively analyzed via Richard Krueger's Classic Analysis Strategy to identify response themes (Krueger & Casey, 2008). Using an Excel document with individual responses to each cognitive interview question, responses were then grouped into these themes: (a) accuracy in understanding question intent, (b) suggested changes to improve wording or visuals, and (c) applicability of PHBO question content to their diet (Krueger & Casey, 2008). These themes were further grouped into potential revisions to the PHBO survey questions. All responses were coded by the primary investigator and an additional investigator not involved in data collection to strengthen the integrity of the coding process. Due to the relative simplicity of responses, there were no discrepancies in coding between the primary and secondary coders.

Results

The self-reported demographics of participants in the cognitive interview process are listed in Table 2. The 42 interviews were included, with later interviews generating similar comments to earlier interviews and no new themes emerging. Ninety-eight percent of participants completed the 12 PHBO survey questions in a linear format in an average of 4 minutes (ranging from 2 to 10 minutes). Depending on the photograph, a majority of participants said the photographs of foods made it easier to answer questions. The only question where less than half (48%) of participants found the photographs helpful was on fortified orange juice. This was also a question where participants reported very low consumption and difficulty accurately describing what fortified meant, which potentially skewed the results. Some participants (42% for the calendar-like visual and 48% for the pie chart representation) thought that the frequency visuals made it easier to answer questions, with less than 10% indicating the frequency visuals made answering the question more difficult. Most of the participants were neutral about the helpfulness of the frequency pictures and stated they did not pay attention to them when answering the question. While, in general, participant responses were reflective of the aims of the PHBO question being asked and provided self-reflective responses about habits, they also offered many suggestions for improvements. Upon completing the survey, of the 18 participants who had closing overall comments on the PHBO survey, 17 had positive comments. One participant stated, "It was simple, to the point, comprehensive, and easy for a person to understand and answer."

Table 2. Demographics and Characteristics of Personal Health Behaviors Overview Cognitive Interviewees

Characteristics	n	%
Education		
Less than High School Diploma	7	16.7
High School Diploma or Equivalent	15	35.7
Some College	13	30.9
Associate's Degree	4	9.5
Bachelor's Degree	2	4.8
Unknown	1	2.4
Sex		
Female	30	71.4
Male	12	28.6
Ethnicity		
Hispanic or Latino/a	3	7.1
Non Hispanic or Non Latino/a	39	92.9
Race		
African American	11	26.2
Caucasian	24	57.1
Mixed Race	2	4.8
Other	2	4.8
Unknown	3	7.1
First Generation Immigrant		
Yes	2	4.8
No	40	95.2
First Language English		
Yes	41	97.6
No	1	2.4
Age		
Average Age, years	41.0	
Range, years	18-85	

The cognitive interview responses indicated that some participants did struggle with wording and photograph choices for some questions, as well as photograph placement within the survey. Table 3 outlines five common types of revision that arose during the cognitive interviews about the PHBO survey.

Table 3. Personal Health Behaviors Overview Question Content and Recommended Revision

Question Content (#)	Text Revision	Photo Revision	Equivalent Revision	Additional Questions	Remove
Key Message: Low-fat Dairy Consumption					
Fat content of dairy (#1)	Clarify if about milk or dairy	Change photo if on milk only			
Milk intake (#2)			Photos on same page		
Calcium-fortified orange juice intake (#3)					Low intake of "fortified"
Yogurt intake (#4)					Low intake
Cheese intake (#5)	Different wording for "ounce"	Different photo for ounce of cheese	Photos on same page		
Key Message: Nutrition Facts Panel					
Use of nutrition facts panel (#6)				Multiple needed on specifics	
Key Message: Whole Grain Food Consumption					
Whole grain bread intake (#7)	Determine if definition of whole grain affects results				
Whole grain foods intake (#8)	Determine if definition of whole grain affects results	Include more types whole grains			
Brown rice intake (#9)					Low intake
Key Message: Fruit and Vegetable Consumption					
Vegetable intake (#10)			Include a measuring cup	Test different questions	
Fruit intake (#11)			Include a measuring cup	Test different questions	
Key Message: Leisure Time Physical Activity					
Frequency of physical activity (#12)	Simplify reading level			Multiple needed on specifics	

One problem area was wording of some questions where participants stated they were confused on the topic, or their responses in the cognitive interview indicated lack of clarity because of the varied responses. Four participants suggested clarification as to whether they were supposed to respond only about milk or about the fat content of all dairy products in question 1 on the fat content of dairy. In the cognitive interview for PHBO question 9, participants were asked how they knew if something was whole wheat. Based on the diversity in responses, participants may not be accurately identifying whether they are consuming whole wheat products. One stated, "You can tell by the color, and the words on the package"; another stated, "I have been told to look at the label [and it should] not have enriched be part of the first few ingredients"; and yet another said, "The hulls have to be visible [in the product]."

Participants indicated that using different photographs or changing photograph content may be more helpful in clarifying the meaning of some of the difficult or misinterpreted questions. The picture of a cheese stick in question 5 about cheese intake confused a number of participants ($n = 7$) because they thought it looked like a stick of butter. They recommended changing the photo to improve the question.

Many of these comments were also related to the layout of the questions and food photographs to be used on that particular question. A variety of the questions were asking about specific quantities of foods consumed with equivalency pictures offered to give participants multiple visuals to use when determining an answer. During the interview process, participants noted that it would have been more beneficial for the equivalency photos to be provided on the same page as the question to which they referred. One participant was not sure what the equivalency pictures of measuring cups filled with milk were supposed to be used to answer. The question was on the subsequent page to the pictures due to limited space in formatting. During the analysis process, researchers also found an inconsistency with the questions on fruit and vegetable intake and the equivalency photos. They included photos of one serving of an apple, carrots, and a tomato but did not include an example of a 1-cup measuring cup containing fruits and/or vegetables the way other questions with equivalency photos did.

The interviewee responses also indicated that some of the questions may provide extremely broad types of information. For these questions, there may be different questions better suited to gather this information, or it may be beneficial to ascertain this information through multiple questions. When discussing question 6 about the use of a nutrition facts label, participants thought about different parts of a label. One participant said, "If there is any question about sugar or amount of ingredient, [then] I'm a label person," while another stated, "I never used to read it either. I look at certain things on the label like sodium and sugar to go for the healthier one." Although most participants said the pictures of the measuring cups, as well as the whole fruit and vegetable equivalents, made it easier to answer questions 10 and 11, participants' responses indicated they had a variety of ways to determine an answer for these questions. Some

determined their answers based on the number of times or meals where they ate fruits or vegetables, while others determined an answer based on the amount they prepared and ate.

Finally, the interviews also indicated some questions were not relevant to the current diets of the study participants. When asked how they came up with an answer to Question 3 on calcium-fortified orange juice intake, responses indicated that participants were reporting orange juice consumption, but they were not always aware of whether the orange juice was fortified. While some participants knew if their orange juice was fortified, under half of the participants ($n = 17$) stated the orange juice they purchase is fortified, while a number of participants ($n = 7$) stated they did not buy fortified orange juice. On question 4 and question 9, about yogurt and brown rice intake, respectively, there were no significant results, as most participants indicated they did not regularly or had never consumed these products.

Discussion

Based on the cognitive interview responses, participants reported liking this short, image-based survey and found it easy to complete. The short completion time and reported ease of completion indicate that the PHBO survey or a similar tool could be completed quickly in an adult classroom setting. Although this study took a sample of the SNAP-Ed population, which includes low-income and anecdotally lower-literacy populations, literacy of participating individuals was not specifically assessed. Based on the National Assessment of Adult Literacy, three out of four food stamp or SNAP recipients perform in the lowest two literacy levels (Begin to Read, n.d.). While the lowest literacy SNAP recipients may have chosen not to attend SNAP-Ed classes or participate in the survey, the sample of SNAP-Ed participants is likely to contain moderate- to low-literacy participants. Since participants were all able to complete the survey relatively quickly, it should be noted that participants were all likely able to read at least moderately well at a fifth-grade level as evidence by the reading level of the majority of the questions.

Participants' responses helped identify areas for improvement on each PHBO survey question to promote understanding of the intended meanings. For example, it became apparent in the cognitive interviews that participants had differing definitions of concepts, such as "physical activity" and "whole grains," that could impact the accuracy of responses. Similarly, some of these responses may have been related to limited knowledge of particular items as participants were recruited from a variety of classes and backgrounds. However, the questions are not aimed at determining a person's knowledge, but at determining his or her behaviors. If participants needed specific knowledge (i.e., a definition of whole grains) to answer a specific question, then that may not be appropriate for audiences coming from a variety of classes or curricula. The suggested revisions for each PHBO survey question based on responses that arose during the cognitive interview process are listed in Table 3.

As this was a limited formative evaluation study, the PHBO survey would benefit from additional research and revision. The revisions of these questions should include further formative evaluation and validation and will likely produce more accurate responses from participants. To address the key USDA nutrition guidelines, additional questions on alternative products should be tested (i.e., fortified soy milk or fortified cereals to assess calcium or oatmeal to assess whole grains). Further testing is also needed to look at alternative methods for frequency visuals to elicit a higher rate of use. Validation of survey results correlated to standard dietary assessment tools is needed, as well as a comparison of this style/format of assessment to similar types of assessment for specifically low-literacy populations. A wide variety of limited-resource Minnesotans was sampled in this study, but additional validation is needed. This would assure the usability, reliability, and cultural acceptance of the PHBO survey in other audiences. As very few picture-based dietary assessments have been tested or used, more testing is needed to ensure results are accurate. Specifically, more development is needed for these particular survey questions, but initial results show that this simple text- and visual-based assessment method could be a promising technique for further exploration.

Implications for Research and Practice

Findings from the cognitive interview development of the PHBO survey indicate that this innovative image-based technique is a potentially viable way to improve participants' acceptance and understanding of evaluation tools for community-based nutrition education efforts. With more research, the PHBO survey or similar image-based tools could be a quick and inexpensive strategy to assess specific dietary habits in limited-resource, limited-literacy populations. While not all results from the PHBO survey may be adopted in their current form, findings from this study will facilitate changes and adaptations, as these results indicate the use of photos and some graphics may improve survey understanding in this targeted population. Currently, the revised PHBO survey questions on fruits and vegetables are being retested for concurrent validity with other fruit and vegetable assessments, such as 24-hour dietary recalls.

More broadly, these findings have implications for community-based nutrition educators attempting to determine the most appropriate method of dietary assessment for their participants. While further validation is necessary, the simple, image-based question technique used in the PHBO survey could be a viable solution for assessing eating behaviors. These findings, as well as continued research in the area, will provide insight and examples for development of new nutrition and dietary assessment methods when addressing low-income populations. Research is needed to determine the validity of these specific questions and visuals, though. Image-based evaluations have the potential to make nutrition assessments more effective and efficient. With new and innovative assessment techniques, community nutrition educators will have more reliable evaluation data to inform their current and future practice.

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Acknowledgements

Personal Health and Finance Quiz:
A Tool for Outreach, Research, and Evaluation

Barbara O'Neill
Karen Ensle
Rutgers University

Rutgers Cooperative Extension developed an online self-assessment tool called the *Personal Health and Finance Quiz* available at http://njaes.rutgers.edu/money/health-finance-quiz/. Believed to be among the first public surveys to simultaneously query users about their health and personal finance practices, the quiz is part of *Small Steps to Health and Wealth™* (SSHW), a Cooperative Extension program developed to motivate Americans to take action to improve both their health and personal finances (see http://njaes.rutgers.edu/sshw/). Respondents indicate one of four frequencies for performance of 20 daily activities and receive a Health, Finance, and Total score indicating their frequency of performing activities that health and financial experts recommend. In addition to providing users with personalized feedback, the quiz collects data for research about the health and financial practices of Americans to inform future Extension outreach and can be used as a pre-/post-test to evaluate the impact of SSHW programs. Initial research analyses are planned for 2015.

Barbara O'Neill holds the rank of Distinguished Professor at Rutgers University and is Rutgers Cooperative Extension Specialist in Financial Resource Management. She has written over 125 articles for academic journals and conference proceedings and received over three dozen awards for program excellence. Direct correspondence to Barbara O'Neill at oneill@aesop.rutgers.edu

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The Journal of Human Sciences and Extension is published online three times a year in October, February, and June.

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ISSN

ISSN 2325-5226

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