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Measuring the Relationship between Agriculture Teachers' Self-Efficacy, Outcome Expectation, Interest, and their use of Interactive Whiteboards

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The purpose of this descriptive-correlational study was to examine the level of self-efficacy of Oklahoma secondary agricultural education teachers regarding their use of the interactive whiteboard (IWB) in classroom teaching. The study also sought to determine if relationships existed between teachers' IWB self-efficacy scores, outcome expectation scores, interest scores, and selected personal and professional characteristics. The findings of this study revealed that as age and years of teaching experience increased, levels of self-efficacy and outcome expectations decreased. Therefore, younger and less experienced teachers were more efficacious and had higher expectations regarding the use of IWBs. Further, this study showed that teachers who perceived they used IWBs more frequently demonstrated higher levels of self-efficacy and outcome expectation. Recommendations and implications point to the creation of professional development opportunities for digital immigrant *teachers to learn how to use IWBs more effectively and engage students better. In addition, future research should examine how* digital native *teachers are using IWBs as well as other interactive technologies they may be using in their classrooms.*

Keywords: self-efficacy; outcome expectation; interest; interactive whiteboards; agriculture teachers

Introduction

"Here and across the country, the traditional chalkboards that have been teachers' primary tool for presenting content for more than two centuries are quickly being erased from classrooms" (Manzo, 2010, para. 3). This phenomenon is due partly to meet the needs of the digital generation (Manzo, 2010). Students of today have changed drastically and are not the students our current educational system was intended to teach (Oblinger, 2003; Prensky, 2001; Tapscott, 1998). Contemporary students spend numerous hours interacting with computers, cellular phones, MP3 players, and a variety of other technologies (Bennett, Maton, & Kervin 2008; Prensky, 2001). As a result of this digital environment, and the absolute quantity of student interaction with technologies, students think and process information differently than previous generations (Brown, 2000; Frand, 2000; Prensky, 2001; Tapscott, 1999).

Prensky (2001) identified these modern day students as *digital natives* because students are *native speakers* of the *language* regarding digital technologies. Moreover, technological advances unfamiliar to prior generations of learners are routine with today's *computer savvy* generation (Bunch, Haynes, Ramsey, Edwards, & Robertson, 2010). Digital natives perceive that the educational system has brought in *outsiders* to instruct them. These students speak a *different language* than their pre-digital instructors (Prensky, 2001). Brown (2000) described this phenomenon as a shift in learning. He contributed this shift to differences in learning medium, i.e., Internet versus books. Digital natives have been engrossed with digital libraries and endless amounts of information via the Internet. As such, digital natives have also shifted from an authority-based learning style

(i.e., behaviorist) to a more discovery-based learning style (i.e., constructivist) (Brown). Digital natives favor learning through investigation and trial. This is contrary to their pre-digital instructors who have a propensity to be authority-based. Prensky defined *these pre-digital instructors* as *digital immigrants*. A digital immigrant is someone who was not immersed in the digital world while growing up but has taken up using some aspects of digital technologies later in life.

As instructors who are digital immigrants confront the challenges that accompany a *newfangled* generation of students, they must reevaluate their approaches to instruction and recognize practices that are pertinent to today's digital natives (McAlister, 2009). One technological advancement being used in today's classrooms is the Interactive Whiteboard (IWB). Lewin, Somekh, and Steadman (2008) described IWBs as oversized, touch screen whiteboards coupled to a classroom computer, which allow teachers to access motionless and moving imagery accompanied by sound. IWBs offer a multi-media approach that addresses the needs of entire classes or individual learners, and are being used to challenge students to think by using an assortment of stimuli (i.e., audio, visual, and kinesthetic; Glover, Miller, Averis, & Door, 2007). Haldane (2007) noted that several interactivities were observed when teachers used IWBs. These interactivities included,

> Verbal interpersonal [communication] between the pupils and their teacher; Visual interaction between the pupils and the pictorial symbols on the IWB; Cognitive interaction between the pictorial symbols on the IWB; Teacher interaction with the content (verbal and on the IWB) and the pupil responses; Interactions with the content via the technological facility of the medium zoom in, to move parts of a plant around, to illustrate points by introducing short animations showing how a shoot grows up and a root grows down. (p. 269)

To that end, Hodge and Anderson (2007) asserted that student engagement (interactivity) is a positive element of teachers using IWBs.

The use of IWBs in the agricultural education classroom, due to its potential for stimulating interactivity, can be associated with experiential learning. Rufus Stimson (1919) surmised that, "neither skill nor business ability can be learned from books alone, nor merely from observation of the work and management of others. Both require active participation during the learning period . . ." (p. 32). More recent, Roberts (2006) noted that experiential learning has been a hallmark of secondary agricultural education. So, can IWBs be used as a tool to enrich experiential learning in secondary agricultural education?

Few studies have examined how agricultural education teachers are incorporating technology into their pedagogical practices (Kotrlik, Redmann, & Douglas, 2003). Given that little research has been conducted on how teachers are using IWBs, especially in the agricultural education classroom, a study examining agricultural education teachers' use of IWBs was warranted (Bunch et al., 2010). In particular, studies to describe teachers' self-efficacy regarding their use of IWBs could add value to the scholarly literature with implications for teacher professional development.

Theoretical Framework

The theoretical framework undergirding this study was Bandura's (1977) self-efficacy theory. According to Bandura (1977), two main influences on human behavior operate concurrently: an individual's personal characteristics and his or her environment. How the two interact independently with an individual's behavior, and with one another, influences a person's future behavior choices (Bandura, 1986). To change a behavior, the person needs to believe he or she is capable of performing the desired change and concomitant action (Bandura, 1989). Bandura referred to this concept as self-efficacy. Bandura (1993) noted that efficacy influences the way in which individuals feel, think, are motivated, and behave. Further, Bandura (1997) asserted that perceived self-efficacy is an individual's belief in his or her ability to systematize and perform the sequence of actions necessary to complete a task or achieve an outcome.

In addition, Bandura (1977) described the concept of outcome expectancy as a person's belief that a specific behavior will presage a

definite outcome. Outcome expectations play a vital role in human motivation (Niederhauser & Perkman, 2008). If individuals do not believe their actions will have the preferred outcomes, they will be less likely to perform those actions (Pajares, 2006). Further, outcome expectations could make people maintain behaviors over time if they perceive their actions will produce the preferred outcome ultimately (Niederhauser & Perkman).

Self-efficacy and outcome expectations have a prevailing influence on interest (Lent et al., 2005; Smith, 2002). Demonstrations of interest replicate "a person's patterns of likes, dislikes, and indifferences regarding . . . career relevant activities" (as cited in Niederhauser & Perkman, 2008, p. 101). According to Bandura (1986), people build interests in which they believe themselves to be self-efficacious and envision more positive outcomes. Likewise, in a study conducted by Fouad and Smith (1996), interest was a significant mechanism in career psychology, and a strong predictor of intentions.

Based on Bandura's (1977) self-efficacy theory, Tschannen-Moran, Hoy, and Hoy (1998) defined teacher self-efficacy as "the teacher's belief in his or her capability to organize and execute courses of action required to successfully accomplish a specific teaching task in a particular context" (p. 233). In addition, the combination of a teachers' perceptions of his or her teaching capability and beliefs about the task requirements contribute to teacher efficacy (Tschannen-Moran et al., 1998). The authors also posited that higher levels of efficacy presages more effort and perseverance, resulting in higher efficacy levels, and lower efficacy foretells less effort and perseverance leading to lower efficacy levels and poor teaching outcomes. This "fulfilling" or concomitant nature of self-efficacy in teaching also has been found in agricultural education (Knobloch, 2001; Roberts, Harlin, & Briers, 2008; Roberts, Harlin, & Ricketts, 2006; Whittington, McConnell, & Knobloch, 2006). However, the amount of research featuring teacher self-efficacy and its relationship to teachers' use of educational technologies in agricultural education is limited.

Purpose and Objectives

The purpose of this descriptive-correlational study was to assess selected perceptions (i.e., level of self-efficacy, outcome expectation, and interest) of Oklahoma secondary agricultural education teachers regarding their use of the IWB in classroom teaching. The study also sought to determine if relationships existed between teachers' IWB self-efficacy scores, outcome expectation scores, interest scores, and selected personal and professional characteristics.

Four research questions guided this study: (a) What were the selected personal and professional characteristics of Oklahoma agricultural education teachers, e.g., age, years of teaching experience, access to IWBs, access to IT personnel, and frequency of IWB use?; (b) What were Oklahoma agricultural education teachers' levels of self-efficacy, outcome expectation, and interest regarding the use of IWBs?; (c) What relationships existed between Oklahoma agricultural education teachers' self-efficacy, outcome expectation, and interest?; (d) What selected relationships existed between Oklahoma agricultural education teachers' levels of self-efficacy, outcome expectation, interest, and selected personal and professional characteristics.

Methods

The study presented here was descriptive and correlational; its target population consisted of Oklahoma secondary agricultural education teachers (N = 437) during the 2010-2011 academic year. The study's sample (n = 205) was selected randomly from the target population (Krejcie & Morgan, 1970). Data were collected through an Internet questionnaire using the Tailored Design Method developed by Dillman, Smyth, and Christian (2009). This process included four contacts by electronic mail during the fall semester of the 2010-2011 academic year.

To address frame error, i.e., teachers no longer in the profession and teacher relocation, 18 participants were removed from the sample. In addition, 18 participants had unusable electronic mail addresses resulting in their removal from the sample. So, the initial 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. To ensure that results were representative of the target population, an independent samples *t*-test was used to compare early and late respondents (Lindner, Murphy, & Briers, 2001). The first one-half of respondents, as determined by the date of return of the instrument, were considered *early* and the later one-half of respondents formed the *late* group. Level of significance was set at $p < .05$ *a priori*. No statistically significant differences were found between early and late respondents for constructs representing the study's dependent variables (i.e., SE, OE, and INT; see Table 1). So, assuming the late respondents were similar to non-respondents, the results of this study were deemed representative of the target population regarding the variables of interest.

Table 1
Comparison of Early and Late Respondents Regarding Oklahoma Agricultural Education Teachers' Levels of Self-Efficacy, Outcome Expectation, and Interest

	Early Respondents		Late Respondents		
Construct	*M*	*SD*	*M*	*SD*	*p*-value
Self-Efficacy	3.85	.65	3.68	.87	.32
Outcome Expectation	3.79	.70	3.68	.73	.49
Interest	3.81	.60	3.66	.76	.33

Note. The *real limits* of the scale were 1.00 to 1.49 = *strongly disagree*, 1.50 to 2.49 = *disagree*, 2.50 to 3.49 = *neutral*, 3.50 to 4.49 = *agree*, and 4.50 to 5.00 = *strongly agree.*

Instrumentation

The Interpersonal Technology Integration Scale (ITIS) developed by Niederhauser and Perkmen (2008) was used in this study. The 21-item ITIS asked teachers to signify their level of agreement with each statement using a five-point, summated-rating scale: 1 = *strongly disagree*, 2 = *disagree*, 3 = *neutral*, 4 = *agree*, and 5 = *strongly agree*. The *real limits* of the scale were 1.00 to 1.49 = *strongly disagree*, 1.50 to 2.49 = *disagree*, 2.50 to 3.49 = *neutral*, 3.50 to 4.49 = *agree*, and 4.50 to 5.00 = *strongly agree.* The ITIS consisted of three constructs: Self-Efficacy (SE) to determine teachers' confidence for using IWBs (six items); Outcome Expectation (OE) to determine teachers' expected benefits from using IWBs (nine items); and Interest (INT) to determine teachers' interest in using IWBs (six items).

The ITIS was adjusted to meet the objectives of this study. Items were combined into a single instrument, which employed a five-point, summated-rating scale. Additionally, 18 professional and personal characteristics questions were added to describe the sample and make selected correlational analyses possible. The instrument was reviewed by a panel of four agricultural education experts at Oklahoma State University to establish content and face validity. Per the recommendations of the panel, minor revisions were made to the final instrument. The ITIS was then pilot-tested with 36 Oklahoma agricultural education teachers to determine reliability estimates by construct. Reliability analysis of the pilot instrument yielded acceptable Cronbach's alpha coefficients for the three constructs: SE = 0.93; OE = 0.91; INT = 0.89.

Data Analysis

The data collected were analyzed using SPSS® version 17.0 for Windows™. Responses were coded for computer analysis. Research objectives one and two were analyzed using descriptive statistics (i.e., frequencies, percentages, means, and standard deviations). Research objectives three and four were achieved by computing Spearman rho and Pearson product-moment correlation coefficients, where appropriate. According to Ary, Jacobs, and Razavieh (2002), Pearson *r* offers a significant index for demonstrating relationships. The strength of relationships was described using Davis' (1971) coefficient conventions: $.01 \geq r \geq .09$ = *Negligible*, $.10 \geq r \geq$

.29 = *Low*, .30 ≥ *r* ≥ .49 = *Moderate*, .50 ≥ *r* ≥ .69 = *Substantial*, and *r* ≥ .70 = *Very Strong*.

Findings/Results

Research question one sought to describe selected personal and professional characteristics of Oklahoma agricultural education teachers. Seventy-three (90.1%) of the participants were male, eight (6.2%) were female, and three (3.7%) failed to respond (see Table 2). Five (6.2%) of the teachers were between 21 and 25 years of age, 18 (22.2%) of the respondents were between 26 and 30 years of age, 12 (14.8%) were between 31 and 35 years of age, and 14 (17.3%) were 51 years of age or older.

Regarding level of education attainment, a majority (70.4%) of the participants had earned a bachelor's degree only, and nearly one-fourth (24.7%) had earned a master's degree (see Table 2). Concerning years of teaching experience, 21 (25.9%) of the respondents indicated they had zero to five years of teaching experience, 16 (19.8%) had taught 11 to 15 years, and 14 (17.3%) had taught 6 to 10 years. Seventy-four teachers (91.4%) had received traditional teaching certification, and five (6.2%) indicated they had received their teaching certification via an alternative route. As for the size of school, most of the respondents indicated they were employed at either 1A schools (150 to 199 students), 2A schools (200 to 320 students), or B schools (86 to 149 students). The class size with the fewest respondents was class 5A (688 to 1242 students), where only two teachers (2.5%) reported being employed (see Table 2).

In all, 59 (72.8%) participants indicated having access to IWBs. Thirty-three (40.7%) participants reported having "full access" to school-employed IT personnel, 30 (37%) indicated having access to school-employed IT personnel "sometimes," and 10 teachers (12.3%) had no access to school-employed IT personnel (see Table 2).

Table 2
Selected Characteristics of *Oklahoma Agricultural Education Teachers* (*n* = 81)

Variable		*f*	%
Age	21 to 25 years	5	6.2
	26 to 30 years	18	22.2
	31 to 35 years	12	14.8
	36 to 40 years	11	13.6
	41 to 45 years	7	8.6
	46 to 50 years	11	13.6
	51 or older	14	17.3
	No Response	3	3.7
Gender	Male	73	90.1
	Female	5	6.2
	No Response	3	3.7
Highest level of educational attainment	Bachelor's	57	70.4
	Master's	20	24.7
	Education Specialist	1	1.2
	Doctorate	1	1.2
	No Response	2	2.5

Table 2 Continued

Years of teaching experience	0 to 5 years	21	25.9
	6 to 10 years	14	17.3
	11 to 15 years	16	19.8
	16 to 20 years	4	4.9
	21 to 25 years	6	7.4
	26 to 30 years	12	14.8
	31 or more years	4	4.9
	No Response	4	4.9
Teaching certification type	Traditional	74	91.4
	Alternative	5	6.2
	No Response	2	2.5
School size	Class C = < 86 students	4	4.9
	Class B = 86 to149 students	17	21.0
	Class 1A = 150 to 199 students	18	22.2
	Class 2A = 200 to 320 students	16	19.8
	Class 3A = 321 to 482 students	7	8.6
	Class 4A = 483 to 687 students	7	8.6
	Class 5A = 688 to 1242 students	2	2.5
	Class 6A = 1243 to 4461 students	8	9.9
	No Response	2	2.5
Access to IWBs	Yes	59	72.8
	No	21	25.9
	No Response	1	1.2
Access to School-Employed IT	Yes	33	40.7
	Sometimes	30	37.0
	No	10	12.3
	No Response	8	9.9
IWB Use per Week	0 to 5 times per week	17	21.0
	6 to 10 times per week	19	23.5
	11 to 15 times per week	14	17.3
	16 to 20 times per week	10	12.3
	21 to 25 times per week	6	7.4
	26 to 30 times per week	1	1.2
	30 or more times per week	2	2.5
	No response	12	14.8

Research question two sought to describe Oklahoma agricultural education teachers' level of self-efficacy, outcome expectation, and interest regarding the use of IWBs. Data are reported using summated means by item and construct (see Table 3).

Table 3
Oklahoma Agricultural Education Teachers' Level of Self-Efficacy, Outcome Expectation, and Interest Regarding the Use of IWBs (n = 81)

Item	*M*	*SD*
Construct 1: Self-Efficacy		
I feel confident that I can regularly incorporate appropriate IWBs into my lessons to enhance student learning.	3.93	.83
I feel confident that I can teach relevant subject matter with appropriate use of IWBs.	3.90	.88
I feel confident that I can effectively use IWBs in my teaching.	3.89	.82
I feel confident that I can select appropriate IWBs for instruction based on curriculum standards–based pedagogy.	3.74	.95
I feel confident that I have the necessary skills to use IWBs for instruction.	3.62	.92
I feel confident that I can help students when they have difficulty with IWBs.	3.49	.94
Composite Mean	3.76	.76
Construct 2: Outcome Expectation		
Using IWBs in the classroom will increase my effectiveness as a teacher.	4.17	.83
Using IWBs in the classroom will make my teaching more exciting.	4.11	1.00
Using IWBs in the classroom will increase my productivity.	4.02	.88
Using IWBs in the classroom will make it easier for me to teach.	3.99	.92
Using IWBs in the classroom will make my teaching more satisfying.	3.93	.83
Effectively using IWBs in the classroom will increase my sense of accomplishment.	3.60	.90
Effectively using IWBs in the classroom will increase my colleagues' respect of my teaching ability.	3.30	.99
My colleagues will see me as competent if I effectively use IWBs in the classroom.	3.25	1.00
Effectively using IWBs in the classroom will increase my status among my colleagues.	3.23	.94
Composite Mean	3.73	.72
Construct 3: Interest		
I am interested in learning about new educational software.	4.11	.76
I am interested in working with IWB tools.	4.07	.70
I have an interest in attending IWB workshops during my teaching career.	3.88	.87
I have an interest in listening to a famous instructional technologist speaking about effective use of IWBs.	3.74	.95
I have an interest in working on a project involving IWB concepts.	3.47	.88
I have an interest in reading articles or books about IWBs.	3.16	.94
Composite Mean	3.74	.68

When self-efficacy items were analyzed, respondents *agreed* that they were confident incorporating IWBs appropriately into lessons to enhance student learning (M = 3.93, SD = .83), and the respondents *agreed* they were confident teaching relevant subject matter with appropriate use of IWBs (M = 3.90, SD = .88) (see Table 3). In addition, the respondents *agreed* they could use IWBs effectively in their teaching (M = 3.89, SD = .82). The respondents reported having the lowest level of agreement in being confident about helping students when they have difficulties with IWBs (M = 3.49, SD = .94). In addition, responses to all self-efficacy items

were summed and averaged to yield an overall self-efficacy score of 3.76 (*SD* = .76), indicating that the teachers *agreed* to being self-efficacious at using IWBs (see Table 3).

As for teachers' levels of agreement regarding outcome expectation, the respondents rated the item, *using IWBs in the classroom will increase their effectiveness as a teacher*, highest (*M* = 4.17, *SD* = .83) (see Table 3). The teachers expressed the second highest level of agreement with the item, *using IWBs in the classroom will make their teaching more exciting* (*M* = 4.11, *SD* = 1.00), and the third highest level of agreement was with the item, *using IWBs in the classroom will increase my productivity* (*M* = 4.02, *SD* = .88). However, the respondents were neutral regarding the item, *effectively using IWBs in the classroom will increase their status among colleagues* (*M* = 3.23, *SD* = .94). The responses to all outcome expectation items were summed and averaged, which yielded an overall outcome expectation score of 3.73 (*SD* = .72), indicating the teachers agreed that using IWBs would result in the learning outcome they intended to attain (see Table 3).

Regarding interest, the respondents' highest levels of agreement were with the items, *I am interested in learning about new educational software* (*M* = 4.11, *SD* = .76), and *I am interested in working with IWB tools* (*M* = 4.07, *SD* = .70) (see Table 3). The respondents indicated they were least interested in the item, *I have an interest in reading articles or books about IWBs* (*M* = 3.16, *SD* = .94). The responses to all interest items were summed and averaged, which yielded an overall interest score of 3.74 (*SD* = .68), indicating the teachers agreed that they were interested in using IWBs in their classroom teaching (see Table 3).

Research question three sought to describe selected relationships between Oklahoma agricultural education teachers' self-efficacy, outcome expectation, and interest regarding the use of IWBs. Outcome expectation and interest were related moderately and positively (r = .61), and had the highest correlation coefficient for the associations measured (see Table 4).

In addition, teachers' self-efficacy and outcome expectation regarding their use of IWBs was also related moderately and positively (r = .54). Teachers' self-efficacy and interest regarding IWB use revealed a low and positive relationship (r = .26) (see Table 4).

Table 4
Relationships[a] *between Oklahoma Teachers' Self-Efficacy, Outcome Expectation, and Interest Regarding Use of IWBs* (*n* = 81)

Construct	Outcome Expectation	Interest
Self-efficacy	.54*	.26*
Outcome Expectation		.61*

Note. [a]Pearson-product moment correlation coefficient; *p < .05

Research question four sought to describe relationships between Oklahoma agricultural education teachers' levels of self-efficacy, outcome expectation, and interest with selected personal and professional characteristics (i.e., age, years of completed teaching experience, size of school where employed, access to IWBs, access to school-employed IT personnel, and frequency of IWB use per week).

The analyses revealed that teachers' age, years of teaching experience, and size of school all had inverse relationships with the variables self-efficacy, outcome expectation, and interest (see Table 5). However, only the relationships between age, years of teaching experience, self-efficacy, and outcome expectation were statistically significant (p < .05). Self-efficacy and outcome expectation had a low and negative relationship with teacher age (r_s = -.29). Self-efficacy (r_s = -.26) and outcome expectation (r_s = -.24) both demonstrated a negative and low relationship with a respondent's years of teaching experience (see Table 5). The teachers who were younger and had fewer years of teaching experience perceived they were more efficacious regarding their use of IWBs and held a higher outcome expectation for that practice.

Table 5
Relationships[a] *between Oklahoma Teachers' Self-Efficacy, Outcome Expectation, Interest and Their Age, Years of Teaching Experience, and Size of School* (*n* = 81)

Construct	Age	Year of Teaching Experience	Size of School
Self-Efficacy	-.29*	-.26*	-.11
Outcome Expectation	-.29*	-.24*	-.09
Interest	-.09	-.11	-.13

Note. [a]Spearman rho correlation coefficient; *$p < .05$

In addition, teacher self-efficacy was found to be related moderately and positively with their access to IWBs (r_s = .32), access to IT personnel (r_s = .46), and IWB use per week (r_s = .42) (see Table 6). The variable "outcome expectation" had a low and positive relationship with teachers' access to IT personnel (r_s = .25) and their IWB use per week (r_s = .23). However, teacher interest was not related significantly with the variables measured. The variable *self-efficacy* and *access to IT personnel* revealed the strongest relationship (r_s = .46) (see Table 6).

Table 6
Relationships[a] *between Oklahoma Teachers' Self-Efficacy, Outcome Expectation, Interest with Their Access to IWBs, Access to School-Employed IT Personnel, and Frequency of IWB Use per Week* (*n* = 81)

Construct	Access to IWBs	Access to IT Personnel	IWB Use per Week
Self-Efficacy	.32*	.46*	.42*
Outcome Expectation	.16	.25*	.23*
Interest	-.06	-.02	.15

Note. [a]Spearman rho Correlation Coefficient; *$p < .05$

Conclusions

The most frequent age category reported by the respondents was 26 to 30 years. As such, it can be concluded that the teachers in this group were born between 1980 and 1984. According to Bennett, Maton, and Kervin (2008), individuals born during or after 1980 are considered digital natives who prefer to use digital technology. Of the 81 respondents involved in this study, more than 90% were male. This finding is consistent with the Oklahoma agricultural education teacher population (G. Shoulders, personal communication, September 22, 2010). A majority of teachers had taught between zero (i.e., a first year teacher) and 15 years, and 63% were employed at smaller, more rural schools, ranging from class C (< 86 students) to class 2A (200 to 320 students). Nearly, three-fourths of the respondents had access to IWBs, and almost 80% had access to school-employed IT personnel at least *sometimes* (see Table 2).

This study revealed the responding teachers were confident using IWBs to teach and they perceived that IWBs enhanced student learning. In addition, the teachers indicated that IWBs made them more effective and their teaching more exciting. The findings also revealed teachers had an interest in learning about other educational technologies.

Small differences existed in the composite mean scores for the study's major constructs. The teachers *agreed* with the self-efficacy items (*M* = 3.76) regarding their use of IWBs. Teachers also "agreed" that IWBs would assist them in obtaining their outcome expectations regarding its use (*M* = 3.73). Finally, the teachers *agreed* that they were interested in IWBs (*M* = 3.74).

The findings of this study suggest that as a teacher's age and years of teaching experience increased, his or her levels of self-efficacy and outcome expectation regarding IWB use decreased. Therefore, younger and less experienced teachers were more efficacious and had higher expectations regarding their use of

IWBs. This finding resonates with research by Prensky (2001) who claimed that most teachers, i.e., those who are older and more experienced, are digital immigrants and lack technological confidence. In addition, teachers who had access to IWBs agreed they were more efficacious because of opportunities to practice using the IWB. This finding is consistent with Bandura's (1977) self-efficacy theory, which posits the more an individual attempts a task, the more self-efficacious that person becomes regarding the behavior.

Further, this study showed that teachers who used IWBs more frequently perceived they held higher levels of self-efficacy and outcome expectation. This finding also supports research by Bandura (1989) who stated that to change a behavior (i.e., increased use of IWBs), an individual must believe he or she is capable of performing the task. In addition, this finding supports research by Pajares (2006) who claimed that if an individual perceives his or her actions will result in the preferred outcome, he or she is more likely to perform said actions. It should be noted that teacher interest was not found to be related significantly with any of the selected personal and professional characteristics tested. This finding contradicts research by Lent et al. (2005) and Smith (2002) who stated that self-efficacy and outcome expectation is likely to influence an individual's interest significantly.

Discussion and Implications

This study found two distinct teacher groups: digital immigrant teachers and digital native teachers. In terms of respondents, 72% were considered digital immigrants and 28% were digital natives. Teachers' ages and years of teaching experience were related negatively to outcome expectation for using IWBs. Further, it can be implied that because these veteran teachers are pre-digital (Prensky, 2001), it will take them longer to develop confidence in using IWBs, teaching with IWBs, and perceiving the relevance of IWBs, as indicated by their lower self-efficacy scores. Although the more experienced teachers did not use IWBs as frequently as less experienced teachers, Prensky (2001) noted digital immigrants used some aspects of digital technologies. The findings of this study supported Bandura's (1977) self-efficacy theory which posits the more an individual attempts a task the more self-efficacious that person becomes.

Further, according to Bandura (1986), people develop interest in tasks for which they believe themselves to be efficacious. However, this study did not support that contention: Why is that? Teachers indicated having the highest level of agreement in learning about new educational technologies. So, could it be they have lost interest in using IWBs because new classroom technologies have been implemented? Or, could it be that IWBs are less novel than they once were, considering 73% of the teachers indicated having access to them (see Table 2).

Recommendations for Practice

Professional development opportunities should be created for teachers to learn how to use IWBs effectively to engage students better. In addition, providers of professional development should consider delivering workshops or in-service sessions designed to meet the needs of the two teacher groups: digital natives and digital immigrants. Opportunities should also exist in which digital native and digital immigrant teachers could be paired together to develop a Community of Practice (CoP) (Lave & Wenger, 1991). For example, a CoP devoted to learning about the use of IWBs and other instructional technologies could be formed. Teacher educators might consider using digital immigrants as cooperating teachers during the student teaching internship. Student teachers who are confident using IWBs could be placed purposefully with digital immigrant cooperators to create an environment where IWBs are used more frequently (Understandably, teacher educators must consider other important variables regarding a student teacher's placement, and, in some cases, a potential cooperator may excel the intern in his or her instructional technology acumen.).

Recommendations for Future Research

Future research should be conducted to determine which interactive technologies experienced and early-career teachers are using in their classrooms. This would provide insight on these teachers' needs regarding their use of instructional technologies. For example, are

younger, less experienced teachers using IWBs in behavioral or constructivist ways (Brown, 2002)? In addition, future research should examine teachers' different types of interest more thoroughly in regard to an array of educational technologies, including IWBs. Finally, future inquires should be conducted to determine how the use of IWBs and other educational technology affects student learning and achievement in secondary agricultural education.

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