

4-2013

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### Recommended Citation

Wohleb, Elisha C. and Pritchett, Chistal C. (2013) "Skill level of Web 2.0 technology applications of certified educators and the link to ISTE/NETS Standards," *International Journal for Business Education*: Vol. 153: No. 1, Article 5.

DOI: 10.30707/IJBE153.1.1648133795.829857

Available at: <https://ir.library.illinoisstate.edu/ijbe/vol153/iss1/5>

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# SKILL LEVEL OF WEB 2.0 TECHNOLOGY APPLICATIONS OF CERTIFIED EDUCATORS AND THE LINK TO ISTE/NETS STANDARDS



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## Abstract

The research study was designed to examine the degree of perceived skill level of utilizing Web 2.0 technology applications among certified education professionals. In addition, this research study was designed to examine differences among various groups as well as reasons for these differences. Furthermore, the Web 2.0 applications presented in the survey were linked to the International Society for Technology in Education's National Educational Technology Standards and presented to participants to increase knowledge of Web 2.0 technology applications. The population included all certified education personnel at 34 schools. The perceived skill level of business educators as compared to all educators was significant and the overall sum score mean was one of the highest reported in this study. All educators reported a higher skill level for events and social networks. Business educators perceived a higher skill level for cloud computing; whereas cloud computing was a reported lower skill level for overall certified participants.

## Introduction and Background Information

Web 2.0 can be described as an array of socially oriented Web-based tools that are free, or nearly free, and has led a movement from institutionally provided to freely available technology tools (Diaz, 2010). Web 2.0 has grown into the phenomenon of the 21st century. Educators have the accessibility to utilize interactive tools, but do they? The International Society for Technology in Education (ISTE) promotes the effective integration of technology by teachers, students, and administrators. ISTE is a not-for-profit organization devoted to supporting the use of information technology to assist in

improving teaching and learning of K-12 students and teacher education (International Society for Technology in Education [ISTE], 1997). The main goal of ISTE was to develop national standards for educational uses of technology to enhance educational and literacy improvements in school (Lam, 2007).

Ertmer and Ottenbreit-Leftwich (2010) suggested that professionals of the 21st century have a different philosophy than those in previous centuries, partly due to the many different technology tools used to perform their jobs. Technology has changed our society, and educators need to reflect this change in their classrooms. In today's world, educators must commit to being life-long learners and embrace technology and the rapidly changing technological environment. Our responsibility as educators is to prepare our students to thrive in the world when they leave our classrooms. Utilizing technology and having appropriate skills to integrate this technology will allow our students to succeed in any environment.

### **Statement of the Problem/Purpose of the Study**

The purpose of this research study was to examine the degree of perceived skill level among certified education professionals when utilizing Web 2.0 technology applications. This study also linked those applications with the International Society for Technology in Education's National Educational Technology Standards (ISTE-NETS) and was presented to participants to increase knowledge of Web 2.0 technology applications. Furthermore, this study researched if there was a significant difference between the groups based on demographic data. The research problem of this study was to determine the degree of perceived skill level of Web 2.0 technology applications by certified education professionals and examine differences, if any, among various groups.

### **Research Questions**

1. To what degree do certified education professionals, including business educators, perceive their skill level of interactive online technology applications?
2. To what extent are there statistical differences in the skill level of Web 2.0 applications among all sub groups (certification areas) of education professionals?
3. What are the differences among various demographic groups in relation to their skill level of interactive online technology tools?
4. To what degree do school administrators implement and model the use of technology based on technology standards?

### **Review of Related Literature**

Solomon and Schrum (2007) discussed that in the beginning of the 21st century, the Internet transitioned from linking and clicking to creating and sharing. This

transformation was designated as Web 2.0 in which the user can not only research information, but can also create and share thoughts and ideas. Asselin and Moayeri (2011) suggested that many of our youth are utilizing interactive web, or Web 2.0, in their everyday lives. Education professionals should also commit to learning and utilizing Web 2.0 technologies to increase their skill level. Hosler and Meggison (2008) reported that business education has evolved from a discipline that taught typewriting, shorthand, and bookkeeping at the secondary level in the 20th century to a multi-level discipline that embraces technology beginning at the elementary school level in the 21st century. Bruett (2006) suggested that it is vital that teachers utilize technology in the classroom to prepare students to be competitive in the global economy, an economy that would not be possible without current technology.

Brush, Glazewski, and Khe Foon (2008) suggested that “specific technology skills have been identified as a major factor affecting the integration of technology” (p. 114). The lack of technology skills results in teachers not integrating technology, and teachers with technology skills are more likely to integrate technology. Hur (2011) suggested that there are many educational benefits to integrating Web 2.0 technology into the classroom, which indicates a critical need for educating teachers on how to integrate this technology effectively. Holden and Rada (2011) identified that “user acceptance, satisfaction, and perceived usability of innovative technologies are crucial to the diffusion of those technologies” (p. 343). The interactive 21st century demands that educators have the skill level, knowledge, and ability to effectively implement these technologies into their teaching practices.

## **Methods and Procedures**

### ***Participants***

Superintendents and/or school principals from various school systems across a state in the southeast were contacted to obtain permission to survey participants during faculty/in-service meetings at the beginning of the school year. Upon granted permission, a survey administrator attended in-service sessions at designated school systems. The survey administrator was provided by the research team in this study. The population for this study included all certified education personnel at each of the participating schools. A brief introduction/overview of the research was provided to participants. By completing the survey and returning to the researcher, respondents were granting their consent. All surveys (842) were returned to the researchers and entered for data analysis. Technology training and professional development in the area of implementing Web 2.0 tools in the classroom as well as linking those Web 2.0 tools to the ISTE-NETS standards were provided to participating schools and school systems. The technology training was individualized based on the results of their data by the researchers who conducted this study.

### ***Research Design***

A quantitative survey instrument, Interactive Technology Applications Survey, was developed by the researchers in this study to gather demographic information and data

from certified education professionals in regards to their perceptions about Web 2.0 applications. The basis for the items on the survey was derived from the review of literature and the research objectives of this study. To ensure the validity of the scores and the usability of the survey instrument, a panel of expert university faculty members was asked to evaluate the content. Panel comments, input and recommendations were considered and incorporated into the final instrument. Cronbach's alpha was calculated to measure homogeneity of items. The coefficient alpha of .938 among the 13 items assessing participants' skill level of Web 2.0 applications indicated very high instrument reliability.

The respondents were asked various demographic and background questions in the first section of the survey instrument. Next, participants were asked to rate their skill level of Web 2.0 technology applications using the following four-point Likert-type scale, with 1 = No Skill, 2 = Low Level of Skill, 3 = Moderate Level of Skill, and 4 = High Level of Skill. Finally, participants were asked to rank their administrator's implementation of technology standards in the last section of the survey. The review of current literature provided a basis for topics that were evaluated in the survey.

## **Data Analysis, Findings and Results**

Descriptive statistics were used to organize, summarize and describe collected data. Analysis of variance (ANOVA), t-test and Pearson product-moment correlation were the statistical procedures used to examine the data.

Eight hundred forty-two (N=842) education professionals participated in this study. Of the respondents who completed the survey, the majority 749 (89%) were teachers; 37 (4.4%) were administrators; 23 (2.7%) were counselors and 33 (3.9%) were media specialists. The education professionals included in this study were certified in the following areas: administration (n=69); language arts (n=157); counseling (n=24); career and technical (n=47); business (n=25); elementary (n=377); math (n=131); PE/health (n=68); social studies (n=135); science (n=129) special needs (n=85); foreign language (n=9) and fine arts (n=26). Of the population that participated in the study, 168 (20%) were male and 673 (80%) were female. Thirty-four schools within seven school systems in one state in the southeastern United States were included in this research study.

**Research Question 1:** To what degree do certified education professionals, including business educators, perceive their skill level of interactive online technology applications?

The participants were asked to rank their perceived skill level of 13 categories of Web 2.0 technology applications using the following four-point Likert-type scale: (1) No Skill; (2) Low Level of Skill; (3) Moderate Level of Skill and (4) High Level of Skill. Business educators felt they had the highest skill level with events, social networks, and cloud computing; whereas, they reported the lowest skill level with social bookmarks, blogs, and podcasts. Overall, certified education professionals reported the highest skill level with events, social networks, social news networks, and music; while, they indicated the lowest skill level with social bookmarks, cloud computing, and podcasts. Table 1 reflects

the percentages of degrees of participants' perceived importance of Web 2.0 applications as reported by all educators in this research study.

Table 1.

*Percentages of Perceived Skill Level of Web 2.0 Technology Applications*

Web 2.0 Application <sup>a</sup>	High Level (%)	Moderate Level (%)	Low Level (%)	No Skill (%)
Blogs	8.0	34.6	34.4	23.0
Cloud Computing	9.3	29.7	31.8	29.2
Events	18.2	46.7	24.0	11.1
Music	18.2	39.6	28.7	13.5
Pictures	15.2	40.3	28.5	16.0
Podcasts	10.5	30.8	33.8	24.9
Question/Reviews/Ratings/Polling/Surveys	11.2	37.0	32.9	18.9
Social Bookmarks	7.9	27.3	35.1	29.7
Social Networks	23.3	38.7	24.1	13.9
Social News Networks	19.7	38.7	28.0	13.6
Video Sharing	12.4	34.4	32.6	20.6
Virtual Learning Network	13.6	32.6	32.3	21.5
Wiki	13.1	31.2	32.3	23.4

<sup>a</sup>  $n = 842$  for each Web 2.0 Application.

**Research Question 2:** To what extent are there statistical differences in the skill level of Web 2.0 applications among all sub groups (certification areas) of education professionals?

A Pearson product-moment correlation design was utilized for each of the 13 Web 2.0 applications and the 13 different certification areas of education professionals. A significant positive relationship was indicated between business educators and cloud computing [ $r(841) = .139, p < .01$ ]; events [ $r(841) = .084, p < .05$ ]; podcasts [ $r(841) = .070, p < .05$ ]; virtual learning network [ $r(841) = .090, p < .01$ ]; and wiki [ $r(841) = .077, p < .05$ ]. A significant positive relationship was indicated between career and technical educators and cloud computing [ $r(842) = .084, p < .05$ ]. A significant positive relationship was indicated between language arts educators and music [ $r(842) = .070, p < .05$ ]; social networks [ $r(842) = .075, p < .05$ ]; video sharing [ $r(842) = .072, p < .05$ ]; and virtual learning networks [ $r(842) = .091, p < .01$ ]. A significant positive relationship was indicated between special needs educators and social news networks [ $r(841) = .077, p < .05$ ]. A significant positive relationship was indicated between foreign language educators and pictures [ $r(842) = .077, p < .05$ ]; podcasts [ $r(842) = .072, p < .05$ ]; social networks [ $r(842) = .068, p < .05$ ]; and video sharing [ $r(842) = .071, p < .05$ ]. A significant negative relationship was indicated between physical/health educators and blogs [ $r(842) = -.069, p < .05$ ]; music [ $r(842) = -.083, p < .05$ ]; pictures [ $r(842) = -.081, p < .05$ ];

reviews/polling/surveys [ $r(842) = -.068, p < .05$ ]; social networks [ $r(842) = -.110, p < .01$ ]; social news network [ $r(842) = -.103, p < .01$ ]; video sharing [ $r(842) = -.079, p < .05$ ]; and virtual learning networks [ $r(842) = -.088, p < .01$ ].

A sum score was calculated for the overall perceived level of skill as ranked by all certified education professionals. The overall sum score could range from 13 to 52. An ANOVA was conducted and found that the overall sum score for the perceived level of skill for the Web 2.0 applications by business educators as compared to all educators was significant at the .05 level,  $F(1, 841) = 6.024, p = .014$ ; by foreign language educators as compared to all educators was significant at the .05 level,  $F(1, 842) = 4.082, p = .044$ ; and by physical/health educators as compared to all educators was significant at the .05 level,  $F(1, 842) = 6.521, p = .011$ .

The overall sum score for perceived level of skill for the Web 2.0 technology applications by administrators as compared to all educators was analyzed utilizing an ANOVA design and was not significant at the .05 level,  $F(1, 842) = .220, p = .639$ ; by counselors as compared to all educators was analyzed utilizing an ANOVA design and was not significant at the .05 level,  $F(1, 842) = .466, p = .495$ ; by career and technical educators as compared to all educators was analyzed utilizing an ANOVA design and was not significant at the .05 level,  $F(1, 842) = 1.639, p = .201$ ; by elementary educators as compared to all educators was analyzed utilizing an ANOVA design and was not significant at the .05 level,  $F(1, 842) = .232, p = .630$ ; by math educators as compared to all educators was analyzed utilizing an ANOVA design and was not significant at the .05 level,  $F(1, 842) = .085, p = .771$ ; by language arts educators as compared to all educators was analyzed utilizing an ANOVA design and was not significant at the .05 level,  $F(1, 842) = 2.626, p = .105$ ; by social studies educators as compared to all educators was analyzed utilizing an ANOVA design and was not significant at the .05 level,  $F(1, 840) = .025, p = .874$ ; by special needs educators as compared to all educators was analyzed utilizing an ANOVA design and was not significant at the .05 level,  $F(1, 841) = .722, p = .396$ ; by science educators as compared to all educators was analyzed utilizing an ANOVA design and was not significant at the .05 level,  $F(1, 842) = .445, p = .505$ ; and by fine arts educators as compared to all educators was analyzed utilizing an ANOVA design and was not significant at the .05 level,  $F(1, 841) = .010, p = .922$ . No further tests were necessary. The means and standard deviations of perceived skill level of Web 2.0 technology applications for all educators and for all sub groups (certification areas) are reported in Table 2.

Table 2

*Mean and Standard Deviation for Perceived Skill Level of Web 2.0 Technology Applications (Sum Score)*

Educator	<i>n</i>	<i>M</i> <sup>a</sup>	<i>SD</i>
Foreign Language Educators	9	37.67	7.416
Business Educators	25	35.72	10.922
Career & Technical Educators	47	32.55	10.622
Language Arts Educators	157	31.87	10.028
Special Needs Educators	85	31.56	9.301
Administrators	69	31.22	9.933
Science Educators	129	31.22	10.596
Social Studies Educators	135	30.77	10.258
All Educators	842	30.65	10.494
Elementary Educators	377	30.46	9.793
Fine Arts Educators	26	30.46	10.085
Math Educators	131	30.40	10.345
Counselors	24	29.21	10.608
Physical/Health Educators	68	27.54	11.020

<sup>a</sup> Means are based on the sum score for perceived skill level of the 13 categories of Web 2.0 applications and could range from 13-52.

**Research Question 3:** What are the differences among various demographic groups in relation to their skill level of interactive online technology tools?

The overall sum score for the perceived level of skill of the 13 Web 2.0 applications was compared to various demographic groups. An analysis of variance (ANOVA), t-test, or Pearson product-moment correlation was conducted to find the subsequent results. With an alpha level of .05, type of school (city, county) [ $t(840) = 3.599, p < .001$ ]; title I school (yes, no) [ $t(840) = 2.847, p = .005$ ]; years in education [ $r(828) = -.313, p < .001$ ]; and age [ $r(797) = -.356, p < .001$ ] were all significant. However, current position (administrator, teacher, counselor, media specialist) [ $F(4, 842) = 1.834, p = .120$ ]; highest degree (bachelors, masters, specialist, doctorate) [ $F(3, 836) = 1.407, p = .239$ ]; and gender (male, female) [ $t(839) = .333, p = .739$ ] were not significant. No further tests were necessary. The participant data for these various demographic groups is reported in Table 3. The mean age for all educators was 40.69 years, whereas the mean number of years in education was 13.58 years.



Table 3.

*Participant Data of Demographic Groups*

Groups <sup>a</sup>	<i>n</i>	Percent
<b>Current Position</b>		
Administrator	32	3.8
Teacher	746	88.6
Counselor	18	2.1
Media Specialist	46	5.5
<b>Gender</b>		
Male	168	20
Female	673	80
<b>School Type</b>		
City	275	32.7
County	567	67.3
<b>Highest Degree</b>		
Bachelor	314	37.6
Master	435	52.0
Specialist	77	9.2
Doctorate	10	1.2
<b>Title I School</b>		
Yes	328	39.0
No	514	61.0

<sup>a</sup> All educators

## Conclusions

All educators reported a higher skill level for events and social networks. This is reassuring because these are likely technology tools used on a regularly basis, which supports the idea that using technology frequently increases perceived skill level. Second, business educators perceived a higher skill level for cloud computing; whereas cloud computing was a reported lower skill level for overall certified participants. This is encouraging because business educators reported being current with innovative technology. Third, both business educators and overall certified educators perceived skill level of social bookmarks and podcasts were the lowest. The perceived skill level of business educators as compared to all educators was significant and the overall sum score mean was one of the highest reported in this study. Respondents in city school systems reported higher perceived skill levels for Web 2.0 applications than did respondents in county school systems. Years in education and age reported by the participants were significant in relation to the overall sum score for perceived skill level. In Title 1 school systems respondents reported higher perceived skill levels for Web 2.0 applications.

## Recommendations

Since business educators reported being current with innovative technology, they should facilitate instruction to other faculty members wishing to learn new technology. Professional development should be planned to increase perceived skill level of social bookmarks and podcasts because these were ranked the lowest by both business educators and all certified educators. Given that the perceived skill level of business educators as compared to all educators was significant and the overall sum score mean was one of the highest reported in this study was reassuring since business educators should be the trailblazers in the field of technology. Steps need to be taken to ensure that county school systems have the necessary resources and training to implement Web 2.0 applications seeing as respondents in city school systems reported higher perceived skill levels for Web 2.0 applications than did respondents in county school systems. Further research is needed to determine the reasons why years in education and age reported by the participants were significant in relation to the overall sum score for perceived skill level. It is inspiring that Title 1 school system respondents reported higher perceived skill levels for Web 2.0 applications because Title 1 funding can be used for technology purposes.

Additional research is needed to determine the reasons for various differences regarding the perceived skill level of Web 2.0 technologies. Possible areas for additional scientific study include professional development opportunities, effectiveness of professional development, and training and funding for professional development for educators. It is further recommended that this study be repeated in future years and in other K-12 schools across a wider geographic area.

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