5-12-2011

Enhancing Preservice Elementary Teachers' 21st Century Information and Media Literacy Skills

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This is an electronic version of an article published in Action in Teacher Education, Volume 33, Issue 2, 2011. Action in Teacher Education is available online at: http://www.informaworld.com/smpp. DOI: 10.1080/01626620.2011.569468

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Abstract

This two-semester pedagogical study investigated the effectiveness of an approach to information and media literacy instruction for elementary preservice teachers. Participants were trained in and then used a systematic process of searching for, evaluating, and using journal articles and websites. Two-thirds of the Semester one participants were unsuccessful identifying relevant, high-quality journal articles and ½ inaccurately evaluated the quality of websites. After three opportunities for formative assessment were added to the instruction model in Semester two, participants proficiently evaluated websites and ¾ were able to find relevant journal articles. The results demonstrate the importance of formative assessment and the need to provide preservice teachers with information and media literacy training so they are better able to navigate and evaluate digital-age resources in order to expand their content mastery and teach their students 21st century skills.

This pedagogical study investigated the effectiveness of an approach to information and media literacy instruction for elementary preservice teachers. We, a teacher educator and education librarian team, were specifically concerned with preservice teachers' skill using Internet search engines and library subscription databases to locate, evaluate, and use relevant, appropriate, reliable, and authoritative resources. We trained the participants in a systematic research process of searching for, evaluating, and using information resources, specifically journal articles and websites, to increase their content knowledge. After completing the training, preservice teachers used the research process to complete a major assessment in a social studies curriculum and instructional methods course. Although we focused on two forms of media in the training, the information and media literacy skills they learned are transferable to other resources. We evaluated the effectiveness of our instructional approach over a 2-semester academic year by collecting data to explore the questions: How successful are preservice teachers in selecting and evaluating high-quality resources? How do preservice teachers' perceptions of their information and media literacy skills compare with their abilities to evaluate resource quality? What is the relationship between preservice teacher age and ability to evaluate resource quality?

In order to have a sophisticated understanding of an issue, teachers must rely on quality information from appropriate resources. The ability to identify, locate, evaluate, and use information effectively has long been considered the crux of information literacy, which helps to drives lifelong learning (American Library Association, 1989). Media literacy involves being able to access, analyze, and evaluate media, as well as produce it (Culver, Hobbs, & Jensen, 2009). Since the digital age has made electronic databases and Internet sources easy ways to access information that can increase preservice teachers' content knowledge, we endeavored to teach future elementary teachers how to find and evaluate journal articles and websites. Students were charged with the task of using these research and evaluation skills to expand their content knowledge within the authentic context of learning more about the social studies content in children's literature they might use with K-8 students. For clarity, we use the term "21st century information and media literacy" to specifically refer to using Internet search engines and library subscription databases to locate, evaluate, and use relevant, appropriate, reliable, and authoritative resources and rich media.

The results from the first semester in which we undertook this inquiry were disheartening: two-thirds of the participants either used journal articles that were inappropriate for the task, of poor quality, or confused magazine articles and encyclopedia articles with journal articles. Half of the participants inaccurately evaluated the quality of websites, often selecting ones with questionable authority or purpose. They made these errors even though two-thirds of the participants indicated that 50% of more of the training reviewed material they already knew. These

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results led us to refine the information literacy and media literacy training to include three opportunities for formative feedback. After these changes were implemented, there was a marked improvement in the quality of resources the preservice teachers used and the accuracy of their evaluations. The results demonstrate the value of providing preservice teachers with training in and formative feedback about their effectiveness navigating and evaluating the abundance of information available in the digital age so they can expand their content mastery and prepare to teach 21st century information and media literacy skills to their future students.

Related Literature

Learning to increase social studies knowledge is important because prospective elementary teachers' background in this content is often inadequate (Gallavan, 2008; May, 2005). Nonetheless, beginning teachers need to learn to lead children through learning experiences that promote civic values and foster active citizenship. If they lack adequate social studies content knowledge, teachers cannot effectively help children acquire the knowledge and skills necessary to fulfill the democratic mission of schools and become "vigilant citizens who are informed, thoughtful, questioning, and reasonable in making decisions that apply to public affairs that can be justified in terms of democratic values" (Ochoa-Becker, 2007, p. 26). The need to prepare informed, responsible citizens has never been greater as 21st century Americans must join the rest of the world in addressing crucial international issues such as globalization, social justice, conflicting cultures and religions, climate change, and environmental issues (Cawelti, 2006; Ochoa-Becker, 2007).

Meaningful social studies education consists of "integrated study of the social sciences and humanities to promote civic competence" (National Council for the Social Studies, 1994, p. 3). Effective teaching of social studies requires extensive content knowledge. Because there is such a range of courses required for elementary certification, teacher preparation programs often have to make choices to provide a balance between content background and pedagogical knowledge (May, 2005). Although coursework requirements vary among institutions, overall they appear minimal (Bolick, Adams, & Willox, 2010). This makes it difficult to ensure that candidates have adequate social studies disciplinary knowledge and skills (McCall, 2006). Therefore, it is not surprising that elementary teachers often report feeling unprepared to teach social studies because of a lack of content knowledge, particularly in world citizenship (Gallavan, 2008) and geography (May, 2005).

Since content-area coursework requirements are often insufficient in social studies (Bolick, et al., 2010), elementary teachers must be capable of meeting their own information needs by identifying, locating, and accessing quality resources. However, conversations about 21st century information and media literacy in social studies often focus on K-12 students. For example, the National Council for the Social Studies (NCSS) recently published a position statement on media literacy that underscored the organization's endorsement of helping students become critical evaluators of media. NCSS explained,

> In the 21st century, media literacy is an imperative for participatory democracy because new information/communication technologies and a market-based media culture have significantly reshaped the world. The better we can prepare our students to critically question the information and media they are seeing, hearing, and using, the more likely they are to make informed decisions and to participate as citizens who can shape democracy for the public good. (National Council for the Social Studies, 2009, p. 189)

Although NCSS recognized the importance of 21st century information and media literacy skills and resources in K-12 social studies curriculum, the position statement did not include recommendations for the skills and training teachers need in order to implement such a 21st century curriculum. This omission overlooks the importance of ensuring teachers have the content knowledge and pedagogical training needed to implement the NCSS vision.

In contrast, the International Society for Technology in Education (ISTE) has provided National Educational Technology Standards (NETS) for students *and* teachers (International Society for Technology in Education, 2007, 2008). ISTE outlined the information and communication technology skills students need to be a fully engaged citizens in a world where information is gathered and shared in a variety of media. Additionally, ISTE's NETS for

teachers indicated the need for teachers to model information gathering, evaluation, and use in a digital context. The importance of such standards was foreshadowed over a decade ago when Hamot, Shiveley, and Vanfossen (1998) studied of the extent of media literacy training in social studies teacher education courses. Their finding led them to recommend "media understanding [be] an essential aspect of preservice social studies teacher education, and … increase [the] emphasis on the application of critical thinking to mass media" (p. 249).

Other literature identifies the importance of pedagogical training in 21st century information and media literacy skills as a component of teacher preparation. Providing preservice teachers with experiences that increase their exposure, comfort, and proficiency with information technology was positively correlated with preservice teachers' readiness to integrate technology into instruction (Bansavich, 2005). Researchers have also recommended integrating technology into teacher preparation courses so skills are not learned in isolation (Albee, 2003; Fleming, Motamedi, & May, 2007). The literature also supports ongoing and integrated information and media literacy instruction. For example, Martin (2008) found no correlation between one-time library instruction and the types of sources undergraduate education majors reported using in their academic work. Martin's results support the importance of embedding 21st century information and media literacy skill instruction throughout coursework since content learned in isolated, one-time workshops seems unlikely to impact preservice teachers' learning.

Existing literature underscores the importance of promoting 21st century information and media literacy in K-12 schools, explains barriers to enhancing elementary preservice teachers' social studies content knowledge, and reveals the corresponding perception among inservice elementary teachers that they are unprepared to teach social studies. The literature also indicates the importance of embedding training in 21st century information and media literacy skills in the context of teacher preparation courses. Each of these bodies of literature is robust, yet intersections between them appear undeveloped. Thus, this study was designed to fill a gap in the literature by providing preservice teachers with specific and integrated training in 21st century information and media literacy skills so they are better prepared to enhance their social studies content knowledge.

Methods

Participants

The participants were enrolled at a large land-grant university in the western United States and were seeking K-8 elementary teaching certification or dual certification in elementary/bilingual or elementary/special education. Participants were recruited from a required social studies methods course, which had a total enrollment of 26 during two semesters. Fifteen (semester one) and 24 (semester two) preservice teachers agreed to participate in the study. Table 1 provides a summary of demographic information about the participants. These demographics were typical for elementary preservice teachers at the university.

Context and Procedures

This investigation occurred within the context of a major assessment in the social studies methods course. Candidate teachers read juvenile or young adult literature with social studies topics or themes and kept track of their content-related questions. The participants were given a list of seven books to choose from. The titles were purposefully selected through consultation with children's librarians and the National Council for the Social Studies' annual list of *Notable Trade Books for Young People* (http://www.socialstudies.org/notable) in order to provide choices of high-quality books about a variety of multicultural topics.

After reading the book of their choice, the preservice teachers prepared their two-part assessment: (1) a summary of background information about the book's social studies content, and (2) instructional recommendations for how to use the book with K-8 students. In order to prepare the participants to be successful on the assessment and to ensure that they had the requisite skills to conduct background research, participants completed a 2-hour information and media literacy training session co-taught by the librarian and teacher educator.

The training session provided instruction and practice in finding and evaluating relevant academic resources for use in preparing the summative assessment. The preservice teachers were trained in a model for evaluating resource quality that used five criteria: (a) currency, the timeliness of the information; (b) relevance, the importance of the information for the researcher's needs; (c) authority, the source of the information; (d) accuracy, the reliability, truthfulness, and correctness of the information; and (e) purpose, the reason the information exists (Meriam Library, 2007, p. 1).

The participants learned how to apply the Meriam Library (2007) evaluation model to two types of resources they were required to use for their summative assessment: an article from a peer-reviewed journal listed in ERIC or another academic database and a website from a reputable source. In the interest of simplifying the training to limit it to the two hours available, we introduced preservice teachers to one information literacy model and taught them to apply it to media in the form of websites instead of teaching an additional media literacy model. The Center for Media Literacy (2002-2010) developed a media literacy framework based around five key questions, and three of the questions address concepts similar to the Meriam Library (2007) criteria for authority, accuracy, and purpose. Our decision to use one model meant we did not provide specific training in specific media literacy criteria advocated by the Center for Media Literacy (2002-2010) such as analyzing techniques used to gain viewers' attention. However, we felt providing a more thorough training with one model was a better pedagogical decision than cursory exposure to two models.

After completing the 2-hour training session, participants were instructed to apply the searching and evaluation process to their independent work on their summative assessment. In order to avoid the minimal impact one-time library instruction has on student resource selection (Martin, 2008) and provide participants with ample opportunity to ask follow-up questions about the skills from the training session once they began their independent work, the librarian attended the next two class sessions. She was also available for one-on-one consultation after class and during office hours. These procedures were consistent for both semester one and two.

We added three opportunities for formative assessment during semester two. First we provided additional time for guided practice during the information and media literacy training session by condensing the portion of the information training session about finding and evaluating resources so participants could spend the last 20 minutes of the session beginning their search for appropriate resources. In semester one we only provided 8 minutes for this guided practice. We were joined by a second education librarian for semester two, facilitating two additional opportunities for formative assessment. At the end of the training session, participants listed one element they learned from the workshop and concepts they still had questions about. The librarians reviewed their responses and, after identifying that many were still unsure how to determine the quality of different resources, the librarians provided a mini-lesson to review this process when they returned to the class for questions the following week. For the third opportunity for formative assessment, participants were required to submit their research questions, bibliography of sources, and reference quality evaluations to the librarians. The librarians responded within one week, providing feedback about the quality of the resources. The timely nature of the feedback allowed participants to use different sources if their original ones were problematic.

Data Sources and Analysis

There were two data sources in this investigation: participants' reference-quality evaluations and an evaluation of the information and media literacy training session. The latter provided self-reported data about the preservice teachers' prior knowledge of and confidence with information and media literacy skills; their status as traditional or non-traditional students, which we used as a measure of age; and their evaluation of how much of the training session addressed new and unfamiliar material. Participants completed the reference quality evaluations using a template (see figure 1) to guide their evaluation of their sources. We designed the template using Meriam Library's (2007) criteria for evaluating resources and provided prompting questions the corresponded to information from the training session.

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Our initial step in data analysis involved determining the accuracy of the participants' evaluations of resource quality. To determine the accuracy, first we independently rated the quality of each resource using the reference quality template (figure 1). This involved examining the resources each preservice teacher used for the summative assignment. Specifically, we visited the websites and researched the host organization. We obtained and read a copy of the journal articles. We researched the publication. Next we compared our ratings. Our independent quality ratings were the same for 95% of the sources participants used. We resolved our discrepancies by discussing the reason for the rating and coming to a consensus for the source. For example, one of us evaluated the authority of one journal article more highly than the other. Upon discussion, it became apparent that we had different perceptions of the author's qualifications because one of us found more detailed information. In this case, we agreed to use the lower rating based on the more detailed information. These normed-evaluation ratings were considered accurate and compared with the preservice teachers' evaluations to determine how successful the preservice teachers were selecting and evaluating high-quality resources.

In the second step of analysis, we compared participants' evaluations for resource quality with our accurate ones and determined the percentage of agreement for each source and criteria. For example, in the semester one journal article currency data, seven participants' evaluations of their source quality were accurate or consistent with ours while eight evaluations were inconsistent with ours or inaccurate. This yielded a percentage of agreement of 46.67. We then used Perreault and Leigh's (1989) Index of Reliability (I_r) to determine if each percentage of agreement was statistically significant. We selected I_r because the measure was developed for use with judgment-based nominal-scale data and is robust with small sample sizes. Complete agreement between two judges (in this case the researchers and the participants) would yield an I_r of 1. Ten separate I_r values were prepared: one for the five evaluation categories (currency, relevance, accuracy, authority, and purpose) for each of the two resources. Along with the I_r, we calculated a 95% confidence interval to determine whether the reliability index was significantly different from 1.

Lastly, we used a frequency table to examine the number of inaccurate evaluations each preservice teacher made. The frequency table included each participant's status as a traditional or non-traditional aged student and their estimate of the percentage of the information and media literacy training session that addressed new and unfamiliar material. This frequency table allowed us to determine how preservice teachers' perceptions of their information and media literacy skills compared with their abilities to evaluate resource quality as well as to determine if there was a relationship between preservice teacher age and ability to evaluate resource quality.

Results

Table 2 summarizes the Index of Reliability (I_r) results, including the percentage of agreement, I_r, standard error of estimate, and a 95% confidence interval (CI), for journal articles and the five evaluation criteria by semester. For semester one and two data, there was a low level of consistency between the preservice teachers' evaluations and the accurate evaluations of resource quality for the relevance of journal articles. There was essentially no improvement in the I_r values for this criteria from semester one to semester two (I_r - S1 = .65; I_r - S2 = .66), indicating the semester two participants were not better able to evaluate the relevance of journal articles than semester one participants. However, semester two participants were more successful evaluating resource quality for four of the criteria - currency, accuracy, authority, and purpose - than semester one participants.

The lack of improvement in evaluating the relevance of journal articles merits further explanation. In semester one, 5 participants selected inappropriate materials for the journal article: 3 out of 15 participants cited an online encyclopedia entry while 2 referenced magazines. An additional semester one preservice teacher included an incomplete reference for her journal article, and we were unable to locate a copy. Thus a sixth participant may have referenced an inappropriate source. Referencing a source other than a journal article was inappropriate because the assignment guidelines and information and media literacy training session specifically indicated that the article needed to be from a peer-reviewed journal listed in ERIC or another scholarly database. Selection of inappropriate sources for the journal article remained an issue for six out of 24 semester two students: four selected newspaper articles and two selected magazine articles. In terms of the accuracy ratings, failure to include a journal article received "not applicable" for relevance – the importance of the information for the researcher's needs (Meriam

Library, 2007) – because the preservice teacher selected a resource that was inappropriate based on assignment guidelines. Not applicable ratings were calculated as inaccurate when determining the I_r.

Table 3 presents the Index of Reliability (I_r) results for websites. The I_r values for website quality evaluation were higher in semester two for every criterion than semester one. The upper confidence intervals (CI = 1) for all values indicate that difference between the participants' evaluations and the accurate evaluations of resource quality were not significantly different from 1. Therefore, the semester two participants were more successful evaluating resource quality for all criteria - the currency, accuracy, authority, relevance, and purpose - than the semester one participants.

Table 4 presents the total number of errors each semester one preservice teacher made by type of media, the percentage of the information and media literacy training session that each individual estimated addressed content that was new and unfamiliar material, and the participants' status as traditional or non-traditional aged undergraduate students. Despite self-identifying themselves as skilled with finding and evaluating resources, 9 out of 15 semester one preservice teachers made five or more errors when evaluating resources. Their evaluation skills led more than two-thirds of the participants to use one or more resources that were either of limited academic value or inappropriate for the assignment.

There was no pattern or consistency between semester one participants' performance evaluating resources cited in the summative assessment and how useful they found the training session. Excluding participant number 15, who did not include an accurate reference for one her sources and thus may have made more errors, of the five preservice teachers who were *most* accurate, only one rated the usefulness of the training as low. That individual estimated that only 10% of the training content was new and unfamiliar; she also provided written feedback indicating that she considered the training unnecessary. Her critique was unique among the other most accurate participants. All four evaluated the training as highly positive, two estimated that 50% of the content of the training was new and unfamiliar, and the other two estimated that 75% and 85% of it was new. Of the six participants who were *least* accurate when evaluating the quality of their resources, two indicated that 15% of the training introduced new and unfamiliar material. The other three who were least accurate considered 50-100% of the training content to be new and unfamiliar material.

There was no pattern or consistency between participants' age (traditional or non-traditional aged undergraduate) and performance on evaluating resources or their rating of the usefulness of the training. Of the six participants who had four or fewer discrepancies in their evaluation of resource quality, three were traditional aged undergraduates. Two of the participants who made seven or more errors were non-traditional and four were traditional in age. Three traditional aged participants considered 70-100% of the information and media literacy training to be new and unfamiliar material while only one non-traditional aged participant did.

Table 5 provides a comparison between semester one and two participants in terms of traditional and non-traditional status and the percentage of the information and media literacy training session that each preservice teacher estimated addressed content that was new and unfamiliar material. The comparison table indicates semester one and two participants had similar characteristics in terms of their age and considered comparable amounts of the information and media literacy training new. As was the case with semester one particpants, there was no pattern or consistency between semester two participants' status as a traditional or non-traditional aged undergraduate student and performances on evaluating resources or their rating of the usefulness of the training.

Discussion

The training we provided preservice teachers was designed to ensure that they had sufficient 21st century information and media literacy skills to expand their social studies content knowledge through research. We did not anticipate the semester one results. We thought that by providing participants with a high-quality information and media literacy training session, guided practice, independent practice, and follow-up support from the librarian through a task relevant to inservice teachers' work, our participants would be successful selecting, using, and evaluating high quality resources. Semester one results made it clear that we needed to expand and improve our approach. Although we did not use a true control-experiment group design, semester one and two participant

characteristics were similar enough that it seems reasonable to attribute at least some of the positive improvement in most areas of preservice teachers' resource evaluation skills to the changes implemented in semester two: three opportunities for formative assessment. Of course, further research is needed.

There was a gap between the semester one participants' self-assessment of their information and media literacy skills and their demonstration of those skills: 6 of the 9 participants who were familiar with 50% or more of the content of the information and media literacy training incorrectly evaluated the qualities of their sources 50% or more of the time. In contrast, with the exception of journal article relevance, semester two participants demonstrated 21st century information and media literacy skills. Twenty-nine percent of the semester two participants were unfamiliar with 50% or more of the training content. These preservice teachers were more successful than we might have expected based on their self-reported level of information and media literacy. This may be due to the feedback they received through formative assessment.

The importance of formative assessment is well established in literature about K-12 teaching and learning, as is the need to increase its use to promote student achievement (Stiggins, 1999, 2001). Existing literature reports the benefits of peer or self-provided formative assessment in field experiences (Cheung, 2009; Shin, Wilkins, & Ainsworth, 2007). However, literature examining the impact of using formative assessment in preservice teacher education courses is less developed. Our findings suggest that using formative assessment may support preservice teachers' academic achievement, and we recommend future studies examine the long-term impact of formative assessment in teacher education on inservice teachers' practice.

We found no relationship between participants' age (as indicated by traditional or non-traditional undergraduate status) and information and media literacy skills. This finding supports earlier work indicating that being born in the digital age does not guarantee academic proficiency with digital technology (Bennett, Maton, & Kervin, 2008; Lei, 2009). Although more than half of the participants in our study were born in the digital age, only two of these younger students were among the five participants who were most accurate when evaluating sources. This finding supports Lei's recommendation that technology training will remain an important part of preservice teacher education even as the population grows more technology literate because, despite the popular notion of "the young generation as technology savvy and technology enthusiastic," teacher educators "cannot … ignore the within-group variation and individuality" (p. 93). This is important because of an issue that goes beyond preservice teachers' content knowledge: schools need to provide K-12 students with 21st century information and media literacy skills in order to prepare them for success in the digital age (Coiro, 2005; Prensky, 2005-2006). Yet many teachers charged with this responsibility lack proficiency with information technology (Albee, 2003). Since preservice teachers do not enter their certification programs with equitable levels of experience in research or computer use, we recommend future studies investigate how providing differentiated instruction based on skill level influences preservice teachers' development of 21st century literacy skills.

During both semesters that we undertook this inquiry, a considerable number of participants failed to select a journal article: 33% (semester one) and 25% (semester two). At the end of semester one, we speculated that some preservice teachers remained unclear about what differentiates a journal article from other forms of media despite specific directions and instruction. Or these participants may have thought they made a correct resource choice since pieces in magazines, newspapers, and encyclopedias are also referred to as "articles." Additional exposure to journal articles may help these preservice teachers differentiate them from other kinds of media. We were surprised that 25% of semester two participants made this kind of mistake despite receiving formative feedback about their resource selection. We reviewed the feedback they received, and one student chose to disregard the librarian's recommendation and still used a magazine article written for children instead of the required journal article. The other semester two participants who used non-journal articles ended up changing the focus of their research slightly and used different resources in their final paper than the ones they submitted to the librarian. We conclude that additional exposure to journal articles remains necessary even when formative assessment is used.

It is worth nothing that our overall approach – a collaborative session designed to train preservice teachers in a model for finding and assessing information and media followed by formative assessment feedback – can be applied to other media or information literacy needs. For example, preservice teachers can view historical films and research

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their accuracy or compare textbook content with primary source information. Media literacy education models such as the one developed by the Center for Media Literacy (2002-2010) provide a more specific framework for evaluating these kinds of media. We recommend that educators interested in using our approach select the framework most appropriate for their instructional goals.

The greatest limitation of this investigation was our small sample size drawn from students at one university. While we do not suggest that our findings are applicable to other populations, we do think it is important to consider the possibility that our students' need for support in developing 21st century information and media literacy skills is not unique. We recommend additional studies with larger populations to determine the extent to which preservice elementary teachers need enhanced training in 21st century information and media literacy skills and the extent to which formative assessment facilitates their learning.

Implications for Teacher Education

Ultimately, the results of this study indicate the complexity of ensuring that preservice teachers develop sophisticated 21st century information and media literacy skills. When we only provided participants with training, opportunity for practice, and follow up instruction, most of the preservice teachers did not demonstrate proficiency with 21st century information and media literacy skills. Our subsequent use of formative assessment provided scaffolding for the preservice teachers' learning and supported their success. Those of us in the teacher education community need to provide experiences that develop preservice teachers' 21st century information and media literacy skills throughout their preparation coursework since doing so in one course seems insufficient. Integrating the pedagogy of K-12 technology use is another important goal so preservice teachers learn how to use their 21st century information and media literacy skills to develop their future students' proficiency.

In conclusion, teacher educators cannot expect teachers to effectively teach 21st century information and media literacy skills that they themselves lack. Teacher educators need to ensure that preservice teachers are able to find and use high-quality media. Given the ever-changing nature of 21st century information and media, the implications of this study extend beyond preservice teacher education to professional development for inservice professionals. Teachers need ongoing training to stay up to date in navigating and evaluating the abundance of information available in the digital age so they can effectively teach 21st century information and media literacy skills to their students *and* expand their own content mastery.

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This is an electronic version of an article published in Action in Teacher Education, Volume 33, Issue 2, 2011. Action in Teacher Education is available online at: http://www.informaworld.com/smpp. DOI: 10.1080/01626620.2011.569468

Author Note

Alan Howard, a Statistical Computation Specialist at the University of Vermont, provided extensive assistance with data analysis for this study. His contributions are truly appreciated.

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Table 1
Participant Demographic Information by Semester

	Semester One (n = 15)	Semester Two (n = 24)
Non-traditional	13	18
Post-baccalaureate	6	5
Women	14	23
Minority	2	1

Note: Non-traditional students were defined as 24 years of age or older.

Table 2

Summary of Index of Reliability (I_r) Results for Journal Articles

Criteria and Semester	% Agreement	I_r	Standard Error	95% CI
Currency – S1	46.67	.65	.12	.41 - .90
Currency - S2	70.83	.83	.10	.65 - 1
Relevance - S1	46.67	.65	.12	.41 - .90
Relevance - S2	45.83	.66	.12	.42 - .90
Accuracy - S1	20.00	.38	.13	.13 - .62
Accuracy - S2	66.67	.81	.10	.61 – 1
Authority - S1	53.33	.71	.12	.48 - .94
Authority - S2	66.67	.81	.10	.61 – 1
Purpose – S1	53.33	.71	.12	.48 - .94
Purpose – S2	70.83	.83	.10	.65 - 1

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Table 3

Summary of Index of Reliability (I_r) Results for Websites

Criteria and Semester	% Agreement	I_r	Standard Error	95% CI
Currency – S1	60.00	.76	.11	.54 - .97
Currency - S2	75.00	.86	.09	.68 - 1
Relevance - S1	40.00	.60	.13	.35 - .85
Relevance - S2	91.67	.96	.05	.85 - 1
Accuracy - S1	46.67	.65	.12	.41 - .90
Accuracy - S2	75.00	.86	.09	.68 - 1
Authority - S1	46.67	.65	.12	.41 - .90
Authority - S2	66.67	.81	.10	.61 - 1
Purpose - S1	46. 67	.65	.12	.41 - .90
Purpose - S2	75.00	.86	.09	.68 - 1

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Table 4

Inaccurate Evaluations of Resource Quality by Semester One Participants

Participant	Article	Website	Total[1]	Traditional (T) or Non-Traditional (NT)	% of Training Estimated New
1	0*	1	1	NT	10
2	4	2	6	NT	40
3	1	2	3	NT	75
4	2	5	7	NT	60
5	5*	5	10	T	100
6	1	3	4	T	85
7	2*	5	7	T	70
8	4	2	6	NT	50
9	5*	2	7	T	15
10	2	5	7	T	50
11	5	0	5	T	50
12	1	1	2	T	50
13	1	3	4	NT	50
14	5*	2	7	NT	15
15	NA	3	3**	T	50

[1] Total number of inaccurate evaluations. There were 5 evaluations for each source; a total score of 10 indicates no criteria were evaluated accurately.
* These participants used an online encyclopedia or magazine article instead of a journal article.
** This participant included an incomplete reference which made it impossible to locate the resource.

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Table 5

Comparison of Semester one and Semester two Students

	Semester 1 (n = 15)	Semester 2 (n = 24)
Traditional Age	8 or 53%	13 or 54%
Non-Traditional Age	7 or 47%	11 or 46%
0-25%[1]	3 or 20%	6 or 25%
26-50%[1]	7 or 47%	11 or 46%
51- 75%[1]	3 or 20%	4 or 17%
76-100%[1]	2 or 13%	3 or 12%

[1] Participant-estimated percent of training that was new or unfamiliar.

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Figure 1. Reference quality evaluation template based on Meriam Library's (2007) criteria.

Currency: ***The timeliness of the information.*** Is the information (while perhaps historic) current or out-of-date? Has it been revised or updated?

Not Applicable	Not Current	Somewhat Current	Current	Very Current

Relevance: ***The importance of the information for your needs.*** Does the information relate to your topic or answer your question? Is the information at an appropriate level**?**

Not Applicable	Not Relevant	Somewhat Relevant	Relevant	Very Relevant

Authority: ***The source of the information.*** What are the author's qualifications to write on the topic?

Not Applicable	Not Authoritative	Somewhat Authoritative	Authoritative	Very Authoritative

Accuracy: ***The reliability, truthfulness, and correctness of the informational content.*** Where does the information come from? Is the information supported by evidence? Has the information been reviewed or refereed?

Not Applicable	Not Accurate	Somewhat Accurate	Accurate	Very Accurate

Purpose: ***The reason the information was published.*** Is the information fact, opinion or propaganda? Does the point of view appear objective and impartial?

Not Applicable	Inappropriate purpose	Somewhat Appropriate Purpose	Appropriate Purpose	Very Appropriate Purpose