

Electronic Books versus Paper Books: Pre-Service Teacher Preference for University Study and Recreational Reading

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Abstract: *Publishing trends suggest that electronic books or e-books are the future of reading. Since teacher reading attitudes influence student reading attitudes, it is important to understand patterns of e-book use among pre-service teachers. One hundred ninety-nine pre-service teachers complete an online questionnaire that queried use of e-books and paper books or p-books. While the majority of pre-service teachers expressed preference for p-books over e-books both for university study and for recreational reading, a shift in relative proportion was apparent. That is, 27% of pre-service teachers did not report a preference for p-books over e-books for recreational reading; 14% did not report a preference for p-books over e-books for university study. Teacher educators might present their students with improved e-book learning strategies, not only because digital technologies facilitate literacy but also because teachers should promote forms of literacy consistent with life after the digital revolution.*

1. INTRODUCTION: ELECTRONIC BOOKS AND UNIVERSITY STUDENTS

In a relatively short period of time, higher education has been transformed by digital technologies such as the internet, laptop computers, mobile phones and, most recently, electronic books or e-books. E-books are regarded as “a radical innovation” for university students, transforming their academic life and reading habits (Martinez-Estrada & Conaway, 2012, p. 126). Australian publishers report that e-books account for 15% to 20% of total sales (Hazard Owen, 2011). Several higher education institutions have invested substantial funding in purchasing e-books, encouraging students to shift to e-book use due to potential advantages such as interactivity, portability, reduced cost, engagement and quick provision of updated information for research and learning (Choi, 2012; Martin, 2012; Muir & Hawes, 2013; Murray & Perez, 2011). In the history of learning technologies, digital innovation emerges first in undergraduate education and then migrates to progressively younger students and increasingly varied learning environments (Johnson, 2007). According to Vasileiou, Rowley and Hartley (2013), e-books “are becoming central to learning and education” (p. 519).

2. PAPER BOOKS AND ELECTRONIC BOOKS: READER PREFERENCE AND PERCEPTION

While the current generation of university students is comfortable with digital information and communication devices, surveys often indicate a strong preference for paper books or p-books (Miller, Nutting, & Baker-Eveleth, 2013). Smyth and Carlin (2012) reported that during a study period, e-books were accessed 30 times more frequently than p-books and yet, when surveyed, students expressed a definite preference for p-books. Abram (2010) argued that students prefer p-books over e-books because of the tactile interaction with p-books. Nonetheless, following implementation of a Kindle eReader initiative at a large American university, students reported, on average, reading more and learning more with the eReaders. “Ninety-four percent said they would recommend use of the Kindle to other students” and when queried about their preference between a paper textbook and the Kindle format, “72% of the students preferred the eBook version” (Martinez-Estrada & Conaway, 2012, p. 3). Furthermore, the eReader initiative “made a significant positive impact on the learning outcomes ... particularly with regard to student engagement” (p. 32).

P-books and e-books are often compared in terms of reader perception of advantages and disadvantages. E-book functionality such as text highlighting, note writing and copying text have been reported by university students as beneficial to their learning (Behler & Lush, 2010; Croft & Davis, 2010). The interactivity of e-books is often cited as an advantage with features such as editing tools, hyperlinks and search capabilities (Cassidy, Martinez, & Shen, 2012). The most common advantages of e-books reported by university students, according to Smyth and Carlin (2012), include convenience (30%), remote access (20%), flexibility (20%), searchability (14%), cost (4%), choice (3%) and environmental benefits (2%). Other advantages of e-books include the visibility and discoverability of the contents due to search engines such as Google (Hasan, Chavan, & Chaurasia, 2011), remote access (Ashcroft, 2011), portability and convenience (Lai & Chang, 2011; Martinez-Estrada & Conaway, 2012; Muir & Hawes, 2013), ease of purchase (Chao & Lu, 2011), font adjustability, text clarity and readability equivalent to p-books (Barron, 2011), interactive images, animations, quizzes and simulations available in the new generation of e-textbooks (Choi, 2012; Murray & Perez, 2011), as well as saving space and trees (Letchumanan & Tarmizi, 2010).

Reported disadvantages of e-books included lack of student familiarity and comfort with control features such as moving forward and backward and finding specific pages (Martinez-Estrada & Conaway, 2012). Apparently, many university students complain that “holding an e-reader or even a tablet computer is far more awkward than holding a textbook” (Jones, 2012, paragraph 2). Hasan and others (2011) reported disadvantages associated with e-books including: harm to eyes and brain, high cost of single use, screen resolution, contrast and brightness, difficult-to-understand subscription policies, lack of compatibility across different hardware and/or software, and fragile, inflexible e-book hardware. Data collected from paper-based questionnaires administered to 253 undergraduate students at a Ghanaian university showed that, while the students indicated they were capable of using e-books and that they acknowledged the usability and helpfulness of e-books, the majority (93%) were strongly against their use for academic purposes. Three reasons accountable for this adverse attitude: Ghanaian unreliable electric power, low internet availability and high internet cost. Letchumanan and Tarmizi (2010) also reported that university students in rural and remote regions were reluctant to use e-books due to difficulty accessing computers/internet and their lack of confidence with technology. Other reasons that reportedly contribute to student preference of p-books over e-books included difficulty transferring an e-book from one reader device to another, long-term rental arrangement (Nicholas & Lewis, 2010), difficulty in reselling or future use due to expiry of access (Murray & Perez, 2011), platform limitations and incompatibility (Chao, Fuxman, & Elifoglu, 2013; Chao & Lu, 2011), poor navigation, lack of availability of some texts in e-book form (Martin, 2012), short battery life, and weight of e-book readers (Gibson & Gibb, 2011).

University students who prefer to read e-books likely differ from university students who prefer to read p-books. Asunka (2013) found that, although no correlation was established between e-book reading and age, gender, programme of study or technology proficiency, there was a significant correlation between years of university study and e-book usage. The higher the year of study, the more frequently the students used e-books. Woody, Daniel and Baker (2010) found no correlation between students' previous experience of e-books and their choice of this type of book format. On the contrary, Stone and Baker-Eveleth (2013), who surveyed 1,382 American university students, found that students' previous experience with digital devices positively predicted purchase of e-books. In addition, the preferences of parents, classmates and professors were reported to influence student intention to use e-books. Miller, Nutting and Baker-Eveleth (2013) investigated the factors that influenced students' purchase/use of e-books and found a strong relationship to area of study. Students from technical and business colleges were reported to be more likely to use e-books than those majoring in arts and social sciences which included pre-service teachers. Relative to other professionals, the reading attitudes and behaviour of pre-service teachers may be particularly important because teachers influence, directly and indirectly, the reading attitudes and behaviour of their students (Lukhele, 2013).

3. TEACHERS, E-BOOKS AND STUDENT LEARNING

Most teachers are avid readers with “devotion to the book as a material object” (Goodwyn, 2013, p. 149). Nonetheless, research increasingly suggests that e-books support literacy development

(Park & Yang, 2013). For example, Shamir and Shlafer (2011) compared the effect of reading educational e-books on phonological awareness and concept about print among normally developing and at risk pre-school children. While both groups of children demonstrated improved performance, gains were greater for the children identified as at risk. Korat (2010) examined the effect of reading e-books on language and literacy in 5 and 6 year old children. Reportedly, the children who read e-books exhibited significantly greater progress in word meaning and word reading compared to the control group who followed the regular school program. Based on observation data, Ciampa (2013) observed that primary school students spend more time on-task when presented with e-books as opposed to p-books. "Simply stated, e-books have the potential to change the way our students read and consume text because of their interactivity and convenience" (Schugar, Smith, & Schugar, 2013, p. 615). Consequently, as with information and communication technologies, generally, teacher acceptance and use of e-books may indirectly influence student learning outcomes. In this regard, "devotion to the book as a material object" may not necessarily be in students' best interest.

Familiarity with e-books is among the best predictors of teachers' use of e-books with students in school (Ahmad, Halim, Aleng, Mohamed, Abdullah, & Ali, 2013). Chen and Jang (2013) examined elementary school mathematics and science teachers' reasons for using or not using e-books. Teachers' reasons for using e-books included increased student motivation to learn, support in teaching complex concepts, increased teacher-student interaction and enhanced student participation in class. Teachers' reasons for not using e-books included lack of school funds to purchase e-books, lack of time to design teaching materials to accompany e-books, technical problems in the classroom, and lack of professional training for e-book functions and operations.

If e-books are the future of reading (Vasileiou et al., 2013), teachers might reasonably be expected to embrace and promote e-books with their students. The option to purchase e-books is currently common in teacher education courses. Both advantages and disadvantages have been articulated, although research on the patterns of use among pre-service teachers is not readily available. It is reasonable to assume, however, that some pre-service teachers use e-books for university study and some read e-books for personal interest or recreation. Since teacher reading attitudes influence student reading attitudes (Lukhele, 2013), it is important to understand reasons for e-book or p-book use and preference among pre-service teachers. To what extent do pre-service teachers report purchase of e-books and p-books for university study and recreational reading? What reasons do pre-service teachers provide for their use of e-books and p-books? What are the implications for teacher education?

4. RESEARCH METHODS

4.1. Research Context

All students enrolled in the first-year unit, *Child Development for Educators*, in a large university in Western Australia were invited, via email, to complete an online questionnaire that queried the number of and reasons for purchase of e-books and p-books for university study and recreational reading. The pool of potential respondents included approximately: 75 students enrolled in an on-campus secondary education program; 150 students enrolled in an on-campus primary education program; 75 students enrolled in an on-campus early childhood education program; 600 students enrolled in an online primary education program; and 300 students enrolled in an online early childhood education program. Of the total pool of approximately 1200 first-year education students sent an email of invitation to complete the online questionnaire, 199 or 16.6% responded in the affirmative.

5. THE ONLINE QUESTIONNAIRE

Approximately mid-semester, pre-service teachers were sent an invitation via their university email accounts to complete an online questionnaire (Qualtrics Survey Software). In addition to demographic items necessary to describe the sample of participating pre-service teachers, the questionnaire queried the number of e-books and p-books purchased for university study and recreational reading during the past year. Additionally, pre-service teachers were asked to provide written comments as to why they preferred p-books, e-books, or had no preference.

6. PRE-SERVICE TEACHER PARTICIPANTS

The sample of responding pre-service teachers included 15 males (7.5%) and 184 females (92.5%), a gender distribution approximately characteristics of the university courses from which the students were solicited. The age of the responding pre-service teachers ranged from a low of 17 years to a high of 56 years, with the mean age being 29 years (standard deviation 9.75). Twelve pre-service teachers indicated that English was not the first language that they spoke; 31 pre-service teachers reported that they were not born in Australia. Approximately 31% of pre-service teachers stated that they were not employed; 7.5% indicated that they were employed more than 40 hours per week during the regular academic term. On average, students reported being employed 10 to 20 hours per week. Approximately 20% of pre-service teachers indicated that they attended classes on campus; 79.8% reported studying fully-online (i.e., Open Universities Australia and Western Australia Regional Learning). This explains the relatively high average student age of 29 years. Demographic information on students enrolled in Open Universities Australia, for example, consistently reports that students are older than students in traditional on-campus university programs (Stone & O'Shea, 2012). Where full-time student enrolment is eight units of study for each of four years, 24.6% of participating pre-service teachers indicated that they were enrolled in one unit, 40.2% indicated two units, 5.5% indicated three units, 28.6% indicated four units, 0.5 indicated five units and 0.5 indicated six units. Approximately 30% of pre-service teachers were enrolled in the early childhood education program, 66.2% in the primary education program and 4.0% in the secondary education program. The differences in representation of pre-service teachers from various courses reflects differences in the initial pool of potential participants, that is, the secondary education course was not offered online and, thus, had relatively few enrolments. In response to the questionnaire item *I have as much money as I need to live comfortably*, approximately 40% of pre-service teachers agreed, 40% disagreed and 20% neither agreed nor disagreed (mean rating of 2.98 on a 5-point scale, standard deviation 1.16).

7. FINDINGS: SUMMARY OF QUESTIONNAIRE RESULTS

In response to the questionnaire item concerned with the number of p-books purchased for university study during the past year, pre-service teachers reported a range from a low of 0, to a high of 20, with the average number being 5.7p-books. For the number of e-books purchased for university study during the past year, responses ranged from a low of 0 to a high of 6, with the average being 0.7 e-books. The quantity of p-books purchased by pre-service teachers for recreational reading ranged from a low of 0 to a high of 150, with the average being 7.7 p-books. For e-books purchased for recreational reading, the number reported ranged from a low of 0 to a high of 60, with the average being 3.0 e-books. Figure 1 presents a visual-graphic summary of the average number of e-books and p-books reportedly purchased by responding pre-service teachers during the past year. As apparent, there was considerable variability with a heavy preference toward p-books over e-books irrespective of purchase for university study or recreational reading.

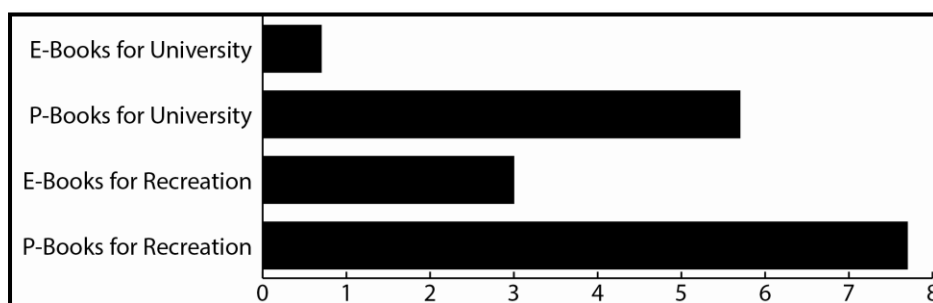


Figure 1: Average Number of Books Purchased by Pre-Service Teachers

In addition to actual completed purchases, the online questionnaire queried pre-service teachers with regard to their preference for p-books or e-books for university study and recreational reading. Approximately 86% of pre-service teachers reported a preference for p-books for university study, 9.7% reported a preference for e-books for the same purpose and 4.6% indicated that they had no preference for one book format over the other. When further queried to provide a reason/s for such preference (or lack thereof), the most common theme expressed by pre-service

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teachers, approximately 38% of those indicating a preference for p-books for university study, was that it was easier to highlight and to make notes or marginalia in p-books. The next most frequent theme, expressed by approximately 26% of participating pre-service teachers, was that it was easier to read from paper copy than from a computer screen. This theme included statements that reading e-books would entail too much time reading from computer screens and less eye strain by reading p-books. The next most common theme discerned from respondents who preferred p-books for university study was expressed by approximately 17% of pre-service teachers who indicated that they preferred the physical look, feel and even smell of p-books. Approximately 13% of pre-service teachers preferring p-books for university study indicated that p-books were more portable and did not have the prospect of technology failure such as a discharged battery. The next most common theme, expressed by approximately 10% of pre-service teachers, was that it was easier to find specific information in p-books than it was in e-books. Approximately 8% of pre-service teachers indicated that it was easier to use p-books when writing term papers, as one could have several p-books open and quickly refer to each while writing on a computer screen. The remaining themes were: p-books are cheaper; p-books are easier to retain for long-term reference purposes; and never used an e-book, expressed by only three pre-service teachers.

Many reasons provided by participating pre-service teachers for preference of e-books over p-books were similar, if not identical, to the reasons provided for preferences of p-books over e-books. For those 19 pre-service teachers who reported a preference for e-books for university study, six themes were discerned: 1) easier to search for specific information, as expressed by seven respondents; 2) easier to read e-books, as expressed by six respondents; 3) portability, as multiple books can be on a single device, four respondents; 4) it is easier to cut-and-paste information from e-books, when writing papers, as noted by three respondents; 5) e-books are the only cost-effective option for those in remote locations, two respondents; and 6) e-books are cheaper, as two respondents stated. Two themes emerged from the nine pre-service teachers who indicated that they had no preference for either p-books or e-books for university study. The most common theme, expressed by eight respondents, was that both book formats had merit, while the other theme, expressed by three respondents, was that e-books saved resources such as paper.

In addition to book format preferences for university study, the online questionnaire queried pre-service teachers with regard to their preference for p-books or e-books for recreational reading. Approximately 73% reported a preference for p-books, 15.2% reported a preference for e-books and 11.7% indicated that they had no preference for one book format over the other. When further queried to provide a reason/s for such preference (or lack thereof), pre-service teacher responses fell into seven major themes. Most commonly (expressed by 62 pre-service teachers) respondents noted a personal preference for the look and feel of p-books. Thirty-five individuals indicated that eye strain or being tired of looking at computer screens was the main reason that they preferred p-books for recreational reading. Finding p-books easier to read was the next most prevalent theme, as indicated by 27 pre-service teachers. The belief that p-books were more portable than e-books was a theme expressed by 15 participating pre-service teachers. Closely related to this theme was that of preferring p-books for reading in bed or at the beach. Two pre-service teachers claimed never to have used e-books, and two respondents stated that p-books were cheaper.

Thirty pre-service teachers indicated a preference for e-books for recreational reading (15.1% of the sample). Six themes emerged from the written reasons provided to explain such preference, the leading being that of portability, expressed by eleven respondents. In a similar vein, nine pre-service teachers indicated that they preferred e-books because several books could be contained on a single device. Five pre-service teachers indicated that e-books were easier to read than p-books, while three respondents indicated that e-books were less expensive than p-books. The final theme, shared by three pre-service teachers, was that e-books were better for the environment. Two themes emerged from the reasons provided by pre-service teachers who had no preference for one book format over the other for recreational reading: 1) that both formats had advantages and 2) that they did not read recreationally (expressed by seven pre-service teachers).

8. DISCUSSION OF RESULTS AND IMPLICATIONS FOR PRE-SERVICE TEACHER EDUCATION

From the questionnaire data, it is apparent that p-books continue to be the preferred reading format for both university study and recreational reading by pre-service teachers in their first-year of university. Such a finding must be interpreted in the context of the sample of participating pre-service teachers of which almost 80% reported studying fully-online. On the one hand, it might reasonably be expected that those who study fully online would prefer, due to exposure, e-books over p-books. On the other hand, given that, on average, participating pre-service teachers were older than might be expected in a traditional on-campus first-year university class (i.e., 29 years), it may be that a generational effect impacted on adoption of innovation digital technologies such as e-books (Erickson & Johnson, 2011). Nonetheless, results of the current investigation are consistent with previous research reporting that university students typically express preference for p-books over e-books (e.g., Berg, Hoffmann, & Dawson, 2010).

Pre-service teachers provided a variety of reasons for their preference for p-books over e-books for university study. The most common theme to emerge from comments provided by pre-service teachers in the online questionnaire was that it was easier to interact with one format than with the other; this was true of pre-service teachers who reported preference of either book format. Indeed, one pre-service teacher wrote about preference for p-books, "this is what I'm used to and I prefer to be able to have the information physically in front of me." In this regard, familiarity with book format appears to be the underlying reason for expressed preference. It is reasonable to expect that computer-based reading was not experienced initially by most of the participating pre-service teachers, and that learning to read from computer and computer-like screens is a protracted process. This is also supported by the fact that pre-service teachers commonly indicated that they found it easier to read from p-books than from e-books. A representative comment of this sentiment was, "Reading off a screen does not stick. Plus I find that staring at a screen really hurts my eyes." Related to this idea was the preference for the look, feel and even smell of p-books. Again, such a finding suggests that many individuals prefer a format with which they are most experienced and comfortable. Stone and Baker-Eveleth (2013) reported that university students' previous experience with computers positively predicted their purchase of e-books.

Several additional themes expressed by those preferring p-books over e-books for university study echoed those expressed by pre-service teachers who expressed the opposite preference including book cost and ease of book use for writing papers. For example, those who preferred p-books contended that it was easier to keep several books open at once, and not have to clutter the computer screen with multiple windows. On the other hand, those who preferred e-books appreciated that several references as well as the paper being written could be placed on a single device, which facilitated cutting-and-pasting material. The differences again appear to be one of preference based on prior use and experience. Perhaps the most insightful comment about this phenomenon was written by a pre-service teacher who stated, "Maybe being older I am more used to studying via a paper book." From the responses provided by the pre-service teachers who preferred e-books for university study, it seems that these university students were either more comfortable with the technology than other students, or they had more experience using computers and e-books successfully. For example, the most common theme, that e-books were easier to search for specific information than p-books, reflects these sentiments. A representative statement indicated that e-books were "easier to look up specific information. Good for copying and pasting when taking notes." It seems likely that as students become more comfortable with e-books, especially if they are exposed to them at younger ages, the use of such technology will increase. Moreover, the trend of university libraries in shifting from paper to electronic copies of journals (Asunka, 2013) will likely facilitate this process. As one pre-service teacher who preferred e-books wrote, "I use electronic devices to read journals, articles etc."

Pre-service teacher online questionnaire responses explaining preference for book format for recreational reading were generally similar to explanations of book format for university study. Regardless of reason for reading (i.e., university study or recreation), many responding pre-service teachers preferred p-books because of the look and feel of the actual physical format. As with the question about which format was preferred for university study, familiarity and associated comfort were the underlying reasons that p-books were preferred over e-books for recreational

reading. A typical pre-service teacher explanatory statement for p-book preference for recreational reading was, "I enjoy the feel of being able to curl up with a book. It is not the same with e-books." Another pre-service teacher added that he/she preferred p-books because he/she was, "old fashioned." Consistent with responses to the question about the preferred format for university study, many pre-service teachers indicated that they found p-books easier to read than e-books. Additionally, pre-service teachers indicated that p-books were better for reading in bed, the bath, or at the beach. A typical response was, "I love reading in bed, and I disagree with electrical devices being used in a bedroom, a traditional place of rest." It seems that with some pre-service teachers, e-books are not connoted with leisure or recreation. Surprisingly, the concept of portability was expressed both by those pre-service teachers preferring p-books and those preferring e-books. To be sure, some pre-service teachers who preferred e-books noted that several books could be contained in one device, an important consideration related to portability. Regardless of reason for reading, few pre-service teachers noted concerns about e-book technology, such as battery life and possible fragility. Similarly, there were few comments made concerning the possible positive environmental impact of using electronic resources rather than those that are paper-based. It seems that in this sample of pre-service teachers, therefore, the main concerns dealt with ease of use, and look and feel of the two formats. Consistent with previous research (e.g., Martinez-Estrada & Conaway, 2012), university student exposure to e-books and corresponding familiarity and comfort appear to be the actual underlying reasons for differences in reported preferences for e-books or p-books. In the case of pre-services teachers, consequently, the onus for e-book exposure rests squarely with teacher educators.

While the majority of pre-service teachers who responded to the online questionnaire expressed preference for p-books over e-books both for university study and for recreational reading, a shift in relative proportion may be discernable. Indeed, 27% of pre-service teachers did not report a preference for p-books over e-books for recreational reading; 14% did not report a preference for p-books over e-books for university study. Because almost 80% of the sample of pre-service teachers reported studying fully-online, preference may be mediated by student age as well as by exposure and corresponding familiarity. That is, pre-service teachers studying fully-online commonly have the option to purchase e-textbooks for university study (Brahme & Gabriel, 2012). And yet, among the sample of participating pre-service teachers, preference for e-books was lower for university study than for recreational reading. As reported by Miller and others (2013), there is "evidence of a distaste among professors in general for e-textbooks" (p. 46). If university professors are influencing university student preference for book format, it seems likely that school teachers would similarly influence their students' preference for book format.

In the most general sense, schools are social institution responsible for the transition of cultural norms and values to the up-coming generation. Fortunately or unfortunately, traditional cultural values evolve much more slowly than digital information and communication technologies (i.e., the digital revolution). The educational benefits of digital technology are well-established (OECD, 2010). For example, "in contrast to teacher reports, recent research suggests that use of textese (i.e., idiosyncratic written conventions used in text messaging) is positively associated with Standard English literacy skills during childhood" (Johnson, 2012, paragraph 1). Johnson (2013) reported a positive association between reading comprehension and mobile phone text messaging among Indigenous adolescents in remote regions of Western Australia. Although young people enthusiastically adopt applications of digital technology in their personal and social lives, school-based learning remains entrenched in the traditional views of literacy (Aldunate & Nussbaum, 2013). Results of the current investigation (i.e., that pre-service teachers are more likely to read e-books for recreation than for university study) substantiate this pattern and shed light on the origin and maintenance of the personal-school digital chasm.

Teachers and schools are typically viewed as an essential aspect of the solution to a range of social woes including poverty (Jensen, 2009), unemployment (Chorafas, 2011) and mental illness (Macklem, 2014). Recently and increasingly, teacher education programs have been targeted as an even more fundamental, and thus more effective, catalyst of social improvement (Darling-Hammond, 2012). In Australia, for example, pre-service teacher university course accreditation has recently shifted from state to federal regulatory authority (Australia Institute for Teaching and School Leadership, 2011). While the conservative nature of schools and teachers may function as

an anchor for traditional values, it also appears to slow (if that is possible) effective implementation of innovative information and communication technologies. Educational researchers might now focus attention on discovering the mechanisms by which e-book formats enhance pre-service teacher learning. Teacher educators might then present their students with improved e-book learning strategies, not only because digital technologies facilitate literacy (Johnson, 2012, 2013) but also because school teachers should promote forms of literacy consistent with life after the digital revolution.

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