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Research and innovation in teaching and learning are prime topics for the *Journal of Instructional Technology and Distance Learning* (ISSN 1550-6908). The Journal was initiated in January 2004 to facilitate communication and collaboration among researchers, innovators, practitioners, and administrators of education and training involving innovative technologies and/or distance learning.

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Editorial

Advances in Technology

Donald G. Perrin

In the 1990s, I taught distance learning courses using [Instructional Television Fixed Service](#) (ITFS) at the San Jose State University. The studio classroom had multiple remote controlled cameras and a complement of audiovisual and computer displays. Each receive site had a telephone for questions and feedback. The world-Wide-Web provided additional resources.

I developed a [satellite video teleconference](#) series for the California Department of Education. These required preplanning to get satellite frequencies, truck for origination, and data to correctly orient the origin and receive dishes. Participants could phone-in questions. In this millennium, these expensive technologies are rendered unnecessary by [broadband internet](#). Internet lessons can be produced on any PC, and they can be accessed anywhere and at anytime.

Initially, internet video was limited by bandwidth. I worked with the [Ohana Foundation](#) on a technology to seamlessly integrate video from DVD with web learning. An inexpensive set-top-box enabled interactive lessons to be presented on TV in any home or classroom. It is still marketed in South-East Asia.

For children in regions where there is no electricity, [Nicholas Negroponte of MIT](#) developed an inexpensive laptop powered by a retractable pull-handle. These laptops come with a basic set of learning programs. Solar-powered wireless networks enable access centralized resources and the Internet! Over a million of these [laptops](#) are used in third world countries.

For the rest of the world, global fiber networks support video and interactive multimedia on a trillion computers. [Learning Management Systems](#) control registration, access, responses, and testing. Diagnostic-prescriptive tools customize the learning experience using learning objects.

There is increasing tension between [privatized and open source](#) content and management systems. [Moodle](#) parallels the capabilities of commercial systems and is leader in some areas. Both systems provide an array of opportunities that serve different institutions. [Skype](#) is excellent for interactive audio. I used it to plan and manage an international disaster relief website with persons in China, India and Canada. So long as communication is from computer-to-computer, it is free! This reliable and flexible resource is greatly under-used by education.

[Wimba](#) adds live interactive video where students have broadband access. Wimba provides excellent two-way video for synchronous classes, dialog, tutoring and counseling. It enables a full range of audiovisual displays including applications on the computer screen, PowerPoint, video, and web. Students can share their videos and computer based presentations. It is possible to switch control of the screen and keyboard from or to any class member. A possible limitation is the bandwidth for students to “up” link video to the internet where broadband is not available.

An explosion of mobile devices replicate computer, web and telephone functions. Books, CDs and videos can be purchased, downloaded from the internet, and stored on [Kindle](#), [Nook](#), [i-Pad](#), and similar devices. Laptops have integrated [webcams](#) and internet connectivity; [Netbooks](#) are smaller and lower in cost. Smart phones such as [Blackberry](#), [i-Phone](#) and [Droid](#), are communication centers with two-way wireless and 3G broadband to connect the internet.

Amazing improvements in hardware, software, processing, storage, and user interface have commanded an equally amazing public response. They are owned by an increasing percentage of students, who use them for social networking and “surfing” the web. In the hands of creative teachers, these flexible [mobile devices](#) should become powerful tools for learning.

Editor's Note: This is well-documented research of an important area of concern within the Online Learning Division of Education. Boredom may be a student excuse but a valid one to be considered as evaluation of teaching, whether face-to-face or at a distance. What is essential is recognition of and support of students to positively engage in distance learning- i.e. positive motivation.

Impact of learner engagement on attrition rates and student success in online learning

Christine E. Schaeffer & George D. Konets

USA

Abstract

Attrition rates, learner engagement issues, and concerns relating to student success are growing pains currently plaguing online learning. Defining these issues, the factors behind them and developing potential solutions are concurrent priorities in education theory and application. This article serves to examine the condition of these concerns, the recent developments that have emerged through research, and to provide a critical perspective as to the online learners' progress and course. Improving learner engagement in online courses positively impacts retention rates and student success, however the methods for engaging students are diverse and the level of effectiveness for each method may vary from learner to learner.

Keywords: Online learning, distance education, distance learning, attrition, dropouts, engagement, online community, social networking, learner centered, social presence

Concerns Within Online Learning

Across the country, many secondary schools look towards online programs to supplement existing curriculum as these programs provide high-achieving students the opportunity to enroll in courses not typically available at their physical school. Additionally some secondary schools view online programs as a learning option for at-risk, disengaged teens. Educators struggle to agree that disengagement is even a crisis, let alone something for which districts and individual schools need to extend additional resources to support at-risk students. While online courses and programs sound like an easy and appealing solution, online program attrition rates are consistently higher than attrition rates of traditional on-site delivery methods. Therefore, placing at-risk students into online programs may not be the solution for these disengaged youth. Online coursework requires personal qualities that at-risk students often do not possess or need assistance in cultivating.

Problem Statement

Defining "At-Risk"

A large proportion of the secondary education students in the United States may be considered "at-risk," as they report themselves to be disengaged from their educational experience. In March 2009, a Gallup Student Poll surveying over 70,000 secondary school students from across the United States found that 50% report feeling "not engaged" or "actively disengaged," and 50% of the respondents feel "stuck" or "discouraged" with their educational experience (Lopez, 2009). Disengagement is an indicator that a student may be considered "at-risk" (Bridgeland, Dilulio, & Balfanz, 2009). Educators define "at-risk" students as those at-risk of leaving an academic setting by dropping out, aging out, or expulsion for behavioral reasons (Watson & Gemin, 2008).

Causes of Attrition

Dissatisfaction and isolation among learners are major concerns and causes for high attrition rates in online learning programs, and may be solved in part by redefining and reapplying the concept

of community. There is a rapid increase in the number of students enrolled in online learning based courses (Bambara, Harbour, Davies, & Athey, 2009). However, high attrition rates have become a problem that persists despite the overall growth of the field (Van Tryon & Bishop, 2009). These dropout rates were found to range between 15 and 50% greater than those of traditional classroom face-to-face learning courses (Bambara, et al., 2009). Dissatisfaction with online learning is seen as one of the key issues which contribute to these abnormally high rates of student attrition (Lin, Lin, & Laffey, 2008).

Overall dissatisfaction with the learning environment has been traced to various causes, feelings of learner isolation ranking chief among them (Joyce & Brown, 2009). Learner disconnection and lack of immediacy are continually reported as major causes for student dropouts as well as lack of overall satisfaction in online learning based programs (Van Tryon & Bishop, 2009). Developing a sense of community in order to foster connectivity and interaction within online courses is challenging because the concept of community is often viewed as location specific. Changing these preconceptions and encouraging the growth of the notion of community from that of a geographic specific idea to a relationship-based model is important for the success of isolated learners and for online learning as a whole (Joyce & Brown, 2009).

Who is to Blame?

Educators do not appear to agree on a cause of or resolution for the disengagement and dropout problem plaguing the country. Bridgeland, Dilulio, and Balfanz (2009) surveyed high school teachers and principals across the nation about their perceptions of the current state of student engagement and retention. The researchers also included a small sample of recent high school dropouts to garner their input and reactions. Two-thirds of the former students report that they did not work as hard as they could have, because they felt the educational system did not place stringent enough demands on them. They report being bored. Interestingly, 42% of the responding teachers report that boredom is an excuse, and less than half (32%) report that they do not expect all students to meet high academic standards and be prepared for college. In contrast, 70% of the principals believe there is validation to the dropouts' responses, and 87% report there is work to be done to engage students.

Recognizing Traits of Success

Several states and individual school districts are looking towards online options to support and reengage the at-risk student population, but this may not be an adequate solution to the problem. Research exists to demonstrate student success in such online programs (Watson & Gemin, 2008), but additional points must be considered. Demographics and family background impact initial commitment to education and personal goals, which then impacts a student's integration into the academic community and overall degree persistence (Morris, Wu, & Finnegan, 2005; Tinto, 1975, 1993). While this research focuses on traditional-age undergraduate college students, and researchers caution the correlation of higher education findings to K-12 students without validation (Barbour, 2007; Cavanaugh, Gillan, Kromrey, Hess, & Blomeyer, 2004; Ronsivalle & Watkins, 2005), a significant body of scholarly research currently does not exist pertaining to secondary school student success or attrition in online programs. From the research that does exist, it appears that student qualities necessary for success in online education are consistent across both secondary and higher education settings.

A review of relevant high school and higher education-related literature demonstrates that successful online students are typically goal-oriented (Roblyer & Marshall, 2002-2003) with higher cumulative grade point averages (Diaz, 2002; Dupin-Bryant, 2004; Wojciechowski & Palmer, 2005). In addition, they demonstrate greater determination (Morris, Finnegan, & Wu, 2005) and motivation (McLester, 2002; Morris, Finnegan, et al., 2005; Muller, 2008; Roblyer & Marshall, 2002-2003). Finally, successful online students appear to be actively engaged in the

academic experience before enrolling in an online course or program (Morris, Finnegan, et al., 2005), willing to take risks (Roblyer & Marshall, 2002-2003), and able to interact comfortably with basic technology (Dupin-Bryant, 2004; McLester, 2002; Roblyer & Marshall, 2002-2003; Romi, Hansenson, & Hansenson, 2002). In general, students must be ready and prepared to successfully complete an online course or program (Harrell, 2008).

Impact of Engagement on Online Student Retention and Success

College and university administration recognize the impact of student retention on institutional success. Engagement serves as a foundation to successful student retention initiatives. The more engaged a student is, the more likely he or she will remain enrolled in a particular course or in the institution as a whole (Tinto, 1975). Relevant literature, as demonstrated in this essay, suggests that a key element of engagement, particularly in online coursework, is professors' instructional approaches. Therefore, shifting from face-to-face to online learning environments may challenge instructors to rethink their teaching methodologies. Additionally, institutions must consider the type and range of services offered to online students to support their overall college experience.

Incorporating Learner-Centered Instructional Methodologies

A constructivist approach forms the basis of learner-centered instructional methodologies that are relevant and meaningful for students. Constructivist instructors guide learning but do not direct it, for faculties involve students in shaping the learning objectives (Diaz & Bontenbal, 2001). Furthermore, students construct knowledge from relating new information to old knowledge. Therefore, good teaching and engaged learning is contextualized for learners so that it is relevant and appropriate (Adams, 2007).

A learner-centered approach requires flexibility on behalf of course instructors. As the role of instructors in online courses continue to evolve (Beldarrain, 2006), the varied demographics of students enrolled in online courses suggest that these instructors adjust instructional strategies to best meet the needs of their students (Angelino, Williams, & Natvig, 2007; Diaz & Bontenbal, 2001; Reigeluth, 1999). This is not to imply that faculty adjust overall course objectives or expected learning outcomes. Instead, faculty may fine-tune the course learning strategies to meet the objectives and outcomes (Angelino, et al., 2007). Faculty should consider interaction between the faculty and students and students overall while modifying instructional strategies, as instructor responsiveness impacts retention (Herbert, 2006).

Central to constructivist learning methodologies is faculty-to-student and student-to-student interaction. These methodologies require significant interaction between faculty and students and amongst students themselves (Diaz & Bontenbal, 2001). Developing strong and supportive relationships within the course or program increases student comfort with the instructor, each other, the course, and the online learning environment overall (Angelino, et al., 2007).

Offering Effective Online Student Services

The need for student engagement carries beyond academic coursework. Hughes (2004) suggests that institutions offer services to support online learners and mirror those services available to on-site face-to-face students. Online students require services similar to face-to-face students such as academic support and tutoring, career services, club, and extra-curricular lectures and activities (LaPadula, 2003). These services should be student-centered and interactive (Four principles of effective online student services; Hughes, 2004; Lorenzetti, 2006). Moreover, many students crave interactive and responsive services (Four principles of effective online student services; Hughes, 2004).

Developing a Sense of Online Community

Developing online communities which increase social connectedness and presence may help alleviate learner isolation and lessen both dissatisfaction and attrition rates. Social aspects are believed to be a more significant factor contributing to dissatisfaction with online learning than problems with the actual process of learning (Lin, et al., 2008). Developing a sense of community and learner connectedness with other students as well as the instructor has been seen to increase student motivation and overall educational value (Shen, Nuankhieo, Huang, Amelung, & Laffey, 2008). This social connectedness helps to alleviate the anxieties and stresses that lead to student attrition (Van Tryon & Bishop, 2009). Student interaction is a vital component in building a greater sense of community in online courses (Lin, et al., 2008).

Increasing levels and channels of student communications and relations has been explored by a number of avenues using online social networking sites like Facebook and Myspace in order to augment the levels of social presence in a group of learners. These endeavors have been more successful when proper guidance and instruction are given and practiced in regards to using the mediums for proper course-defined procedures and networking (Joyce & Brown, 2009). In addition, the creation of online groups for the purpose of collaboration and knowledge sharing has been studied. Success in these specific instances has hinged on establishing trust among group members; however groups that fail to establish trust experience dissatisfaction and higher levels of attrition (Thoms, Garrett, Herrera, & Ryan, 2008).

Critical Review/

Critical Evaluation

Many of the techniques used to foster increased levels of connectedness and social presence involve proactive student participation. However little has been mentioned to address reaching and assisting students who are not generally socially proactive in the context of online learning. According to Van Tryon & Bishop (2009), in face-to-face learning environments there exists the host of nonverbal cues and factors which build immediacy and social presence even amongst students who are generally quiet and non-participatory. Also an instructor can use such information to creatively draw inactive students into classroom events and increase their level of participation. Thus the socially inactive student benefits twofold as physical presence and nonverbal cues benefit immediacy and the instructor may be able to use this superficial immediacy to draw the learner into deeper social involvement. Learners who are not socially proactive however may not derive much benefit from measures taken to increase social collaboration in online learning environments. Thus measures should be taken in order to develop and explore existing theoretical conceptions for advancing community and social presence in online learning. However additional measures should also be taken to account for the learners who may not neatly fit into existing theoretical frameworks.

Without movement towards more individualized and personalized student support and services, online program retention will continue to lag behind physical classroom programs. Independent Schools in Texas and The Florida Virtual School demonstrate this movement by successfully utilizing online programs driven by individualized attention and services to support at-risk secondary students (Watson & Gemin, 2008). Even with added support and individualized attention, educators are still not convinced that all students, especially at-risk students, have the necessary skills to succeed in an online environment (Ronsisvalle & Watkins, 2005; Wojciechowski & Palmer, 2005). Commonly understood characteristics of at-risk students do not come close to meeting the necessary qualities of successful online students as defined in the preceding paragraphs. Therefore, educators may be setting these already risky students up for failure by placing them in an online environment and expecting them to excel.

Conclusions

Instructors must be cognizant of the students enrolled their courses. Some students, especially younger and less experienced students, may not initially realize the responsibilities related to online learning. Therefore faculty may want to consider additional or increased and poignant interaction with students who demographically appear to be at risk of withdrawing or failing. Further, in order to meet the needs of the varied students within one online class, instructors may need to rethink their instructional approach and consider integrating multiple approaches.

Similar to academic coursework, student service professionals must rethink and retool online services to ensure they meet the needs of the targeted population of students. Simply listing a tutoring center's hours and expecting students to come to campus to utilize these services will no longer suffice. If students enrolled in a distance education program are truly studying at a distance, their ability to utilize on-campus services is limited. Therefore students require online services mirroring those services offered to on-campus students, yet offered in cyberspace.

Increased retention in online courses requires colleges and universities as a whole to examine instructional strategies and student services. The integration of learner-centered instructional methodologies and the deployment of student-centered services developed specifically to meet the needs of online learners require increased interaction between faculty and students, university professional staff and students, and among students themselves.

Developing socially-situated online interactive learning communities will likely lead to increased student engagement and reduced student attrition in online programs. It falls to us as researchers to determine the validity of this assertion.

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References

- Adams, Nan B. (2007). Toward a model for knowledge development in virtual environments: Strategies for student ownership. *International Journal of Social Sciences*, 2(2). Retrieved from Academic OneFile March 13, 2010.
- Angelino, L. M., Williams, F. K., & Natvig, D. (2007). Strategies to engage online students and reduce attrition rates. *Journal of Education Online*, 4(2), 1-14.
- Bambara, C., Harbour, C., Davies, T., & Athey, S. (2009). Delicate Engagement: The Lived Experience of Community College Students Enrolled in High-Risk Online Courses. *Community College Review*, 36(3), 219.
- Barbour, M. (2007). Principles of effective web-based content for secondary school students: Teacher and developer perceptions. *Journal of Distance Education*, 21(3).
- Beldarrain, Y. (2006). Distance education trends: Integrating new technologies to foster student interaction and collaboration. *Distance Education*, 27(2), 139-153.
- Bridgeland, J. M., Dilulio, J. J., & Balfanz, R. (2009). On the front lines of school: Perspectives of teachers and principals on the high school dropout problem: Civic Enterprises.
- Cavanaugh, C. S., Gillan, K. J., Kromrey, J., Hess, M., & Blomeyer, R. (2004). The effects of distance education on K-12 student outcomes: A meta-analysis. Naperville: Learning Point Associates.

- Diaz, D. P., & Bontenbal, K. F. (2001). Learner preferences: Developing a learner-centered environment in the online or mediated classroom. *Education at a Distance*, 15(8).
- Diaz, D. (2002). Online drop rates revisited. *The Technology Source*, http://technologysource.org/article/online_drop_rates_revisited/.
- Dupin-Bryant, R. A. (2004). Pre-entry variables related to retention in online distance education. *The American Journal of Distance Education*, 18(4), 199-206. Retrieved March 10, 2010 from http://www.usdla.org/html/journal/AUG01_issue/article03.html.
- Four principles of effective online student services. (2006). *Recruitment & Retention in Higher Education*, 20(3), 8.
- Harrell, I. L. (2008). Increasing the success of online student. *Inquiry*, 13(1), 36-44.
- Herbert, M. (2006). Staying the course: A study in online student satisfaction and retention. *Online Journal of Distance Learning Administration*, 9(4).
- Hughes, J. A. (2004). Supporting the online learner. In T. Anderson and F. Elloumi (Eds.), *Theory and Practice of Online Learning* (pp. 367-384). Canada: Athabasca University.
- Joyce, K., & Brown, A. (2009). Enhancing Social Presence in Online Learning: Mediation Strategies Applied to Social Networking Tools. *Online Journal of Distance Learning Administration*, 12(4).
- LaPadula, M. (2003). A comprehensive look at online student support services for distance learners. *The American Journal of Distance Education*, 17(2), 119-128.
- Lin, Y., Lin, G., & Laffey, J. (2008). Building a social and motivational framework for understanding satisfaction in online learning. *Journal of Educational Computing Research*, 38(1), 1-27.
- Lopez, S. J. (2009). Gallup student poll national report *GALLUP Student Poll*. Washington, D.C.: GALLUP Poll.
- Lorenzetti, J. P. (2006). Developing effective online student services. *Distance Education Report*, 10(4), 5-6.
- McLester, S. (2002). Virtual learning takes a front row seat. *Technology and Learning*, 24-36.
- Morris, L. V., Finnegan, C., & Wu, S. (2005). Tracking student behavior, persistence, and achievement in online courses. *Internet and Higher Education*, 8, 221-231. doi: 10.1016/j.iheduc.2005.06.009
- Morris, L. V., Wu, S., & Finnegan, C. (2005). Predicting retention in online general education courses. *The American Journal of Distance Education*, 19(1), 23-36.
- Muller, T. (2008). Persistence of women in online degree-completion programs. *International Review of Research in Open and Distance-Learning*, 9(2), 1-18.
- Reigeluth, C. M. (1999). What is instructional design theory? In C. M. Reigeluth (Ed.), *Instructional Design Theories and Models: A New Paradigm of Instructional Theory* (Vol. 2, pp. 5-29). Mahwah: Lawrence Erlbaum Associates.
- Roblyer, M. D., & Marshall, J. C. (2002-2003). Predicting success of virtual high school students: preliminary results from an educational success prediction instrument. *Journal of Research on Technology in Education*, 35(2), 241-255.
- Romi, S., Hansenson, G., & Hansenson, A. (2002). E-learning: A comparison between expected and observed attitudes of normative and dropout adolescents. *Education Media*

- International*, 47-54. doi: 10.1080/0952398021013122 2
- Ronsisvalle, T., & Watkins, R. (2005). Student success in online K-12 education. *The Quarterly Review of Distance Education*, 6(2), 117-224.
- Shen, D., Nuankhieo, P., Huang, X., Amelung, C., & Laffey, J. (2008). Using social network analysis to understand sense of community in an online learning environment. *Journal of Educational Computing Research*, 39(1), 17-36.
- Thoms, B., Garrett, N., Herrera, J., & Ryan, T. (2008). *Understanding the Roles of Knowledge Sharing and Trust in Online Learning Communities*.
- Tinto, V. (1975). Dropout from higher education: A theoretical synthesis of recent research. *Review of Educational Research*, 45(1), 89-125.
- Tinto, V. (1993). *Leaving College: Rethinking the Causes and Cures of Attrition* (2nd edition ed.). Chicago: Chicago University Press.
- Van Tryon, P., & Bishop, M. (2009). Theoretical foundations for enhancing social connectedness in online learning environments. *Distance Education*, 30(3), 291-315.
- Watson, J., & Gemin, B. (2008). Using online learning for at-risk students and credit recovery *Promising Practices in Online Education*: North American Council for Online Learning.
- Wojciechowski, A., & Palmer, L. B. (2005). Individual student characteristics: Can any be predictors of success in online classes? *Online Journal of Distance Learning Administration*, 8(2),
<http://www.westga.edu/~distance/ojdla/summer82/wojciechowski82.htm>.

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Editor's Note: This paper compare the effectiveness of different kinds of feedback in Computer Assisted Language Learning.

The Effect of Computer-Mediated Corrective Feedback on the Development of Second Language Learners' Grammar

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Iran

Abstract

The present study investigated the impact of two types of computer-mediated corrective feedback on the development of learners' second language (L2) knowledge: (1) implicit feedback in the form of recast, and (2) explicit feedback in the form of meta-linguistic feedback. The participants of this study, 30 beginning level learners of English, were randomly divided into two experimental groups and one control group. The experimental groups completed two computer-mediated focused tasks activities about the target structure in the study. During task-based interaction via text-chat, the learners received focused, corrective feedback when an error was made with the target form. Acquisition was measured by means of the three tests: computerized fill-in-the-blank test, grammatical judgment test, and a meta-linguistic knowledge test. Analysis of the results on the computerized fill-in-the-blank test and the meta-linguistic knowledge test indicated that the experimental groups who received computer-mediated corrective feedback in the form of meta-linguistic feedback and recast differed significantly from the control group. The results obtained from the grammatical judgment test showed some benefits though the values obtained did not reach statistical significance. The findings also indicated computer-mediated corrective feedback in the form of meta-linguistic feedback is more effective than computer-mediated corrective feedback in the form of recast.

Keywords: Corrective Feedback, Recast, Meta-linguistic Feedback, Text-Chat.

Introduction

Computer assisted language learning (CALL) has received a great deal of attention in the field of second language acquisition (SLA) in recent years and every year an increasing number of teachers are using computers in their second language (L2) and foreign language classrooms, (Kawase, 200). Computers, which entered school life in the late 1950s in developed countries, are still increasing in number day by day throughout the world. Today, they have become more powerful, faster, easier to use, more convenient and cheaper, and they can process and store much more data, as well (Gunduz, 2005).

At the end of the 20th century, the Computer-Mediated Communication (CMC) and the Internet have reshaped the use of computers for language learning. Computers are no longer a tool for only information processing and display but also a tool for information processing and communication (Gunduz, 2005). Warschauer (1996a) argues that CMC is probably the single computer application to date with the greatest impact on language teaching. Warschauer (1999) points out that its strength is in the provision of 'time and place independent' environment for the interaction of not only one-to-one, one-to-many or many-to-one, but, basically, many-to-many. Nonetheless, as Dhaif (1989) claims computers can never replace the 'live' teacher, especially in language teaching, where the emphasis is on mutual communication between people. It can just play a role in teaching the second or foreign language as an aid to the teacher.

CMC, conventionally, is divided up into two broad categories: (1) asynchronous CMC (ACMC e.g., email and bulletin boards) and (2) synchronous CMC (SCMC e.g., real-time, live discussion via online channels such as chat systems) (Abram, 2003). Synchronous CMC helps learners to expand the exposure to the target language through real-time interaction (Lee, 2008). When learners engage in interaction, they can receive feedback, and have opportunities to produce modified output, all of which facilitate the development of learners' interlanguage (Long & Robinson, 1998). The absence of nonverbal cues in text chats (e.g., facial expressions) affects the way corrective feedback is generated. The visual salience of written discourse and the self-paced setting in a text-based medium increase learner' opportunities to take notice of errors and make output modifications including self-repairs (Lee, 2004). To date, the CMC studies, grounded in Long's Interaction Hypothesis (1996), have focused on how negotiation of meaning elicits corrective feedback using various types of negotiation moves (e.g., clarification requests, recasts) to attain mutual comprehension (Smith, 2003).

Despite the fact that a limited number of studies showed that CMC enhanced the development of grammatical competence through noticing errors in certain syntactical features (e.g., Fiori, 2005; Salaberry, 2000), other reports revealed that lexical errors were the main triggers for negotiation of meaning, whereas syntactical errors were largely ignored (e.g., Sotillo, 2000; Smith, 2003). From a pedagogical point of view, grammatical accuracy and lexical growth should be equally important for the development of L2 language competence. Accordingly, the current study explores learning outcomes following two computer-mediated corrective feedback treatments (recasts and metalinguistic prompts) on development of second language grammar of learners.

Computer Mediated Communication and Interaction

The interactionist perspective on second language acquisition (SLA) argues that conversational interaction in the target language (TL) forms the basis for language development (Smith, 2004). In his most recent version of the Interaction Hypothesis, Long (1996) claims that interactive tasks that promote learners' negotiation of meaning facilitate the development of a second language. Pica (1994) claims that meaning negotiation, as a particular way of modifying interaction, can accomplish a great deal of SLA by helping learners make input comprehensible and modify their own output and by providing opportunities for them to access L2 form and meaning.

The key interest in CMC, from an interactionist perspective on L2 learning, involves the specific ways in which CMC is relevant to and facilitative of the processes believed to be beneficial to SLA. Among the most important issues is establishing the facility of CMC to supply rich input, promote pushed output, provide plentiful and dynamic feedback, focus learners' attention on aspects of the TL, and enhance noticing (Smith, 2004). Although the current research in no way suggests that CMC can or should supplant face-to-face communication in the L2 classroom, CMC research has suggested several potential benefits over face-to- face interaction.

These benefits include an increased participation equality among students (e.g., Beauvois, 1992; Sullivan & Pratt, 1996), an increased quantity of learner output (Chun, 1994; Kern, 1995), and an increased quality of learner output (e.g., Chun, 1994; Warschauer, 1996b). There is also evidence that CMC is viewed by students as being less threatening than face-to-face interaction, which often results in an increased willingness to take risks and try out new hypotheses (Warschauer, 1997). Warschauer (1996b), for example, found that students were more inclined to pursue idea-generating discourse and were less inhibited during written production than in oral discussion.

The potential for anonymity may complement this willingness for risk taking as it has been found to create a certain distance between participants that may contribute to an observed atmosphere of critical receptivity (Kern, 1998). Kern, (1995), compared the interaction of French learners in text based online chat with interaction in face-to-face communication, and stated that learners in chat

room contexts produced more turns and sentences and used a greater variety of discourse structures. Kern (1995), found that learners using SCMC contributed an average of 2 to 3.5 more turns than those discussing a similar topic in oral interaction.

A heightened quality of learner output was also reported by Kern (1995), who found that students were linguistically more creative and sophisticated during CMC than during traditional whole-class discussions and that 80% of the students reported feeling more confident in writing French during the CMC sessions. Sotillo (2000) compared the discourse functions and syntactic complexity of 25 ESL students' writing. The results of study indicated that, whereas synchronous discussions elicited conversation that was similar to F2F communication in terms of discourse functions, asynchronous writing promoted more sustained interactions and greater syntactic complexity.

In terms of pushed output, Blake and Zyzik (2003) in a unique study exploring interaction between heritage speakers and learners of Spanish suggested that the demands of electronic chatting seem to force participants to produce the TL. Blake and Zyzik (2003) found that the CMC environment seemed to offer the Spanish heritage speakers a chance to expand their bilingual range, including grammatical, textual, illocutionary, and sociolinguistic competencies. Blake and Zyzik (2003) also suggested that the output elicited by the CMC environment can serve to remedy the incessant problem of disfluency among Spanish heritage speakers by serving to facilitate automatization of language processing.

There is some indication that the text-based CMC medium can amplify students' attention to linguistic form (e.g., Kern & Warschauer, 2000; Shekari & Tahririan, 2006) by offering learners ample opportunity to notice lexical and grammatical features in the input. As Chapelle (2001) noted, written communication likely affords more opportunity for attention to form than spoken language. The visual saliency of incoming and outgoing messages as well as the ability to reread previous messages may allow students to better attend to such formal aspects without substantially hindering the flow of communication. CMC may also afford learners more processing time, the importance of which has been addressed by Dörnyei and Kormos (1998). This extra time may lead to better comprehension and more accurate production and may also help facilitate a higher quality inter-language than would occur in a non-electronic environment (Smith, 2004).

The modest-yet-growing body of CMC research grounded in an interactionist theoretical framework suggests that learners can and do negotiate for meaning during CMC and that computer-mediated negotiated interaction is quite similar in many ways to that observed in the face-to-face literature. For example, as with face-to-face interaction, lexical items have been found to trigger the vast majority of computer-mediated negotiation, with morphosyntax triggering very little negotiation (e.g., Blake, 2000; Blake & Zyzik, 2003; Toyoda & Harrison, 2002).

CMC has also been found to be a good venue for providing learners opportunities to attend to and engage in pushed output. Finally, task types typically used during face-to-face instruction have proven successful in eliciting high amounts of learner interaction and negotiation in a CMC environment as well (Blake, 2000).

However, today most of the researchers have pointed out that communicative activities which focus solely on meaning processing are not adequate for learning a second language and a certain amount of focus on form is needed (e.g., Ellis 2001; Long , 1996). A focus on form during interaction causes learners to notice certain input features, and compare them with their own output. Therefore, teachers and material designers should consider tasks that result in attention to form while maintaining meaningful communication. The tasks that involve negotiation of meaning and focus on form (also called focused tasks) may encourage noticing of forms and

implicit learning (Ellis, 2003). The focused tasks provide a forum for students' mistakes to appear and therefore, there exists a need for corrective feedback on those mistakes.

Corrective Feedback and Second Language Acquisition

The role of corrective feedback in second language acquisition (SLA) has received much attention in the literature and it is still a topical issue (e.g., Ammar & Spada, 2006; Ellis et al., 2006). Advocates of the nativist theory claim that SLA is driven by exposure to positive evidence and comprehensible input without any need for corrective feedback (Krashen, 1985). However, there are indications that exposure and input alone might not be sufficient for high-quality L2 learning and corrective feedback plays a beneficial role in facilitating the acquisition of certain L2 forms which may be difficult to learn through input alone (Ammar & Spada, 2006).

Implicit and Explicit Corrective Feedback

All corrective feedback is classified either as explicit or implicit in form. In the case of implicit feedback, there is no overt indicator that an error has been committed, whereas in explicit feedback types, there is. Implicit feedback often takes the form of recasts, defined as corrective feedback technique that reformulates the learner's immediately preceding erroneous utterance while maintaining his or her intended meaning (e.g., in response to "The boy has three toy," a teacher might respond "The boy has three toys" (Ellis et al., 2006).

Recasts are TL reformulations by the interlocutor of a learner's nontarget-like utterances that retain the central meaning while changing the form of the utterance (Long, 1996). The recast functions both to confirm the meaning of the student's utterance and to correct the form. Recasts may draw learners' attention to the inconsistency between their utterances and the TL forms (Long & Robinson, 1998).

Schmidt (2001) described 'noticing' as a "first step in language building" that is, in integrating new language within the interlanguage system. He claimed that it is only what the learner notices about the input that holds potential for learning. In particular, learners need to notice the gap between their interlanguage forms and the TL form (Doughty, 2001). Thus, in exploring the benefits of recasts, it is important to consider what aspects of recasts highlight the changes made to nontarget-like production. Certain elements may increase the salience of the recast, that is, help to draw the learner's attention to the recast form. Although according to some researchers, recasts facilitate noticing linguistic items in productive ways, other researchers take a more pessimistic view of their effectiveness (e.g., Lyster, 1998; Panova & Lyster, 2002).

Knowledge about the effectiveness of recasts continues to expand, and it is now widely accepted that their effectiveness can be affected by some factors. Recasts raise the learner's consciousness of L2 forms in input to restructure their inter-language and finally leads to pick up of target forms. Teachers' intentions and learners' perception affect recast effectiveness (Mackey et al., 2007).

Lyster (1998) suggested that feedback options more explicit than recasts are preferable. He discovered that teachers left many errors uncorrected and also repeated correct utterances as often as they recast incorrect utterances. Given these similar response patterns for both correct and incorrect utterances, Lyster and Ranta (1997) concluded that recasts, because they are implicit, are unlikely to benefit learners, who may experience difficulty in differentiating positive and negative feedback.

Second limitation of recasts, which Lyster and colleagues (Lyster, 1998; Lyster & Ranta, 1997; Panova & Lyster, 2002) pointed out, concerns learner repair. According to these researchers, recasts are less beneficial than elicitation moves because, with recasts, the teacher solves the problem for the learners and the learners are under no compulsion to modify their own utterance

or to produce “pushed output” (Swain, 1985). Given Swain’s (1985) output hypothesis, opportunity for self-repair is an important consideration. However, although elicitation provides greater opportunity for either self-repair or other-repair, this opportunity is not always realized because self-repair requires at least latent knowledge of the targeted linguistic form. In such cases, recasts may follow unsuccessful self-repair, and the teacher’s recast resolves the knowledge gap (Loewen & Philp, 2006).

Explicit feedback can take two forms: (a) explicit correction, in which the response clearly indicates that what the learner said was incorrect (e.g., “No, not goed—went”) and thus affords both positive and negative evidence or (b) metalinguistic feedback, defined by Lyster and Ranta (1997) as “comments, information, or questions related to the well-formedness of the learner’s utterance” - for example, “You need past tense,” which affords only negative evidence.

According to Lyster (2007), metalinguistic feedback can lead learners to self-repair, whereas recasts can lead only to repetition of correct forms by students. Lyster (2007) argued that self-repair following a metalinguistic feedback requires a deeper level of processing than repetition of a teacher’s recast. Self-repair is thus more likely to destabilize interlanguage forms as learners are pushed to reanalyze interlanguage representations and to attend to the retrieval of alternative forms. In contrast to self-repair following a metalinguistic feedback, repetition of recast does not engage learners in a similarly deep level of processing nor necessitate any reanalysis.

Previous Studies on Corrective Feedback

There are a number of studies that investigated separately whether either implicit or explicit corrective feedback facilitates acquisition. Nicholas et al. (2001) and Ellis and Sheen (2006) provided reviews of the research on recasts. In general, the recast studies demonstrated that implicit feedback of this kind can have a beneficial effect on acquisition, especially when the recasts are more explicit in nature (Ellis et al., 2006). Other studies demonstrated that explicit feedback is of value. Carroll, Roberge, and Swain (1992), for example, found that a group that received explicit corrective feedback directed at two complex French noun suffixes (–age and –ment) outperformed a group that received no feedback, although no generalization of learning to nouns not presented during the treatment occurred.

Results from a number of comparison studies have found advantages for certain types of corrective feedback. Using quasi-experimental research designs with pre-test-treatment, immediate and delayed post-test structures, Ammar and Spada (2006) and Lyster (2004) investigated the effects of recasts and prompts – defined as corrective feedback techniques that push the learners to self-correct – on the acquisition of English possessive determiners and French grammatical gender respectively. Written and oral measures were used as dependent variables in the three testing sessions to measure the effects of the treatments. Ammar and Spada (2006) reported that the prompt group significantly outperformed the recast group on the immediate and delayed written post-tests. Results from the oral test indicated that the prompt group benefited more than the recast group. However, the difference between the two groups was found to be statistically significant only at the time of the delayed post-test.

A similar pattern of results emerged from the study of Lyster (2004) insofar as the prompts group outscored the recast group in both written post-tests. No differences were found between the two groups in the oral tests. Ellis et al. (2006) investigated the effects of recasts in comparison to metalinguistic feedback. An oral-elicited imitation task and a grammaticality judgement task were employed to measure the effects of the corrective feedback techniques on the acquisition of the past tense –ed prior to the treatment (pre-test) immediately after it ended (post-test) and 12 days later (delayed post-test). Results indicated that the metalinguistic group did better than the recast

group on both measures at the delayed post-test. When compared with the control group, results showed that the recast group did not perform significantly better than the control group.

While face-to-face comparison studies have found advantages for certain types of corrective feedback over others, the limited number of outcomes-based studies on corrective feedback in CMC has found no such advantage. Loewen and Erlam's (2006) study, which investigated the relative effectiveness of recasts and metalinguistic prompts administered during small group text-chat interaction, found no significant advantage for either feedback type over the control condition and no significant advantage for one corrective feedback type over the other. Analysis of their participants' pre-tests suggested that these findings may have been influenced by the learners' low proficiency with the target form (English past tense -ed), an indicator that they may not have been at a high enough level to internalize and demonstrate gains resulting from the feedback during the short duration of the study.

Similarly, a second CMC comparison study of corrective feedback found no significant difference in gains following two different types of corrective feedback: enhanced and non-enhanced recasts (Sachs & Suh, 2007, cited in Sauro, 2009). Sachs and Suh (2007) incorporated underlining and bolding of key elements of the recast that were related to the targeted form (backshifting of verbs from simple past to present perfect in reported speech). Despite a higher level of form awareness reported by participants in the enhanced condition, no significant difference in target form accuracy was found between the groups.

In other study, Sauro (2009) investigated the effects of two different types of corrective feedback (metalinguistic feedback and recasts) delivered via written SCMC on the development of L2 grammar among intermediate and advanced learners of English. Results showed no significant advantage for either feedback type on immediate or sustained gains in target form knowledge, although the metalinguistic group showed significant immediate gains relative to the control condition.

SCMC as a Context for Research on Corrective Feedback

The features of text-chat that may make synchronous computer mediated communication (text-chat) an ideal context for investigating second language acquisition processes (i.e., noticing, noticing the gap, pushed output) and outcomes from corrective feedback include the visual saliency of forms, the greater processing and planning time, and the enduring as opposed to ephemeral nature of written turns that are recorded on the computer screen (Sauro, 2009).

Written interaction, such as that afforded by text-chat, may help to increase the visual saliency of linguistic forms (Chapelle, 2001), including, for instance, English articles, third person singular –s, and the past tense-ed morpheme. According to Gass (1997), salience can be said to help ensure that particular forms are noticed by the learner and hence lead to rule strengthening. Thus, the visual saliency of linguistic forms during text-chat may help learners to either confirm or disconfirm currently held hypotheses about the target language (TL).

In addition, the slower turn taking in a written conversation, allows interlocutors both to increase the processing time and increase online planning time. The pace of a text-chat conversation is slower than that of a spoken conversation because humans cannot type as quickly as they can speak even in their L1. The increased time of text-chat may also be particularly beneficial for promoting noticing and production of TL forms that typically require greater control (Payne & Whitney, 2002). Williams (2005) points out that one factor affecting what elements of input learners notice is time pressure. Thus the reduced time pressure during text-chat may allow learners the opportunity to notice the linguistic forms in the input than they might notice in real-time spoken input. Furthermore, the reduced speed of text-chat (compared to face-to-face oral conversation) also affords language learners increased planning time to compose their own messages. Thus, the increased online planning time afforded by text-chat may promote not only

attention to target language forms in the input but also closer attention to and monitoring of target language output (Sauro, 2009).

The third feature of text-chat that may be beneficial for learners is the enduring as opposed to ephemeral record of the interaction. In contrast to the highly ephemeral nature of most face-to-face oral interaction, one of the key features of interaction via text-chat is an enduring visual record of the exchange in the chat window. The enduring nature of text-chat allows the learners to review and reuse TL forms available in the input. Accordingly, the enduring nature of text-chat permits quick hypothesis confirmation and may promote the reuse of TL forms (Sauro, 2009).

The present study

Synchronous CMC provides an ideal context for investigating second language acquisition processes (i.e., noticing, noticing the gap, pushed output) and outcomes from corrective feedback. It helps students to learn the complex or low salient forms due to the visual saliency of certain forms during written interaction, the amount of processing and planning time afforded by synchronous chat, and the enduring as opposed to ephemeral nature of the turns (Sauro, 2009). Despite the potential advantages of synchronous CMC for facilitating the noticing and learning of these low salient and difficult forms, research on learning outcomes following computer-mediated corrective feedback is still limited (e.g., Loewen & Erlam, 2006; Sauro, 2009). Accordingly, the present study investigates the impact of two types of computer-mediated corrective feedback (metalinguistic and recast feedback) delivered via written SCMC on the development of L2 grammar among beginning learners of English who possess prior knowledge of the target form.

The research was designed to answer the following question:

RQ: What is the effect of computer-mediated corrective feedback on the development of L2 learners' grammar?

Participants

The study was conducted in Kosar Private School in Meshkinshahr. The participants of the study were beginning level learners of English. They volunteered to participate in this study. The participants were classified as beginning level of learners according to scores on an Oxford Placement Test. After elimination, due to their scores, the final subject pool consisted of 30 participants. The participants ranged in age from 15 to 17. The students were classified into three groups. These three groups were randomly divided into two experimental groups (experimental group 1 =10 students, experimental group 2 =10 students) and one control group (group 3 =10 student).

Based on a pre-treatment background questionnaire, learners were determined to have similar previous experience working with computers and reported using computers regularly for purposes including e-mail, word processing, Web surfing, and chatting . Two teachers were asked to be the researcher's assistants. The participating teachers were two female English language teachers (ages: 27 and 33 years). They both held TEFL certificates and had taught adult EFL learners at both beginner and intermediate levels. They were briefed about using chat programs and were interested in the role of computer-mediated corrective feedback in language learning.

Target Structure

Past tense form was chosen as the target structure for two reasons. First, learners at the beginning level were likely to already be familiar with and have explicit knowledge of this structure. Our purpose was not to examine whether corrective feedback assists the learning of a completely new structure, but whether it enables learners to gain greater control over a structure they have already partially mastered. The second reason was that the past tense form is known to be problematic for learners and to cause errors; thus, it was hypothesized that although learners at this level would

have explicit knowledge of this structure, they would make errors in its use, especially in a communicative context

Materials

Instructional Materials

The materials used in this study included two computer-mediated focused tasks activities completed by participants. The selection of tasks was motivated by previous studies (e.g., Ellis et al., 2006; Loewen & Erlam, 2006). These tasks have been tested and used in a number of prior studies (e.g., Ellis et al., 2006; Loewen & Erlam, 2006). The tasks constituted what Ellis (2003) called focused tasks; in other words, they were designed to encourage the use of particular linguistic forms and, to this end, learners were provided with certain linguistic prompts.

Task 1

Learners were given the sequence of pictures, which narrated a short story. They were also given written account of the same story. Learners were told that they would have only a couple of minutes to read the written account of the story and that they needed to read it carefully because they would be asked to rewrite it in as much detail as possible. The story was removed and a set of verbs was given to them to help them rewrite the story and then discuss it. They were told that they would not be able to use any prompts other than the picture sequence and verb list. The opening words of the story were written to clearly establish a context for past tense: "Yesterday, Jack and Alex.....". (See Appendix A).

Task 2

Each student was given the sequence of pictures. The students were asked to write about the pictures. Pictures were chosen to depict actions that would require the use of verbs with past tense forms (Loewen & Erlam, 2006). Learners were given two minutes to prepare for writing about Michelle's weekend (see Appendix B).

Testing materials

Metalinguistic Knowledge Test

Learners were presented with five sentences and were told that the sentences were ungrammatical. The parts of the sentences containing the error were underlined. Learners were asked (a) to correct the error and (b) explain what was wrong with the sentence (in English, using their own words). They were shown one practical example. Each item was presented on a new page and test-takers were told that they were not allowed to turn back (Ellis et al., 2006). Learners scored one point for correcting the error and one point for a correct explanation of the error.

Grammaticality Judgment Test

This was a pen-and-paper test consisting of 15 sentences. Of the 15 sentences, 7 were grammatically correct and 8 were grammatically incorrect. The participants were required to (a) indicate whether each sentence was grammatically correct or incorrect, and (b) self-report whether they used a rule or intuition/feeling to judge the sentence (Ellis et al., 2006).

Learners were given two sentences to practice on before beginning the test. For past tense, 7 of the 15 statements presented the target structure in the context of new vocabulary and 8 presented the target structure in the context of vocabulary included in the instruction. Learners' responses were scored as either correct (1 point) or incorrect (0 points).

Computerized Fill-in-the-blank Test

This was a computer-based test. Learners were presented with 20 items. The participants were required to read the sentences and fill the gaps with the correct forms of given verbs. Learner's

responses were scored as either correct or incorrect. Each correct answer received one point and each incorrect answer received a zero.

Procedure

During the preparation period, Yahoo! Instant Messenger (YIM) chat program was downloaded and set up in each computer. During the first meeting, the students participated in a training session where they received an introduction to the YIM chat program, which was to be used in the study. The YIM chat program was chosen as the interface because it resembles various free chat software and Web-based programs available today. During this session, participants were given two practice tasks to complete. These tasks were shortened versions of similar tasks used in the treatment. The tasks were implemented according to Ellis' (2003) definition of tasks; that is, they included a gap, they required learners to focus primarily on meaning and to make use of their own linguistic resources, and they had a clearly defined outcome.

The interaction took place outside the classroom and outside of class time, in a small room equipped with computers. The experimental groups completed two focused tasks during the treatment sessions. Each learner was paired up randomly with one of the teachers or researcher for each activity; partners had 20 minutes to work together to complete the tasks.

During this collaborative period, English-teacher partners supplied corrective feedback when an error was made with the target form. Prior to the study, the teachers were briefly familiarized with the general categories of interactional feedback, including recasts and metalinguistic feedback, and they used them whenever they felt it was needed and appropriate. The learners received corrective feedback while performing the tasks. For example, experimental group one received implicit feedback in the form of recasts, as in (1).

(1) Yalda: yesterday, Jack and Alex go to the river for a picnic.

Teacher: went

Yalda: Jack and Alex went to the river for a picnic and...

The learners in experimental group 2 received explicit feedback in the form of metalinguistic information, as in (2).

(2) Nasim : . . . and the cow look at the picnic basket

Teacher: look, you need past tense.

Nasim: the cow looked at the picnic basket and....

This was typical of the corrective feedback episodes in the current study; the instructor first repeated the error and then supplied the meta-linguistic information.

The study took place during three weeks. Students in the experimental groups participated in four sessions that consisted of two computer-mediated focused tasks activities: a story completion task and picture description task. The post-tests were completed after four treatment sessions. During the testing session, three tests were administered in the following order: computerized fill-in-the-blank test, grammaticality judgment test, and metalinguistic knowledge test. The tests were designed to measure the effect of both types of feedback on development of L2 grammar knowledge of the participants.

Post-tests Results

The effect of both types of feedback was assessed through three tests: the meta-linguistic knowledge test, the grammaticality judgment test, and the computerized-fill-in-the-blank test. Three separate means and ANOVAs were calculated for the groups on three tests. Group differences were considered significant when $p < .05$. The analysis of data is presented below.

Analysis of Results in the Metalinguistic Knowledge Test (MKT)

The descriptive statistics of MKT, including group means and standard deviations, for each group appear in Table 1.

Table 1
Results of Descriptive Statistics for MKT

| | Mean | Maximum | Std. Deviation | Minimum |
|--|------|---------|----------------|---------|
| Experimental Group 1 (recast) | 6.5 | 1.43 | 8 | 3 |
| Experimental Group 2 (metalinguistic) | 7.00 | 1.33 | 9 | 5 |
| Control group (placebo) | 5.2 | 1.31 | 7 | |

As the above table shows, three groups' performances on MKT are different. The results indicated that the two experimental groups who received computer mediated corrective feedback in the form of metalinguistic feedback and recast feedback (metalinguistic group and recast group) obtained higher mean scores ($=7.00$ and $=6.50$, respectively) in comparison with control group ($=5.2$) that did not receive any feedback. Also, the metalinguistic group's mean ($=7.00$) was higher than that of the recast group ($=6.50$). Figure 1. displays means for three participating groups on MKT.

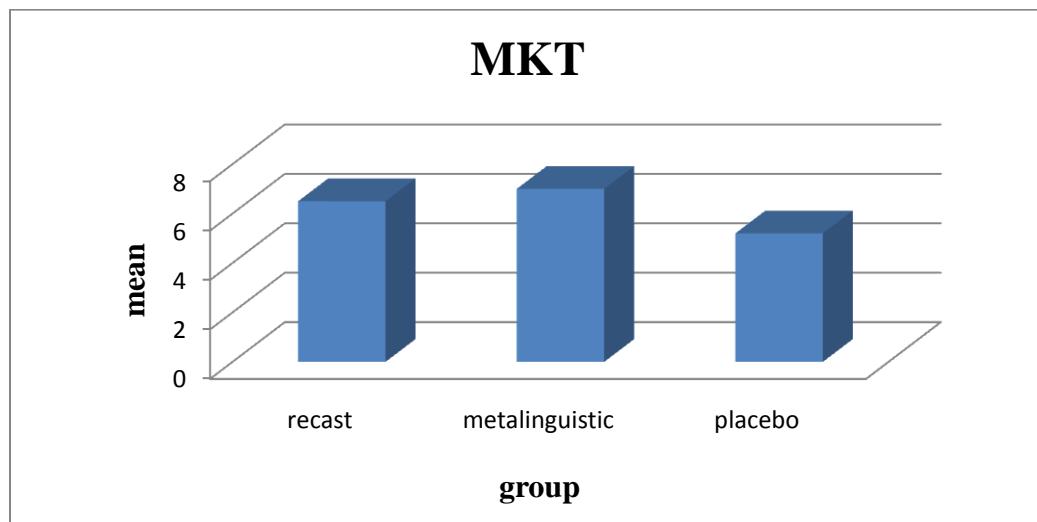


Figure 1. Group means for MKT

One way analysis of variance (one way ANOVA) was employed to find out if the difference between the three groups was significant.

The result of one way ANOVA revealed that the difference between groups was significant in MKT. Technically speaking ($F= 4.653, p = .018$) proved to be significant at the .05 level in terms of the dependent variable. A post-hoc comparison was run to exactly pin down where the difference lays. The results showed that there was a meaningful difference between the experimental groups who received computer-mediated corrective feedback and the control group who did not receive any feedback. However, the difference between the two experimental groups (the recast group and the metalinguistic group) was not statistically significant.

Analysis of Results in the Grammaticality Judgement Test (GJT)

Group means and standard deviations for the three participating groups on GJT appear in Table 2.

Table 2
Results of Descriptive Statistics for GJT

| | Mean | Maximum | Std. Deviation | Minimum |
|--|------|---------|----------------|---------|
| Experimental Group 1 (recast) | 12.6 | 1.07 | 15 | 11 |
| Experimental Group 2 (metalinguistic) | 12.8 | 1.68 | 15 | 10 |
| Control group (placebo) | 11.7 | 1.05 | 13 | 10 |

As the above table shows, both metalinguistic and recast groups obtained higher mean scores ($=12.6$ and $=12.8$, respectively) in comparison with the control group ($=11.7$). Also, the metalinguistic group's mean ($=12.8$) was higher than that of recast group ($=12.6$). Figure 2. displays the means for three participating groups on GJT.

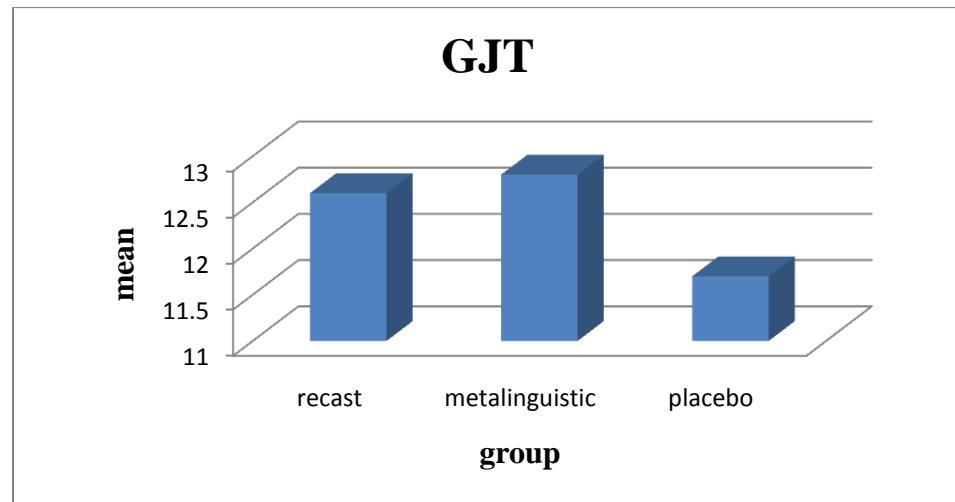


Figure 2. Group means for the GJT

The results of the one way ANOVA revealed that the difference between groups was not statistically significant ($F=2.011, p=.153$) at the .05 level in terms of dependent variable.

Analysis of Results in the Computerized Fill-in-the-blank Test (CFBT)

Table 3 presents the group means and standard deviations for each participating groups in CFBT.

Table 3
Results of Descriptive Statistics for CFBT

| | Mean | Maximum | Std. Deviation | Minimum |
|--|-------|---------|----------------|---------|
| Experimental Group 1 (recast) | 17.20 | 1.47 | 19 | 14 |
| Experimental Group 2 (metalinguistic) | 17.80 | 1.87 | 20 | 13 |
| Control group (placebo) | 14.90 | 2.02 | 17 | 10 |

As the above table shows, the two experimental groups (the metalinguistic group and the recast group) obtained higher mean scores ($M = 17.80$ and $M = 17.20$, respectively) in comparison with the control group ($M = 14.90$). Also, the results indicated that the metalinguistic group's mean ($M = 17.80$) was higher than that of the In recast group ($M = 17.20$). Figure 3 displays the group means graphically.

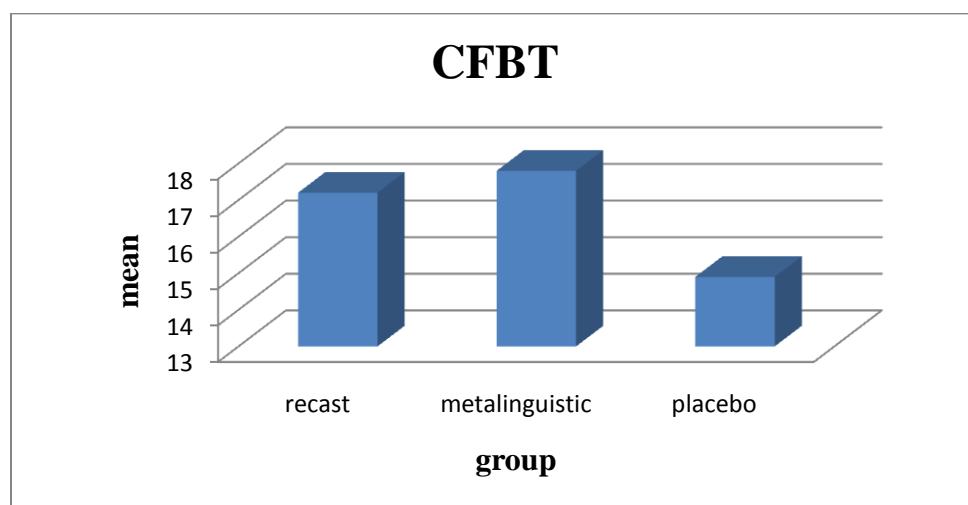


Figure 3. Group means for the CFBT

In one way ANOVA was administered to find out if the difference between groups was significant. The results of this one way ANOVA, provided in table 4.7, revealed that the difference between groups was significant. Technically speaking ($F = 7.182, p = .003$) proved to be significant at the .05 level in terms of the dependent variable.

A post-hoc comparison was run to determine exactly where the difference lies. The Tukey's post hoc pairwise comparisons revealed that the control group has meaningful differences with both the metalinguistic group and the recast group. In other words, both experimental groups (metalinguistic and recast group) significantly outperformed the control group. However, the results did not show such a significant difference between the recast group and metalinguistic group.

Discussion

In summary, the findings of the present study suggest that, at least in a chat environment, recasts and metalinguistic feedback were effective. Learners in the two experimental groups (metalinguistic and recast groups) benefited more than those who were in the control group (i.e., with no corrective feedback). Furthermore, comparisons of the results indicated the experimental

group that received computer-mediated corrective feedback in the form of metalinguistic information outperformed the group that received computer-mediated corrective feedback that reformulates the error in the form of recasts.

Students' inability to benefit from recast feedback to the same extent as metalinguistic feedback may be due to the differential noticeability of both corrective feedback techniques. Although no direct measure of noticing was used in the present study, it may be argued that learners were unable to notice recasts. In other words, learners in the recast group might have been able to detect the reformulations but could not store them in long-term memory for subsequent retrieval and accurate use. Despite the protracted processing time the written synchronous computer-mediated communication environment afforded participants, reformulations that occurred during the interaction may still have been less likely to be noticed. Metalinguistic feedback, on the opposite, by explicitly signalling the presence of an error and pushing the learners to modify their own output, might have been more noticeable and hence more effective.

Concern with correction of mistakes is the second principal factor that might have contributed to the superior results of metalinguistic feedback over recast feedback. Learners in the metalinguistic feedback group were pushed to correct their ungrammatical utterances, which had the potential to take up to 100% of the time. More importantly, all of the repairs were student-generated. However, and as Van den Branden (1997) pointed out, metalinguistic feedback always encourages the learner to take part in the process of repair, which puts him or her in the appropriate framework to at least acknowledge the suggested solution and, therefore, to notice it. So whether the reformulation was provided by the student who initially produced the error or by his or her peers, the learner was always forced to confront his or her errors and to revise the pertinent hypotheses.

In the recast group, however, the teacher was the one who always provided the correct form. Students had neither an obligation nor an opportunity to draw on their own resources in order to try to come up with the correct grammatical form. In other words, the teacher solves the problem for the learners and the learners are under no compulsion to modify their own utterance or to produce "pushed output" (Swain, 1985). Although it is true that the teacher's reformulations might have led to uptake in the recast group, uptake following recasts is not necessarily evidence of hypothesis re-evaluation, noticing, and L2 learning. As mentioned previously, even though learners' reactions to teachers' recasts might be the result of hypothesis testing or evaluation, they might also simply be repetitions that do not involve any analysis. Therefore, it is not only the quantity of uptake opportunities that might have led to the differences between the metalinguistic group and the recast group but also the nature of the uptake opportunities.

In contrast, metalinguistic feedback, in part due to its overtly corrective nature, tended not to go unnoticed by the participants, as the examples in (3) and (4) suggest (see, next page). In both episodes, the teacher's feedback move overlaps with the learner's preceding move but, because the metalinguistic feedback is longer, it might have been better attended to and perceived as overtly corrective. In both episodes, however, the learner successfully repairs the error following the feedback move, but, again, there is evidence of greater awareness that repair is needed in the metalinguistic episode. Whereas in (3) the learner simply repeats the reformulated past tense verb, in (4) the learner's "yes" seems to overtly acknowledge that repair was required. Thus, metalinguistic feedback—in comparison to recasts—seems more likely to lead to greater depth of awareness of the gap between what was said and the target norm, thereby facilitating the acquisition of implicit knowledge. It is also important to recognize that the metalinguistic feedback, as illustrated in (4), does not intrude unduly in the communicative flow of the activity. It constitutes a brief time-out from communicating, which allows the learner to focus explicitly but briefly on form. The effectiveness of the metalinguistic feedback, therefore, might derive in

part from the high level of awareness it generates and in part from the fact that it is embedded in a communicative context.

(3) *Yalda*: yesterday two boys, Jack and Alex go to the river for a picnic (Oct 10, 2009 9:24:56 AM)

Teacher: went (Oct 10, 2009 9:2 :5 AM)

Yalda: went to the river for a picnic (Oct 10, 2009 9:25:56 AM)

(4) *Nasim*: and the cow look at the picnic basket (Oct 10, 2009 11:10:15 AM)

Teacher: look, you need past tense (Oct 10, 2009 11:10:50 AM)

Nasim: looked -yes (Oct 10, 2009 11:11: 5AM)

Nasim: she looked at the picnic basket and smelled the cakes and sandwiches (Oct 10, 2009 11:11:50 AM)

What is also revealed in these excerpts is that there is slower turn taking in text-chat. According to Sauro (2009) the increased time that is afforded in text-chat may also be particularly beneficial for promoting noticing and production of TL forms that typically require greater control.

Williams (2005) points out that one factor affecting what elements of input learners notice is time pressure. Thus, the reduced time pressure to process incoming messages during text-chat may allow learners the opportunity to notice a broader range of linguistic forms in the input than they might notice in real-time spoken input.

Furthermore, the reduced speed of text-chat (compared to face-to-face oral conversation) also affords language learners increased planning time to compose their own messages. Thus, the increased online planning time afforded by text-chat may be particularly beneficial for promoting not only attention to target language forms in the input but also for promoting closer attention to and monitoring of target language output. Both increased processing time (Payne & Whitney, 2002) and increased online planning time. Thus, these features of the text-chat medium together with higher rates of uptake following metalinguistic feedback in comparison with recast feedback may have given the participants in the metalinguistic group the time and opportunity to notice, analyze and internalize the corrective feedback.

Conclusion and Pedagogical Implications

This study has examined the relative effectiveness of two different types of computer-mediated corrective feedback on the development of L2 target form knowledge. Despite the fairly limited amount of feedback generated, the results demonstrated higher gains in development of grammar knowledge for groups who received computer-mediated corrective feedback in comparison to the control group. The findings showed that computer-mediated communication provided favorable conditions for feedback negotiation and also helped learners to focus on their grammar errors.

This study indicates some support for using text-based CMC to expand learners' grammatical accuracy. Thus, it would be reasonable to allocate some time to the training of teachers in this regard. The findings of this study may also have implications for the design of learning activities to be completed using instant messaging or SCMC. As L2 learners collaborate in online communicative activities with their partners, focused corrective feedback might eventually lead to successful learner uptake. These constitute supplemental learning activities that can take place outside the traditional classroom environment.

Limitations and Suggestions for Further Research

This study was narrowed down in terms of its participants, structure in focus, techniques of corrective feedback, etc. It seems necessary to point out some further research needs to be done in this regard. Future research should address the limitations outlined as well as several other areas. For example, the study only considered of two different types of computer-mediated corrective feedback (metalinguistic feedback and recast) and not other types of corrective feedback. It is suggested that similar studies be conducted with other types of computer-mediated feedback whether implicit ones or explicit ones, such as clarification request, elicitation, etc.

Moreover, more comprehensive studies could be done to investigate the effect of more than two techniques at a time on language acquisition. Since the present study focused on only one structure in English, similar studies could examine the accuracy gains in terms of other structures in English or any other languages. Finally, this study could be replicated with learners at higher levels of language proficiency.

References

- Ammar, A., & Spada, N. (2006). One size fits all? Recasts, prompts an L2 learning. *Studies in Second Language Acquisition*, 28, 543–574.
- Abrams, Z. I. (2003). The effects of synchronous and asynchronous CMC on oral performance in German. *The Modern Language Journal*, 87(2), 157–167.
- Beauvois, M. H. (1992). Computer-assisted classroom discussion in the foreign language classroom: Conversation in slow motion. *Foreign Language Annals*, 25, 455–464.
- Blake, R. (2000). Computer mediated communication: A wind on L Spanish interlanguage. *Language Learning & Technology*, 4, 120–136.
- Blake, R., & Zyzik, E. (2003). Who's helping whom? Learner/heritage-speakers' networked discussions in Spanish. *Applied Linguistics*, 24, 519–544.
- Carroll, S., Roberge, Y., & Swain, M. (1992). The role of feedback in adult second language acquisition: Error correction and morphological generalizations. *Applied Psycholinguistics*, 13, 173–198.
- Chapelle, C. (2001). *Computer applications in second language acquisition: Foundations for teaching, testing, and research*. New York: Cambridge University Press.
- Chun, D. M. (1994). Using computer networking to facilitate the acquisition of interactive competence. *System*, 22, 17–31.
- Dhaif, H. A. (1989). Can computers teach languages? *English Teaching Forum*. 27(3), 17–19.
- Dörnyei, Z., & Kormos, J. (1998). Problem-solving mechanisms in L2 communication. *Studies in Second Language Acquisition*, 20, 349–385.
- Doughty, C. (2001). Cognitive underpinnings of focus on form. In P. Robinson (Ed.), *Cognition and second language instruction* (pp. 206–257). New York: Cambridge University Press.
- Ellis, R. (2001). Introduction: investigating form-focused instruction. *Language Learning*,
- Ellis, R. (2003). *Task-based language learning and teaching*. Oxford: Oxford University Press.
- Ellis, R., Loewen, S., & Erlam, R. (2006). Implicit and explicit corrective feedback and the acquisition of L2 grammar. *Studies in Second Language Acquisition*, 28(2), 339–368.
- Fiori, M. (2005). The development of grammatical competence through synchronous computer-mediated communication. *CALICO Journal*, 22(3), 567–602.
- Gass, S. M. (1997). *Input, interaction, and the second language learner*. Mahwah, NJ: Erlbaum.
- Gunduz, N. (2005). Computer assisted language learning. Retrieved April 25, 2009, from <http://jlls.org/Issues/Volume1/No.2/nazligunduz.pdf>

- Kawase, A. (2005). *Second language acquisition and synchronous computer mediated communication*. Retrieved April 17, 2009, from <http://www.tc.columbia.edu/tesolwebjournal>.
- Kern, R. (1995). Restructuring classroom interaction with networked computers: Effects on quantity and characteristics of language production. *The Modern Language Journal*, 79, 457–476.
- Kern, R. (1998). Technology, social interaction, and FL literacy. In J. A. Muyskens (Ed.) *New ways of learning and teaching: Focus on technology and foreign language education* (pp. 57–92). Boston: Heinle & Heinle.
- Kern, R., & Warschauer, M. (2000). Theory and practice of network-based language teaching. In M. Warschauer & R. Kern (Eds.), *Network-based language teaching: concepts and practice* (pp. 1–19). New York: Cambridge University Press.
- Krashen, S. (1985). *The input hypothesis: Issues and implications*. London: Longman.
- Lee, L. (2004). Learners' perspectives on networked collaborative interaction with native speakers of Spanish in the U.S. *Language Learning & Technology*, 8(1), 83–100.
- Lee, L. (2008). Focus-on-form through collaborative scaffolding in expert-to-novice online interaction. *Language Learning & Technology*, 12, 53–72.
- Loewen, S., & Erlam, R. (2006). Corrective feedback in the chatroom: An experimental study. *Computer Assisted Language Learning* 19(1), 1–14. *language grammar*. *Language Learning & Technology*, 13, 96–120.
- Loewen, S., & Philp, J. (2006). Recasts in the adult L2 classroom: characteristics, explicitness and effectiveness. *The Modern Language Journal*, 90(4), 536–556.
- Long, M. H. (1996). The role of linguistic environment in second language acquisition. In W. Richie & T. Bhatia (Eds.), *Handbook of second language acquisition* (pp. 413–478). San Diego: Academic Press.
- Long, M. H., & Robinson, P. (1998). Focus on form: Theory, research and practice. In C. Doughty & J. Williams (Eds.), *Focus on form in second language acquisition* (pp. 15–41).
- Lyster, R. (1998). Recasts, repetition, and ambiguity in L2 classroom discourse. *Studies in Second Language Acquisition*, 20, 51–81.
- Lyster, R. (2004). Differential effects of prompts and recasts in form-focused instruction. *Studies in Second Language Acquisition*, 26, 399–432.
- Lyster, R. (2007). *Learning and teaching languages through content: A counter-balanced approach*. Amsterdam: John Benjamins.
- Lyster, R., & Ranta, L. (1997). Corrective feedback and learner uptake: Negotiation of form in communicative classrooms. *Studies in Second Language Acquisition*, 19, 37–66.
- Mackey, A., Al-Khalil, M., Atanassova, G., Han, M., Logan-Terry, A., & Nakatsukasa, K. (2007). Teachers' intentions and learners' perceptions about corrective feedback in L2 classrooms. *Studies in Second Language Acquisition*, 1, 129–152.
- Nicholas, H., Lightbown, P., & Spada, N. (2001). Recasts as feedback to language learners. *Language Learning*, 51, 719–758.
- Payne, J.S., & Whitney, P.J. (2002). Developing L2 oral proficiency through synchronous CMC: Output, working memory, and interlanguage development. *CALICO Journal*, 20(1), 7–32.
- Pica, T. (1994). Research on negotiation: What does it reveal about second-language learning conditions, processes, and outcomes? *Language Learning*, 44, 493–527.
- Salaberry, M. R. (2000). L2 morphosyntactic development in text based computer mediated communication. *Computer Assisted Language Learning*, 13(1), 5–27.

- Swain, M. K. (1985). Communicative competence: Some roles of comprehensible input and comprehensible output in its development. In S. M. Gass & C. G. Madden (Eds.), *Input in second language acquisition* (pp. 235–253). Rowley, MA: Newbury House.
- Panova, I., & Lyster, R. (2002). Patterns of corrective feedback and uptake in an adult ESL classroom. *TESOL Quarterly*, 36(4), 573–595.
- Sauro, S. (2009). Computer-mediated corrective feedback and the development of second language grammar. *Language Learning & Technology*, 13, 96–120.
- Schmidt, R. (2001). Attention. In P. Robinson (Ed.), *Cognition and second language instruction* (pp. 3–32). New York: Cambridge University Press.
- Shekary, M., & Tahirian, M. H. (2006). Negotiation of meaning and noticing in text-based online chat. *The Modern Language Journal*, 90(4), 557–573.
- Smith, B. (2003). Computer-mediated negotiated interaction: An expanded model. *The Modern Language Journal*, 87(1), 38–57.
- Smith, B. (2004). Computer-mediated negotiated interaction and lexical acquisition. *Studies in Second Language Acquisition*, 26(3), 365–398.
- Sotillo, M. S. (2000). Discourse functions and syntactic complexity in synchronous and asynchronous communication. *Language Learning & Technology*, 4(1), 82–119.
- Sullivan, N., & Pratt, E. (1996). A comparative study of two ESL writing environments: A computer assisted classroom and a traditional oral classroom. *System*, 29, 491–501.
- Toyoda, E., & Harrison, R. (2002). Categorization of text chat communication between learners and native speakers of Japanese. *Language Learning & Technology*, 6, 82–99.
- Van den Branden, K. (1997). Effects of negotiation on language learners' output. *Language Learning*, 47, 589–636.
- Warschauer, M. (1996a). *Computer-assisted language learning: An introduction*. Retrieve April 18, 2009, from <http://www.gse.uci.edu/faculty/markw/call.html>
- Warschauer, M. (1996b). Comparing face-to-face and electronic communication in the second language classroom. *CALICO Journal*, 13, 7–25.
- Warschauer, M. (1997). Computer-mediated collaborative learning: Theory and practice. *The Modern Language Journal*, 81(4), 470–481.
- Warschauer, M. (1999). *Electronic Literacies: Language, Culture, and Power in Online Education*. Mahwah, NJ: Lawrence Erlbaum Associates.
- Williams, J. (2005). Form-focused instruction. In E. Hinkel (Ed.), *Handbook of research in second language teaching and learning* (pp. 671–691). Mahwah, NJ: Lawrence Erlbaum Associates.

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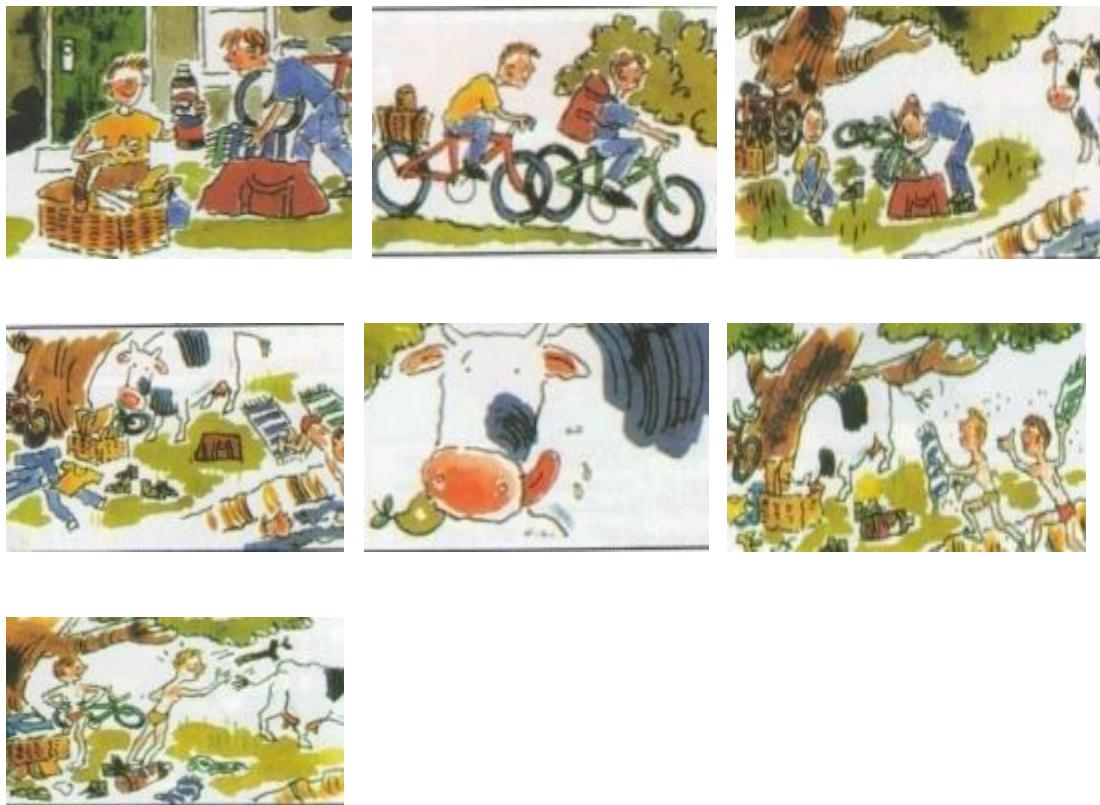
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Appendix A

Story Completion Task

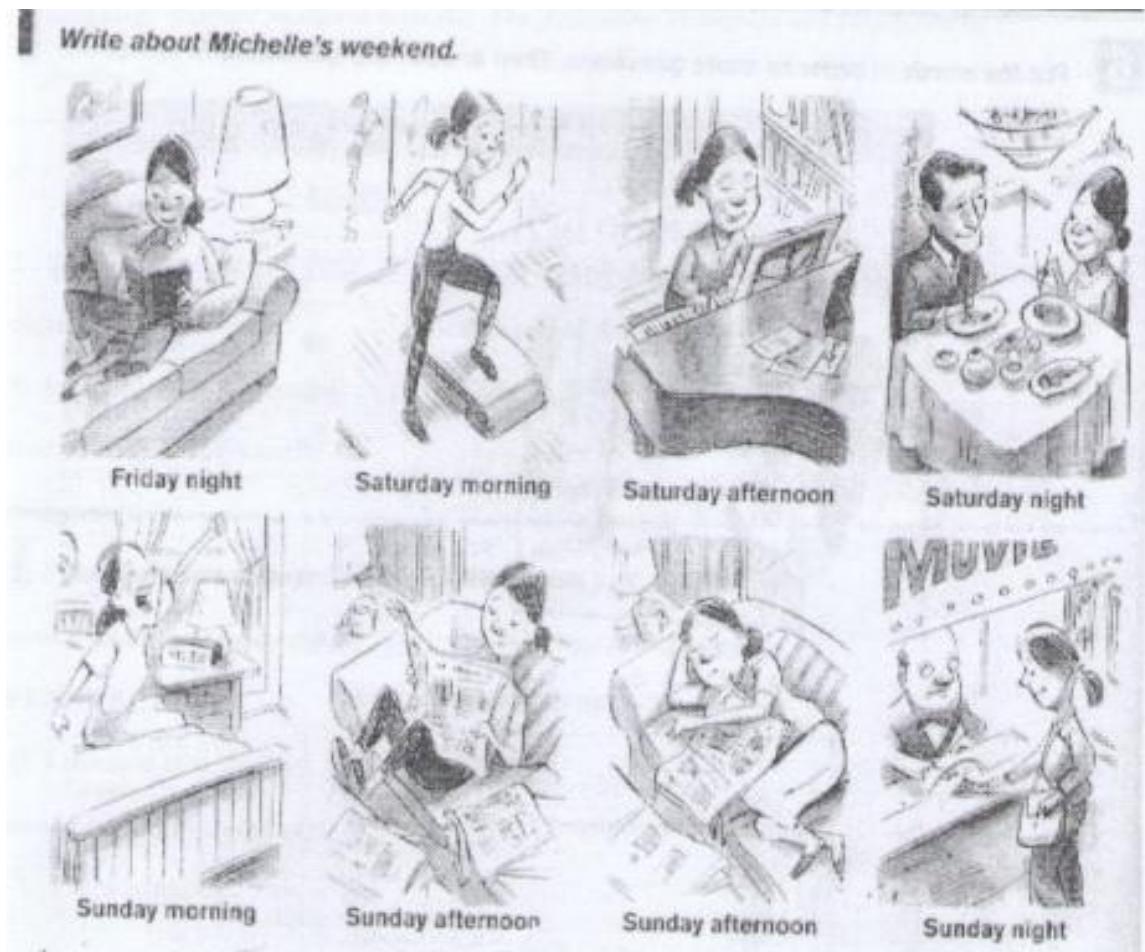
Story Completion Task



Appendix B

Picture Description Task

Michelle did different activities last weekend. Write sentences about her weekend.



Editor's Note: Okorie Nelson is seeking research evidence to determine the significance of the Internet in tertiary education. His findings support more widespread use of the Internet for teaching and learning. Additional research is needed to generalize results to other tertiary institutions in Nigeria and elsewhere.

ICT and Educational Performance: The Inter-Relationship of Selected Critical Variables

Okorie Nelson

Nigeria

Abstract

This original data-based study set out to measure the use of the internet as an information and communication tool in promoting educational performance and knowledge of Covenant University undergraduates, and analyze the inter-relationship of selected social and demographic and other relevant variables. Four hypotheses were tested and analyzed with the use of Chi square analysis and computed correlation using SPSS. The first hypothesis proposes that there will be significant relationship and correlations between internet usage and the sex of the respondents. The second hypothesis proposes that there will be significant relationship between internet knowledge and the age of the respondents. The third hypothesis proposes that there will be significant relationship between internet knowledge and the academic performance of the respondents. The last hypothesis proposes that there will be significant relationship between internet usage and the academic performance of the respondents. The study revealed some interesting correlation among the critical variables. Based on the finding of the research, some far reaching recommendations are suggested.

Keywords: ICT, education, performance, inter-relationship, variables

Introduction

Information and communication technology has precipitated a revolution in the communication industry with an emphasis on improved methods and efficiency. It guarantees accuracy, efficiency, prompt and instantaneous transmission and distribution of information. Information technology provides near limitless possibilities for increasing quantity and enhancing the quality, speed and availability of information in a complex but increasingly interdependent world of business (Soola, 1998). In addition, the application of ICTs has revolutionized not only the information and communication sector, but the entire facets of human life. It has impacted favorably on the individual, groups, organizations, government and societies. It has provided good governance which has precipitated development in all fronts (Adaja, 2005).

The internet is increasingly being defined by new digital technologies that empower users to develop, create, rate and distribute internet content and applications (O'Reilly, 2005). Generally, the internet is a world wide network of computers networks, connected to each other by telecommunication links. It is made up of an ever growing number of organizations and individuals who have decided to share information in this giant, interconnected open system (Norton & Smith 1996). Okpoko (2006) argued that the principal function of the internet is communication (e-mail), information gathering and electronic marketing. It has been argued that information has replaced capital and labor as the primary economic resource of our time. Information is not only power, it is also the raw material of truth, beauty, creativity, productivity and freedom. In essence, information is central in all form of activity and all sphere of life (Adaja, 2005).

In Africa and the wider world, Nigeria is regarded as a developing nation that is characterized with many challenges truncating developmental programs and policies. These challenges include illiteracy, poverty, ethnicity as well as a low standard of living. These challenges negatively affect the educational sector in Nigeria, but emergence of ICT has precipitated developmental strides in diverse sectors of the economy. This paper examines the use of the Internet as a form of ICT for acquisition and development of knowledge and promotion of academic performance among undergraduate students. Covenant University is used as an example.

Objective of the Study

Against the background described above, a study was conducted to measure the use and knowledge of the internet and how it contributes to academic performance among undergraduate students of Covenant University. This paper reports only the inter-relationship of critical social demographic variables such as age, income, sex and marital status with the emphasis on usage, knowledge and performance.

Hypotheses

The following hypotheses were tested in this study:

- H1: There will be significant relationship between Internet usage and the sex of the respondents.
- H2: There will be significant relationship between Internet knowledge and the age of the respondents.
- H3: There will be significant relationship between Internet usage and the academic performance of the respondents.
- H4: There will be significant relationship between Internet knowledge and the academic performance of the respondents.

Theoretical Framework

This study is hinged on the Use and Gratification theory. The theory deals with way in which different individuals use media and the gratification they derive from its use. Folarin (2001:22) notes the theory is basically concerned with questions of who, which media, which content, under which condition and for what reason? Furthermore, the theory is concerned with what media people use, how the media are used, and what gratification learners expect from its usage.

According to West and Turner (2004), this is an extension of the need and motivation in Abraham Maslow's hierarchy of needs. The satisfaction of one need gives rise to another need. Elihu Katz, Blumler Jay G and Gurevitch Michael were motivated by Maslow's theory to study how people consume mass communication. Their finding gave birth to the Use and Gratification theory. In conclusion, West and Turner (2004: 396) summarize the assumption of the theory as providing a framework for understanding when and how individual media consumers become more or less active and the consequences of that increased or decreased involvement". The theory is relevant to this study to determine how students use the internet as an educational resource.

Brief Review of Related Literature

Information Communication Technologies combine three comparative complementary concepts - information, communication and technology - which describe its desired meaning and the area of coverage. Information is the message that is transmitted and received in the process of communication. This message, idea or feeling is shared by both the receiver and sender at the same time. Communication refers to any process in which people *share* the same information,

ideas and feelings. It involves spoken and written words, body languages, personal mannerisms and style (Hybel and Weaver, 2001). Technology refers to the systematic application of the tools and art. In practice, communication cannot be effective if information is not accurately received by the target audience, the passage of information cannot be complete without the instruments of communication and feedback. Technology makes communication easier, faster and more effective. Today, information and communication technology uses a combination of computer, telecommunication, and information systems services and products. Farnham (1999) defines information and communication technology (ICT) as consisting of hardware, software, telecommunication networks, workstation and robotics and smart chips. Stewart (1994) looks at it as the collection, processing, storage and transmitting information by electronic means.

Information and communication technologies have revolutionized the lives of people. It has brought changes in the social, economic, cultural facets of human life across the globe. ICT has influenced a revolution in communication. Old machines and old ways of communication are abandoned for new technologies, which offer efficiency, speed, quality and reliability. McLuhan (1967) notes that the advent of a new medium often reveals the lineaments and assumptions as it were, of an old medium. Traditional mass media (newspaper, magazine, television and radio) are largely driven by the power of ICT. Newspaper and magazines are refreshingly vibrant in the color, design, and advanced printing technology. Broadcast presentations have a sparkle, clarity, and digital precision that give better picture and sound quality. In many parts of Africa, despite the freedom it offers, ICT media literacy has not been achieved. Ogunshola and Oluwasanmi (2005) in their analysis point out that Africa has 13% of the world's population, but only 2% of the world's telephone lines and 1% of internet connectivity making African peoples slaves rather than masters in the global world.

The most prominent manifestation of ICT in the 21st century is the Internet. The ability of the internet to maintain open standard for transmitting digitized data - voice, video or text - from one computer to another, has constituted its single most important reason of success (Amodu, 2008). The internet is usually referred as an electronic network that links people and information through computers and other digital devices allowing person-to-person communication and sharing of information. The internet with the various information and communication technologies has to a great extent changed our ideas of business, marketing, economy and trade relationships between individuals, organizations and nations. The explosive growth of the internet has created unprecedented opportunities in the field of educational research and practice in the 21st century. The use of the internet in education pedagogy is growing. The impact of using internet resources to enhance educational courses has two principal advantages to students. First, these resources offer a new medium of interaction that complements class room instruction and facilitates learning. Second, they offer students the opportunity to learn and use internet technology and access global resources to support their for future academic and career path (Pierces, Blomeyer & Roberts, 1995).

Today's young people have been called the "Net generation" or "digital generation", given to their fondness for new information technologies and the internet. Ribisi (2001) noted that by the age of 10, young people are more likely to use the internet than adults at any age beyond 25. Nearly, two-third (65.4%) of 10-13 year olds and more than three quarter (75.6%) of 14-17 year olds use the internet.

The Internet offers a significant benefit over other electronic media for educational institutions because it is much cheaper, based on the public networks and open protocols rather than propriety ones, resulting in lower setup and connection costs. In addition, many students and stakeholders are familiar with Internet technology through their own home use and find it less complicated than older technologies. The Internet adds powerful features for managing information, such as tracking, product availability, search and query. It provides students with the opportunity to

develop skills necessary to live, work and play in the 21st century. The Internet allows students to engage in global communication and to access the most current information available (Heise and Grandgenette, 1996).

The internet offers many resources and tools for teachers, scholars and students, such as electronic mail, on-line searches of world libraries, curriculum ideas, software, journals, instructional games, weather data and general information on topics such as politics, global issues and other cultures. Barak and Fisher (2001) note that the benefits of internet based educational technology for complementing standard educational practices are numerous. For example, internet based educational materials provide expert instruction to a very large audience. Their flexibility, reusability, and availability on an anywhere any-time basis makes them extremely cost effective. These educational materials can be regularly updated and upgraded to deliver state of the art instruction on a continuous basis. Internet mediated e learning also enables those who reside in remote locations or who are physically confined to receive these educational programs.

Method

For this exploratory study, a survey was carried out in February, 2009 using the sample of Covenant University registered for the 2008-2009 academic session. All Colleges in the University were divided into three groups using a stratified sampling technique. These groups were the College of Human Development, College of Science and Technology and the College of Business and Social Science. Three Departments were then selected from each group by a random sample. The department of Electrical Engineering was selected from the College of Science and Technology; the Department of Mass Communication was selected from the College of Human Development, while the Department of Accounting was selected from the Department of Mass Communication. A sample size of 378 was derived from a population of 7000 undergraduate students of Covenant University by use of a sampling formula i.e. $n = N / 1 + N(e)^2$ where N is the population size, e^2 is error margin (level of significance : 0.05) and n is the sample size. A questionnaire was used as the data collection instrument and the data was analyzed for cross tabulation and chi square using SPSS. The hypotheses were tested using the Chi Square Test of Independence at the 5% level of significance (i.e. alpha= 0.05). The Chi Square Test of Independence was chosen because it is a standard measurement test instrument. Secondly, it is used to establish relationship between two variables or establish independence. Chi Square test results were further subjected to the Somer' d directional measure and symmetric measures so as to determine the strength and nature of the relationship using a Statistical Package of Social Sciences (SPSS).

Result

A total of 318 questionnaires were returned, out of the 387 administered, which represents a response rate of 95.7 percent. However, many respondents did not answer some questions. In data analysis, the researcher treated all unsupplied responses as missing cases. Of the number of questionnaires that were received and used, 77 respondents were males representing 23.5% and 227 respondents were females representing 79.5% of the total respondents. In terms of age, 224 respondents (70.4%) were between 15-20, 72 respondents (20.4%) were between 21 and 24 years of age, and 36 respondents (9.2%) were between 25 and 30.

Table 1
Demographic Characteristics of Respondents

| Characteristics | Percent |
|-----------------------|-----------|
| Gender | |
| Male | 23.5 |
| Female | 79.5 |
| Total | 100 |
| | N= 327 |
| Marital Status | |
| Single | 100 |
| Married | 0 |
| Single parent | 0 |
| Total | 100 |
| | N=327 |
| Age | |
| 15-19 | 70.4 |
| 20-25 | 20.4 |
| 25-29 | 9.2 |
| 30 and above | 0 |
| Total | 100 N=327 |
| Income | |
| 5,000-30,000 | 56.9 |
| 31000-59000 | 24.8 |
| 60000-150000 | 2.4 |
| 151000-299000 | 1.8 |
| 300,000 AND ABOVE | 3.4 |
| Missing system | 10.7 |
| Total | 100 |
| | N=327 |

The study revealed that 262 respondents (80.4%) indicated that the internet drives knowledge in the 21st century, while 46 respondents representing 14.1% disagreed that the internet drives knowledge in the 21st century. In addition, 234 respondents (71.6%) revealed that they had adequate knowledge of use of the internet, while 23 respondents representing 7.0% revealed that they didn't have adequate knowledge of the internet. Furthermore, the study revealed that 251 respondents (76.5%) had both internet access at home and at school, while 31 respondents (9.5%) revealed they didn't have access at home or in school. They study also revealed that 295 respondents indicated that they made frequent use of the internet while 14 respondents argued that they don't have frequent usage of the internet.

Table 2
Internet use and research performance of respondents

| Categories | Percent |
|---|--------------|
| Frequent Usage of Internet | |
| Strongly Agree | 45.6 |
| Agree | 44.6 |
| Undecided | 2.8 |
| Disagree | 4.3 |
| Missing System | 2.8 |
| Total | 100 N=327 |
| Knowledge of computer/Internet | |
| Strongly Agree | 71.6 |
| Agree | 18.7 |
| Strongly Disagree | 7.0 |
| Missing System | 2.8 |
| Total | 100 N=327 |
| Internet aids research performance | |
| Strongly Agree | 26.9 |
| Agree | 51.4 |
| Undecided | 10.4 |
| Disagree | 8.6 |
| Missing System | 2.8 |
| Total | 100 N=327 |
| Internet access at school | |
| Strongly Agree | 51.1 |
| Agree | 25.7 |
| Undecided | 11.0 |
| Disagree | 9.5 |
| Missing System | 2.8 |
| Total | 100 N=327 |

Testing the Hypothesis

To test our hypotheses, we cross tabulated selected variables and also computed correlations using the SPSS statistical package.

Table 3
Gender – Frequent Use of the Internet

| Gender | | Frequent Usage of the Internet | | | | Total |
|--------|----------------|--------------------------------|-------|-----------|----------|-------|
| | | Strongly Agree | Agree | Undecided | Disagree | |
| Male | Count | 9 | 64 | 0 | 14 | 77 |
| | Expected Count | 37.7 | 33.4 | 2.3 | 3.5 | 77.0 |
| Female | Count | 140 | 78 | 9 | 0 | 227 |
| | Expected Count | 113.3 | 98.6 | 6.7 | 10.5 | 227.0 |
| Total | | 149 | 132 | 9 | 14 | 304 |
| | | 149.0 | 132.0 | 9.0 | 14.0 | 304.0 |

Table 3a
Chi-Square Tests

| | Value | df | Asymp. Sig (2-sided) |
|------------------------------|---------------------|----|----------------------|
| Pearson Chi-Square | 80.577 ^a | 3 | .000 |
| Likelihood Ratio | 97.511 | 3 | .000 |
| Linear-by-Linear Association | 68.453 | 1 | .000 |
| N of Valid Cases | 304 | | |

a. 2 cells (25%) have expected count < 5 The minimum expected count is 2.28

Table 3b
Direct Measures

| | | | Value | Asymp. Std. Error(a) | Approx T(b) | Approx Sig. |
|--------------------------------------|----------|-----------|-------|----------------------|-------------|-------------|
| Ordinal-by-Ordinal | Somers'd | Symmetric | -.433 | .043 | -8.618 | .000 |
| Gender Dependent | | | -.361 | .041 | -8.618 | .000 |
| Frequent Usage of Internet dependent | | | -.542 | .052 | -8.618 | .000 |

- a. Not assuming the null hypotheses.
- b. Using the asymptotic standard error assuming the null hypothesis

Table 3c
Symmetric Measures

| | Value | Approx. Signif. |
|--|-------|-----------------|
| Nominal-by-Nominal Contingency Coefficient | 479 | .000 |
| N of Valid Cases | 304 | |

- a. Not assuming the null hypothesis
- b. Using the asymptotic standard error assuming null hypothesis.

Table 4
Age and Knowledge of the Internet

| | | | KNOWLEDGE OF INTERNET | | | Total |
|-----|-------|----------------|-----------------------|-------|-------------------|-------|
| | | | STRONGLY AGREE | AGREE | STRONGLY DISAGREE | |
| AGE | 15-24 | Count | 168 | 46 | 0 | 214 |
| | | Expected Count | 154.9 | 42.9 | 16.2 | 214.0 |
| | 25-34 | Count | 38 | 15 | 9 | 62 |
| | | Expected Count | 44.9 | 12.4 | 4.7 | 62.0 |
| | 34-44 | Count | 0 | 0 | 14 | 14 |
| | | Expected Count | 10.1 | 2.8 | 1.1 | 14.0 |
| | 45-55 | Count | 14 | 0 | 0 | 14 |
| | | Expected Count | 10.1 | 2.8 | 1.1 | 14.0 |
| | Total | Count | 220 | 61 | 23 | 304 |
| | | Expected Count | 220.0 | 61.0 | 23.0 | 304.0 |

Table 4a
Chi-Square Tests

| | Value | df | Asymp. Sig. (2-sided) |
|------------------------------|---------|----|--------------------------|
| Pearson Chi-Square | 199.448 | 6 | .000 |
| Likelihood Ratio | 119.730 | 6 | .000 |
| Linear-by-Linear Association | 42.997 | 1 | .000 |
| N of Valid Cases | 304 | | |

- a. 5 cells (41.7%) have expected counts less than 5.
b. The minimum expected count is 1.06.

Table 4b
Directional Measures

| | | | Value | Asymp. Std. Error(a) | Approx. T(b) | Approx. Sig. |
|-----------------------|--------------|------------------------------------|-------|----------------------------|-----------------|-----------------|
| Ordinal by Ordinal | Somers' d | Symmetric | .256 | .060 | 3.994 | .000 |
| | | AGE Dependent | .265 | .061 | 3.994 | .000 |
| | | KNOWLEDGE OF COMPUTER Dependent | .248 | .060 | 3.994 | .000 |

a Not assuming the null hypothesis.

b Using the asymptotic standard error assuming the null hypothesis.

Table 5
Frequent Usage of Internet * Internet Contributes to my Performance

| | | INTERNET CONTRIBUTES TO MY PERFORMANCE ^a | | | Total |
|--|-----------------------------|---|--------------------|------------------------|-------------------|
| | | STRONGLY ^b AGREE ^c | AGREE ^c | UNDECIDED ^c | |
| FREQUENT ^d USAGE OF INTERNET ^e | STRONGLY AGREE ^f | Count | 60 ^g | 80 ^g | 9 ^g |
| | | Expected-Count | 44.5 ^g | 84.8 ^g | 19.7 ^g |
| | AGREE | Count | 26 ^g | 101 ^g | 19 ^g |
| | | Expected-Count | 43.6 ^g | 83.1 ^g | 19.3 ^g |
| | UNDECIDED ^f | Count | 9 ^g | 0 ^g | 0 ^g |
| | | Expected-Count | 2.7 ^g | 5.1 ^g | 1.2 ^g |
| | DISAGREE | Count | 0 ^g | 0 ^g | 14 ^g |
| | | Expected-Count | 4.2 ^g | 8.0 ^g | 1.8 ^g |
| Total | | Count | 95 ^g | 181 ^g | 42 ^g |
| | | Expected-Count | 95.0 ^g | 181.0 ^g | 42.0 ^g |

Table 5a
Chi-Square Tests

| | Value | df | Asymp. Sig. (2-sided) |
|------------------------------|----------------------|----|--------------------------|
| Pearson Chi-Square | 135.557 ^a | 6 | .000 |
| Likelihood Ratio | 102.778 | 6 | .000 |
| Linear-by-Linear Association | 37.338 | 1 | .000 |
| N of Valid Cases | 318 | | |

- a. 4 cells (33.3%) have expected count less than 5.
b. The minimum expected count is 1.19

Table 5b
Directional Measures

| | | Value | Asymp. Std. Error ^a | Approx. T ^b | Approx. Sig. |
|--------------------|--|-------|--------------------------------|------------------------|--------------|
| Ordinal by Ordinal | Somers'd | .260 | .056 | 4.520 | .000 |
| | FREQUENT USAGE OF INTERNET Dependent | .260 | .056 | 4.520 | .000 |
| | INTERNET CONTRIBUTES TO MY PERFORMANCE Dependent | .261 | .057 | 4.520 | .000 |

- a. Not assuming the null hypothesis.
b. Using the asymptotic standard error assuming the null hypothesis

Table 5c
Symmetric Measures

| | | Value | Approx. Sig. |
|--------------------|-------------------------|-------|--------------|
| Nominal by Nominal | Contingency Coefficient | .547 | .000 |
| N of Valid Cases | | 318 | |

- a. Not assuming the null hypothesis.
b. Using the asymptotic standard error assuming the null hypothesis.

Table 6
Knowledge of Internet * Internet Contributions to my Performance

| | | | INTERNET CONTRIBUTES TO MY PERFORMANCE | | | Total | |
|-----------------------|-------------------|----------------|--|-------|-----------|-------|--|
| | | | STRONGLY AGREE | AGREE | UNDECIDED | | |
| KNOWLEDGE OF INTERNET | STRONGLY AGREE | Count | 86 | 148 | 0 | 234 | |
| | | Expected Count | 69.9 | 133.2 | 30.9 | 234.0 | |
| | AGREE | Count | 9 | 33 | 19 | 61 | |
| | | Expected Count | 18.2 | 34.7 | 8.1 | 61.0 | |
| | STRONGLY DISAGREE | Count | 0 | 0 | 23 | 23 | |
| | | Expected Count | 6.9 | 13.1 | 3.0 | 23.0 | |
| Total | | Count | 95 | 181 | 42 | 318 | |
| | | Expected Count | 95.0 | 181.0 | 42.0 | 318.0 | |

Table 6a
Chi-Square Tests

| | Value | df | Asymp. Sig. (2-sided) |
|------------------------------|---------|----|-----------------------|
| Pearson Chi-Square | 207.019 | 4 | .000 |
| Likelihood Ratio | 176.522 | 4 | .000 |
| Linear-by-Linear Association | 113.137 | 1 | .000 |
| N of Valid Cases | 318 | | |

- a. 1 cell (11.1%) has expected count less than 5.
- b. The minimum expected count is 3.04.

Table 6b
Directional Measures

| | | Value | Asymp. Std. Error ^a | Approx. T _b | Approx. Sig. |
|--------------------|--|-------|--------------------------------|------------------------|--------------|
| Ordinal by Ordinal | Somers'd | .494 | .044 | 8.555 | .000 |
| | KNOWLEDGE OF INTERNET Dependent | .427 | .042 | 8.555 | .000 |
| | INTERNET CONTRIBUTES TO MY PERFORMANCE Dependent | .584 | .052 | 8.555 | .000 |

- a. Not assuming the null hypothesis .
- b. Using the asymptotic standard error assuming the null hypothesis

Table 6c
Symmetric Measures

| | Value | Approx. Sig. |
|--------------------|-------------------------|--------------|
| Nominal by Nominal | Contingency Coefficient | .628 |
| N of Valid Cases | | .000 |

- a. Not assuming the null hypothesis
- b. Using the asymptotic standard error assuming the null hypothesis

Discussion

Modern ICTs has to do with the convergence of computer technology and telecommunication technology. From the literature review, it was determined that the Internet is the information superhighway, a global network of networks connecting millions of computers. Today, the internet is the most technologically advanced medium of communication. It shares digital information through a common set of networking and software protocols (Muciano and Kennedy, 2002, Nsude 2004). The Internet is a major driver of the globalized world in the 21st century. It has also claimed to have the immense ability to change societies.

This study set out to examine the influence of the internet on academic performance by analyzing the relationship between critical variables. Results for each hypothesis were as follows:

H1: There will be significant relationship between Internet usage and the sex of the respondents.

An analysis on gender and the frequent use of the Internet supported the hypothesis as stated. Chi Square analysis on Table 3a, b and c revealed there *was* a relationship between variables, but the relationship was a weak one. Results from the Chi Square tests were significant at the 5% alpha level. Table 3b and 3c help to determine the strength and direction between variables i.e. the approximate significance value has 0.00 in its column; one can infer there was a relationship between the variables. In addition, the value statistics helps to determine the strength or the direction of the relationship, it can range from -1 to 1 i.e. negative value indicates a negative relationship, and positive values indicate a positive relationship. From table 3b and c, the relationship between variables is a weak one. With regards an analysis of age and knowledge of the internet. The hypothesis was upheld. From the available data on table 4a, b and c, the hypothesis was accepted because the asymmetrical values in the Chi Square test were less than 0.05.

H2: There will be significant relationship between Internet knowledge and age of the respondents.

Table 4 b and 4c reveal a positive and strong relationship between variables. This hypothesis focused the significant relationship between frequent use of internet and academic performance. This result supports the assertions of Ribisi (2001) study, whereby he asserted that by the age of 10, young people are more likely to use the internet than adults at any age beyond 25. Nearly, two-third (65.4%) of 10-13 year old and more than three quarter (75.6%) of 14-17 year old use the internet.

H3: There will be significant relationship between Internet usage and the academic performance of the respondents.

This hypothesis was upheld as revealed in tables 5a, 5b and 5c. Table 5a indicated the chi square test with a significance value less than 0.05. This indicates there may be some relationship between the two variables. In this case, there is an asymmetrical value of .000 which is less than 0.05, which means there is a form of relationship at a degree of freedom (df) of 6 with a linear by linear association of 37.338. Tables 5b and 5c indicate that the relationship among the variables is a positive and strong relationship.

H4: There will be significant relationship between Internet knowledge and the academic performance of the respondents

The fourth hypothesis tested the relationship between the knowledge of the internet and academic performance. The data in tables 6a, 6b and 6c confirmed the hypothesis with asymmetrical values in the Chi Square test less than 0.05. Tables 6 b and c reveal that the relationship between variables is a positive and strong relationship.

Recommendations and Conclusions

This study reveals that the internet is an important resource for manpower development as well as educational performance and research. In addition, efforts need to be made to ensure that universities and school of higher learning are ICT driven. In essence, if students and scholars have access to the internet, academic performance is generated. The government must improve the Information and Technology as the educational sector for manpower performance and skill acquisition. In essence, the Internet can effectively contribute to educational advancement rather than obstruct it. Some pre- conditions must been met, such as the provision of infrastructure with provision of subsidized internet subscription and training for students, scholars and researchers. African countries can emulate the positive gains of countries like United Kingdom, Malaysia, and United States of America, among others, where open and free access to the internet is having a significant impact on the quality of education and training. Access to the Internet will encourage computer literacy and educational development in African countries.

References

- Adaja, T. (2005). Communication and Strategies for Effective Communication . *Journal of Communication and Society*, 4, 33-48.
- Agba, P. (2002). New Communication Technologies in Broadcasting for Enhancing Development. *Nigerian Journal of Communication*.
- Amodu, L. (2008). The role of the internet in the sustainable development in rural Africa: A fact or a farce. In Soola, E.O. (Ed), *Health communication, gender violence and ICTs in Nigeria* (pp. 285-296). Ibadan: Ibadan University Press.
- Barak, A. & Fisher, W. (2001). Towards an internet driven, theoretical based, innovative approach to sex education. *Journal of Sex Research*, 38(4), 324-332.
- Cambell, R.(1998). *Media and Culture: An Introduction to Mass Communication*. Newyork: St Martin Press.
- Defleur, L & Dennis, E.(1988). *Understanding Mass Communication*. Boston: Houghton Mifflin Company.
- Farnham, D. (1999). *Managing in the Business Context*. Institute of Personnel Management.
- Folarin, B.(1998).*Theories of Mass Communication*.Ibadan, Nigeria.Sceptre Publishing ltd
- Heisse, D & Grandgenette, N.(1996). Perspectives on the use of internet in Art classroom. *Art Education*, 49 (6), 12-16.
- Kombol, M. (2006). An Assessment of the Pattern of ICT use among Nigerian media practitioners: Implication for Media Relations practice in Public Relations. *Journal of Nigerian Institute of Public Relations*
- Nwuneli, O.(1986). *Key Note Address in Community, Rural Change and Development in Anambra State*. Enugu: Government Printers.
- McLuhan, M. (1967). *Understanding media: The extension of man*. London: Sphere Books.
- McQuail, D. (1987).*Mass Communication Theory: An Introduction*.Detroit, USA:Sage Publishing
- Okpoko, J. (2006).Prospects of Information and Communication Technology on Business operations in Nigeria. *Journal of Nigerian Institute of Public Relations*

Pierce, J., Blomeyer, R. & Roberts, M. (1995). Surfing the internet: A whale of an information source for education researchers. *Educational Researcher*, 24(5), 25-26.

Ribisi, K.(2001). The potential of the internet as a medium to encourage and discourage youth tobacco use. *Tobacco Control*, 12(1), 48-49.

West, R. and Turner, L.(2004). *Introducing communication theory: Analysis and application*. Boston: Mc Graw Hill

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Editor's Note: This is an interesting, well-researched study. Hopefully, well-designed commercial games will be more widely accepted and used in academia. Formal collaboration between video game designers and academia should be encouraged. Educators should research, validate, and actively implement video games for learning. There have been many attempts to do this, including the Ngee Ann Polytechnic in Singapore in the 1990s and the University of Southern California in this millennium.

Survey of Commercial off-the-shelf Video Games: Benefits and Barriers in Formal Educational Settings

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Abstract

This paper examines the use of commercial-off-the-shelf (COTS) games in formal educational settings. A survey method was employed to determine which COTS video games are appropriated for formal educational settings, and the benefits and barriers to integration in formal educational settings. Ninety-nine members of the Special Interest Group of Games and Simulations (SIGGS) in the International Society for Technology in Education (ISTE) responded to the survey. The results suggest that greatest benefits to integrating COTS video games include developing cognitive skills, teaching complex problem-solving, accepting and learning from mistakes, and learning by doing. The greatest barriers include teachers' background in games and technology, perception of games, lack of financial resources, alignment with the curriculum, lack of evidence to support their use, and lack of time to integrate into the classroom. Conclusions are provided.

Keywords: Commercial-off-the-shelf, formal educational settings, benefits, barriers.

Introduction

In recent years, attention has been placed on the utility of commercial-off-the-shelf (COTS) video games in formal and informal educational settings (Becker, & Jocobsen, 2005; Becker, 2006; Sanford, Ulicsak, Facer, & Rudd, 2006; Ertzberger, 2008; Charsky & Mims, 2008), particularly for military training applications (Barlow, Morrison, & Easton, 2002; Morrison & Barlow, 2004; Fong, 2006). COTS video games can be purchased from brick-and-mortar businesses, online, and via catalogs. COTS video games, unlike serious games (Michael & Chen, 2005), are not designed for the sole purpose of training, educating or informing, but rather for the primary goal of entertainment. Some COTS video games are deemed appropriate for formal educational settings (Sanford, Ulicsak, Facer, & Rudd, 2006). Charsky and Mims (2008) note "creating game-based learning environments or experiences using COTS games is becoming an increasingly tenable, valuable, and popular instructional strategy" (p. 38). COTS video games for formal educational settings should exhibit broad appropriateness for school settings, engage players with authentic content and challenges, and show the presence of clear causal relationships between game variables (Sanford, Ulicsak, Facer, & Rudd, 2006).

However, as discussed by Becker (2006), there remains resistance to the use of COTS games in formal educational settings. Squire (2003) suggests that integrating games into formal educational settings potentially raises as many problems as it solves. COTS video games may not appeal to every student equally (Ke, 2008) and students may be distracted by game-playing, and consequently, not achieve the educational goals (Miller, Lehman, & Koedinger, 1999). Egenfeldt-Nielsen (2004) states there are numerous barriers to successfully integrating games; including scheduling, setting, class expectations, teacher background, genre knowledge, technical problems, teacher preparation, perception of games, class size, and priority issues – all of which place a tremendous burden on teachers. Thus, the use of COTS video games in formal educational setting remains a topic of debate among researchers and educators alike.

Commercial-Off-The-Shelf Games in Education

Becker and Jacobsen (2005) surveyed 109 educators about the utility of computer and video games in a classroom setting. Fifty-seven percent of their respondents had used computer or video games in their classroom practice. More than half of the educators indicated that the teachers themselves, either through their own efforts, through professional development opportunities, or through help from their students or nearby colleagues provided the greatest amount of help in integrating computer or video games into their classroom practice. When asked about barriers, more than 70% of the respondents indicated that there was not enough time to integrate games, not enough classroom computers, not enough games within the schools, or that integrating games was not a school priority.

Ertzberger (2008) surveyed 390 educators from 110 different schools about the utility of video games as instructional tools. His results suggest the most important factors in promoting the use of video games are the games alignment to curriculum, reliability of the technology, and hands on training available. Results indicate the biggest deterrents to the use of video games were the expense of video games, lack of time to create video games, lack of relevance to curriculum, and lack of the needed technology. Participants boasted the ability to individualize instruction, and increase motivation as benefits to video game use.

Future Lab, a non-profit organization for innovation in teaching, conducted a survey of primary and secondary teachers' ($N = 1,000$) attitudes towards games in education (Future Lab, 2005). Their survey was not specifically about COTS video games. Their findings suggest that 72% of the teachers do not play video games in their leisure time and 69% have not used games in their classrooms for educational purposes. Though 59% of the teachers would consider using games in their classroom, 49% of same population see the largest integration barrier as access to equipment (Future Lab, 2005).

Kerbitchi (2009) examined factors affecting teachers' adoption of computer games using a case study method. The results were compared with the existing literature on the adoption of educational software, and the barriers in the use of educational computer games in formal K-12 settings. The findings showed that adoption attributes for the games and other educational software had a similar pattern from high to low significance on relative advantage, compatibility, complexity, trialability and observability (Rogers, 2003) and that the game adoption factors were more inclusive than the barriers of using the computer games.

While these studies have certainly informed educational research, they leave much to be desired. Not one of the aforementioned studies specifically examined the role of COTS video games in formal educational settings. Further, in another study, the results confirmed that the majority of the educators were not gamers (72%) and had not integrated games into their classrooms (69%). These findings are alarming and confirm there is a dearth of existing research examining role of COTS video games in formal educational settings.

Research Questions

Therefore, this research sought to address the following research questions:

1. What commercial-off-the-shelf video games do professionals deem appropriate for formal educational settings?
2. What are the benefits of integrating commercial-off-the-shelf games in formal educational settings?
3. What are the barriers to integrating commercial-off-the-shelf games in formal educational settings?

Method

Participants

Participants included members of the Special Interest Group of Games and Simulations (SIGGS) in the International Society for Technology in Education (ISTE). One-hundred fifty-four participants opened the survey, and of those participants, $N=137$ provided a response to at least one item. During this period, the SIGGS had approximately 1,400 members, which is a response rate of approximately 10%. Those participants that did not complete at least 75% of the survey items were removed from the analysis resulting in a final set of $n=99$ participants.

As can be gleaned in Table 1, approximately 68% of the participants were female. The majority of the participants are in the age range of 36 to 65 years old. More than 80% of the participants reported salary ranges from \$30,000 to \$100,000 per year. More than 80% of the participants reported a White/Caucasian ethnicity. One hundred percent of the sample held at least a bachelors degree with approximately 49% holding a masters degree.

Table 1
Demographic characteristics of sample.

| Category | n | % |
|---------------------------|----|-------|
| Gender | | |
| Female | 67 | 67.68 |
| Male | 31 | 31.31 |
| Age Range | | |
| 0-25 | 3 | 3.03 |
| 26-35 | 15 | 15.15 |
| 36-45 | 27 | 27.27 |
| 46-55 | 27 | 27.27 |
| 56-65 | 24 | 24.24 |
| >65 | 2 | 2.02 |
| Salary Range | | |
| N/A | 6 | 6.06 |
| 0 - \$30,000 | 1 | 1.01 |
| \$30,001 - \$50,000 | 18 | 18.18 |
| \$50,001 - \$75,000 | 37 | 37.37 |
| \$75,001 - \$100,000 | 26 | 26.26 |
| \$100,001 - \$150,000 | 7 | 7.07 |
| > \$150,000 | 2 | 2.02 |
| Ethnicity | | |
| Asian | 2 | 2.02 |
| Black/African American | 3 | 3.03 |
| Hawaiian/Pacific Islander | 2 | 2.02 |
| Hispanic/Latino | 2 | 2.02 |
| White/Caucasian | 84 | 84.85 |
| Other | 6 | 6.06 |

| Category | n | % |
|------------------------------|----|-------|
| Highest Degree Earned | | |
| Bachelors Degree | 23 | 23.23 |
| Masters Degree | 49 | 49.49 |
| Specialist Degree | 5 | 5.05 |
| Doctorate Degree | 22 | 22.22 |

Ninety-six percent of the participants were from the United States with the remaining from Canada. Approximately 68% of the participants reported playing computer games and 51% reported playing video games. The job titles of the participants represented a wide range of careers from teachers to college professors to educational technologists. Participants reported an average of 15.36 years ($SD = 9.35$) in educational technology-related professions.

Instrument

The instrument was divided into four sections: background information, COTS, COTS barriers, and COTS benefits. The background information section included items pertaining to age, gender, ethnicity, salary range, educational attainment, game play information, and job title information. The COTS section included 19 popular COTS games for multiple platforms derived from multiple sources (Kirriemuir, 2005; Prensky, 2010) and with a response scale of Very Appropriate, Appropriate, Neutral, Inappropriate, and Very Inappropriate.

The COTS games barriers section included 23 potential barriers to the integration of COTS games in formal educational settings with a response scale of Very Significant Barrier, Significant Barrier, Neutral, Insignificant Barrier, and Very Insignificant Barrier. Finally, the COTS games benefits section included 18 potential benefits of integrating COTS games into a formal educational setting with a response scale of Very Significant Benefit, Significant Benefit, Neutral, Insignificant Benefit, and Very Insignificant Benefit. Both the COTS games benefits and barriers scales were derived from previous research (Becker, & Jocaobsen, 2005; Ertzberger, 2008). All scales also included a Do not Know option.

Procedures

The survey was made accessible in a web-based format using SelectSurvey. The survey was available during a three-week period, and during this time, two reminder emails were sent to members of the SIGGS. Participants were informed the purpose of this project was to examine characteristics related to the use of COTS games in formal educational settings.

Data Analysis

This study employed a mixed-method approach, (Tashakkori & Teddlie, 1998), involving both quantitative and qualitative procedures used concurrently and independently. Quantitative analyses of the data included descriptive analysis of response frequencies and measures of variation and central tendency, (Knupfer & McLellan, 1996), and internal consistency reliability analysis, (Cronbach's alpha). Three open-ended survey items were included in the instrument for the purpose of gaining further insight into COTS games, benefits and barriers. The data were analyzed using a constant comparative method (Glaser, 1965; Glaser, 1967).

Results

The results of this research must be viewed in light of its limitations. The sample had a low response rate. Prior research suggests that average online response rates fall somewhere within the range of 24% – 39% (Cook et al., 2000, Sheehan, 2001). Our research achieved 10% response rate. This low response may not accurately represent the perceptions of the population.

Additionally, the survey itself is a limitation. The questions were few and the content of a limited nature. Further research is necessary to validate an instrument for wide scale use. In light of these limitations, this research has resulted in several interesting findings.

Commercial-off-the-shelf (COTS) Video Games

The internal consistency reliability for the scale was high at $\alpha = .89$. As can be seen in Table 2, many of the participants were not familiar with a handful of the COTS games listed in the survey. Big Brain Academy, Brain Age, and Oregon Trail had item averages at or above 4.0, indicating that those that were aware of the games, deemed them appropriate for a formal educational setting. Other games had high averages (> 3.5), including Civilization III, Dimension M, Railroad Tycoon, Rise of Nations, The Sims, Wii Sports, and Zoo Tycoon. The only game identified as not appropriate was the Grand Theft Auto series with an item average of 1.83 ($SD = 1.22$).

Table 2
COTS games scale with descriptive statistics.

| COTS Game | n | DK | VI | I | N | A | VA | M* | SD* |
|--------------------------------|----|-------|-------|-------|-------|-------|-------|------|------|
| Big Brain Academy | 95 | 64.65 | 1.01 | 0.00 | 6.06 | 11.11 | 13.13 | 4.13 | 0.96 |
| Brain Age | 95 | 60.61 | 2.02 | 0.00 | 5.05 | 15.15 | 13.13 | 4.06 | 1.03 |
| Civilization III | 93 | 42.42 | 3.03 | 1.01 | 8.08 | 29.29 | 10.10 | 3.82 | 0.97 |
| Dimension M | 92 | 69.70 | 3.03 | 1.01 | 4.04 | 9.09 | 6.06 | 3.61 | 1.31 |
| Endless Ocean | 92 | 60.61 | 9.09 | 1.01 | 4.04 | 12.12 | 6.06 | 3.16 | 1.53 |
| Grand Theft Auto | 91 | 20.20 | 42.42 | 13.13 | 5.05 | 8.08 | 3.03 | 1.83 | 1.22 |
| Guitar Hero | 91 | 19.19 | 7.07 | 15.15 | 19.19 | 24.24 | 7.07 | 3.13 | 1.15 |
| Half-Life | 91 | 47.47 | 6.06 | 5.05 | 12.12 | 9.09 | 12.12 | 3.36 | 1.37 |
| Oregon Trail | 89 | 18.18 | 1.01 | 1.01 | 5.05 | 30.30 | 34.34 | 4.34 | 0.79 |
| Railroad Tycoon | 89 | 39.39 | 1.01 | 1.01 | 8.08 | 28.28 | 12.12 | 3.98 | 0.82 |
| Rise of Nations | 89 | 42.42 | 1.01 | 3.03 | 5.05 | 26.26 | 12.12 | 3.96 | 0.91 |
| Simcity | 89 | 27.27 | 3.03 | 4.04 | 13.13 | 25.25 | 17.17 | 3.79 | 1.07 |
| Super Mario Galaxy | 89 | 39.39 | 3.03 | 16.16 | 20.20 | 9.09 | 2.02 | 2.82 | 0.94 |
| The Sims | 89 | 34.34 | 2.02 | 6.06 | 18.18 | 20.20 | 9.09 | 3.51 | 1.02 |
| The Legend of Zelda | 89 | 51.52 | 5.05 | 8.08 | 16.16 | 6.06 | 3.03 | 2.84 | 1.10 |
| Trauma Center: Under the Knife | 88 | 52.53 | 6.06 | 3.03 | 9.09 | 13.13 | 5.05 | 3.22 | 1.29 |
| Wii Sports | 86 | 21.21 | 1.01 | 4.04 | 16.16 | 30.30 | 14.14 | 3.80 | 0.90 |
| World of Warcraft | 80 | 41.41 | 9.09 | 10.10 | 13.13 | 5.05 | 2.02 | 2.51 | 1.14 |
| Zoo Tycoon | 64 | 31.31 | 1.01 | 1.01 | 8.08 | 13.13 | 10.10 | 3.91 | 0.98 |

*n=Number of respondents, DK = Do not Know, VI = Very Inappropriate, I = Inappropriate, N = Neutral, A = Appropriate, VA = Very Appropriate, M = Item average, SD = Item Standard deviation, *Note the average and standard deviations do not include the Do not Know response.*

Participants also had the option of listing COTS games that were not listed in the scale. These responses are summarized in Table 3. Only those with two or more responses are shown. In total, 22 unique games were provided. Of the 99 participants, only 23 provided a response with an average of 5.13 words ($SD = 4.74$). Of those listed, both Spore and Risk occurred most.

| Table 3 | |
|--------------------------------|---|
| Other COTS games listed | |
| Age of Empires | 2 |
| Spore | 3 |
| Risk | 3 |
| Math Blaster | 2 |
| Carmen San Diego | 2 |
| Making History | 2 |

Benefits to COTS Video Games

The internal consistency reliability for the scale was also high at $\alpha = .93$. Table 4 shows the results. The highest rated item averages (> 4.0) for the support of COTS in formal educational settings are to develop cognitive skills ($M = 4.31$, $SD = 0.64$), develop spatial relation skills ($M = 4.14$, $SD = 0.72$), develop motor skills ($M = 4.12$, $SD = 0.73$), knowledge acquisition ($M = 4.18$, $SD = 0.76$), increase memory capacity ($M = 4.02$, $SD = 0.85$), teaching complex problem-solving ($M = 4.45$, $SD = 0.66$), increase creativity ($M = 4.15$, $SD = 0.91$), transfer knowledge to real-world situations ($M = 4.17$, $SD = 0.77$), accept and learn from mistakes ($M = 4.28$, $SD = 0.75$), learning by doing ($M = 4.26$, $SD = 0.70$), increase self-esteem and self-confidence ($M = 4.00$, $SD = 0.88$), incorporate technology student's use every day ($M = 4.18$, $SD = 0.83$), and to promote differentiated instruction ($M = 4.17$, $SD = 0.81$). Notably, none of the potential benefits listed are below the central point (3.0).

Table 4
Benefits to COTS video games.

| Benefit | n | DK | VIB | IB | N | IB | VIB | M* | SD* |
|--|----------|-----------|------------|-----------|----------|-----------|------------|-----------|------------|
| Eliminate the digital generation gap | 98 | 4.04 | 1.01 | 6.06 | 21.21 | 45.45 | 21.21 | 3.84 | 0.88 |
| Develop cognitive skills | 98 | 2.02 | 0.00 | 1.01 | 6.06 | 51.52 | 38.38 | 4.31 | 0.64 |
| Develop spatial relations skills | 98 | 3.03 | 0.00 | 3.03 | 10.10 | 53.54 | 29.29 | 4.14 | 0.72 |
| Develop motor skills | 98 | 3.03 | 0.00 | 1.01 | 11.11 | 55.56 | 27.27 | 4.12 | 0.73 |
| Knowledge acquisition | 98 | 1.01 | 0.00 | 2.02 | 15.15 | 44.44 | 36.36 | 4.18 | 0.76 |
| Increase memory capacity | 98 | 5.05 | 0.00 | 4.04 | 20.20 | 39.39 | 30.30 | 4.02 | 0.85 |
| Teach complex problem solving | 98 | 0.00 | 0.00 | 1.01 | 6.06 | 39.39 | 52.53 | 4.45 | 0.66 |
| Increase creativity | 98 | 1.01 | 1.01 | 4.04 | 15.15 | 36.36 | 41.41 | 4.15 | 0.91 |
| Transfer of knowledge to real-world situations | 98 | 3.03 | 0.00 | 2.02 | 17.17 | 39.39 | 37.37 | 4.17 | 0.79 |
| Accept and learn from mistakes | 98 | 3.03 | 0.00 | 1.01 | 14.14 | 37.37 | 43.43 | 4.28 | 0.75 |
| Learning by doing | 98 | 3.03 | 0.00 | 0.00 | 14.14 | 42.42 | 39.39 | 4.26 | 0.70 |

| Benefit | n | DK | VIB | IB | N | IB | VIB | M* | SD* |
|---|----------|-----------|------------|-----------|----------|-----------|------------|-----------|------------|
| Increase self-esteem and self-confidence | 98 | 3.03 | 1.01 | 4.04 | 18.18 | 43.43 | 29.29 | 4.00 | 0.88 |
| Promote social skills | 98 | 5.05 | 6.06 | 8.08 | 21.21 | 37.37 | 21.21 | 3.63 | 1.12 |
| Teach students how to role-play | 96 | 3.03 | 1.01 | 5.05 | 25.25 | 45.45 | 17.17 | 3.77 | 0.85 |
| Incorporating technology that student's use everyday | 90 | 1.01 | 0.00 | 4.04 | 12.12 | 37.37 | 36.36 | 4.18 | 0.83 |
| COTS games used as part of a reward system (i.e. work completion, etc.) | 98 | 5.05 | 10.10 | 4.04 | 32.32 | 34.34 | 13.13 | 3.39 | 1.12 |
| Promotes healthy competition | 96 | 5.05 | 2.02 | 7.07 | 26.26 | 41.41 | 15.15 | 3.66 | 0.92 |
| Promotes differentiation of instruction | 96 | 6.06 | 1.01 | 1.01 | 14.14 | 40.40 | 34.34 | 4.17 | 0.81 |

n=Number of respondents, DK = Do not Know, VIB = Very Insignificant Benefit, IB = Insignificant Benefit, N = Neutral, SB = Significant Benefit, VIB = Very Significant Benefit, M = Item average, SD = Item Standard deviation,

*Note the average and standard deviations do not include the Do not Know response.

Participants also had the option of listing potential benefits not listed in the scale. Eighteen participants provided free-form responses averaging 11.05 ($SD=9.94$) words in length. Results suggest, in addition to those listed, increased communication among students and teachers, increased teamwork and collaboration among students, stealth assessment, and students learning the design of games themselves are additional potential benefits.

Barriers to COTS Video Games

The Cronbach's alpha was high at $\alpha = .92$. Table 5 shows the results. The greatest barriers ($4 >$) to the integration of COTS games include teachers' background in games and technology ($M = 4.33$; $SD = 0.86$), perception of games ($M = 4.23$; $SD = 0.85$), lack of financial resources ($M = 4.13$; $SD = 1.01$), alignment with the curriculum ($M = 4.09$; $SD = 1.00$), lack of evidence to support their use ($M = 4.04$; $SD = 0.89$), and lack of time to integrate into the classroom ($M = 4.23$; $SD = 0.85$).

Participants also had the option of listing potential barriers not listed in the scale. Twelve participants provided responses with an average length of 16.08 ($SD=19.28$) words. Additional barriers to integrating COTS video games include gender issues, equity issues for students with special needs (e.g., visually impaired), lack of games aligned with standardized tests, unhealthy competition, and Internet safety.

Discussion

One respondent captured the essence of perhaps the most significant barrier to using COTS video games in formal settings by stating "I must teach to these academic standards; my principal will give me a bad evaluation if I am not teaching the standards and we are playing games instead" (Respondent, 2009). This statement reiterates the ongoing challenge educators face in attempting to pioneer innovative instructional approaches employing technology. The perception of COTS video games is itself a major barrier as confirmed by our findings. Educators must make the case to leadership of the value of integrating COTS video games in the classroom. This inevitably requires more evidence to substantiate the use of COTS video games. This lack of documentation

has been identified as another significant barrier. We believe these findings, at minimum, make a call to educators and researchers alike to spearhead this complicated domain.

Table 5
Barriers to COTS video games.

| Barrier | n | DK | VIB | IB | N | IB | VIB | M | SD |
|--|----|-------|-------|-------|-------|-------|-------|------|------|
| Lack of parental consent | 99 | 6.06 | 3.03 | 13.13 | 27.27 | 33.33 | 17.17 | 3.52 | 1.05 |
| Parental perceptions about games | 99 | 5.05 | 4.04 | 7.07 | 17.17 | 38.38 | 28.28 | 3.84 | 1.07 |
| COTS game ratings | 99 | 14.14 | 1.01 | 11.11 | 29.29 | 34.34 | 10.10 | 3.48 | 0.91 |
| Lack of access to technology | 99 | 2.02 | 3.03 | 11.11 | 12.12 | 30.30 | 41.41 | 3.98 | 1.14 |
| Lack of administrative support | 99 | 3.03 | 3.03 | 8.08 | 15.15 | 31.31 | 39.39 | 3.99 | 1.09 |
| Teacher's background in games and technology | 99 | 1.01 | 2.02 | 2.02 | 7.07 | 38.38 | 49.49 | 4.33 | 0.86 |
| Perception of games | 99 | 2.02 | 2.02 | 2.02 | 8.08 | 45.45 | 40.40 | 4.23 | 0.85 |
| Training regarding the new technology | 99 | 2.02 | 3.03 | 7.07 | 12.12 | 48.48 | 27.27 | 3.92 | 0.99 |
| Technology reliability | 99 | 1.01 | 4.04 | 14.14 | 24.24 | 36.36 | 20.20 | 3.55 | 1.09 |
| Lack of financial resources | 99 | 2.02 | 2.02 | 6.06 | 13.13 | 32.32 | 44.44 | 4.13 | 1.01 |
| Alignment of curriculum | 99 | 3.03 | 1.01 | 7.07 | 16.16 | 30.30 | 42.42 | 4.09 | 1.00 |
| Lack of evidence to support their use | 99 | 2.02 | 1.01 | 6.06 | 12.12 | 47.47 | 31.31 | 4.04 | 0.89 |
| Lack of technical support | 99 | 1.01 | 1.01 | 10.10 | 25.25 | 40.40 | 22.22 | 3.73 | 0.96 |
| Lack of time to familiarize oneself with the technology | 99 | 2.02 | 2.02 | 5.05 | 15.15 | 48.48 | 27.27 | 3.96 | 0.91 |
| Lack of time to integrate into classroom | 99 | 3.03 | 0.00 | 7.07 | 15.15 | 43.43 | 31.31 | 4.02 | 0.88 |
| Class expectations | 99 | 3.03 | 2.02 | 8.08 | 27.27 | 44.44 | 15.15 | 3.65 | 0.92 |
| Class size | 99 | 3.03 | 6.06 | 11.11 | 24.24 | 39.39 | 16.16 | 3.50 | 1.10 |
| Lack of student motivation | 99 | 2.02 | 21.21 | 31.31 | 25.25 | 15.15 | 5.05 | 2.51 | 1.15 |
| Lack of teacher motivation | 99 | 3.03 | 3.03 | 10.10 | 14.14 | 40.40 | 29.29 | 3.85 | 1.07 |
| Lack of access to professional development | 99 | 3.03 | 3.03 | 7.07 | 18.18 | 46.46 | 22.22 | 3.80 | 0.98 |
| Lack of access to technology outside of schools | 98 | 3.03 | 4.04 | 15.15 | 28.28 | 28.28 | 20.20 | 3.47 | 1.12 |
| Conflict between teacher's interests and teacher's responsibilities | 87 | 5.05 | 0.00 | 10.10 | 16.16 | 40.40 | 16.16 | 3.76 | 0.91 |
| Concern for how students will be affected by the integration of games into the classroom | 87 | 4.04 | 2.02 | 17.17 | 25.25 | 30.30 | 9.09 | 3.33 | 1.00 |

n=Number of respondents, DK = Do not Know, VIB = Very Insignificant Barrier, IB = Insignificant Barrier, N = Neutral, SB = Significant Barrier, VIB = Very Significant Barrier, M = Item average, SD = Item Standard deviation,
*Note the average and standard deviations do not include the Do not Know response.

The results of our research corroborate the findings of prior research. For instance, lack of time to integrate into the curriculum was perceived as a major barrier in Becker and Jocaobsen findings and in our own results. Additionally, Ertzberger (2008) found that lack of alignment to the curriculum and lack of financial resources were also significant barriers. Our findings provide further evidence of these barriers in integrating video games in formal educational settings. In addition, our research has identified a teachers' background in games and technology, perception of games in general, and lack of evidence to support their use as significant barriers.

In exploring potential benefits, the greatest benefits identified include developing cognitive skills, teaching complex problem-solving, accepting and learning from mistakes, and learning by doing. Additionally, qualitative findings suggested increased communication among students and teachers, increased teamwork and collaboration among students, stealth assessment, and students learning the design of games themselves are additional potential benefits. These findings are analogous to prior research suggesting video games are a tool to "use action instead of explanation, create personal motivation and satisfaction, provide interactive decision-making context" (Kebritchi, 2008, p. 15), and can promote collaboration among learners (Kaptelin & Cole, 2002). While this research has explored the many perceived benefits of COTS video games, further research is necessary to examine the efficacy of these benefits in experimental and quasi-experimental settings. Put simply, more research is necessary.

Our research has also identified COTS video games that are deemed appropriate for formal educational settings. These games include Big Brain Academy, Brain Age, Oregon Trail Civilization III, DimensionM, Railroad Tycoon, Rise of Nations, The Sims, Wii Sports, and Zoo Tycoon. These games are a list of tools that educators can choose to employ in their classrooms. Further, the list also provides a list of appropriate games to investigate from a research perspective as more evidence to substantiate their use is indispensable.

We believe that our findings should be used to create a larger validated instrument that can be used on a wider audience of educational professionals on the benefits and barriers to integrating COTS video games. This paper has documented a dearth of literature on the use of COTS video games in educational settings. Our instrumentation is a starting place for researchers to document and validate a tool to collect this pertinent information from education professionals.

As noted by Charsky and Mims (2008), "COTS game are not a panacea, just a strategy with which we, and others, have had success; a strategy that may be successful for some educators, especially those educators who are already playing video games outside of work." COTS video games should be perceived as one tool among many different instructional strategies - a tool that has the potential to truly engage our students.

References

- Barlow, M., Morrison, P. & Easton, A. (2002). 1st-Person tactical shooters: COTS games with military training potential? *In Proceedings of SimTecT*.
- Becker, K. (2006). Pedagogy in commercial video games. In Gibson, D., Aldrich, C., & Prensky, M. (Eds.). *Games and simulations in online learning: Research and development frameworks* (). Hershey, PA: Information Science Publishing.
- Becker, K. & Jocaobsen, D. M. (2005). Games for learning: Are schools ready for what's to come? *Proceedings of DiGRA 2005 Conference: Changing Views – Worlds in Play*.
- Charsky, D. & Mims, C. (2008). Integrating commercial-off-the-shelf video games into school curriculums. *TechTrends*, 52(5), 38 – 44.
- Cook, C., Heath, F. & Thompson, R. L. (2000). A meta-analysis of response rates in web- or Internet-based surveys, *Educational and Psychological Measurement*, 60, 6, 821-836.

- Ertzberger, J. (2008). An investigation into factors affecting teachers' use of video games as instructional tools, (Doctoral dissertation, Pepperdine University).
- Fong, G. (2006). Adapting COTS games for military experimentation. *Simulation & Gaming*, 37(4), 452-465.
- Future Lab (2005). Teaching with games: Survey on teachers' attitudes to games and learning. Retrieved on July 11, 2009 from:
http://www.futurelab.org.uk/resources/documents/project_reports/teaching_with_games/TWG_teachers_survey.pdf
- Glaser, B. G. (1965). The constant comparative method of qualitative analysis. *Social Problems*, 12(4), 436-445.
- Glaser, B. G. (1967). The constant comparative method of qualitative analysis. In B. Glaser & A. Strauss (Eds.), *The discovery of grounded theory: Strategies for qualitative research* (pp. 101- 116). Chicago: Aldine.
- Kaptelin, V., & Cole, M. (2002). Individual and collective activities in educational computer game playing. In T. Kosmann, R. Hall, & N. Miyake (Eds.), g2057CSCL 2: Carrying forward the conversation (pp. 303-316). Mahwah, NJ: Lawrence Erlbaum.
- Ke, F. (2008). A case study of computer gaming for math: Engaged learning from gameplay? *Computers & Education*, 51(4), Pages 1609-1620.
- Kebritchi, M. (2009). Factors affecting teachers' adoption of educational computer games: A case study. *British Journal of Educational Technology*.
- Kebritchi, M. (2008). *Effects of a computer game on mathematics achievement and class motivation: An experimental study*. Unpublished doctoral dissertation, University of Central Florida.
- Kirriemuir, J. (2005). Commercial games in the classroom. *Interact*, 31, 20-21.
- Knupfer, N. N., & McLellan, H. (1996). *Descriptive research methodologies*. In D. H. Jonassen (Ed.). Handbook of research for educational communications and technology (pp. 693-719). New York: Macmillan.
- Michael, D. & Chen, S. (2005). Serious Games: Games that educate, train, and inform. Thomson: Course Technology.
- Miller, C. S., Lehman, J. F., & Koedinger, K. R. (1999). Goals and learning in microworlds. *Cognitive Science*, 23(3), 305-336.
- Morrison, P. & Barlow, M. (2004). Child's Play? Coercing a COTS Game into a Military Experimentation Tool. In *SimTecT 2004 Conference Proceedings*, 72-79.
- Niederhauser , D. S., & Stoddart, T. (2001). Teachers' instructional perspectives and use of educational software. *Teaching and Teacher Education*, 17(1), 15 – 31.
- Prensky, M. (2010). Video games. Retrieved on April 23, 2010 from <http://www.marcprensky.com/>.
- Sanford, R., Ulicsak, M., Facer, K., & Rudd, T. (2006). Teaching with Games: Using commercial off-the-shelf computer games in formal education. Entertainment Arts: FutureLab.
- Sheehan, K. (2001). E-mail survey response rates: A review. *Journal of Computer-Mediated Communication*, 6(2), Available at: <http://jcmc.indiana.edu/vol6/issue2/sheehan.html>.
- Squire, K. D. (2003). Gameplay in context: Learning through participation in communities of civilization III players. Unpublished PhD dissertation. Instructional Systems Technology Department, Indiana University.
- Tashakkori, A. & Teddlie, C. (1998). *Mixed Methodology: Combining Qualitative and Quantitative Approaches*. Thousand Oaks, California: Sage.

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Editor's Note: The power of the blog in its many forms has become one of the pillars of Internet II and social networks. This paper shows how the blog to support academic and personal goals.

Blog Insights

Brent Muirhead

USA

Introduction

The purpose of this paper is to discuss self-publishing involving blogs. The discussion will focus on issues related to the nature of blog capabilities and limitations. The narrative will describe the role of blogs in sharing knowledge in the areas of citizenship journalism and education.

Background

Internet use has increased significantly in the last ten years. In 2006 survey by the Pew Internet & American Life Project, over 140 million Americans related that they using the Internet. The Internet usage was even higher in South Korea, Finland and Canada (Skank, 2008). The Pew report revealed that people were using the Internet to acquire information related to their jobs, hobbies, making purchases and healthcare. There has been a major increase in people posting online content and this development reflects advances computer technologies. Individuals do not need technical expertise such as knowing HTML to share with others online. Web 2.0 computer applications have created a new set of two-way communication tools and platforms that is transforming the World Wide Web. The rapid growth of Web 2.0 or the read and write web is a remarkable development that has important implications for education, democracy and social networking (Richardson, 2006).

What is a Blog?

Discussions on the origin of term blog often begin with Justin Hall who in 1994 created a home page on the Internet. Hall's website became a journal first known as a web log and later called a blog. The term web log was dropped because it created confusion and focused on server files. The first definitions of blogs were connected to a tool or service used to produce the postings. Conniff (2005 terms of engagement para#1) uses six attributes to define a blog "...reverse chronology, unfiltered content, comments, links, an informal attitude, and appropriate text." The characteristics provide basic highlights into the multidimensional nature of blogs. Technology writers define the structure of blogs because the content varies. Blogs are conversations that stop and start at different times and this makes them difficult to describe.

A popular definition among bloggers is Jarret's (2003, para#2) "blogs are personally published documents on the web, with attribution and date, collected in a single place, generally published with a static structure to facilitate incoming links from other sources, and updated with some regularity and frequency..." Blogs reflect idea sharing by an individual which makes the comments subjective. The author can control the contents through the process of posting comments, editing, revising and deleting materials. The power to control content has contributed to making blogging popular. The Pew Internet & American Life Project (2008) notes that 5% of the daily Internet usage involves people who are reading blogs. The ability to reach a national and international audience makes blogging an appealing and dynamic endeavor. Blogging can be empowering for those who want to share their thoughts with a larger audience. The term blogosphere refers to "the distributed, collective, and interlinked world of blogging" (Duffy, & Axel, 2006, p.32).

Blogs are different from conventional web sites which are often more static in their content and have a more formal document structure (e.g. University home page). In contrast, blogs reflect the author's daily journey which could involve posting comments several times within one day. Readers can search tools to quickly identify the author's remarks and archives can be used to create a historical and chronological record (Jarrett, 2003). Contemporary blogs have grown more sophisticated with search tools that enable individuals to track topics and specific comments. The blog archives operate as a permanent place for keeping and reviewing the author's thoughts. (Jarrett, 2003) argues the records could be considered a form of accountability among those who are reading and sharing within the blog communities.

The bloggers' web presence is established through commentary, links, personal pictures and sometimes video clips. Hyperlinks can be used to evaluate the author's perspectives by examining the original source material. One of the built in limitations of blogging is the author's expertise on the topics discussed within their sites. Bloggers can share their biography that includes both personal and professional data. The information can help potential readers answer some questions about their credibility. Harrington (2009, p. 148) notes that "the biggest question that arises is whether the information in a given blog is authentic and authoritative. Because no one regulates what is posted on the Internet, it is up to each individual user to decide."

Blog Citizenship Journalism

The rise of web amateur reporters is having a profound impact on the journalism business. In a 2004 CBS evening news report, Dan Rather shared papers about President George W. Bush's past military records. Bloggers discovered that the documents were forgeries. CBS news executives had to make a public apology for the incident which hurt their credibility. The inauthentic papers probably played a role in Rather's retirement (Richardson, 2006). The incident highlights how blogs are influencing the news media. People can read newspapers in print or online which makes the information more accessible. Newspapers are financially struggling because of the loss of readers and drop in their print and online advertising revenues. An audit of over 500 newspapers has shown sharp declines in circulation and this includes established newspapers such as The New York Times and The Los Angeles Times. Pena-Perez (2008, p. B4) relates that "analysts have warned in recent years that offering steadily less in print, newspapers were inviting readers to stop buying. Most papers have sharply reduced their physical size---fewer and smaller pages, with fewer articles---and the newsroom staffs that produce them." The current financial crisis is placing pressure on the newspaper industry to change their business model and publishing strategies to keep pace with a more technologically literate public (Croteau, 2006).

The 2004 Presidential election has been used a case study of blog journalism. Carlson (2007) examines the reaction of journalists to the election controversy surrounding the decision by bloggers to share election exit polls results that mistakenly predicted John Kerry's victory. The political bloggers are part of the new media technology that challenges traditional journalism's authority. Bloggers often took the role of media and election watchdogs. This upsets journalists who considered themselves engaged investigative actives designed to inform and protect the public from political corruption. The public influence of blogs has risen due to their ability to quickly deliver information.

During the 2004 presidential election, television networks were hesitant to share predictions about election results. The traditional media noticed the evening exit polls were not as positive toward Kerry as those during the day. Blogs predicted Kerry's victory and this event reflected the flaws in their research and reporting methods. The blogosphere operates without established journalistic norms and individuals lack the interpretive expertise to evaluate the poll data. The blogs failed at verifying election information which represents a major limitation for election coverage. Yet, blogs have made journalists more transparent about their practices. Carlson (2007)

observes that blogs have become popular because of their ability to engage people in political conversations.

The traditional media has struggled to capture the imagination of people who are choosing alternative news sources. A growing number of mainstream reporters such as Brian Williams have started their own blogs. Newspapers and their staffs are using blogs in an effort to be more responsive to news events. A major concern among journalists involves the frivolous blogs that share useless media information and people might miss the important news (Gorman, 2007a). Traditional journalists consider creative endeavors which strive to be interesting but are weaker on accuracy issues. Bloggers can edit and post their correct errors much more quickly than the media. Critics are concerned that this self-correcting ability fails to alleviate the damage done to people from rumors and falsehoods (Boudreau, 2006). In a tragic case, a 21 year old engineering student committed suicide with a homemade bomb close to the University of Oklahoma football stadium. Bloggers were wildly speculating about the incident and raised questions whether the media was covering up a story about terrorists. The true story was a depressed student who killed himself near a crowded stadium. The parents had to defend their dead son and his brother against terrorist accusations. Sadly, the even generated conspiracy theories that continued long after the bloggers corrected their information. The incident illustrates how the blogosphere can operate in a social vacuum at times due to weak fact checking procedures and poor reporting skills (Young, 2005).

The role of the citizen journalist is still evolving as the blogosphere participates in politics and elections. Conservative and liberal bloggers select over 86% of their links to align with their ideology (Prior, 2008). The links can create more political fragmentation and polarization of views because people share with those who have similar viewpoints. Researchers are finding that the link information can have political value. People who are exposed to the information are motivated to increase their political participation (e.g. voting). The political links seem to have minimal impact on those who are surfing the Internet for entertainment purposes. Individuals who read blogs for news are more inclined to become active in political activities. This raises the possibility that the blogosphere can provide a resource for foster political accountability (Prior, 2008).

Political blogs such as the well known The Huffington Post (2008) have provided forums for people to discuss social issues. Political blogs can be effective tools to raise money for candidates during elections. This is an essential task due to the high costs of running presidential campaigns. During the 2008 election, blogs were used effectively to raise money for presidential candidates. Over 3 million people contributed to President elect Obama campaign (Phillips, 2008).

Westheimer & Kahne (2004) describe three versions of citizenship:

1. Personally responsible citizen- donates blood, obeys laws
2. Participatory citizen- active in civic affairs
3. Justice oriented citizen- highlight injustices and seek social justice

The three types of citizenship create a democratic vision that transcends giving money and voting. This raises the question of whether blogs are capable of mobilizing people to social activism. The Mum's Army blog is an example of how a British group of over 300 women worked together in an effort to reach 2.5 million working class women who were not voters (Simmons, 2008). The group's voting campaign and online dialogs encouraged local communities to address issues with anti-social behaviors in their towns. Bloggers share a diversity of stories about their personal lives involving rape and violence in their communities. The blog merged private and public narratives into an intimate citizenship that transformed their blog into a dynamic social force (Simmons, 2008).

Blog Education

Today's college students are used to using Internet search engines such as Google and creating content on MySpace with pictures and video clips. Students are developing online peer communities that are transforming knowledge sharing and social relationships. Self publishing on the web includes a diverse range of producers "...start up commercial enterprises, independent non-profits, religious groups, hobby enthusiasts, political organizations, ethnic groups, and the informal efforts of individuals or small group of friends" (Croteau, 2006, 340). The popularity of blogs is due to their flexible nature and the ability of blogs to reflect the purpose and design of their authors. Blogs can be a basic diary (e.g. photo journal) which communicates news for the author's friends and family members. Public blogs can serve people in business, education, government and entertainment industries through the sharing of a variety of types of information such as business minutes or book club notes. Blogs can be used for educational purposes due to the easy access through computer technology. Bouldin, Holmes & Fortenberry (2006) observe how blogs are being used for professional development, class dialogs, teachers who manage and share course content and reflective student journaling. Blogs represent a new frontier in the teaching and learning process.

Educators wonder about the blog's educational value. Brock (2005, para#3-8) shares five educational benefits to blogs:

1. Blogs can promote critical and analytical thinking.
2. Blogging can be a powerful promoter of creative, intuitive, and associational thinking.
3. Blogs promote analogical thinking.
4. Blogging is a powerful medium for increasing access and exposure to quality information.
5. Blogging combines the best of solitary reflection and social interaction.

Brock's perspective on the blogosphere is quite positive. The five benefits do reflect different ways that individuals can acquire new knowledge and skills. Blogs are text driven which makes them somewhat similar to online university classes. Individuals write and read materials and this offers opportunities to study and learn. People will vary in their ability to comprehend, analyze and share information. For instance, the ability to demonstrate critical thinking skills during online dialogs is influenced by four major factors: cognitive maturity, communication style of blogger, person's prior learning experiences and degree of understanding the critical thinking process (Bullen, 1998).

Brock's (2005) point about the importance to learning through individual and group sharing does have support among cognitive psychologists. The interaction over ideas can encourage different types of critical and creative thinking skills. People can test and experiment with ideas with other bloggers. Sawyer (2006) stresses meaningful group interaction as a foundation for creativity in education and business organizations. The blogosphere can foster creativity by integrating learning, professional practice and research on social and educational issues. Information is presented within the community which stimulates dialog by asking thought provoking questions. The merging of content and discussion offers numerous opportunities to explore new ideas. Also, the discussions can be quite dynamic and ongoing over extended periods of time. Individuals are can take their time to reflect and devote additional time investigating a topic before posting their comments. Bloggers can create learning climate that stimulates risk taking and exploration of ideas. Research studies affirm that "creativity does not occur in magical moment of insight; rather, creative products result from long periods of hard work that involve many small mini-

insights, and these mini-insights are organized and combined by the conscious mind of the creator" (Sawyer, 2006, p. 74).

An important characteristic among bloggers is their spirit of adventure and sharing information. The blogosphere contains thousands of people who enjoy informal learning outside of higher education. People need more just-time-learning that meets their personal and professional needs. Web 2.0 applications such as RSS feeds provide content syndication to exchange and share information resources with others. Bloggers are developing information networks that offer generalized and specialized information. People are meeting in cyberspace according to their areas of interest and using communication technologies (e.g. email lists) that address basic and complex learning problems (Skank, 2008).

The blogosphere is developing new information networks that support lifelong learning. People want to remain current in their knowledge and skills. Downes (2005) describes how knowledge networks can be the most effective:

1. Decentralized so that the flow increases and risk of network failure is reduced
2. Distributed so that knowledge is created and enhanced by all and divergent views are maintained
3. Disintermediated (that is, no moderator) to facilitate direct access to people and content
4. Dynamic to afford new information, people, and ways of operating
5. Desegregated so that learning and work are mixed, allowing learning as the need arises (Skank, 2008, p. 249).

Downes (2005) argues against controlling the knowledge networks because this will destroy the autonomy and freedom within the learning communities. Knowledge networks are capable of helping people to freely send and receive information and negotiate these interactions. The networks affirm flexibility and diversity among bloggers. Technology enables people to control information production and communication. Blogs have weakened the media's control of the public forum (Keen, 2007).

Bloggers are known for their playful personas while being dedicated to sharing with others. Justin Hall who is a pioneer blogger produced 4,800 pages of text over a ten year period of writing. Cognitive psychologists have recognized an important paradox found in creative accomplishments involving playfulness and discipline. Creative individuals work very hard and continue their work with a level of persistence which is rarely matched by others. They often possess playful attitudes which help them deal with ideas with an abandonment and imagination. The ability to find joy in their work enables them to take necessary breaks from seriously pondering complex ideas. Creative people have learned how to foster a receptive mental outlook that produces novel concepts or ideas (Csikszentmihalyi, 1996).

Blog Limitations

The positive benefits of blogging should include a discussion of limitations. Blogs can be quickly built but are much more difficult to maintain. People must invest time into writing posts and responding to their readers. This can be quite time consuming because writing reflective and coherent messages takes time. Blogs require having the personal discipline to research topics while posting new materials and interacting with those who make posts. Also, those who write frequently might not always have something significant to share with others. Bloggers have limited amount of time to investigate subjects and breaking news events. This has an impact on the quality of their writing and increases the potential for presenting only partial or misleading information.

Nye (2006, p. 47) observes that “no technology exists in isolation. Each is open-ended set of problems and possibilities.” Blogs have only been in existence since 1994. People are experimenting with blogs and learning new ways to use and manage their technological applications. Individuals are discovering the blog’s social limitations. Justin Hall’s blog site has closed with a powerful video message that stresses how the Internet community had failed to meet intimacy needs. People who devote enormous amounts of time online can have trouble maintaining close relationships with their family and friends (Harmanci, 2005). Constantly pouring one’s emotional and cognitive energies into online communities to help others with their project does appear noble. People who devote less time in face-to-face interactions are taking relationship risks that they might later regret. Perhaps, individuals have had unrealistic expectations about technology and neglected to consider unexpected negative social outcomes (Nye, 2006).

Blog authors should spend time studying some of the dangers associated with those who visit their sites. Those who post personal information must recognize the risks involved with their data. The dark side of blogging can arise through identity theft, harassment, attacks on reputations and vandalism of the sites (Houghton, 2005). These are serious issues which reflect potential antisocial behaviors within the blogosphere.

Conclusion

The digital world has given people access to new knowledge and learning communities. Blogs are part the Web 2.0 movement that is changing how people create and share knowledge. The new technologies have been a mixed blessing that has created educational opportunities, raised concerns about sharing reliable information and developed complex social networks. Blogs can foster political participation and affirm democratic ideals. “The task before us is to extend into the digital world the virtues of authenticity, expertise, and scholarly apparatus that have evolved over the 500 years of print...” (Gorman, 2007b, para#5)

References

- Bouldin, A. S., Holmes, E. R., & Fortenberry, M. L. (2006). “Blogging” about course concepts: Using technology for reflective journaling in a communication class. *American Journal of Pharmaceutical Education*, 70 (4), 1-8. Retrieved from EBCOHOST database December 13, 2008.
- Brock, E. (2005). Brain of the blogger. Neurolearning Blog. Retrieved December 15, 2008 from <http://eideneurolearningblog.blogspot.com/2005/03/brain-of-blogger.html>
- Boudreau, T. (2006). Before you blog: Legal and ethical concerns about joining the blogosphere. National Newspaper Association Annual Convention, Oklahoma City, OK. Retrieved December 16, 2008 from <http://huckboyd.jmc.ksu.edu/symposium/XII/Boudreau%20Speaking%20on%20Blogging.pdf>
- Bullen, M. (1998). Participation and critical thinking in online university distance education. *Journal of Distance Education*. 13 (2). Available: <http://cade.icaap.org/vol13.2/bullen.html>
- Carlson, M. (2007). Blogs and journalistic authority: The role of blogs in US election 2004. . *Journalism Studies*, 8 (2), 2007, 264-279. Retrieved from EBCOHOST database December 13, 2008.
- Conniff, M. (2005). Just what is a blog, anyway? *Online JournalismReview*. Retrieved December 15, 2008 from <http://www.ojr.org/ojr/stories/050929/>

- Csikszentmihalyi, M. (1996). *Creativity: The flow of psychology of discovery and invention*. New York, NY: HarperCollins.
- Croteau, D. (2006). The growth of self-produced media content and the challenge to media studies. *Critical Studies in Media Communication*, 25 (4), 340-344.
- Downes, S. (2005). Learning networks: Theory and practice. Retrieved December 16, 2008 from www.downes.ca/files/palermo.ppt. In Skank, P. (2008). Web 2.0 and beyond: The changing needs of learners, new tools, and ways to learn. In Carliner, S. & Skank, P. (Eds.). (2008). *The e-learning handbook*, 241-278. San Francisco, CA: John Wiley & Sons.
- Duffy, P. & Axel, B. (2006). The use of blogs, wikis and RSS in education: A conversation of possibilities. Online Learning and Teaching Conference, Brisbane, Australia, 31-38. Retrieved December 15, 2008 from <http://eprints.qut.edu.au/5398/1/5398.pdf>
- Gorman, K. (2007a). Brian Williams weighs in on the new media. We Want Media. Retrieved December 16, 2008 from <http://journalism.nyu.edu/pubzone/wewantmedia/node/487>
- Gorman, M. (2007b). Web. 2.0: The sleep of reason: Part I. Encyclopedia Britannica Blog. Retrieved December 17, 2008 from <http://www.britannica.com/blogs/2007/06/web-20-the-sleep-of-reason-part-i/>
- Harmanci, R. (2005, February 20). Time to get a life -- pioneer blogger Justin Hall bows out at 31. San Francisco Chronicle. Retrieved December 15, 2008 from <http://www.sfgate.com/cgi-bin/article.cgi?file=/c/a/2005/02/20/MNGBKBEJO01.DTL>
- Harrington, J. L. (2009). *Technology and society*. Boston, MA: Jones and Bartlett.
- Houghton, B. (2005). Limitations of blogs? Blog study. Retrieved December 15, 2008 from <http://blog-study.blogspot.com/2005/05/limitations-of-blogs.html>
- Jarret, T. (2003). What is a blog? Retrieved December 15, 2008 from <http://www.jarrethousenorth.com/2003/10/10.html#a2781>
- Keen, A. (2007). The dark side of the media revolution. Encyclopedia Britannica Blog. Retrieved December 17, 2008 from <http://www.britannica.com/blogs/2007/04/the-citizen-media-revolution-10-year-anniversary/>
- Nye, D. E. (2006). *Technology matters: Questions to live with*. Cambridge, MA: The MIT Press.
- Perez-Pena, R. (2008, October 27). Newspaper circulation continues to decline rapidly. *New York Times*, B4. Retrieved December 14, 2008 from <http://www.nytimes.com/2008/10/28/business/media/28circ.html>
- Pew Internet & American Life Project (2008). Pew Internet posts. Retrieved December 12, 2008 from <http://www.pewinternet.org/PPF/p/1494/pipcomments.as>
- Phillips, K. (2008, October, 19). Obama raised over 150\$ million in September. *New York Times*. Retrieved December 3, 2008 from <http://thecaucus.blogs.nytimes.com/2008/10/19/obama-raised-record-150-million-in-september/?hp>
- Prior, M. (2008). Are hyperlinks weak ties? In Turow, J., & Tsui, L. (Eds.). (2008). *The hyperlinked society: questioning connections in the Digital Age*, 250-267. Ann Arbor, MI: University of Michigan Press.

- Richardson, W. (2006). *Blogs, wikis, podcasts, and other powerful web tools for classrooms*. Thousand Oaks, CA: Corwin Press.
- Sawyer, R. K. (2006). *Explaining creativity: The science of human innovation*, Oxford, England: Oxford University Press.
- Simmons, T. (2008). The personal is political? Blogging and citizen stories, the case of Mum's Army. *Information Polity*, 13, 41-50. Retrieved from EBCOHOST database December 16, 2008.
- Skank, P. (2008). Web 2.0 and beyond: The changing needs of learners, new tools, and ways to learn. In Carliner, S. & Skank, P. (Eds). (2008). *The e-learning handbook*, 241-278. San Francisco, CA: John Wiley & Sons.
- The Huffington Post. Retrieved July 16, 2008 from <http://www.huffingtonpost.com/>
- Young, C. (2005, October 24). When blog hysteria does real harm. *The Boston Globe*. Retrieved December 16, 2008 from http://www.boston.com/news/globe/editorial_opinion/oped/articles/2005/10/24/when_blog_hysteria_does_real_harm/
- Westheimer, J. & Kahne, J. (2004). What Kind of Citizen? The Politics of Educating for Democracy. *American Educational Research Journal*, 41(2), 237-269.

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