

CALL and the "\$100 laptop"

John P. Madden(jpmadden@stcloudstate.edu)
St Cloud State University, U.S.A.

Abstract

Providing students with laptop computers has been found to support literacy development, including for students of English as a second language (ESL) (Warschauer, 2008; Warschauer, Grant, Del Real, and Rousseau, 2004; Silvernail, 2007). This article reports on a brief test of the XO-1, the "\$100 laptop" being developed by the One Laptop Per Child Association. ESL students and their teachers will find that small laptops like the XO support basic writing and collaboration. Training and technical support will help teachers meet students' needs.

Keywords: XO-1, \$100 laptop, ESL

Introduction

In this article, I offer an exploration of and commentary on the XO, the "\$100 laptop" being developed and distributed by the One Laptop Per Child Association (OLPC), whose goal is to improve education for children in developing countries through small, durable, low-cost computing (The OLPC Wiki - OLPC, 2009; One Laptop Per Child (OLPC): Vision, n.d.). Currently priced at \$199, the XO, like other small, mobile, emergent technologies, offers language learners access to authentic input and opportunities for negotiation of meaning, and yet stands out from many of these because it is aimed at children in the developing world (see One Laptop per Child (OLPC) Ways to give. (n.d.); Hanson-Smith, 2008a; Hanson-Smith, 2008b; Godwin-Jones, 2008; The OLPC Wiki - OLPC, 2009). I obtained my XO (specifically an XO-1) by donating to the 2007 Give One Get One program in order to learn more about the computer and because of an interest in reducing digital divides (see XO Giving - OLPC, 2009). Others may also be interested in supporting OLPC's efforts, or in obtaining similar laptops for their students or research projects. Examining an XO computer allows a limited test of OLPC's claim that small, durable laptops can change how children are taught. A central purpose of education is literacy development both in the L1 and L2, and writing is fundamental to literacy. In this article I seek to answer questions as to how well the XO supports some basic writing, collaborative, and multimedia activities recommended for computer-assisted language learning (CALL) practitioners. If we know how well an XO computer supports commonly recommended activities, we move a step closer to determining how transformative the XO might be.

This article has a narrow focus. Beyond its scope are the XO's history and deployment, and OLPC's workings and personnel (Lohr, 2008; Rothman, 2008; One Laptop Per Child News, n.d.; The OLPC Wiki - OLPC, 2009; Abramson, 2008). Some

of these issues will be taken up as limitations. The goal here is to examine a single computer with a view towards how an ESL / EFL writing teacher might be able to use it to help her learners improve their L2 writing in English. Examining a single computer provides a stable unit of analysis. Considering a teacher's perspective highlights the importance of teachers as an audience for CALL technology, something acknowledged by OLPC's support for teacher training (Deployment Guide / Teacher Preparation Student Facilitation - OLPC, 2009). The following literature review discusses the XO, laptop initiatives, and teachers' adoption of technology.

The XO, Laptops, and Teachers' Use of Technology

While the XO represents the ideas of many, including Alan Kay and OLPC Founder Nicholas Negroponte, central seem to be Seymour Papert's ideas involving "constructionism" (Constructionism - OLPC, 2009; One Laptop Per Child (OLPC), People, n.d.; One Laptop Per Child (OLPC): Project, n.d.; Rothman, 2008). Papert has long argued that computers can help children go beyond the bounds of the classroom to direct their own learning, though he has acknowledged the importance of the community in children's education (Papert, 1980; 1993). Papert's ideas have influenced CALL (Levy, 1997; Levy & Stockwell, 2006). Language learning and CALL are discussed on the OLPC Wiki (Educational Content Ideas/Language Learning - OLPC, 2008; Drill and test software - OLPC, 2008).

Papert's ideas are reflected in the increasing interest in using laptops for writing and literacy development with a variety of learners. His thinking helped influence the state of Maine to distribute laptop computers to all of its seventh and eighth grade students, who appear to have improved their writing as a result. (Silvernail & Gritter, 2007; Maine Learning Technology Initiative: About MLTI, 2005).

Providing laptops to students has been found to facilitate improved writing, collaboration, and multimedia literacy, including for ESL students, though providing technology alone has not been found to remake education nor close digital divides for marginalized populations; technology initiatives require effective community support (Warschauer, Grant, Del Real and Rousseau, 2004; Warschauer, 2006; 2008). Examinations of the effects of laptop use on test scores in English as an L1 have documented both improvements (Silvernail & Gritter, 2007), and a lack of significant improvements, though tests may not reflect authentic writing practices (Grimes & Warschauer, 2008; Warschauer, 2006).

Regarding the XO itself, OLPC documents XO deployments on its website; most are in the developing world though there have been deployments in the United States (One Laptop Per Child (OLPC): Children > Countries, n.d.). In a final report on an XO pilot test at a middle school in New York City, Lowes and Luhr concluded that the XO would be a feasible child's laptop. Students collaborated and used the XO to write, chat, browse the web, and record audio and video. Students reported the XO could be unstable and the touchpad could be unreliable; the networked collaboration feature of the XO lacked sufficient reliability for classroom use (2008).

Schools and teachers play an important role in many laptop deployments. Teachers seem to adopt classroom technology when it fits in with their beliefs about teaching and

learning (Cuban, 1986; 2001). ESL teachers in the United States regularly use word processing programs and the Internet with their students (Meskill, Anthony, Hilliker-Vanstrander, Tseng, and You, 2006). Sustainable technology initiatives require training and technical support for the teachers (Silvernail, 2007; Alberta Education, 2006).

In summary, laptop programs seem to benefit students, though this may not be reflected in test scores. Successful educational technology initiatives seem to require community involvement and support for teachers.

Research Questions

1. What kinds of ESL writing activities could a teacher and her students do using the XO?
2. What hardware and software support on the XO would an ESL teacher and her students find for exchanging and collaborating on written documents, and written documents supplemented by multimedia files among XO computers and across platforms?

Overview of the XO and Brief Tests

After briefly discussing the features of the XO most salient to CALL, I will offer a brief exploration of how the XO might support writing, collaboration, and multimedia use. I will also briefly consider issues of technical support.

In terms of hardware, the XO offers students and teachers a robust design, approximately 1 GB of flash memory for long-term storage, along with 256 MB of random-access memory, a sealed keyboard scaled for children 6-12 years old (OLPC: Five Principles - OLPC, 2009), and a screen which can be read using only daylight, allowing children to write in a variety of environments. The XO's built-in camera, microphone, speakers, and jacks for audio input and output allow multimedia language practice. An XO can access the Internet wirelessly or establish wireless mesh networks with other XOs, supporting collaboration. The XO also has a memory-card slot, and three USB ports which would allow a teacher or student to plug in a standard-sized keyboard and mouse.



Figure 1: Clockwise from upper left: The XO, its power supply, a welcome letter from OLPC Founder Nicholas Negroponte, and instructions for getting started.

In terms of software most useful for L2 writing and multimedia-supported language practice, the XO offers learners and teachers a word processor (called simply Write), a web browser (Browse), and audio and video recording software (Record). The XO's graphical user interface (Sugar, running on top of a version of Linux) provides a program (called an "activity" on the XO) to help students manage and automatically save their work (Journal), and, in support of collaboration, can present learners a graphical representation of wireless access points and other XO users.

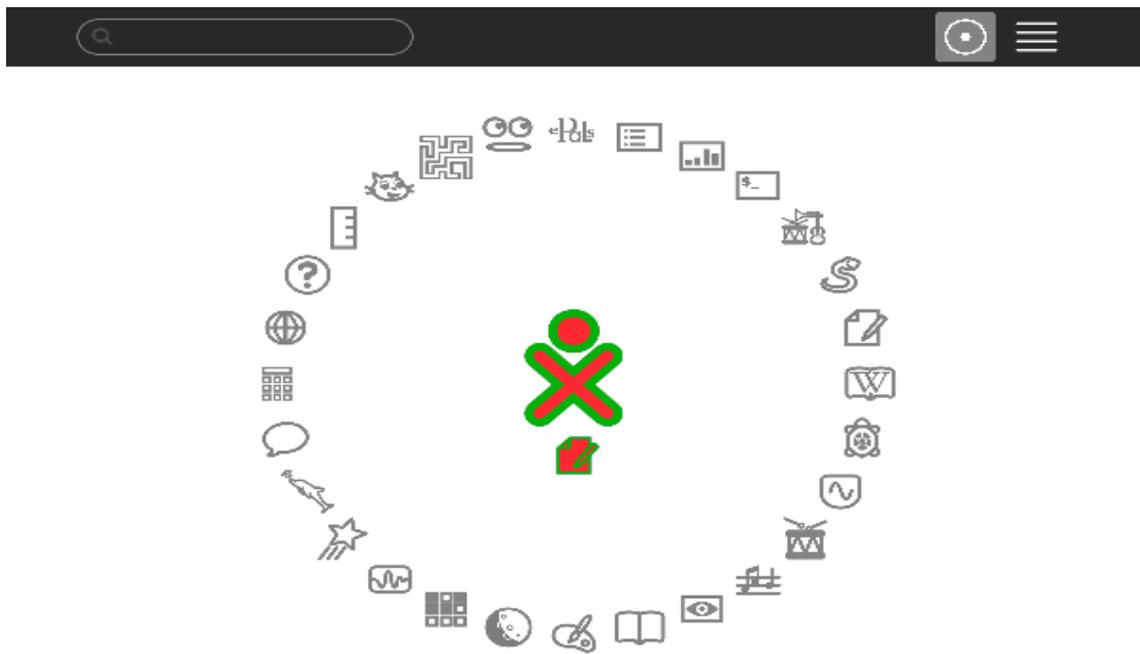


Figure 2: XO Home View (desktop) in Release 8.2.0. Write is the active program.

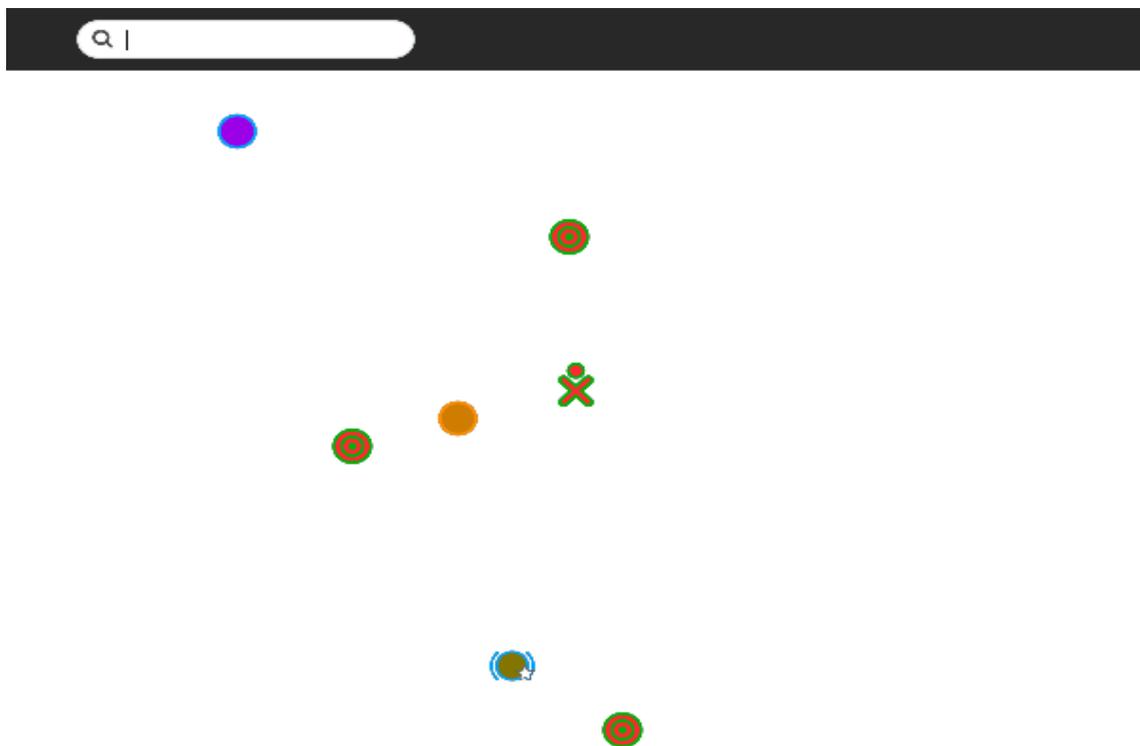


Figure 3: Neighborhood View showing wireless access points and wireless mesh network access points (targets).



Figure 4: This edited photo shows two XO's linked in a wireless mesh network.

In the Neighborhood View, a learner's XO shows an icon in the center of his or her own screen, and friends around the edges. I have added the boxes and ovals to make the relationship clearer. My XO on the left, shows my icon in the center, and, on my colleague's XO, in the upper left corner; both icons representing me are boxed. My colleague's XO, on the right, shows her icon in the center of her screen, and in the upper right corner of my XO; both icons representing her are circled. On each machine, the cursor is pointing to the friend.

This article is based on my observations while using the XO between late 2007 and mid 2009, mainly under two software releases: Release 7.1.2, offered in January 2008, and Release 8.2.0, offered in October 2008 (What release am I running? - OLPC, 2009). Full technical specifications for hardware and software are available from OLPC (see One Laptop per Child (OLPC), Laptop, n.d; The OLPC Wiki - OLPC, 2009; see also Godwin-Jones, 2008).

Many XO teachers may be new to teaching with technology. To examine the viability of the XO for supporting L2 writing, I tested common writing activities de Szendeffy (2005) recommends as starting points for teachers new to CALL. To examine the support the XO might offer for multimedia L2 literacy and collaboration, I briefly tested XO-to-XO collaboration and e-mailed text, images, audio, and video between the XO and computers running the Windows and Macintosh operating systems. Assuming Internet access, e-mail activities, as recommended by de Szendeffy (2005), might be a viable way for XO and nonXO learners to collaborate. After discussing writing and collaboration, I offer some comments on technical support on the XO.

Basic Writing

I found that drafting and editing are well supported by the XO's Write. Documents created in Write can be re-opened and saved under new names. Learners could therefore revise classmates' work, or create new documents from ones developed and shared by their teachers, all activities suggested by de Szendeffy (2005). Under Release 8.2.0, Write did not seem to include a spell checker. With Internet access, discussed below, learners could use sites such as Google Docs (Google, 2009) to check spelling, as well as to collaborate with other L2 writers. There has also been discussion about adding a spell checker to Write (Feature Roadmap - OLPC, 2009). In addition, Release 8.2.0 offers an XO instruction manual installed on the laptop (Hyde et al., 2008) that includes instructions for using Write, sharing Write documents with other XO users, and e-mailing documents. I did not find an easy way to format citations, a task suggested by de Szendeffy (2005), though that may be less important for younger learners.

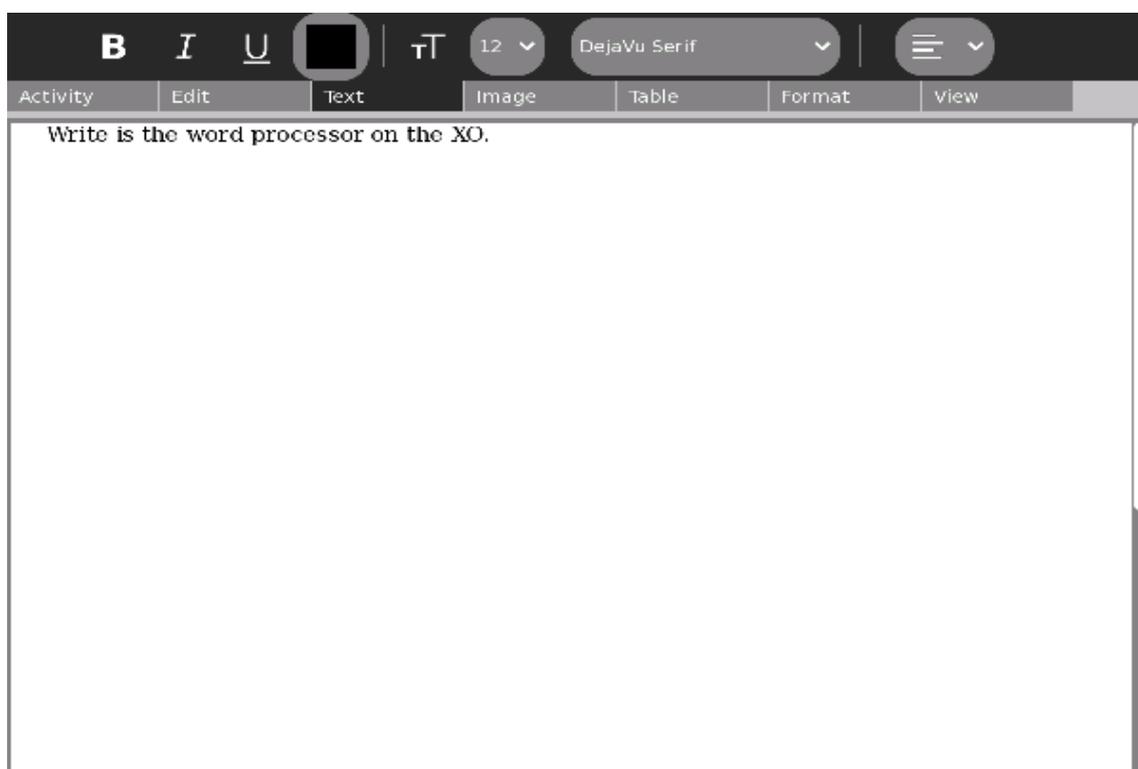


Figure 5: The Write word processor on the XO supports drafting, revision, and collaboration.

Collaboration

Learner interaction and collaboration, both face-to-face and through the computer, provide input vital for L2 acquisition and support peer revision during the writing process (Jeon-Ellis, Debski, & Wigglesworth, 2005; Hyland, 2003; Gass & Selinker, 2008). I

tested both XO-to-XO support for collaboration, and support for cross-platform collaboration using the Internet.

Regarding sharing among XO computers, using a colleague's XO for two separate tests (Madden, 2008; 2009), I found my XO automatically found and established a wireless mesh network with a second XO. File sharing was easy, though not intuitive. I found I was able to discover on my own how to share a document generated by Write. Document sharing was fluid enough to mimic a wiki or interactive chat. The ease of sharing documents developed with Write means that XO users could do much of what is offered by programs like the Daedalus Integrated Writing Environment (DIWE) in terms of drafting, on-line discussion and collaboration, and peer editing, as described by de Szendeffy (2005). However, during my initial test of the XO as part of a presentation (Madden, 2008), I was unable to get the two XOs to share files created with Record, or, in contrast with students in the Lowes and Luhr (2008) study, to use the included chat program to communicate between the XOs. The instruction manual (Hyde, et al. 2008) included with Release 8.2.0 explained how to establish collaboration between two learners using the XO. By following the instructions in preparation for a second presentation (Madden, 2009), I was able to set up a chat session, and to share a written document, still pictures, audio, and video between the two XOs. While I found that I could discover for myself many of the features of my own XO, for me, at least, clear instructions installed on the computer were important for understanding how to collaborate between XOs. Technical support is discussed in more detail below.

Like students in the Lowes and Luhr (2008) study, I also have found the XO touchpad at times behaves erratically. Touchpad problems are a known issue (Support FAQ - OLPC, 2009). During my tests, I have also noticed that I may have to restart the XO if I have been running multiple programs at the same time. That may be an argument for including more random-access memory in future versions of the XO, though that also raises the important issue of increasing cost.

Cross-Platform Sharing via the Internet

While acknowledging that many learners in developing countries will lack Internet access, OLPC does discuss how learners might gain Internet access of some kind (Internet - OLPC, 2008; OLPC country Statistics - OLPC, 2009).

Though an extended treatment of XO Internet issues is beyond the scope of this article, a brief account is offered here to reflect challenges L2 students and teachers may face. As with any laptop, connecting the XO to the Internet can present difficulties. Though OLPC has reported issues in wireless setup (USB Ethernet Adaptors - OLPC, 2009), I found it easy connect to a home wireless network which uses the wired equivalent privacy (WEP) protocol (see McMillan, 2008) and to free wireless access offered to 2007 Give 1 Get 1 users by T-Mobile (T-Mobile - OLPC, 2008). On the other hand, at my university, which uses Wi-Fi Protected Access (WPA) encryption and offers limited networking help for Linux, I found it easier to connect by using a USB-to-Ethernet adapter, a work-around OLPC recommends for XO developers (Support FAQ - OLPC, 2009; USB Ethernet Adaptors - OLPC, 2009; WPA Manual Setting - OLPC, 2008).

Under its current default set-up, my XO was able to access a wireless mesh network, or the Internet, but not both simultaneously (Wifi Connectivity - OLPC, 2009).

Once connected, I used Browse, which shares foundations with Firefox (Browse - OLPC, 2009), to test support for web-based e-mail activities, (see de Szendeffy, 2005; Gaer, 2007), for access to other common websites, and to e-mail files as a way of testing cross-platform collaboration.

Web-based e-mail was generally supported, though I had occasional difficulties, possibly because of browser requirements (Hotmail, Windows Live, Microsoft Corporation, 2009) or site updates (Gmail, Google 2009). I was able to use Browse to create an account at ePals, which offers secure e-mail for students (ePals, 2009; de Szendeffy, 2005). An ePals program offered by OLPC directs teachers and learners to the ePals site (Activities/ALL - OLPC, 2009). I found I was unable to directly log in to ePals using the ePals program, though it did allow me to open a Browse window which provided access.

Also supported by Browse were Nicenet (2003), Facebook (2009), MySpace (2003-2009), the Computer-Assisted Language Learning Interest Section of Teachers of English to Speakers of Other Languages, Inc., which uses Moodle (TESOL CALL-IS, n.d.; Moodle, n.d.), and wikis (Wikispaces, Tangient, LLC, 2009; Wikipedia, n.d.; The OLPC Wiki, 2009). Popular social networking sites currently may not be age-appropriate for the XO's target users, but it is useful to know that access to sites like these is possible. Wikis can facilitate collaborative writing among users across platforms (see Hanson-Smith, 2008b; Zeinstejer, 2008; Gaer, 2007).

L2 learners using the XO could use e-mail to exchange pictures, writing, audio, and video with learners using the Windows and Macintosh platforms provided everyone uses the same file formats (see de Szendeffy, 2005). Digital photographs (.jpg format) taken on the XO using Record opened on both the Windows and Macintosh platforms. The XO opened a digital photograph taken with the camera of an Apple laptop.

Learners using the XO could write collaboratively with Windows and Macintosh users. The XO's Write can open documents in Microsoft Word format (.doc) and can save files in plain text (.txt), hypertext (.html), and rich text (.rtf) formats. Still, the best way to exchange writing across platforms seemed to be using the web: copying and pasting text into a web-based e-mail message and sending it (see Hyde, et al., 2008). Plain text and hypertext documents were reliably exchanged as e-mail attachments. Though I had problems with an earlier version of Write (see Write - OLPC, 2009), I was able to use Microsoft Word to open rich text format documents generated by Write under Release 8.2.0 and sent as e-mail attachments.

Write is based on the free, open-source AbiWord, and natively uses the open document text (.odt) format. Therefore, to share writing across platforms, OLPC suggests converting files to plain text or installing AbiWord (see Write - OLPC, 2009; The Abisource Community, 1998-2009). On Macintosh, AbiWord opened an .odt text file generated by Write. In addition, OpenOffice.org 3 (Macintosh and Windows XP, see OpenOffice.org, n.d.) and Microsoft Word (Windows Vista) opened an .odt file generated by Write (Release 8.2.0) containing both text and a picture taken with Record. Sending writing in the body of an e-mail message, using plain text, or seeking out compatible word processing software seem to be promising ways for nonXO learners to collaborate with XO learners.

Learners on the XO can record audio and video and share these with Windows and Macintosh users. Record (Record - OLPC, 2009) saves audio and video in open source formats (Xiph.org, 1994-2009). Audio e-mailed from the XO could be opened and edited using Audacity (Audacity development team, 2006). Audio edited with Audacity was playable on the XO. Video captured by Record and e-mailed was viewable using the free VLC Media player (VideoLAN team, 1996-2008). Video edited on Windows (Windows Movie Maker, Microsoft Corporation, 2007) or Macintosh (iMovie, Apple, Inc., 2007-2009) could be viewed on the XO provided it had been converted to open-source Theora video.

Technical support on the XO

In 2007, my XO came with no on-board help files and minimal printed documentation. I was referred to OLPC's website for help with software updates and using the XO. Following web-based instructions, I was able to update software releases using the Linux command line in the XO's Terminal program, something XO users unfamiliar with terminal commands might find intimidating at first, but feasible (Release notes / 8.2.0 - OLPC, 2009). To support XO users, if a new update fails, the XO retains the previous software release, which can be used to run the computer (OLPC-update - OLPC, 2009). In release 8.2.0, OLPC began installing an instruction manual on the XO (Hyde et al., 2008) and offering updates to individual programs ("activities"), though not the operating system, via the graphical user interface (Software updater - OLPC, 2009). OLPC has explained web-based instructions by maintaining that children learn by exploring (Support FAQ - OLPC, 2009; Constructionism - OLPC, 2009). I did find exploring the XO and using the web-based instructions to be easy but I also found the on-board manual useful. For example, the manual offers guidance on using Write, sharing files, and using the Journal. The instructions for Write include suggestions that parallel some of de Szendeffy's (2005) and so might provide a good starting point for L2 writers and their teachers. The guidance on sharing files was helpful when experimenting with my colleague's XO. The manual helped me understand file names in the Journal. This was important because I used the Journal to identify and upload e-mail attachments, yet the XO actually sent those with alphanumeric (hashed) system file names (see Journal activity - OLPC, 2008). Understanding Journal file names allowed me to identify the correct file to attach and send. Since OLPC offers training to teachers (Deployment guide / Teacher preparation student facilitation - OLPC, 2009), at least some of whom may lack Internet access and may have never taught using a computer, the manual is a welcome addition.

In summary, learners and teachers using the XO could expect to engage in basic L2 writing in English, including drafting and revision. Sharing documents among XOs, or across platforms using the Internet is feasible but could present challenges in terms of connections (Lowe and Luhr, 2008) and file compatibility. Learners on Windows and Macintosh computers will need to use formats that are cross-platform compatible. Teachers, whether or not they are XO users, will need to consider issues of training and technical support (see Terrill, 2006).

Discussion and limitations

Technology, especially mobile, connected, and collaborative technology is increasingly seen as changing how young people in the developed world learn (Hanson-Smith, 2008b; Ito et al., 2008). Will the XO bring this kind of change to learners in the developing world? Students who use laptops have been found to write more and to improve the quality of their work, though marginalized students, such as some ESL students in the United States, may not get as much of a benefit (Silvernail, 2007; Warschauer, 2006). The XO is a fascinating piece of technology that would support a variety of L2 writing tasks. The XO, competing projects like the Classmate PC (Intel Corporation, 2009; Rothman, 2008), and developments in mobile technology arguably represent trends towards language learners working together on multimedia projects using information from a variety of sources (Hanson-Smith, 2008b; Staudt, 2005). Those trends seem to reflect Papert's vision (1980; 1993). But the XO is being deployed through schools, and OLPC is seeking to involve teachers. The use of the XO really is not just about children constructing knowledge but also about teachers helping them do that. Given how teachers relate to technology in the classroom, support for them would seem to be crucial (Cuban, 1986; 2001; Meskill, Anthony, Hilliker-Vanstrander, Tseng, & You, 2006; Silvernail, 2007). Media reports of OLPC deployments illustrate not only how use of the XO can encourage student exploration, but also the need for teacher support, and the on-going debate concerning over whether providing laptops is the best way to improve education for children in the developing world (Abramson, 2008). How transformative the XO might be in the long term may well depend on support for learners, teachers, and their communities.

The limitations of this brief exploration of the XO provide opportunities for further discussion. This article reports on a single, adult user's experiences with a single XO, and so presents a limited, subjective view. OLPC provides wiki-based accounts of its deployments (The OLPC Wiki - OLPC, 2009). More such accounts, and more evaluation reports similar to that of Lowes and Luhr (2008) would benefit OLPC, learners, teachers, and scholars (see Kraemer, Dedrick, & Sharma, 2009; and Vota, Derndorfer, & Barry, 2009, for more on evaluations). OLPC's efforts and the XO's development and deployment engender much discussion. Microsoft and Google, both discussed above, are among those who have been involved with OLPC's efforts (One Laptop per Child (OLPC): Members, n.d.; Lohr, 2008). Broader issues of how people and institutions in the developed world should work with people in the developing world (see Chambers, 1983; Canagarajah, 2001) have not been covered here, and yet are of great interest.

In some sense, we are shaped by our tools (see Tenner, 2003). The XO may already have influenced laptop design (Rothman, 2008). The XO certainly raises awareness of the importance of technology, education, and social justice in the effort to combat global poverty, and for that OLPC deserves praise. The use of laptops allows students and teachers to work together in new ways, without necessarily determining the ultimate effect of those new ways (Warschauer, 2006). The XO may change how its users work together. The long-term effects may depend on the long-term support for the XO and its users, may be hard to predict, and may ultimately depend on what the children and their communities make of this little computer.

References

- Abramson, L. (Reporter). (2008, December 13). Laptops may change the way rural Peru learns [Radio broadcast]. Weekend Edition Saturday. Washington, DC: National Public Radio. Retrieved from <http://www.npr.org/templates/story/story.php?storyId=96510072>
- Activities/All – OLPC. (2009, June 19). Retrieved from <http://wiki.laptop.org/go/Activities/All>
- Alberta Education (2006, August). One-to-one mobile computing: Literature review. Edmonton, Alberta, Canada: Author. Retrieved from <http://education.alberta.ca/media/528965/litreview.pdf>
- Apple, Inc. (2007-2009). iMovie '09 (version 8.0.3 (802)) [Computer software]. Audacity development team (2006, July 13). Audacity (Version 1.2.5) [Computer software]. Retrieved from <http://audacity.sourceforge.net/>
- Browse - OLPC. (2009, May 30). Retrieved from <http://wiki.laptop.org/go/Browse>
- Canagarajah, A.S. (1996). *Resisting linguistic imperialism in English teaching*. Oxford, England: Oxford University Press.
- Chambers, R. (1983). *Rural development: Putting the last first*. London: Longman.
- Constructionism - OLPC. (2009, April 22). Retrieved from <http://wiki.laptop.org/go/Constructionism>
- Cuban, L. (1986). *Teachers and machines: The classroom use of technology since 1920*. New York: Teachers College Press.
- Cuban, L. (2001). *Oversold and underused: Computers in the classroom*. Cambridge, MA: Harvard University Press.
- de Szendeffy, J. (2005). *A practical guide to using computers in language teaching*. Ann Arbor, MI: University of Michigan Press.
- Deployment guide / Teacher preparation student facilitation - OLPC. (2009, April 28). Retrieved from http://wiki.laptop.org/go/Deployment_Guide/Teacher_Preparation_Student_Facilitation
- Drill and test software - OLPC. (2008, November 6) Retrieved from http://wiki.laptop.org/go/Drill_and_test_software
- Educational content ideas/language learning - OLPC. (2008, July 13). Retrieved from http://wiki.laptop.org/go/Educational_content_ideas/language_learning
- ePals (2009). ePals global community. Retrieved from <http://www.epals.com/>
- Facebook (2009). Welcome to Facebook! | Facebook. Retrieved from <http://www.facebook.com/>
- Feature roadmap - OLPC. (2009, February 27). Retrieved from http://wiki.laptop.org/go/Feature_roadmap
- Gaer, S. (2007). Classroom practice: E-mail and web projects. In J. Egbert & E. Hanson-Smith, (Eds.), *CALL environments: Research, practice, and critical issues* (2nd ed.) (pp. 71-88). Alexandria, VA: TESOL.
- Gass, S. M., & Selinker, L. (2008). *Second language acquisition: An introductory course* (3rd ed.). New York: Routledge.
- Godwin-Jones, R. (2008, October). Emerging technologies: Mobile-computing trends: Lighter, faster, smarter. *Language Learning & Technology*, 12(3), 3-9. Retrieved from <http://llt.msu.edu/vol12num3/emerging.pdf>

- Google. (2009). Retrieved from <http://www.google.com/>
- Grimes, D. & Warschauer, M. (2008). Learning with laptops: A multi-method case study. *Journal of Educational Computing Research*, 38(3), 305-322. Retrieved from <http://baywood.metapress.com>
- Hanson-Smith, E. (2008a). The effect of technology on SLA (and vice versa). Paper presented at the Academic Session of the Computer-Assisted Language Learning Interest Section at the annual meeting of Teachers of English to Speakers of Other Languages, Inc., New York. Retrieved from <http://tesol-tech-sla.wikispaces.com/>
- Hanson-Smith, E. (2008b). Trends in digital media 2007. *TESL-EJ*, 11, 4. Retrieved from <http://tesl-ej.org/ej44/a2.html>
- Hyde, A., Bigenho, C., Gentle, A., Anwar, F., Laughner, B., Bender, W., et al. (2008). Help (version 10) [Computer software]
- Hyland, K. (2003). *Second language writing*. New York: Cambridge.
- Intel Corporation (2009). Laptops for education Educational laptops for kids: ClassmatePC.com. Retrieved from <http://www.classmatepc.com/>
- Internet - OLPC. (2008, December 17). Retrieved from <http://wiki.laptop.org/go/Internet>
- Ito, M., Horst, H. A., Bittanti, M., Boyd, d., Herr-Stephenson, B., Lange, P. G, et al. (2008, November). Living and learning with digital media: Summary of findings from the Digital Youth Project. Retrieved <http://digitalyouth.ischool.berkeley.edu/files/report/digitalyouth-WhitePaper.pdf>
- Jeon-Ellis, G., Debski, R., & Wigglesworth, (2005, September). Oral interaction around computers in the project-oriented CALL classroom. *Language Learning & Technology*, 9(3), 121-145. Retrieved from <http://lt.msu.edu/vol9num3/jeon/default.html>
- Journal activity - OLPC. (2008, December 14). Retrieved from http://wiki.laptop.org/go/Journal_Activity
- Kraemer, K. L., Dedrick, J., & Sharma, P. (2009, June). One laptop per child: Vision vs. reality. *Communications of the ACM*, 52(6), 66-73. Retrieved from <http://portal.acm.org/citation.cfm?id=1516063>
- Levy, M. (1997). *Computer-assisted language learning: Context and conceptualization*. Oxford, UK: Clarendon.
- Levy, M., & Stockwell, G. (2006). *CALL Dimensions: Options and issues in computer-assisted language learning*. Mahwah, NJ: Lawrence Erlbaum Associates.
- Lohr, S. (2008, May 16). Microsoft joins effort for laptops for children [Electronic version]. *The New York Times*. Retrieved from http://www.nytimes.com/2008/05/16/technology/16laptop.html?_r=1&scp=1&sq=Microsoft%20Joins%20Effort%20for%20Laptops%20for%20Children&st=cse&oref=slogin
- Lowes, S., & Luhr, C. (2008, June). Evaluation of the Teaching Matters One Laptop Per Child (XO) pilot at Kappa IV. Retrieved from http://www.teachingmatters.org/evaluations/olpc_kappa.pdf
- Madden, J. P. (2008, April). Exploring the XO laptop. Paper presented in the CALL-IS Electronic Village at the annual meeting of Teachers of English to Speakers of Other Languages (TESOL), New York, NY.
- Madden, J. P. (2009, March). Literacy and the XO laptop. Paper presented in the CALL-IS Electronic Village at the annual meeting of Teachers of English to Speakers of Other Languages (TESOL), Denver, CO.

- Maine Learning Technology Initiative: About MLTI. (2002-2009). Retrieved from <http://maine.gov/mlti/about/index.shtml>
- Meskill, C., Anthony, N., Hilliker-Vanstrander, S., Tseng, C., & You, J. (2006). CALL: A survey of K-12 ESOL teacher uses and preferences. *TESOL Quarterly*, 40(2), 439-451
- McMillan, R. (2008, November 6). Once thought safe, WPA Wi-Fi encryption is cracked [Electronic version]. *Computer World*. Retrieved from http://www.computerworld.com/action/article.do?command=viewArticleBasic&articleId=9119258&source=rss_news
- Microsoft Corporation (2009). Windows Live. Retrieved from <http://www.hotmail.com/>
- Microsoft Corporation (2007). Windows Movie Maker (version 6.0.6002.18005) [Computer software].
- Moodle (n.d.). Moodle - Moodle.org: open-source community-based tools for learning. Retrieved from <http://moodle.org/>
- MySpace.com. (2003-2009). MySpace | A place for friends. Retrieved from <http://www.myspace.com/>
- Nicenet (2003). Retrieved from <http://www.nicenet.org/>
- OLPC country statistics - OLPC. (2009, January 4). Retrieved from http://wiki.laptop.org/go/OLPC_Country_Statistics
- OLPC: Five principles - OLPC. (2009, February 6). Retrieved from http://wiki.laptop.org/go/Core_principles
- OLPC-update - OLPC. (2009, June 11). Retrieved from <http://wiki.laptop.org/go/Olpc-update>
- One Laptop Per Child (OLPC): Children > Countries. (n.d.) Retrieved from <http://laptop.org/en/children/countries/index.shtml>
- One Laptop per Child (OLPC), Laptop. (n.d.). Retrieved from <http://laptop.org/en/laptop/index.shtml>
- One Laptop per Child (OLPC), Members. (n.d.) Retrieved from <http://laptop.org/en/utility/people/members.shtml>
- One Laptop per Child (OLPC): Participate > Ways to give. (n.d.) Retrieved from <http://laptop.org/en/participate/ways-to-give.shtml>
- One Laptop per Child (OLPC), People. (n.d.) Retrieved from <http://laptop.org/en/utility/people/index.shtml>
- One Laptop per Child (OLPC): Project. (n.d.) Retrieved from <http://laptop.org/en/vision/project/index.shtml>
- One Laptop per Child (OLPC): Vision. (n.d.) Retrieved from <http://laptop.org/en/vision/index.shtml>
- One Laptop Per Child News. (n.d.) Retrieved from <http://www.olpcnews.com>
- OpenOffice.org. (n.d.). OpenOffice.org - The free and open productivity suite. Retrieved from <http://www.openoffice.org/>
- Papert, S. (1980). *Mindstorms: Children, computers, and powerful ideas*. New York: Basic Books. Retrieved from <http://portal.acm.org/citation.cfm?id=SERIES11430.1095592>
- Papert, S. (1993). *The children's machine: Rethinking school in the age of the computer*. New York: Basic Books.
- Record - OLPC. (2009, April 21). Retrieved from <http://wiki.laptop.org/go/Record>

- Release notes / 8.2.0 - OLPC. (2009, March 23). Retrieved from http://wiki.laptop.org/go/Release_notes/8.2.0
- Rothman, W. (2008, August 28). OLPC origin: Bittersweet success and future of the XO laptop. Gizmodo, The gadget guide. Retrieved from <http://gizmodo.com/5043089/olpc-origin-bittersweet-success-and-future-of-the-xo-laptop>
- Silvernail, D. L. (2007, April). The impact of the Maine Learning Technology Initiative on teachers, students, and learning: Maine's middle school 1-to-1 laptop program. Retrieved from <http://www.usm.maine.edu/cepare/mlti.htm>
- Silvernail, D. L., & Gritter, A. K. (2007, October). Research brief: Maine's middle school laptop program: Creating better writers. Retrieved from http://www.usm.maine.edu/cepare/Impact_on_Student_Writing_Brief.pdf
- Software updater - OLPC. (2009, May 27). Retrieved from http://wiki.laptop.org/go/Software_update
- Staudt, C. (2005). *Changing how we teach and learn with handheld computers*. Thousand Oaks, CA: Corwin.
- Support FAQ - OLPC. (2009, February 11). Retrieved from http://wiki.laptop.org/go/Support_FAQ
- T-Mobile - OLPC. (2008, September 3). Retrieved from <http://wiki.laptop.org/go/T-Mobile>
- Tangient, LLC (2009). Welcome to wikispaces - Free wikis for everyone. Retrieved from <http://www.wikispaces.com/>
- Tenner, E. (2003). *Our own devices: How technology remakes humanity*. New York: Vintage.
- Terrill, T. B. (2006). *Technology on a shoestring: A survival guide for educators and other professionals*. New York: Teachers College Press.
- TESOL CALL-IS (n.d.). TESOL CALL-IS Moodle. Retrieved from <http://www.call-is.org/info/>
- The Abisource community (1998-2009). AbiWord: Word processing for everyone. Retrieved from <http://abisource.com/>
- The OLPC wiki - OLPC. (2009, June 21). Retrieved from http://wiki.laptop.org/go/The_OLPC_Wiki
- USB Ethernet adaptors - OLPC. (2009, June 16). Retrieved from http://wiki.laptop.org/go/USB_ethernet_adaptors
- VideoLAN team (1996-2008). VLC media player (version 0.8.6i Janus (Intel)) [Computer software]. Retrieved from <http://www.videolan.org/>
- Vota, W., Derndorfer, C., & Berry, B. (2009, March). One laptop per child overview: The status of OLPC and its iconic XO-1 laptop in 2009. Retrieved from http://www.olpcnews.com/files/One_Laptop_Per_Child_Overview_2009.pdf
- Warschauer, M. (2006). *Laptops and literacy: Learning in the wireless classroom*. New York: Teachers College Press.
- Warschauer, M. (2008). Laptops and literacy: A multi-site case study. *Pedagogies: An International Journal*, 3, 52-67. Retrieved from http://www.gse.uci.edu/person/warschauer_m/docs/ll-pedagogies.pdf
- Warschauer, M., Grant, D., Del Real, G., & Rousseau, M. (2004). Promoting academic Literacy with technology: successful laptop programs in K-12 schools. *System*, 32, 525- 537.

- What release am I running? - OLPC. (2009, March 13). Retrieved from http://wiki.laptop.org/go/What_release_am_I_running%3F
- Wifi connectivity - OLPC. (2009, May 26). Retrieved from http://wiki.laptop.org/go/Wifi_Connectivity
- Wikipedia. (n.d.). Retrieved from <http://wikipedia.org/>
- WPA manual setting - OLPC. (2008, August 7). Retrieved from http://wiki.laptop.org/go/WPA_Manual_Setting
- Write - OLPC. (2009, January 15). Retrieved from <http://wiki.laptop.org/go/Write>
- Xiph.org. (1994-2009). Retrieved from <http://www.xiph.org/>
- XO Giving - OLPC. (2009, February 7). Retrieved from http://wiki.laptop.org/go/Give_One_Get_One
- Zeinstejer, R. (2008, March). The wiki revolution: A challenge to traditional education. *TESL-EJ*, 11(4), March 2008. Retrieved from <http://tesl-ej.org/ej44/m1.html>