From ePortfolios to iPortfolios: The find, refine, design, and bind model

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Sebastian Foti, 1949–2008

As this issue was going to print, CJLT learned of the death of Sebastian Foti. The following memorial was provided by Gail Ring:

Sebastian Foti, a gifted teacher and distinguished scholar, died suddenly on December 16, 2008. After teaching in the Peace Corps and in international schools for years, Dr. Foti returned to the United States where he earned his Ph.D. in Educational Technology from the University of Florida. He subsequently joined the faculty there and was awarded a Fulbright Fellowship to the University of Porto where he formed continuing professional relationships with faculty and students there. Recently he moved to the University of North Florida where he worked until his untimely death.

A pioneer in the field of educational technology, Dr. Foti designed a number of innovative projects including Lord Kelvin, a simulation-based learning environment for teaching middle school science in a media-rich learning environment intended to enhance the learning experience of students enrolled in distance education courses.

Everyone who knew Sebastian was drawn to his charismatic presence. Often described as ahead of his time, he was a true visionary with intellectual curiosity, clarity of thought and the ability to motivate others. Sebastian shared his passion and curiosity with students from the middle grades through university. Today, many of his students around the world are producers of learning environments, online help systems and games in true constructivist fashion.

He served as a computer consultant and made significant contributions to the field of educational technology with lively talks and presentations designed to challenge educators around the world to use technology as a tool to augment teaching and learning. For those, like myself, fortunate to learn from and work with Sebastian, he was a role model who constantly pushed and encouraged us to think differently and act as change agents in our life's work.

He is, and will continue to be, missed.

Abstract: During the past two decades, educational institutions around the world began

formalizing the process of collecting student work as a means of showcasing student accomplishments and ultimately providing students a forum for reflecting on their accomplishments. In this article, the authors propose a redefinition of the electronic portfolio development process in a way that supports 21st century learning in which students FIND, REFINE, DESIGN, and BIND materials in the virtual "cloud". The authors believe that by incorporating Web 2.0 tools educators will have the opportunity to technologically integrate the students' school work into their general work flow, their entertainment flow, and ultimately into their web-based curricular work flow. Integration will hopefully reduce student resistance to portfolio development as an add-on activity and allow portfolios to become more personal, providing a richer connection between the students' lives, their education, and their paths to knowledge.

Résumé : Au cours des deux dernières décennies, les établissements d'enseignement à travers le monde ont commencé à formaliser le processus de collecte des travaux des élèves comme moyen de présenter leurs réalisations et, à terme, de fournir aux élèves un forum leur permettant de réfléchir sur leurs réalisations. Dans cet article, les auteurs proposent de redéfinir le processus d'élaboration du portfolio électronique de manière à ce qu'il soutienne l'apprentissage du 21e siècle au sein duquel les élèves TROUVENT et AFFINENT les matériaux, CONÇOIVENT une présentation et LIENT les éléments ensemble dans le « nuage » virtuel. Les auteurs estiment qu'incorporer les outils Web 2.0 donnera aux éducateurs l'occasion d'intégrer technologiquement les travaux scolaires des élèves dans leur flux de travaux général, leur flux de divertissement et, enfin, dans leur flux de travaux scolaires en ligne. Cette intégration, nous l'espérons, permettra de diminuer la réticence des étudiants à l'égard des portfolios en présentant leur élaboration comme une activité complémentaire; les portfolios pourraient ainsi devenir plus personnels et constituer un lien plus riche entre la vie des élèves, leur éducation, et leurs chemins vers la connaissance.

Background

During the past two decades, educational institutions around the world began formalizing the process of collecting student work as a means of showcasing their accomplishments and ultimately providing the students a forum for reflecting on these accomplishments. As one might expect, the shift from traditional three-ring binder scrapbook-like portfolios to electronic portfolios increased over the years and the trend continues. The quintessential method applied to students' portfolio development is the collect, select, reflect model. In this article the authors will try to redefine this process in a way that supports 21st century learning in an attempt to re-envision ePortfolio development as a transformative experience.

We propose a shift in thinking about portfolios from a container of artifacts: ePortfolios; to a digital learning environment in which students find, refine, design, and bind in the same virtual space: their iPortfolio. We believe that the advent of Web 2.0 technologies has allowed for and will make this transition possible. Further, we believe that these tools will free us from the technical constraints of the past to a more reflective and integrative

ePortfolio of the future.

Of the many challenges to the success of ePortfolio implementation, a major one has always been the integration of the portfolio into coursework and into the curriculum. Paulson, Paulson and Meyer (1991) and Evans, Hawes and Shain, (1999) stressed years ago that a portfolio must be fully integrated into the curriculum; it cannot be casually used as an add-on. In addition, the students' perspective that the portfolio represents an additional task that needs to be accomplished has had a negative impact on student motivation and their commitment to maintain their portfolios. The advent of WEB 2.0 tools is about to radically change the way all of us work and think about working in an electronic environment. For the first time, students will be able to work and do their assignments in the same space in which they report and create their portfolios. The transformation brought about by WEB 2.0 will have a profound impact on electronic portfolios and the way students will engage with them.

Portfolio as a tool for learning

Almost 20 years ago, Paulson, Paulson, and Meyer (1991) stated that portfolios press the owners not just to understand what they have already learned and have yet to learn, but to come to know themselves better as learners. Similarly, Shulman (1998) viewed that ePortfolio development is seen by many as theoretical act in which the teacher candidates develop a design, organizational structure, framework, template, or model that represents their own theory of teaching by declaring what is worth documenting, reflecting on, and ultimately putting into the portfolio. More recent studies recount the benefit to student learning in the portfolio development process (Avraamidou & Zembal-Saul, 2003; Milman, 2005; Woodward & Nanlohy, 2004). While these studies emphasize reflection in practice and on practice (Schön, 1995), there remain concerns among those of us that have used digital portfolios with our students for many years. As Wieseman (2004) pointed out, the mechanics of preparing the electronic work samples that meet the standards requires so much energy that survival and mechanics are more important than thinking and reflection. How can reflection, pondered Wieseman, be fostered in the electronic portfolio within the reality of students' limited time, skills, and attitudes?

Flexibility of digital tools for ePortfolios

Until now, students have been developing electronic portfolios using a variety of methods. Some students make PowerPoint presentations. Some build CD-ROMs, usually using a specified template or model. Some use packaged software designed to let students respond to specific questions, filling in boxes with their reflections. Whatever the tool used, portfolios have still been an add-on because students have stored their work on their computers, floppies, USB or zip drives, etc. and have had to assemble their portfolios in much the same way they would assemble a paper portfolio. Others build their portfolios using free-form web tools. Web-based portfolios permit student developers the flexibility to maintain their portfolios in a way that provides remote access to faculty, peers, and potential employers (Pierson & Kumari, 2000). In a recent study (Becta, 2007),

researchers found that

> e-portfolios benefit learning most effectively when considered as part of a joined-up teaching and learning approach, rather than as a discrete entity. The approach should include online repositories, planning and communication tools, and opportunities for both students and teachers to draw out and present e-portfolios at particular times and for particular purposes. There is then likely to be substantial impact on both learning processes and learning outcomes. (p.4)

Moreover, web-based portfolios are dynamic and flexible and can be distributed and edited for a changing audience with relative ease.

ePortfolios, Web 2.0 and social networking

WEB 2.0 is defined by O'Riley (2005) as a revolution in the computer industry caused by the move to the Internet as a platform. In Web 2.0 users can interact with all of their own documents and collaborate with others by sharing the same documents. Associated with WEB 2.0 is the idea of "cloud computing" or "cloud storage" which means that users store their work on remote servers available over the Internet rather than, or in addition to, storing their work locally. While it is not our purpose to discuss the technical aspects of these terms suffice it to say that it is possible to view all of a person's required software and personal files as being in the "cloud." Although the files they use, create, and save may be in different locations (i.e., pictures on Flickr, blogs on Blogster, and webpages on Google), this won't matter to the user. The user will be able to log-in and access all of their work online (in the cloud) without worrying about where it is stored.

Social networking is an important component of Web 2.0 computing. Social networking, which according to Wikipedia enables users to interact and share data through computer mediated communication (Wikipedia, 2008), has added a new dimension to the concept and construction of ePortfolios. While not used extensively in academic portfolios yet, these tools (WIKIs, blogs, social networks) provide the potential to create a space for life that evolves as the developer evolves. Jafari, McGee and Carmean (2006) found that in schools students often request tools like the social software they use in their personal lives. Brown (2008) contends that their attitudes will transform the way K–12 students interact academically just as it has permanently altered the way they interact outside of school, but not without the support of teachers, who have been reluctant to embrace and exploit Web 2.0 technologies for their academic use (as quoted in Waters, 2008). According to Dalsgaard (2006), social software supports increasingly popular problem-based learning and collaborative learning modalities. The use of collaborative technologies enables the students to become publishers rather than merely consumers of information. That is, these tools require the active engagement of students in their learning and communication. Technically-enabled collaboration, knowledge sharing and customization provide educators with significant opportunities for creating socially engaging tasks that require active student participation and knowledge building instead of memorization (Cole, 2008; Cych, 2006; McLoughlin & Luca, 2002; Reinhold, 2006; Sigala, 2007).

To understand the present impact of WEB 2.0 consider the dilemmas faced by developers

of early electronic learning environments. The vision offered by robust electronic learning environments was to provide a place where students could do their work, share their work with others, access their lessons electronically, perform science simulations, engage in polling and statistical analysis and communicate with their professors and other experts. Several textbook companies have attempted to create such environments for students. Unfortunately, to truly realize the dream, the environment would have to be ubiquitous, with millions of students working in the same environment, with familiar interface objects and controls, etc. The same could be said for the tools used in the corporate world. To be effective, everyone has to use the same tools. In the workplace, to a large degree, Microsoft Office has provided these tools. People in different companies could work in similar environments, read each other's documents, share their work, etc. Unfortunately, no single learning platform was available for education.

As students shift to WEB 2.0 tools they will essentially be changing the location of the artifacts they use to accomplish tasks. This remote location or set of locations is referred to as the "cloud" and it is where we will carry out much of our work and much of our learning. In the near future, students will store all of their documents on the web and in the cloud. In fact they are already doing this in Facebook, Flickr, MySpace, etc. Through the use of these tools a student's digital self will emerge, and be accessible during all intellectual activity. It will be possible for students to save all of their work (including their revisions, if they wish) in their digital cloud. Dr. Helen Barrett, a leader in the field of electronic portfolios, sees the cloud as being a source for all aspects of a person's digital life including their various portfolios (Lifelong, Life Wide ePortfolios, 2008, Montreal).

Those of us that have recently been using the cloud as the center of student work have begun to see major changes in the way students work and in the way that they manage their learning. The idea of "appropriateness" becomes very important to students using WEB 2.0 tools. That is, when students have remote access to word processors, spreadsheets, presentation programs, and webpage creators (which can be used free of charge) they begin to consider the tool that is most appropriate for a task. During group projects students sometimes communicate using a word processor and then create their final report using a slide show or a suite of web pages. For example, using Google Docs, a group member sets up a blank word processor page and invites his or her group members to the page as collaborators. Invited group members receive an email with a link to the document. They can add their comments to the comments previously posted by the group and "develop" their idea together. Once they have decided on how to proceed they divide the work and begin to create their presentation or report in the appropriate venue. There are many tools (Docs, Blogs, Wikis, etc.) that can be used to develop projects, including a tool specifically made for group work called Google Sites. Everything is available to the students at all times, from any computer, which means they can work and contribute from anywhere (and they do).

In the portfolio realm, changes in the context of students' workspaces will have profound significance on the way they think, reflect, and learn. It is our belief that these changes

will make our old models of portfolio creation dysfunctional. While the collect, select, reflect, connect, etc. models used in a pre-WEB 2.0 world helped us think about basic tasks in the process, they seem inadequate to describe how students interact with the cloud. Still, the models were useful since they were straightforward and concise. We propose an updated set of processes that are more suited to a world in which "there is no more there" and everything is here, in the cloud.

The flexibility associated with having all of your creations instantly available adds more fluidity to the idea of reflection. Reflection will take place throughout the process of development or creation, since there will be a self-referential capability in the workspace. That is, the process becomes less linear – collect, select, reflect – and more iterative with reflection occurring throughout the process. While portfolios have always been considered an ideal way to encourage reflection (Moon, 2001), portfolios in the cloud are arguably a more appropriate way to do this. The cloud, which encourages re-purposing of previously stored assets, permits a more recursive relationship with one's reflective process. Re-examination and reuse of one's digital assets allows a student to reconsider previous thoughts, to question previous held beliefs and to consider possible alternatives. With that in mind, consider the following tasks:

Find

While similar to the collect phase, *finding* means identifying appropriate or highly contextual elements of work that may apply to the artifact under development rather than collecting specific documents. One important aspect of the cloud is that there is little separation between entertainment, learning, working, and communicating. Students may have everything at their fingertips, but employing artifacts in various contexts will mean considering what is appropriate for a given situation. We may see students "mixing" compilations of several artifacts (or samples) they have created into a new artifact that is appropriate for another use. Cutting and pasting yields to re-mixing or composing. While not all students compose their own music, for example, most students devise their own music playlists rather than listening to a single album. When engaging in group presentations it is common for students to research various aspects of a concept and then "mix" them into their final report. They have discussions about order and composition of the final product and sometimes decide to discard media that they have found. Theirs is a world of abundance, not scarcity, and they look at research in those terms. It is likely that they will look at their portfolio the same way.

Refine

This phase of the process is related to content. Suppose a student finds a paper they wrote and submitted for a grade. Since the teacher was specified as a collaborator in the document, the teacher has no doubt supplied some suggestions or criticisms of the document. *Refining* means the student will reflect on the comments and make decisions about improving the document. Similarly, they may share the document with a friend (a click away) who may also provide feedback. These suggestions will help the student refine

his/her work. If the work is a composition or compilation of previous work, refinement will be related to alignment of content particulars, that is, making sure the artifact flows in an appropriate manner with respect to content, context, voice, etc.

Design

The *Design* phase is where media-based decisions are made. The portfolio of the future will likely be much more media intensive than current portfolios. Therefore, students and faculty will need to become more media savvy. In many ways this will occur naturally as media-centric tools become more ubiquitous and easier to use. But many faculty and students currently view a portfolio as a repository for "Word" docs and text based information. Consider the following Clemson student's comment: *Engineering students may be at a disadvantage because their writing samples are limited*. This view was not unique among students we surveyed. We believe that not all portfolios will be, nor should they be, a collection of white pages that can seamlessly be integrated into the final work.

A portfolio may have a specific "skin" (or interface design) that is consistent throughout. It may have navigation controls that allow movement through the portfolio in multiple ways. Integrating a new artifact into the portfolio may involve a re-design on more than one level. In addition to media considerations the artifact's tone, style, or genre may need to be reworked to provide a consistency between the section of the portfolio being inserted and the larger work. There may even be soundtrack considerations! While this may sound unusual to an educator, we suspect that an artist would be more inclined to agree. In the future, there will be a stronger media connection to personal work. In other words, before the student can link, connect, embed, or attach (that is "bind") the artifact in question to the rest of the portfolio, there will likely be some design work that needs to take place.

Bind

Binding means making the revised artifact available to the portfolio. This may be as simple as making a link from the portfolio, or as complex as working it into a pre-existing portfolio element. This requires that a context be developed in which the binding makes sense. For example, the student might have to revise a graphic to include a hot zone (a link over a portion of a graphic) that when clicked upon will bring up the artifact. This is often not a trivial task and involves content-based and media-based decision-making. In the D*esign*phase, media-based decisions were made. In the *Bind* phase, the actual linking will be done, which may involve some scripting or other modification of the html. Students currently do this when they copy "embed" codes from YouTube and paste them into their MySpace or other web pages to make the video available. Brown and Duguid (2002) predicted that*navigation* may become a new form of literacy for the 21st century. Linking and designing pathways through the composition and its related documents (*binding*) is an intellectual activity that faculty and students will have to learn how to do effectively.

Institutional Change

Given that the migration from paper portfolios to ePortfolios is not complete and has been evolving over two decades, it is likely that the evolution to iPortfolios will likewise take a

great deal of time. There are several reasons for this. Currently, to take part in an electronic portfolio process professors must be able to read electronic documents, follow links, and manage the navigational aspects of portfolios they are viewing. These are minimal (but not trivial for some) skills. To integrate electronic portfolios into their coursework, professors must require that students "post" their documents to their portfolios and/or be flexible enough to allow a wider variety of media types as illustrations of competency. To do so requires some, but not a great deal of modification to their current teaching modalities.

To teach in a WEB 2.0 context will involve actually engaging in the cloud. This will mean changing the way we teach (and work). In education, we have had some experience with similar changes. In science education, for example, a massive movement towards employing inquiry-based science and hands on experiments in teaching science was funded, promoted, and practically mandated by standards committees. Still, many science teachers offer minimal experimental opportunities for students and employ primarily direct instruction methods (Kain, 2003; King, 2003). Similarly, in educational technology circles, it is widely assumed that student-centered activities are required to take advantage of the computer's potential. Yet, many assigned computer activities are highly structured and related to the completion of specific skills. Of course reasons for these conditions go beyond teachers, but nonetheless offer challenges to the respective disciplines. There is hope, however, that the world in general will become more cloud-centric in which case some of the educational challenges facing iPortfolios will (dare we say it…) evaporate.

The changes likely to occur in teacher behaviours have to do with the characteristics of WEB 2.0 that distinguish it from current electronic and non-electronic forms. Four examples alluded to above may be illustrative here.

Temporal neutrality

In a cloud-based work environment, work is situated out of time. All of a person's, or a corporation's, or a school's documents are available at all times. In a school environment this means that teachers will eventually change the way they think about grading. Rather than focusing only on the assignment and/or task at hand, the teacher may begin to add comments related to larger issues in the student's development. A teacher may provide references and/or links to resources that may help the student better understand the teacher's comments. Teachers may even revisit past assignments (which will be instantly available) to review a student's progress or to add comments to a previous work. Teachers will likely provide paths to future or deeper inquiries into the subjects. Students will be alerted to a teacher's comments by revisiting the document through a revision history alert. Documents and handouts that were distributed in the past will now be live. Teachers may request to share documents created by previous students with new classes to encourage better effort, for example. We (the authors) have already employed all of these strategies into our teaching.

More diverse reporting styles

Traditionally teachers have struggled trying to get students who were bad writers to become good writers. Although teachers have employed many strategies to do this, most college professors know that students have a very narrow repertoire when it comes to writing styles. Asking a student to write a report usually results in a paper that looks quite a bit like a book report. Given the fact that reporting has become a much more common element in corporate activity, and that communication tools are becoming much more elaborate, it is quite likely that reporting will become elevated in future curricula. Students will need to employ a more expansive view of writing, reporting, and communication styles. Various genres (explanation, procedure, discussion, narrative, recount, etc.) will map to specific purposes in a student's understanding. Understanding the power and limitations of various media forms will also need to be stressed.

Collaboration

While educators have been shifting to more collaborative teaching and learning models, the tools available to students have not changed much. WEB 2.0 certainly changes that. Students will work in the same environment in which they collaborate. Learning will no longer only come from the top down, but will occur in micro-communities that form in specific courses and are sometimes formed on the fly. The collaborative experience is being augmented in a revolutionary way by new tools and students will grow up employing these tools. Most of our models for collaboration and communication involve "push" technologies in which someone "calls," "emails," or otherwise requests information that is then pushed back. These models are being replaced by the cloud model of collaboration in which everyone shares documents and engages when they have time, or at a previously agreed upon time. These changes will redefine the etiquette and processes of work and play.

Live Curricula

While the world-wide-web has increased the availability of current events in our curricula, it has not often provided a mechanism for adding meaning to specific contexts. Cloud storage will allow teachers and students to develop associations that are personal and related to avenues of inquiry jointly established by the teachers, the students, and the curriculum. A student will come to understand that they have a unique perspective on any given concept that was defined by their inquiry paths, which will be easy to trace. They will have concrete, visible evidence that there are multiple pathways to knowledge and that current events have a place in a conceptual matrix. In other words, the cloud will help students document their emerging selves.

Conclusion

As Batson (2008) reminds us, ePortfolios are not one thing, but many things, and can be applied for multiple purposes in all academic activities and have infinite capacity and potential to "academize" the Web. We advocate for the transition to *iPortfolios* in which students find, refine, design, and bind in the same virtual space. While it is true that not all students are embracing technology at a high level, it has been our experience that once

introduced to new web-based technologies students rapidly embrace them and transition to them quite effortlessly. By incorporating Web 2.0 tools, such as those mentioned above, we will have the opportunity to technologically integrate the student's school work into their general work flow, their entertainment flow, and ultimately their web-based curricular work flow. Hopefully, this will reduce student resistance to portfolio development as an add-on activity and allow portfolios to become more personal, providing a richer connection between the students' lives, their education, and their paths to knowledge.

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