

To the Graduate Council:

I am submitting herewith a thesis written by Elizabeth R. DeGeorge entitled *Organizational E-Portfolios*. I have examined the final electronic copy of this thesis for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Science, with a major in Education.

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Organizational E-Portfolios

A Thesis

Presented for the

Master of Science in Education

Degree

The University of Tennessee, Knoxville

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December 2010

Abstract

This study of the use of e-portfolios by organizations, including businesses, educational institutions, non-profit organizations, and other communities of individuals joined together to accomplish a goal discovers that e-portfolios are robust tools for extensible authentication of group endeavor. The article examines the ways these organizations are currently appropriating the advantages of e-portfolios and some of the directions in which best practice appears to be headed. It discusses three directions related to the use of e-portfolios. First it observes the use of e-portfolio methodology to present an inside look at organizations to the outside world through reports to investment and support communities, for auditing purposes, for presenting evidence-based competencies, for marketing, and for honoring excellence. Second it observes the ways that organizations use e-portfolios to engender good decision-making as they receive information from outside sources such as prospective employees and prospective vendors or partners to inform inside operations. Third it observes the impact of e-portfolios when used internally by organizations and businesses as a framework that allows for new levels of management and internal communication.

Keywords: E-Portfolios, Annual Reports, Auditing, Marketing, Accreditation, Human Resource

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Organizational E-Portfolios

While the educational use of e-portfolios is a widely explored topic, the expansion of e-portfolio theory for application by organizations and, in particular, non-academic organizations has been slower to attract serious study. There are three primary movements to consider when thinking about the use of e-portfolios by corporations, businesses, institutions, and organizations. The first is movement from inside out and the second, from outside in. The third is movement within organizational networks. *Inside out* is a use of e-portfolio methodology by organizations for showcasing internal achievement through collection of artifacts to record accomplishments, prepare for audits, and report or present that information to constituent groups. *Outside in* is the process of receiving e-portfolio-style materials from individuals seeking employment in order to discover human talent or from other organizations to identify vendors/partners. The third movement is within or *Internal* to the organization. It includes uses that encompass management of human resources, projects, supply chains, data, training, and assessment.

Authentication is a word that richly serves the concerns of those seeking to accomplish commercially viable and profitable endeavors. Validating or offering proof that an organization can successfully do what it contends that it can do is a service that an e-portfolio provides for a business as it communicates with customers and clients. Substantiating or providing evidence that an individual can fulfill the personnel needs of an organization is a similar communication service provided by e-portfolios as applicants dialogue with employers. Digitized information made available electronically to an

extended audience, over an extended period of time, and with periodic updates is a source of value for every sector of the business and organizational world.

A Changing Perspective

Business is a behemoth, not always ready to move and update its modes of communication. Organizations cannot transform with every wind of change, vision, and development, yet it is evident that the very language through which people communicate, the megaphones that transport human thought have altered so dramatically that change within the corporate and organizational world is already mustered. The non-linear and complex nature of the information available to business leaders challenges perspectives of those trained according to linear principles (Aram and Noble, 1999). The handheld receptors of the thinking that may be called *Folio Thinking* (Chen, 2009), or multimodal textualization, or, perhaps cyber-semiotics are already in the hands of the last generation of non-electronic natives, who are preparing to deliver passcodes to those digital natives that are more ready than their predecessors to use them. The hesitant steps currently being taken in the business world will accelerate, as a fully nurtured cyber-citizenry demands sophisticated forms of cyber-communication and documentation in the next decade (Welcome, 2009).

Certainly the current reins of authority are in the hands of individuals who are still shunning paperless information, to a large degree (American Institute of Certified Public Accountants, 2007). A report based on research conducted in 2007 by WithumSmith & Brown, a certified public accounting and consulting firm revealed that 81% of all respondents preferred a printed annual report rather than an electronic one. A reported 70% of securities portfolio managers and analysts and 51% of investors said that printed

hard copies are easier to read, however 75% of participants agreed that they would definitely visit a special investor relations web site if offered the opportunity (WithumSmith & Brown, 2007). This set of data reveals that users in business remain attached to paper-based communication, but that they are interested in secondary data that can be communicated in a manner not possible in print.

Inside Out

Use of E-portfolios By Organizations

Like individuals, communities of people joined for a purpose, often need to authenticate achievement or accomplishment. Annual reporting or accreditation documents are the most common formats used by these groups to reflect on activity and communicate to their constituencies. These occasions for reporting are opportunities to reflect, collect, organize, and showcase the work that has been done over the course of a prescribed period of time. In a world where evidence comes in many shapes and sizes including sounds, videos, motion charts, slideshows, chats, and social networks, (DeGeorge, 2005) analog and paper-based reporting cannot adequately provide an inclusive platform for expression.

Organizations can create online or other electronic records that are tools for extensible authentication allowing institutions and businesses to validate that they are accomplishing stated mission and goals (Siemens, 2004). The organizational e-portfolio is a showcase expression from within the organization that exemplifies internal processes and external accomplishments. In the business world such authentication translates well to a multitude of marketing uses that can be exploited for customized business presentations and proposals.

Additional forms of authentication that utilize e-portfolio systems of communication are auditing and accreditation. Programmatic and fiscal documentation and certifications of accomplishments can be leveraged into appropriate and auditable expressions and served by the framework of thinking and communication supported by e-portfolios. The dynamic changes in information systems and the application of these systems to business practices predict notable changes in the coming years.

The nature of the e-portfolio as a document is one that grows over time, recording not just snapshots of information but samplings that tell entire digital stories. In relation to organizations, these are stories of many people working together to accomplish common goals. The concept of digital storytelling, a hybrid multimedia narrative form that enables critical and creative theorizing using an assets-based platform empowering both storyteller and the story (Benmayor, 2008), is well suited for use by the organizational complex. From confirming driver satisfaction in Europe and Asia (General Motors Corporation, 2007) to verifying the creative methodology of a university research unit, (University of Tennessee College of Social Work Office of Research and Public Service, 2008) the story gains both attention and weight when presented in the framework of extended authentication.

Annual Reports

In the United States for example, since 1934, publicly traded organizations have been required by the Securities and Exchange Commission (SEC) to file a detailed annual report in a form called 10-K. The commissions' recent rule (Interactive Data to Improve Financial Reporting, June 15, 2009) involves furnishing XBRL-formatted reports for all SEC disclosures (SEC, 2009). This has resulted in the adoption of XBRL-formatted

reporting by the 500 largest publicly traded firms (Pinsker & Wheeler, 2009). Whether or not the SEC ever begins to require an expanded digital version of 10-K, the move to an e-portfolio style web site that accompanies the public annual report is becoming a standard part of the presentation for many large companies. Furthermore, with the 2009 global downturn in financial markets, companies have sought ways to improve communication while supporting the financial bottom line. For 2009, at least, the trend toward online reporting was strong. USA Today reported on the move to interactive online annual reports. They report the words of Bill Ferguson of INC Design who says, “Some companies are trying to move attention to online annual reports that are more than just an electronic copy of the printed annual reports and are designed to give users a more interactive look at a company” (Krantz, 2009).

The 2008 Online Annual Report published by Eaton Corporation added a feature that places it into the genre correctly described as an electronic portfolio. At the conclusion of the report, if navigated in a linear way, is a survey that collects user demographic information and comments (Eaton Corporation, 2008). This feature of the Eaton report is a tool that allows users to reflect on what they see and communicate that reflection to the corporation and the report authors.

Raytheon Company has developed its annual report in e-portfolio style (Raytheon Company, 2008). Even some of the terminology it has used to describe features of the report come from the e-portfolio community such as *knowledge-based* and *storytelling*. It has included a wide variety of photographs and some flash-based elements to increase user receptivity. With clear navigation and sub-navigation, the piece is extremely user-

conscious as it presents artifacts of success, including a listing of awards and honors conferred on the company during the year.

The year 2008–2009 was a marker year for more than one company. Starbucks (Starbucks Coffee Company, 2009), having grown for 16 consecutive years experienced a downturn. As part of a plan unveiled at their October Leadership Conference, the company determined not to distribute printed annual reports. The cover image for its online report presented in pdf form was of managers signing the “Commitment Wall” touting the slogan, “How will you lead differently when you get back to your store?” And though the online style of its annual report was technologically unimpressive, the integration of the report on its web site is. The site includes digital storytelling of such things as investing in small coffee farms in Tanzania, stock updates every 20 minutes, links to Starbucks idea sharing communities, as well as links to its Twitter, Facebook, and YouTube presences.

At Qualcomm (Qualcomm, 2009) the 2008 annual report is also accessible from their web site. It offers the pdf version for download, but, in addition, it provides an interactive version of the document complete with flash-based motion charts of the financial summaries.

India’s largest automobile company, Tata Motors, is developing a reputation for being on the cutting edge technologically. In October 2009, having recently purchased Jaguar/Land Rover from Ford Motor Company, Jeremy Vincent, CIO of Jaguar announced that while extracting Jaguar from Ford’s data complex, the division would transfer its systems from Microsoft Exchange servers to Google Apps (Weier, 2009). That kind of inventive methodology has also led the company to develop online e-

portfolios to annually report on the organization's activities in Corporate Social Responsibility. The presentation includes audio and video statements from the industries leaders, stories of interventions, case studies, salutes to volunteers as well as pictures and other media artifacts (Tata Motors, 2008).

These companies represent a sampling of the levels of activity being generated by businesses in an effort to use online information networks for business authentication. There is a sense when one visits the investor relations' side of corporate web sites that experimentation is occurring. The experimentation is being driven by financial efficacy (Pinsker & Wheeler, 2009), sound communication practices, and the expectations of a digitally savvy generation of customers and investors. Extensible authentication through e-portfolios is, to some degree, the outcome of that experimentation.

Auditing

In an age that is dominated with financial crises, the corporate role of auditing for public companies has become increasingly more crucial. The results of the auditing process can be a key component for improving organizational performance. Auditing can improve organizational learning, facilitate communication and working relationships, improve operating efficiencies and reduce costs, help identify potential risks and liabilities while improving compliance with the law, improve relationships with stakeholders, and foster greater transparency. Availability of interactive and tagged documents was a concern revealed in the draft record of proceedings of the SEC Advisory Committee on Improvements to Financial Reporting. One proposed improvement was described.

With regard to the delivery of financial information, we propose that the SEC clarify certain legal issues related to the use of company websites as a vehicle for providing useful information to different types of investors in order to facilitate creative methods to present such information, such as in tiered formats. We also propose a gradual phase-in of interactive disclosure technology (i.e., XBRL-tagging) to facilitate the ability of investors to more easily access comparative arrays of company information, while minimizing the burdens on preparers (especially smaller companies). (SEC, 2008, p. 46).

Such creative methodology, in keeping with the use of e-portfolios would facilitate and enhance the auditing process by encouraging greater transparency and greater accessibility by stakeholders. These media-rich applications offer a range of means to demonstrate performance and draw linkages. They are easily customized to suit the needs of a particular organization and they become a repository to which many leaders within the company can turn to archive artifacts that should be available to all branches of the organization as well as the auditors that regularly assess processes and accomplishments.

Caris Healthcare, a firm based in Knoxville, Tennessee, has invested a great deal of energy into creating a fully electronic data system within its organization that is fully secure and yet accessible remotely to employees across the 17 locations within the system. Troy Chambers, IT director, reports, “This will save our auditing team time and money. Instead of crisscrossing all over the state to get a file from a particular location,

our auditing team can simply call it up through this system from the central office where they work. For their purposes, an e-doc and a paper document are the same”

(McCafferty, 2009).

Over the course of time, as organizations use e-portfolio methodology, and as each level of management comes to understand the organizational structure and purposes of the communication format, the data collection process becomes a final step in systematic project management and archiving. This integration of e-portfolio thinking and procedures in the core systems of companies encourages a responsiveness to auditing measures and leads to efficiency in administration of this aspect of corporate responsibility.

Marketing

E-Portfolios have become a way for organizations or corporations to market a wide array of services or products. The presence of a well-developed, regularly-updated, and easily accessible online e-portfolio can become the most important feature of a company’s marketing strategy. Fully developed work examples may be the most referred to instrument in a company’s marketing toolbox. Venerable companies such as New York Life are overcoming security and compliance issues to utilize the “internet cloud” and social networking tools to market their products and establish frameworks for both institutional marketing e-portfolios and individual e-portfolios for their employees (McCafferty, 2010).

Five benefits of marketing flow from these carefully developed corporate or organizational e-portfolios.

1. Accessibility of critical project samples about project development is helpful for all personnel. Though document privacy and limited accessibility features are sometimes built into extended e-portfolio management applications, designing a document with doorways to potential markets is one of the most forward-looking aspects of these tools (Carr, 2010).
2. Consistent updating of the best showcase projects presents the capacities of the organization as it grows and improves, keeping the marketing face of the organization fresh and up-to-date in a changing marketplace.
3. Thoughtful reflection regarding core competencies within the corporate e-portfolio gives direction to marketing and sales personnel as well as potential clients and associates. This tool encourages a style of reflection that leads managers and design participants to invest in regular reassessment of mission, goals, and directions. It is a model of thinking appropriate to predictable and balanced organizational development (Wang, 2009).
4. Integration of supply chain information, including current lead-time, cost, availability, and accessibility data provides marketing and sales staff with critical knowledge for development of successful marketing strategies.

5. Persistent availability of a wide variety of archived examples quickly and easily allows for targeted presentations that exhibit specific experience and applicable illustrations.

Accreditation and Validation

Accrediting agencies are considered to be reliable authorities with regard to quality of education or training offered by institutions of higher learning. Generally, accrediting bodies look at the following issues when evaluating an institution: the institution's mission, goals and objectives, resources and resource allocation, student admission requirements, student support services, and the quality of the faculty and educational offerings. The very institutions that are training students to utilize e-portfolios for work, assessment, and professional showcasing are beginning to develop institutional e-portfolios to assess and showcase their own programs in order to meet demands of their accrediting bodies.

One of the first national projects in the United States that engaged in supporting the utilization of e-portfolios to meet accreditation requirements was the Urban Universities Portfolio Project (UUPP) (<http://www.imir.iupui.edu/portfolio/>). Six institutions participated in a project designed to define best practice for the development of institutional e-portfolios. Two accrediting bodies, the Western Association of Schools and Colleges (WASC) and the Higher Learning Commission (HCL) of the North Central Association of Colleges and Schools (NCA) collaborated with the endeavor.

The host institution for the UUPP project, Indiana University-Purdue University Indianapolis, has successfully maintained its institutional e-portfolio over an extended

period (Indiana University-Purdue University Indianapolis, 2009) and has developed guidelines for institutional practice that are available on its portfolio site. Portland State University (<http://portfolio.pdx.edu>), the first institution to submit its reaccreditation self-study to the Northwest Commission on Colleges and Universities, is a model for submissions for that accrediting body. California State University at Sacramento (<http://www.csus.edu/wascaccreditation/>) has likewise developed and maintained an ongoing e-portfolio site related to institutional accreditation. Its accrediting body, WASC, has encouraged the creation of institutional e-portfolios by phasing in electronic submission requirements for all institutions with student populations of at least 1,000. The sample site maintained by the accrediting body (<http://samples.wascsenior.org>) highlights the diversity by which institutions of higher education can respond to electronic submission requirements.

Outside In

The value of electronic portfolios may be appreciated most fully when they are experienced from the Outside In. Organizations may use an electronic portfolio to gather information from outside a company in order to engender good internal decision-making. The most common examples of this relate hiring and the selecting vendors and partners. Having access to a full set of data that authenticates the capabilities of individuals seeking to join the workforce or other businesses seeking to develop a contractual relationship is a practical and extensive application of the benefits that are embodied by e-portfolios.

Hiring

Working communities have a de facto need that relates to the use of e-portfolios. This requirement, experienced by all businesses, institutions, and organizations is the need for qualified human resources. Hiring and employing people is an underlying reality for all of these groups. Human resource decisions are some of the most difficult and the most important decisions that organizations make. Using e-portfolios as a tool for hiring is one way that organizations can find, not just an individual who fits a categorical description, but an individual who shows, in advance, a range of certifications and authentications with evidence of accomplishments and understandings that are necessary for successful on-the-job performance (Wilbanks, Kelly, & Cox, 2008). In a 21st century, competitive, multi-national economy with a dramatically changing demographic for employable resources, e-portfolio methodology gives companies and organizations an empirical advantage. In an even more global manner, electronic portfolios may become the critical tool that draws economies together and becomes the accounting system capable of crossing the international boundaries, which have formerly immobilized labor forces.

Studies compiled in a paper by Powell and Jankovich (1998) found that potential employers who receive a portfolio prior to the interview of a potential employee, claimed that the portfolios more accurately demonstrated achievement, created a more effective interview environment, and enhanced the candidate's sense of deportment during the actual interview. In addition, graduates of institutions that utilize and encourage portfolio development have reported warm responses when artifacts that validate skills and

achievements accompanied their interviews. In a report on teacher preservice fieldwork, B.M. Morgan cited the experience of one student.

An education student in her last month of residency recently went to her professor and said, “You won't believe what happened today! I showed my supervising teacher my portfolio and after looking through it for a few minutes, she put it under her arm and said let's go. The principal must see this! She practically dragged me into the principal's office and said 'Look at this! I've been telling you we need to interview this student for our faculty. Her portfolio is outstanding.' After looking at the portfolio for a few minutes, the principal scheduled an interview with me and requested that I bring my portfolio.” (Morgan, 1999, p. 416)

The electronic presentation of these kinds of evidences add additional breadth and depth to the affect on the interview experience.

Heinrich, Bhattacharya, and Rayudu (2007) note that a world of rapid technological change with employment patterns pointing to multiple roles during professional lifetimes demands an approach that recognizes not just knowledge but lifelong learning and learning societies using electronic portfolios to support engagement with learning objectives.

The individual who wishes to target a potential employer or employment purpose and use an e-portfolio as a point of entry needs a system that allows for easy customization. Generally speaking, sophisticated systems such as the eFolio system used by Minnesota and Pennsylvania that is supported by Avenet (eFolio World, 2009) and

others such as the social networking and blog-based system created by the open-source developers at ELGG/Curverider (Tosh, 2009) allow for easy reconfigurations of materials and artifacts and password-protected entries that can enable the creation of presentations tailored for specific job applications or career advancement initiatives.

Danny McCall, founder of Talentsphere, LLC, calls for a new paradigm to replace what he considers to be an outdated resume-based construct for human resource management. He states,

I encourage you to quickly abandon the resume and leave it in your wake along with such obsolete devices as mechanical typewriters, slide rules and the wooden butter churn, or when you are forced to use it, at least augment it with higher quality information. I urge you to provide the organization with what they need to fully appreciate the merit in investing in you. . . presented in a compelling manner, in their terms, and from their perspective (McCall, 2001, p. 85).

McCall's alternative is an online e-portfolio described as a Personal Discovery Center that is designed specifically to serve as an electronic agency to introduce employable individuals to corporate employers and to match the full range of human skills with a similar range of business needs (McCall, 2009).

This effort begins to scratch the surface of recording both formal and informal learning and experience and determining under what conditions recognition of non-formal and informal learning can be beneficial for economies as they find new ways to match the skills of the labor force with the needs of business. E-portfolios are central to

the development of efficient systems that can account for and utilize this human capital. Human capital is defined by the Organization for Economic Co-operation and Development as “the knowledge, skills, competencies and attributes that allow people to contribute to their personal and social well-being, as well as that of their countries” (Ester, 2006, p. 4).

Vendor/Partner Selection

Companies use e-portfolios to market their own services, and the inverse of that economic process is also true. Those same companies, understanding the value of folio thinking and presentation, will seek to view the portfolios of other businesses when they are searching for vendors or partners. The information that they find is vital to selection and decision processes.

Vendor selection is a more complicated process than identifying the lowest bid. E-portfolios offer decision makers the level of extensible authentication that allows for the identification of specific competencies based not just upon the promise of adequacy but on the evidence of completed projects complemented by artifacts that answer “show me” questions. George Spafford (2006), business consultant specializing in IT operations, has developed a fourteen-point guide to vendor selection. Many of these requisites would be answered through information gleaned from a thoroughly developed e-portfolio including: identifying experience, adequate project scope and sequence, an understanding of total costs, strategic vision, management, implementation, training, and risks.

The existence of a developed e-portfolio, complete with samples and windows into organizational accomplishment and relationships makes the challenge of identifying qualified vendors and partners a much easier task.

Internal Uses

E-portfolios can be used systematically to present information that authenticates the capacities and accomplishments of organizations (Inside Out). They can be used to receive and assess skills of potential employees and vendors (Outside In). However, they can also be used internally, within the organization, as a tool for communication from department to department or person to person by creating online or other electronic records that are tools for extensible authentication. They allow institutions and businesses to validate, within their own systems that they are accomplishing stated mission and goals. The organizational e-portfolio is a tool for expression used within the organization to documents internal processes and external accomplishments. E-portfolios can be stories of many people working together to accomplish common goals. In addition, electronic portfolios can be used internally for employee assignment and promotion, project management, and management of critical business responsibilities such as supply chain, assessment, data, training, and service.

Human Resource Management

The purposeful use of e-portfolios as a tool for human resource management is an obvious way that corporations can make immediate use of this technologically-based tool for analyzing more than just the qualifications of prospective job applicants who come from outside of the organization and seek to enter. This full expression of employee capabilities including artifacts that authenticate skills, experience, and abilities is a

qualitative advance for the whole sphere of human resource management. For employees seeking promotion, e-portfolios can provide a means to demonstrate the specifics of the effort and successes that take place over a period of time. Individuals can collect artifacts that represent the fruits of their own endeavors and learning. They can record these things digitally and then reflect on them in a way that demonstrates both skills and understanding. Many times the accomplishments that take place, day to day on the job, are not openly evident to others, even within the same department. Recording accomplishments in a form that is accessible, understandable, and updatable, is a strong evidential tool for expressing requests for merit promotions or job advancements or transfers.

Additionally, businesses and organizations operating in a changing global economy often need to move capable employees to new job assignments. E-portfolios provide employers with the kinds of information necessary to make informed strategic human resource decisions.

One example of such application was discussed at the international European Institute for E-Learning (EIfEL) ePortfolio 2007 Conference in Maastricht, The Netherlands, in a session on Employability and ePortfolio (Pruis, 2007). The concern of a Netherlands company, Belden Cable & Wire was to safeguard and develop the human capital that existed within its own company in the face of a market presenting changing requirements and production methods. The presentation discussed the active use of e-portfolios by all employees to track employability of human resources. Using an electronic employability service package (Kenteq Employability Platform) comprising a qualification structure, assessments, a learning accreditation process, learning objects,

and development tracking tools both employers and employees were given tools for appropriately broadening employee competencies in order to maintain human resources necessary to keep pace with corporate and industrial advancement. In addition, on the employee level, this e-portfolio system allowed for the expression and fulfillment of personal ambitions that paralleled perceived company needs.

The Dutch Government has set up the Kenteq Acquired Competencies Certification (ACC). It is a nationally recognized certification label conceived to allow people who have not obtained diplomas or degrees to convert their competencies, acquired over the years, to officially recognized certifications. The certificates acquired are automatically saved in a personal e-portfolio that serves as valid proof of competence. Another example of the application of this certification and e-portfolio solution to human resource needs is found in the Netherlands-based company, NedCar. The Synergetics web site explains part of the process this way, “Staff training is an essential part of the company’s strategy to remain competitive, and to encourage employees to take responsibility for improving their own job prospects, both internally and externally” (Synergetics, 2009, paragraph 2). The e-portfolio solution was introduced by Giunti Labs’ eXact Portfolio. All 3,000 of NedCar’s employees were provided a personal employabilityPortfolio®. Some employment data was imported from other NedCar human resource databases. Each employee with the assistance of HR coaches, trainers, and counselors developed their employability portfolio, creating a standards-based tool to help develop their careers at NedCar (internal employability) or at another firm (external employability).

The advantage of these solutions is that they provide, for both the employee and employer, deep insight into available competencies and development potential. It leads to greater workforce flexibility as well as increased employee competency aggregation.

From the perspective of forward-looking institutions of education, e-portfolios, well-conceived and implemented, are the basis for institution-wide strategies to assist students in making the transition from the academy to the business world. At the Queensland University of Technology (QUT) use and uptake of e-portfolios among students is high. Across 9 campuses a total of 14,236 students utilize e-portfolios. According to Tom Cochrane, Deputy Vice-Chancellor of Technology, Information, and Learning Support, the purpose of the QUT student e-portfolio is “to enable students to record, catalogue, retrieve, reflect on, and present their learning, experiences, and activities, both inside and outside university life. The portfolio becomes evidence of the course and career related skills they have developed while at QUT but is intended to serve graduates in life after university” (Cochrane, 2005, p. 6).

The Australian Government’s Department of Education, Employment and Workplace Relations has commissioned studies through the Strategic ICT Advisory Service in order to determine whether a base of solid evidence has emerged to warrant government investment in an e-portfolio initiative that would support post-education use of systems to meet the goals of:

- Supporting workers facing redundancy
- Career development
- Workforce development and planning

- Continuing professional development
- Lifelong learning
- Articulation of skills and experience (Leeson & Williams, 2009)

The initial findings of these studies that looked at implementations of platforms by the Netherlands, Minnesota, Wales, and Europass, is summed up in their report released in December of 2009. “Despite the relative recency of these implementations, and the lack of a longitudinal evidence base that this implies, e-portfolios are helping citizens through a variety of life states, and simultaneously helping employers and the workforce more broadly” (Leeson & Williams, 2009).

The basic concept behind the attempt to track the value of intellectual capital is not theoretically new. John Dewey even discussed the nature of knowledge as having value as a capital investment in his 1938 classic *Experience and Education* (Dewey, 1938). The idea of the progressive organization of ideas, subject matter, was more than just an intellectual pursuit. Keeping track of ideas, activities, and observed consequences allowed for a genuine accounting of investment. He stated, "To reflect is to look back over what has been done so as to extract the next meanings which are the capital stock for intelligent dealing with further experiences. It is the heart of the intellectual organization and of the disciplined mind" (p. 110). This intellectual capital has increasing value in a knowledge-based economy. Keeping track of that value is no less important than keeping a track of financial assets.

Supply Chain Management

In fully developed form, e-portfolios are not just web pages or hyperlinked presentations pointing to samples and examples. Beyond that conception, this tool is a network application, or even a network of applications that include administrative functions that allow management and organization of files and file relationships as well as information and communication grids, capable of setting gates that determine who can see work or data, who can access, and who can discuss (Greenberg, 2004).

This kind of system integration is one that fits well with the concepts being explored in the business field of supply chain management (SCM), an expanding area of responsibility in light of a world where immediate information exchange has redefined functional performance as it is defined in terms of lead time, cost, quality, availability, and flexibility (Melnik, Lummus, Vokurka, Burns, & Sandor, 2009). Requisite for management in the new business world are responsibilities related to everything from customer service, customer identification, supply continuity, risks, environmental conditions, and 'system thinking'. Melnik, et al. contend that in the emergent field of supply chain management, the need for strategic rather than simply tactical considerations imply the need to foster new kinds of relationships, new kinds of development, and new kinds of practices. In addition, these strategic plans must be supported by robust and integrated technological structures. The study conducted by Melnik, et al. revealed that implementing appropriate technology to allow seamless exchange of information within the supply chain is one of the five most important issues to be address by SCM in the next five years.

It has been noted in the online magazine, CIO, that “Supply chain management software is possibly the most fractured group of software applications on the planet” (Wailgum, 2008, section: What Does Supply Chain Management Software Do?). Because of this, the relevance of e-portfolio system development to SCM strategies may be of great importance. In particular, applying the lessons of folio thinking to the strategic necessities of the supply chain may provide solutions for this evolving business arena.

The application of e-portfolio thinking to this specific sector of the corporate world is one of many that may be identified as businesses look within their organizations and begin to appropriate the technological solutions offered by e-portfolios and communicate them to partners and customers as working, interactive, and extensible means to authenticate the contention that the corporation under consideration can in fact fulfill customer demands and expectations.

Project Management

Literature does exist that discusses the value of e-portfolios as a valuable tool that draws together groups of students for managing class projects because of the ability to allow various users to develop project components, give input, promote peer review, evaluate, and redevelop until consensus and satisfaction is accomplished (DeGeorge, 2006). This same sequence of accomplishment can be taken advantage of in the corporate world allowing teams to work on projects in a contained space that allows for interaction and reflection, debate and improvement.

Electronic portfolios provide a detailed mechanism for engaging in multi-faceted trans-geographic project management. They allow for careful tracking of progress made,

illustration of activities occurring during multiple phases, and better management to determine strengths and weaknesses of personnel and project accomplishment.

The e-portfolio framework is not simply a project management structure in the administrative sense. It is a framework for development and exchange. It is both organizational and dynamically implementational. It is a structure that doesn't just allow for revisions, but calls for them as well as for the multiple intelligences that the application has been designed to accommodate.

Assessment Data Management Systems

Businesses and economies are very skilled at accounting for their capital investments in terms of human capital, financial capital, technical capital, project capital, and equipment capital. These investments are important to the production and services that create value and profit. But these investments can depreciate, expire, or become redundant. Twenty-first century thinking can take us to a new level of accounting that figures in both the investment and the non-depreciable value of resources. The e-portfolio is the ledger capable of tallying value as it allows an organization to, in real time, manage the many facets of an organization.

Assessment data management systems, sometimes known as dashboard indicators, can be incorporated into electronic portfolio systems in order to provide means for enterprise-wide management. The platform, when used as data management systems, can usually be made secure with custom-set accessibility in order to ensure data security (Buzzetto-More & Alade, 2006). When integrated successfully, these systems may include data collected from rubrics and other student assessments as well as faculty and employee information and interaction. Depending on the system goals, whether

educationally or organizationally directed, other individual demographics can be included. According to Love and Cooper (2004), portfolio-based assessment systems are most effective when they take into account the needs of stakeholders including the following considerations: navigation, interface, accessibility, security, user, automation, data, hardware, software, and information storage and processing.

The Tennessee Department of Human Services Office of Learning and Professional Development has successfully implemented an enterprise-wide dashboard indicator system for its employee induction and continuing education training and assessment. Using a single system, each employee can be tracked individually. In addition, groups of employees can be tracked and reports generated that provide real time authentication of assessment data for work groups, county groups, district groups, or the entire state employment group (Tennessee Department of Human Services, 2009).

For institutions with a vision to use electronic portfolios for multiple purposes such as student learning, faculty career development, competency assessment, and accreditation substantiation, a fully implemented system with a searchable database allowing for targeted query functions is a long-sighted investment. It is a step that can't be taken lightly because of the wide institutional implications. Implementers such as the University of Michigan recommend proof of concept deployment prior to large-scale commitment (Fitch, Reed, Peet, & Tolman, 2008). Even with much planning and preparation, the initiative demands general agreement, conceptual design, planning both on a technological and human level, and resources for both software design and operational support. The experience of many, and attested to by Fitch et al. from the University of Michigan (2008) is that e-portfolio implementation “uncovered

organizational, curricular, learning, logistical, and technological issues and challenges involved in moving away from a linear (analog) approach to teaching and learning and toward an integrated (digital) systems approach.” In uncovering problems, the system supported improvement. It promoted evidenced-based learning. It encouraged the generation of a curriculum based on precise competencies, objectives, and goals and then it leveraged the use of the data and artifacts collected by de-identifying, aggregating, and allowing for queries and reports that inform administration and accrediting agencies.

Service Delivery to Constituents

Organizations that provide personalized services may use an e-portfolio management system as a means for delivering individualized service to clients such as career planning and employment services, language development, financial management and debt consolidation, training, and so forth. As folio thinking becomes integrated into the thought processes of those who are developing products and of those who are using services, these individual portals for personal tracking, development, and certification will integrate themselves seamlessly into the digital lives of all of the populace.

In the United States, Minnesota, Pennsylvania, and California, are providing a free e-portfolio platform for all citizens of these states. In this manner, an infrastructure is being constructed to support an accounting and presentation tool for the development of learning and human resources in a dynamic and competitive knowledge-based economy.

E-portfolios are being used to help people overcome barriers such as language and the lack of formal higher education. In Australia, through a national effort under the auspice of the Department of Education, Employment and Workplace Relations, the

Indigenous Engagement Project has opened opportunities for indigenous business owners to use portfolios to demonstrate their skills and knowledge through a recognition of prior learning (RPL) process, enabling them to collect and present evidences using e-tools such as digital storytelling, podcasts, and smart boards in developed e-portfolios (Lindsay, 2007).

In central Australia, the organization DesArt has been established to assist aboriginal art workers in sharing their culture with the world. During the 2008–2009 year, an investigation was undertaken into the potential for using electronic tools to record and recognize skills using evidence/artifact collection. The key interests of this study have been education and industry/workforce development in regional and remote areas (Boyle, 2009).

In addition to this project, the Australian Flexible Learning Framework, a government agency designed to support e-learning opportunities, funded three other e-portfolio implementation trials during 2009. The project supports the goals of assisting learners to move effectively and promptly between job roles and industry sectors. In that, it helps to fast-track available human resources by training, validating training, and moving skilled workers into business sectors that are experiencing skills shortages. The e-portfolio project specifically targets fields in which skills are difficult to identify and certify using traditional assessment methodology. Implementation trials have included childcare, fire protection, and hair styling. Each trial featured the use of a variety of technological collection and presentation applications. Hairdressers used Point of View (POV) camera glasses and audio recorders to collect evidence. Trainees uploaded evidences to Facebook as well as Ning, the free downloadable social networking site.

Some experimented with an instance of the Mahara e-portfolio system and others with a wiki-based system (Australian Flexible Learning Framework, 2009).

The use of e-portfolios by institutions of education to provide students with exceptional learning experiences is now being implemented. In a similar way, life-long and life-wide learning delivery, skills development, and the authentication of both is becoming an integral part of e-portfolio platform development and application for use in settings beyond traditional school and university boundaries. From libraries to online learning, from continuing education classes, to hands-on practicums, the value of extensible authentication through the use of personalized digital records of accomplishment—e-portfolios—is having a persistent effect on learning, knowledge, jobs, experience, and know-how throughout the course of the lives of individuals.

Public Service—Government—Education—Nonprofit Applications

As with for-profit businesses, the non-profit community has been somewhat slow to come to accept digital changes including implementing e-portfolios as means for expressing annual reporting, marketing strategies, staff honors, organizational achievements, and general organizational information. Yet these organizations operate without large budgets, and with a need to communicate information about current governance, practice, and successes to the communities that support them by contract or donation. The organizational e-portfolio is, without doubt, a strong tool for this multipurpose use.

It provides access for artifacts related to contract production and organizational achievement. The e-portfolio offers its contractors a transparent window into the organization's mission, operation, history, people, and vision. Multimedia elements,

including video messages from the directors, associate directors, and other organizational leaders, offer the kind of reflection and personal digital story that epitomizes the advantages of well-developed e-portfolios. Multimedia offerings achieve something that is described by Emma Purnell of the University of Wolverhampton.

The joy of multimedia meant that you could make it sing and dance, you controlled who the audience was, you controlled what voice you used, it just allowed for multiple layers so it wasn't a linear piece of work. You know, life's a lived experience, it sings, it dances, it goes off in lots of different directions and that's really difficult to articulate in some of the traditional assessments or educational methods that we use. So e-portfolio just opened up a window, shall we say, for a different way to express yourself. (Purnell, 2008, audiolink)

Whatever the specifics of the application of e-portfolio systems for non-profit organizations, the advantages of full media communication add richness and depth to expression in a knowledge-based community.

Case Study Social Work Office of Research and Public Service

The University of Tennessee College of Social Work Office of Research and Public Service (SWORPS) is one organization that has developed a complete annual showcase e-portfolio that has replaced its printed annual report (University of Tennessee College of Social Work Office of Research and Public Service, 2008). This online document was developed with attention to folio thinking. Available as a link from the front page of the main organization web site

(https://www.sworps.utk.edu/2009_eportfolio), it utilizes an XML framework that is easily updatable. The advantages that SWORPS has identified for using this form of communication include:

- reporting the activities, programs, projects, and events that the organization has developed or completed over the course of a period of time to administrative bodies, contractors, and funders,
- utilizing all media forms (video, audio, flash) to deliver a full range of evidences,
- providing to potential clients both samples of and reflections about the kinds of services offered by the office,
- offering a platform for commendation to staff members that have performed admirably during the course of the year,
- developing an archive of the best projects and performance that will persist over time in a very accessible form,
- and giving all staff and administration a framework for folio thinking in regard to the type of work being accomplished and the kinds of work that the office desires to pursue.

The Framework for Presentation

Development of an e-portfolio is an enormous task if not pursued thoughtfully and in the long run is served by the utilization of a reusable framework. SWORPS explored a number of possibilities for its presentation platform over the course of

multiple years. They searched for a solution that would provide both year-to-year originality as well as a simple means for updating materials that do not change dramatically over time. In this case, the designers and managers chose to develop a css and XML based framework. The general navigation and images that populate the pages can be updated from within a simple text file of understandable XML code.

Many of the e-portfolio systems on the market are designed for use by individuals. However, off-the-shelf applications can be used by organizations that are not bringing sophisticated specifications to the table. In addition, a number of open source solutions offer both sophistication and customization options, though these come with higher demands for programming knowledge for implementation. For organizations that already have in-house information technology departments, sophisticated solutions are within reach. However, smaller organizations do not need to be dissuaded from considering e-portfolio implementation. Simple wikis, blogs, PowerPoints, and even hyperlinked word-processing documents can provide frameworks for organizational presentations.

For companies apprehensive about technical challenges related either to presentation or security, the benefits of e-portfolios can be experienced, whether or not the final collection is posted on the Internet.

The Framework for Collection

Perhaps the most important consideration for organizations initially developing a system relates to setting up a framework for collecting the raw artifacts that will become part of the final e-portfolio. At SWORPS systematized archiving takes place over the course of the working year in a manner that facilitates communication and the collection

of the artifacts. They maintain a common server space where documents are collected and preserved prior to publication. Utilizing a system of job numbers that are related to specific projects and work initiation dates, all final artifacts can be tracked easily and accessed to populate the e-portfolio.

Though work projects form the core of the e-portfolio presentation, other important data is included also, adding value to the resource. Events such as conference presentations, talks, and news articles or news releases as well as accomplishments such as publications or awards to the organization or individuals within the organization are monitored and acknowledged during the course of the year using the organization's intranet site. This ongoing recognition both encourages consciousness of the collection effort and spurs reporting and participation by employees of the organization on all levels. Then these pieces of information become part of the news, recognitions, or accomplishments section of the e-portfolio publication.

Other components of the e-portfolio include running lists of employee information, lists of contract information, contact information, as well as statements of organizational mission, history, and goals.

The e-portfolio supported by SWORPS is used both as an annual report and as a marketing tool throughout the year.

Conclusion

This study of the use of e-portfolios by organizations, including businesses, educational institutions, non-profit organizations, and any other communities of individuals joined together to accomplish a goal demonstrates that e-portfolios are robust tools for extensible authentication of group endeavor. This article has looked at the ways

these organizations are currently appropriating the advantages of e-portfolios and some of the directions in which best practice appears to be headed.

It discussed three directions related to the use of e-portfolios.

From the inside to the outside, e-portfolio methodology offers the opportunity for businesses to engage in an advanced level of media expression and communication through reports to investment communities and for auditing purposes. It offers educational institutions the means for presenting evidence-based competencies that include all the evidences, not just those that appear well on paper to accrediting bodies. It offers non-profit organizations the means for reporting and telling digital stories that market services and honor excellence.

From the outside to the inside, this study observed the ways e-portfolios engender good decision-making as prospective employees and prospective vendors or partners use this form of extensible authentication to present their capabilities in a full and accessible manner. Then it discussed the impact of e-portfolios when used internally by organizations and businesses. This model offers a framework that allows for a new level management and communication.

In authenticating and tracking the real human capital that exists within businesses and organizations, this tool has proven to be extremely valuable, especially when applied within economies that are experiences great fluctuation in human resource needs and changing population demographics. It opens a network of support for project activity management that addresses the unique needs of knowledge-based economies. In a fully developed form, this tool provides a framework for tracking and management of the

entire supply chain; it can provide a framework for both assessment data management and service delivery for training and tracking for service constituent groups.

Though the process of accepting evidence-based thinking and using the framework of e-portfolios for corporate and organizational management and communication has been slow, these tools are providing a richness and depth of expression and understanding in our knowledge-based communities, adding value and authenticating it in both for-profit and non-profit organizations throughout 21st century global societies.

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