Constructing of ePortfolios with Mobile Phones and Web 2.0

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Abstract. This paper provides rationalisation, description and evaluation of a project using mobile phones and web 2.0 sites to collate eportfolios. The paper will firstly provide a brief introduction to the context in which the project has been carried out. An overview of what has taken place in mlearning, eportfolios and web 2.0 that is relevant to this project will then be discussed. Reports on the various parts of the project, findings and results then follow. The paper concludes with a summary of the future work on mlearning pedagogy.

Keywords: eportfolios, Web 2.0, mlearning, workplace learning.

1 Introduction

CPIT is one of nineteen institutes of technology in New Zealand (NZ). It is the largest polytechnic in the South Island and offers a variety of courses and programmes leading to local and national certificates, diplomas and degrees. In this paper, a project undertaken to assist baking apprentices is reported.

Applied vocational qualifications for trades-based occupations involve completion of competency- based standards overseen by the New Zealand Qualifications Authority (NZQA). Individual components encompassing trade skills and knowledge components are prescribed in National Certificates. In many trades, the majority of the learning and assessments towards the attainment of National Certificates are undertaken in the workplace. However, many workplaces are work production orientated and apprentice completion rates are affected by delays in the completion of assessment requirements (Chan, 2003). Therefore, this project has been a pragmatic solution towards providing apprentices with the tools to gather evidence of skill and knowledge acquisition in the workplace using mobile phones, owned by a majority of apprentices. The project provided for an alternative method for apprentices to complete on-job assessment through collation of an eportfolio and completion of a challenge test.

2 Profile of Young Apprentice Learners

Preliminary student profile surveys of apprentice learners reveal most as young (between ages 16 to 20), male, recently re-sited from their nuclear family residence

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and in their first or second year of paid employment. All the apprentices who participated in the various trials and pilots for the mlearning project owned a mobile phone. In the main, first year apprentices just beginning work owned basic mobile phones capable of text messaging and voice calling. Third and fourth year apprentices owned smart phones capable of web surfing. Therefore, the apprentices participating in this project example young learners having their learning styles reshaped by rapid advances in information technology. (Dede, 2005) These emerging learning styles include fluency in multiple media and simulation-based virtual settings, communal learning involving diverse, tacit, situated experiences and a balance between experiential learning, guided mentoring and collective reflection. The current cohorts of apprentices are now situated in the generation Y grouping of people born between 1982 and 2000. Generation Ys are different not only with respect to their age but are shaped by the economic, social and political conditions and experiences they have grown up with (McCrindle, 2003). Although young people could be characterised as being 'digital natives (Prensky, 2001), work on this project has revealed young apprentices evidence a continuum of digital literacy skills. Hence, the majority of the apprentices participating in the project were significantly proficient in the use of mobile phones. However, up to 25% were not equally confident or competent with the skills required to work with desktop computer-based software. Of these 25%, the majority had poor keyboard skills, were unfamiliar with the concept of 'folders' to archive evidence, had surface orientations to using search engines and were unfamiliar with desk-top based computing jargon.

Following on from the above, the concept of using mobile phones to collect evidence of workplace acquired skills and application of knowledge to practice was proposed.

3 The CPIT Project

The CPIT mlearning project consists of several distinct parts. Each section of the project was organized to meet specific learning outcomes. The sections of the project include the following:-

- Course content for knowledge-based competency standards are delivered to apprentices on hard copy.
- These theory courses are supported using mobile phones via voice and text messaging / short message service (SMS) (Chan, 2005).
- All formative / summative assessments for theory courses and the written part of workplace-based competencies are delivered and answers collected via SMS.
- Evidence gathering to form eportfolios using mobile phone to take photos or videos and posted on photo collation applications on the web.
- Collation and reflection on eportfolio is completed when apprentices attend their yearly block courses at CPIT.
- Eportfolios are collated and shared on social networking/Web 2.0 sites.

Therefore, the two major strands of the project are the

1) provision of distance learning and support via mobile phones and
2) use of mobile phones to gather and collate evidence of workplace-based skill and knowledge acquisition into eportfolios. This second strand is described in this paper.

4 Mobile Phone Generated ePortfolios

Eportfolios are a tool for digitally storing evidence of learners' skill and knowledge acquisition. They can be used to collect evidence to support competency-based assessment in the form of artefacts including photos, video clips, audio snippets and text files. These artefacts can then be collated and used to showcase learners' achievement and for formative or summative assessments.

The use of mobile phones to gather evidence of workplace-based skills acquisition was originally premised on apprentices collecting the photos, videos or text and sending these to multi-media social sharing sites including flickr and youtube. Our trials then advanced to using metacafe for storing mobile phone generated videos. Eventually, many social networking sites provided the facility to directly post photos or videos directly from a mobile phone. Eventually, social networking sites like vox, multiply and bebo were used to archive and collate ePortfolio artefacts..

4.1 Making Use of ePortfolios

In a literature review of ePortfolios (Butler, 2006), advantages of deploying eportfolios to support student learning include:

- efficiency with regards to searching, retrieving information, manipulating and organising. This reduces effort and time needed to maintain the ePortfolio.
- Possibly more comprehensive and rigorous as an assessment approach.
- Able to support multimedia.
- Cost effective to distribute.
- Easy to share with other stakeholders including peers, teachers, parents, employers and others.
- A showcase for the creator of the ePortfolio including access to a global audience if the ePortfolio is web-based.

An important precept of the project reported in this paper, was to adopt Love, McKean and Gathercool's (2004) advise to move eportfolios beyond 'scrapbook' and curriculum vitae type arrangements towards using portfolios as web folios as authentic and authoritative artefacts, linked to standards or other descriptors of skill, knowledge or dispositional development. This means a range of learning evidence needs to be collected, reflected on, selected and collated to form eportfolios showcasing the transformation of apprentices as they develop as trade workers.

4.2 Using Social Networking Sites

An article by O' Reilly (2005) provides a good introduction to what is Web 2.0. Web 2.0 emphasises the use of the web as a platform for 'social software'. Content hosted on various Web 2.0 applications is user generated. For educators, blogs and wikis are the most common examples of Web 2.0 applications. Files archived on Web 2.0 applications are stored on the servers of the companies providing these applications. Ubiquitous internet access to Web 2.0 sites is therefore possible.

Many of the apprentices participating in the trials described in this paper were familiar with social networking websites. A gradual increase in the number of apprentices who maintained their own social networking sites was measured over the 5 years of the project's life. At the start, 60% of apprentices utilised their own social networking sites for the purposes of networking with peers and family. Apprentices' familiarity with the structure, layout and navigation around social networking sites aided the implementation of the 'mobile phone eportfolio' concept.

4.3 'Cloud Computing' and Mobile Learning

The advent of 'cloud computing', with the ability to access digital media stored on remote servers, has increased options available for mobile learning (Corbeil & Valdes-Corbeil, 2007). This means the use of mobile phones to collect just-in-time, authentic and valid evidence of learning is enabled. Apprentices are able to collect photo, video or audio evidence, upload the evidence to a web-based archive and recover and collate the evidence when eportfolio compilation was required.

4.4 Using Social Networking Sites for Collating ePortfolios

Research participants' evaluation of three social networking sites concluded that user friendliness was the most important criteria for selecting a social networking site to use for eportfolio construction. Other criteria used to evaluate social networking sites include:

- ease of access via mobile phones,
- minimal costs and all of the Web 2.0 sites evaluated were free
- simplicity with uploading, archiving and tagging multimedia evidence; and
- suitability of the sites for collating evidence into eportfolios.

The three main social networking sites evaluated for this project are vox (unfortunately no longer available), multiply and bebo. Vox was a social networking site. It was chosen as it had a collation tool that allowed simple aggregation of various artefacts into one or more consolidated folders. This provided for a natural way to compile eportfolios, categorized either as 'product' folders or as 'audience-focused' folders.

Although Multiply was mainly a blogging site, aspects of social networking were also available. Multiply was chosen as it provided an audio blogging tool, important as a means for gathering non-text-based evidence of apprentices' descriptions of product or bakery production evidence in the form of photos and videos.

Bebo was also evaluated as it is one of the most popular social networking sites amongst New Zealand youth, with two thirds of secondary school children registered (Heyday, 2010). However, the project found reluctance amongst apprentices for using Bebo as they preferred to keep Bebo mainly as a personal social networking site. Bebo was accessed by their peers and maintaining a professional eportfolio was seen to not be of interest to peers.

Each of the above social networking sites was supplemented by other Web 2.0 sites. Some apprentices used other means of collating their work. In particular, a site which provided the facility to caption photos proved to be popular. Two sites comic life and comiq were evaluated. Both proved to be easy to use. Captioning of photos was a good way to provide descriptions of baking processes. Captioning encouraged apprentices to provide short text descriptions, leading for some, to more extensive postings on their social networking sites, to describe their learning.

The New Zealand developed open source eportfolio platform, Mahara, was also evaluated in the last iteration of the project. Apprentices found more time was required to learn how to use Mahara but appreciated the structure and layout of the platform, as being more aligned towards compilation of an eportfolio.

4.5 Multimedia and Multiliteracies

One major advantage of utilising mobile phones is the various means by which multimodal (audio, visual) and multimedia (voice recordings, photos, videos and text) could be collected. Many trade apprentices choose a vocational tertiary education route due to perceived lack of achievement with academic (i.e. mainly text-based) learning (Vaughan, Roberts & Gardiner, 2006; Williams, 2008). Therefore, the opportunity to collect and collate evidence of learning in the form of non-text-based media, provides for a wider range of multiliteracies (New London Group, 1996) to be recognised.

4.6 Compiling mPortfolios

The project evolved through several phases as social networking sites developed and matured, mobile phone capabilities increased and the cost of mobile web access lowered. Figure 1 provides an overview of the final iteration of the project.

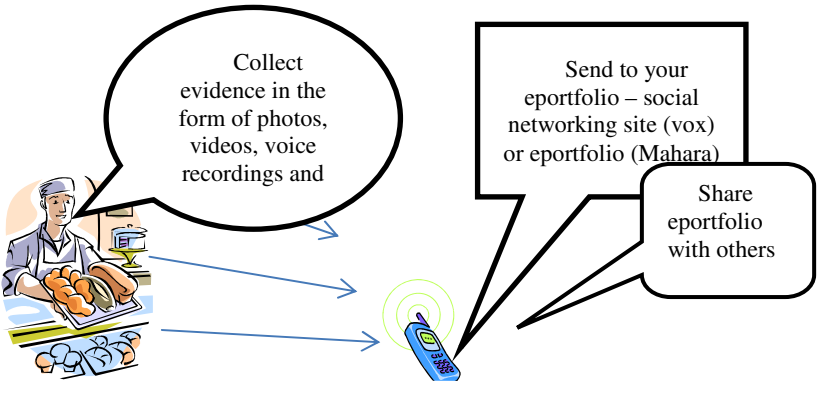

Fig. 1. Compiling eportfolios using mobile phones

In general, the process is as follows:

1) Collection of evidence, usually in the form of photos, short video clips, audio files describing products or processes, text descriptions and 'comic strips' using photos with embedded comments.
2) Archiving of all the above artifacts on a social networking site.
3) Reflecting on the artifacts and collating these into evidence folders of skill acquisition and application of knowledge.
4) Disseminating these evidence portfolios to workplace supervisor for validation and then to course tutors for assessment.
5) Adjusting evidence portfolio based on feedback obtained from tutor.
6) Presenting the evidence as a final eportfolio for summative assessment. From this eportfolio, items are selected and apprentices complete a challenge test to product the products selected. The accomplishment of the challenge test completes summative assessment and completion of an integrated range of competency-based standards.

4.7 Mlearning Pedagogy

The main premise of the projects described in this paper, is to encourage students to not only receive information but to also participate in the creation of knowledge. Hence, mobile technology may be seen as an enabler of a constructive learning process. Mobile phones are used to collect evidence of skill attainment and also as a means by which to access and share eportfolio content with employers, friends and family. Consequently, the mobility of the hardware, provides opportunity to collect evidence of learning on a just-in-time, as it occurs scenario, leading to the collection of 'authentic assessment' (Gipps, 2002) artefacts. The process of eportfolio collation provides opportunities for reflection on the validity of the artefacts accumulated. Selection of artefacts to showcase on eportfolios requires students to match artefacts to required learning outcomes, and display an understanding of assessment requirements. These learning processes further engage learners into constructing deep learning of the skills and knowledge associated with learning a trade, and becoming bakers (Chan, 2011).

5 Evaluation of the Project

The various iterations of the project were evaluated via student feedback using formative evaluation guidelines based on an eclectic-mixed-methods-pragmatic paradigm. Formative evaluations are evaluations carried out to examine the learners' or users' experiences and acceptance of an 'instructional product's' usability. Findings derived from participants self-reporting provide authentic data through responses to written questionnaires, interviews, or thinking aloud (Reeves & Hedberg, 2003). In this project, structured questionnaires and focus groups were used to evaluate the various processes and platforms used in the projects.

6 Findings

Data garnered was then studied, both from an evaluative and a constructive-interpretive perspective.

6.1 Evaluative findings

These findings were used to improve iterations of the project. The main objective of this part of the project was to derive guidelines to inform the construction of mobile phone generated eportfolios. The guidelines include:

Importance of 'user-friendliness'
Apprentices only engaged if the process was user-friendly. The process was required to be intuitive, efficient and cost effective. In general, using mobile phones to gather photos, videos and audio clips was achieved easily. During the first iteration of the project, uploading evidence to social networking sites was challenging. However, as social networking sites became more mobile-centric, the process of uploading, and in some cases collating eportfolios using mobile phones was simplified.

A review of the term 'digital natives'
The term 'digital natives' (Prensky, 2001) has come into common usage as a term to describe young peoples' familiarity with current information and communications technology (ICT). It is based on a presumption that ICT skills of all young people born after 1985 are more extensive than 'digital immigrants' born before 1985. However, this study has revealed a large subset of young people, born after 1985, who are differently ICT literate. Their ICT skills are distinct from the norm perceived by the mainstream population.

Apprentices in this study were extremely skilled in the use of mobile phones and many maintained social networking sites using desktop computers. There is also an age based 'digital divide' with young people owning mobile hardware (mobile phones, game consoles, mp3 players) instead of desktop computers or laptops. This different set of information literacy skills privilege young people towards participation in the forthcoming mobile computing revolution and pre-dispose them to different ways of thinking and learning (Brown, 2002). Further investigation on how young people utilise mobile technology and how this can be used to enhance learning opportunities is a research area ready for further intensive exploration and analysis.

Non-dependence on specific mobile phone operating systems
Throughout the life of the project, apprentices used their own personal phones to collect evidence. If they had a phone capable of accessing the internet, the phones were used to collate and view the eportfolios. A wide range of ever evolving phone models and mobile phone operating systems meant it was difficult to institute a common structure for eportfolio construction. However, the need to accommodate the wide range of mobile phones used by apprentices provided the project team with on-going opportunities to learn more about mobile learning provision. The project found it important to provide apprentices with the means to evaluate the match between the

mobile phone they owned with the type of social networking site chosen to compile their eportfolio.

Possibility to move to a fully mobile phone eportfolio
Work on mobile learning continues. The current iteration of the mlearning projects revolve around the sole construction of eportfolios using mobile phones. This means the evidence is collected using the mobile phone and emailed directly to mobile web sites constructed as eportfolio showcases. The need to use desktop computers for the process is removed. In addition, the launch of a mobile learning engine (MLE) plug-in for Moodle provides impetus for work on delivering courses currently accessible on desktop computers using mobile phones or other mobile devices including mp3 players (exampled by the Apple iPod Touch), game consoles capable of WiFI browsing (including the play station portable (PSPII) and the Nintendo DS), netbooks and net tablets (exampled by the iPad). These devices are owned by many young people and the provision and evaluation of learning content, activities and interaction via mobile devices continues.

6.2 Constructive-Interpretive Findings

This aspect was analysed through adopting the underlying premises of vocational/ occupational identity formation (Chan, 2011).

Need to re-frame competency based assessments with more holistic descriptors
This paper does not undertake a comprehensive evaluation of the benefits or otherwise of competency based assessments. However, competency based assessments by virtue of their structure are often focused on the assessment of individual skills as opposed to more holistic assessment structures based on recognising capability (Robertson, Harford, Strickland; Simons & Harris, 2000). The use of eportfolios, especially with regard to the pedagogical direction and organisation in this project, proposes a more holistic method for the aggregation of evidence of skills acquisition (Gipps, 2002). In particular, the facility to closely match the visual vernacular preference of young people by accepting the use of multimedia evidence, engages young people more deeply in the process of eportfolio creation. This enhanced intrinsic motivation may lead to better assessment completion outcomes.

The construction of ubiquitous knowledge
Peng, Su, Chou and Tsai (2009) propose the concept of using mobile tools and the availability of 'cloud computing' to provide learners with the opportunity to not only access but create knowledge while 'un-tethered'. Therefore, this project provides one possible approach towards providing workplace based learners, in this case trades apprentices, with the opportunity to contribute their learning, ideas and innovations into their wider industry community of practice. Many apprentices will eventually become leaders in their industry. Therefore providing and encouraging digital skills attainment during apprenticeship training may lead to better understanding and utilisation of the future affordances provided by mobile tools and cloud computing to further knowledge in their respective industries. Exposure to the use of social networking sites beyond their original leisure and lifestyle objectives through the introduction of social networking professional eportfolios provides examples and models for young people to further investigate.

7 Discussion and Implications

From the above findings, several implications for practice have been derived. These include the following.

Participative Research

Technology over the course of the project, in particular, the capabilities of mobile phones to connect with Web 2.0 sites, meant that each iteration of the project, required modification of the types of sites used and adaptation of assessment guidelines for assessing the portfolios. Much of the information on worthwhile Web 2.0 sites to use and proposed techniques to construct eportfolios was contributed to by the apprentices. Therefore, as the project progressed, elements of participative research became much more widespread.

Moving Assessments beyond Competency

As discussed in the above section, there is a need to recognise the importance of 'authentic' assessments, implying a close match between how skills, knowledge and dispositions are applied to real-world environments and the way in which learners' skills, knowledge and dispositions are assessed. Therefore, in many vocational trades, the prevalence of written reports and tests to assess practical skills and dispositions, needs to be re-evaluated. Eportfolios may be one method to collect evidence of learning. Learning activities that create opportunities for the generation of evidence need to also be structured, so that authentic evidence is collected of learners' journeys.

Social Networking Sites to Re-engage Reluctant Learners

For apprentices, extrinsic motivation through the need to complete qualifications does not always yield dividends. This is evidenced by low bakery apprentice completion rates (Mahoney, 2009). Workplace learning with its inherent challenges (Billett, 2001) and workplace assessment issues (Cornford, 1998; Robertson et al, 2000), contribute considerable barriers towards the completion of assessment requirements. A combination of social agency in the form of resilience and conscientious action on the part of individual apprentices; and support from a workplace cognisant of the learning needs of novices to the trade are pre-requisites to ensuring that apprentices engage with workplace learning (Chan, 2008).

Therefore, there are significant advantages, in the form of intrinsic motivations for the learner, in employing social networking sites for the collation of eportfolios. These sites are generally familiar territory to young people. The added dividends of using social networking sites include ease of access not only for the apprentices but also by friends, colleagues and family; an increase in 'traditional' information technology skills; a greater awareness of assessment requirements including aspects of validity, sufficiency and authenticity of evidence; improved confidence in the use of the mobile phone for gathering photos, videos, voice recordings and text fragments; and better opportunities to obtain formative feedback from assessors and peers as the process of eportfolio compilation proceeds.

In addition to the above, the resulting eportfolio provides for a more streamlined approach to the workplace assessment process. The majority of the workload involved with workplace assessments is now transferred from bakery supervisors to the apprentices. Off-job training providers complete the final verification and judgements on the evidence presented in the eportfolios along with the results of a summative practical assessment. This process improves completion rates for apprentices of unit standards required for award of National Certificate qualifications.

Opportunities to Research Workplace-Based Skill Attainment and Identity Formation

The original objective of the CPIT mobile generated eportfolios was to provide an avenue for workplace based skill acquisition to be recognised. However, the aspect of eportfolios as narratives of vocational identity formation also occurred. This makes available a tool for the collection of user generated, ethnographical evidence for the study of identity formation. This area of research is now further enhanced by the ubiquity of ownership of mobile phones coupled with ready access to social networking sites and the mobility of the mobile phone. Currently, even low-end mobile phones include still and video camera capabilities along with direct accessibility to social networking sites including facebook, tweeter and bebo.

Social networking sites, by virtue of their structural framework, encourage the generation of user-generated multimedia entries. The sites also promote user-friendly networking capabilities. This further enhances opportunities for sites to be shared either with a close group of friends or with anyone able to access the internet.

8 Conclusion

The on-going projects have produced many results, some of which have exceeded our expectations. In particular, there was deep engagement in the eportfolio evidence collection and collation process. This engagement by students, who are often difficult to motivate with regards to providing evidence of their skill acquisition for the purposes of assessment, has been both heartening and re-affirming. The project has also led to the construction of a diverse range of digital stories that inform workplace and off-job assessors, the researcher, apprentices, their families and their workplace personnel, about how young people become bakers.

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