

Effective practice of using digital portfolios: how can Queensland teachers inform teacher education practice?

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Portfolios have been a popular tool to enable teachers to provide evidence of their teaching practice (Elbow & Belanoff, 1986) and with technology there has been a move to online digital portfolios. This research provides empirical evidence of Queensland teachers who have completed a digital portfolio as part of the Smart Classrooms Professional Development Framework. These digital portfolios provide rich descriptions of evidence that demonstrate a teacher's values, relationships, knowledge and practice in using technology. This paper describes one teacher's digital portfolio as part of the wider research project investigating the development of Technological Pedagogical Reasoning. The paper concludes with a discussion of how this type of digital portfolio can inform teacher education. A key message is to use an evidenced based portfolio, which captures snapshots of a pre-service teachers practice with links to professional standards mingled throughout the discussion of their practice.

Keywords: digital portfolios, pedagogical reasoning, teacher knowledge

Introduction

This paper presents details of a digital portfolio approach adopted by Queensland teachers that can be used to inform teacher education. To begin, a description of portfolios is presented including an outline explaining how the portfolio is used as a tool to store evidence and the advantages of using digital portfolios. Next, the Smart Classrooms Professional Development Framework (SCPDP) is offered to explain the context of the digital portfolio included in this research project. The structure and a detailed review of a digital portfolio termed *Digital Pedagogical License* is provided to help understand how the SCPDP has been implemented. A brief description of the wider doctoral research project is provided to explain how data for this research project was collected. The final section includes a discussion on how this type of digital portfolio can inform teacher education. The goal of this paper is to refresh the discourse on how digital portfolios are used in teacher education.

Background

Artists first used portfolios to show customers examples of their best work. Portfolios have now become popular to showcase work from many professions, for example architects showing plans and drawings to nurses showing evidence of nursing practice. Teachers also have realized the benefits of preparing portfolios to show their best work. Teachers, for the purpose of evaluation or assessment, have prepared paper-based portfolios from the 1980s (Elbow & Belanoff, 1986). Evidence of their teaching was collected from various types of documents that they used in the process of teaching for example: lesson plans; unit plans; assessment tasks; and student observations. The importance was placed on the personal collection of evidence to support growth in developing as a teacher.

As portfolios are personally constructed evidence of work, they can be considered to be a summary of life experiences and are created as digital archives of learning, for assessment, as resumes or as hybrids for all three (Karsenti, Dumouchel, & Collin, 2014). Where Wolf (1994) suggests that portfolios should not be: resumes listing activities and accomplishments; overflowing containers of evidence indiscriminately collected; or scrapbooks of assorted mementos filled with personal meaning. He suggested that portfolios need to be places of serious self-reflection and allow opportunities for critical examination by self and others.

With the introduction of the Internet and web based technologies, paper based folders of evidence were replaced with web based portfolios where vast amounts of evidence could be collected and displayed easily. Karsenti et al. (2014) suggests the following advantages of using digital portfolios over paper portfolios:

- Enhanced social function – better opportunity for others to comment/input;
- Flexibility of content organization – reorganisation when need arises;
- Flexibility of content – ability to show/modify various items;

- Enormous storage capacity – large amounts of data can be stored and accessed with ease;
- Aesthetics – wide choice of templates and uniform legible text;
- Accessibility – universal and immediate access; and
- Development of ICT skills – user must know a wide variety of ICT to be able to prepare.

In Queensland, Australia teachers have been encouraged to prepare a digital portfolio as part of the SMART Classrooms Professional Development Framework.

The SMART Classrooms Professional Development Framework

Education Queensland (a state teacher employing authority) developed a *SMART Classrooms Professional Development Framework* (SCPDF) (Department of Education and Training, 2012a). This framework provided a mechanism for teachers to self-assess their teaching attitudes and practices with regard to digital technology use. Teachers prepared a portfolio for this three level accreditation process. For each level, the teacher was asked to discuss and provide evidence of their professional values, relationships, knowledge and practice in line with a series of predetermined indicators. This framework is shown in Figure 1.



Figure 1: SMART Classrooms Professional Development Framework (Source: <http://www.education.qld.gov.au/smartclassrooms/documents/developing-professionals/pdf/scpd-framework.pdf>)

The 2005 *SMART Classrooms* strategy evolved from an earlier *ICT for Learning* strategy. At the policy launch, the then Premier announced that students needed *smart classrooms* because they were the “first generation to grow up surrounded by and using ICT” (Education Queensland, 2005, p. 3). The strategy provides various initiatives designed to build “a cohesive future-focused mix of products and services for schools to teach, manage, learn and innovate with new technologies” (Education Queensland, 2005, p. 2). A key illustration of the strategy was the Rocket Ship where the *smart learner* was placed in the cockpit (shown in Figure 2). The illustration highlights all of the components of the *SMART Classrooms* strategy supporting the *smart learner*. The components include: an Enterprise Platform; OneSchool (a single school system for all schools across the state managed centrally); Digital Learning Materials; Digital Pedagogies; and My Learning Space (Eden, 2012). The illustration clearly showed the dependency of each of the elements and how one relies on the former for

collective success of the strategy. The illustration also highlights all parties involved including: teachers; administrators; school support; parents and guardians; communities; and the students.



Figure 2: SMART Classrooms rocket ship diagram

The *SMART Classrooms – A strategy for 2011-2014* continued to build on the previous work and provided “direction for harnessing the learning and business potential of ICT now and into the future” (Department of Education Training and Employment, 2012a). The Rocket Ship analogy had been dropped but the strategy document provided a clear outline of the four new drivers: Working Digitally; Developing Professionals; Enabling Learners; and Harnessing the Enterprise Platform. Under the ‘Developing Professionals’ heading, the SCPDF was outlined as a continuing strategy for teachers. The department describes the framework as a “professional learning guide that helps teachers embrace digital pedagogy” (Department of Education and Training, 2012b, p. 1). As a demonstration of their technology competency, the majority of teachers participating in the SCPDF to complete a digital portfolio. The format/tool of the digital portfolio was not stipulated in the policy but teachers had used various tools to prepare their portfolios including webpages, virtual classrooms (BlackBoard) and wikis (EdStudio).

By December 2012, 22000 teachers had achieved their ICT Certificate, and more than 3800 teachers had achieved their Digital Pedagogical Licence (Department of Education Training and Employment, 2012b). With a total teaching population of more than 40000 teachers in Queensland’s state schooling system, this represents a significant growth in the capability in terms of their pedagogical approaches to using technology.

Table 1: Smart Classrooms Professional Development Framework Growth

Smart Classrooms Professional Development Framework	2006	2010	2012
ICT Certificate	549	11714	22000
Digital Pedagogy Licence	525	2021	3800
Digital Pedagogy Licence Advanced	0	54	54

The SCPDF mandated a predefined structure for the completion and assessment of each level but teachers were able to choose the platform they wanted to use to display their portfolio. Using a strong framework gave the teachers “a greater sense of purpose and value in the e-portfolio reflective process” (Lee & Pohio, 2012, p. 553). The following section discusses the format of a Digital Pedagogical License (DPL), the middle level of the SCPDF.

The Digital Pedagogical License

The format of the DPL was determined as part of the SCPDF as shown in Table 2. The DPL contained a variety of items including: context statement; belief statement; evidence (items including unit overviews, assessment tasks, virtual classrooms screen shots, webquest evidence, links to learning objects, lesson plans, photographs, blogs details, student work, recorded lessons, audio recordings, national testing data, resources and grading examples); and a support statement from their principal or delegate.

Table 2: DPL layout

Digital Pedagogical Licence Layout
1. Context Statement (500 words)
2. Reflective Statement (500 words)
3. Items (Explanation to support evidence – format in Table 3)
4. Evidence (using predetermined headings as shown in Table 3)
5. Statement of Support

The objective of the DPL was to “acknowledge teachers who demonstrate and reflect on how learners use ICT purposefully” (Department of Education Training and Employment, 2012d). The DPL “is a collection of carefully selected or composed professional experience, thought and goals that are threaded with reflection, evidence and self assessment” (Department of Education Training and Employment, 2012c). Each DPL was required to contain either two or three items of evidence depending on the coverage of the indicators (see Table 4). Each item of evidence was completed in line with the headings shown in Table 3.

Table 3: Evidence item headings

Evidence Item Headings
a. Title
b. Date of implementation
c. Evidence
d. Year level and student context
e. Item overview
f. Reason for inclusion
g. Development and planning
h. Curriculum links
i. Central focus of the student learning (curriculum intent)
j. Sequence of learning
k. Teaching and learning approach
l. My learnings
m. Further reflections and information

The SCPDF Indicators (as shown in Figure 1 - under DPL heading) were used to assess the DPL. Each teacher was responsible to ensure all indicators were covered in their DPL responses. A reviewer checked the DPL to ensure all indicators were addressed, before a certificate was issued. The indicators fell under one of the four headings: Professional Values; Professional Relationships; Professional Knowledge; and Professional Practice. The indicator statements for a DPL are shown in Table 4.

The origins of the structure and how the indicators were decided had not been explained in the departmental communications or website. To understand a DPL, an example of one teacher’s DPL has been included in this paper. This teacher has participated in the doctoral research project and her name has been disguised with a pseudonym. The research project will be described in the following section.

Table 4: DPL Indicators

<p>DPL Indicators</p> <p>Professional Values PV1 - I am committed to developing my digital pedagogy to improve through reflection on my practice to inform learning goals. PV2 - I acknowledge the potential for ICT to differentiate and personalise learning to improve student outcomes.</p> <p>Professional Relationships PR1 - I seek opportunities to collaborate with professional teams, to support colleagues and learn from each other's digital pedagogy.</p> <p>Professional Knowledge PK1 - I understand how ICT supports and enhances what students learn, how they learn, and when and where their learning takes place.</p> <p>Professional Practice PP1 - I plan for learner needs, by student data and learning context, by critically reviewing, selecting and adapting teaching and learning approaches and digital resources. PP2 - I plan learning experiences within units of work where ICT is used purposefully throughout the learning process to achieve curriculum intent. PP3 - I develop students' digital literacies, including the ability to authenticate, critically evaluate and select relevant information and resources. PP4 - I facilitate student use of digital resources, tools and environments to deepen and demonstrate their learning of concepts and processes. PP5 - I promote reflective learning, thinking skills and creativity through the use of digital resources, tools and environments. PP6 - I provide opportunities for students to purposefully use online environments to interact with others in connected learning communities or collaborative online projects. PP7 - I develop students' digital citizenship through the modelling and explicit teaching of ethical, safe and legal use of digital resources, tools and environments, in accordance with Department of policies.</p>

A DPL example

Alessandra (not her real name) has been selected for review and discussion in this paper. Alessandra has been teaching for over 10 years in a primary school setting. She would be described as a lead teacher and is recognised in her school as such. She has performed technology based leadership roles in her school, initiated technology based learning and responsible for mentoring teachers to use technology. She had first prepared her DPL digital portfolio in 2007 and renewed it in 2010 and 2013 (The DPL was only valid for three years with the teacher required to prepare a renewal statement to explain how they intended to use technology in the following three years). Alessandra had prepared her DPL in a restricted website in the state available learning management system. Only people she authorized could access her portfolio. Most teachers used the learning management system secure platform to store their digital portfolio, as their portfolios contained images of their students and their student's work. Alessandra used photographs/digital movies of her students for assessment purposes and therefore included these in her portfolio to explain how she had used technology for her teaching and their learning.

Table 5: Alessandra DPL details

Teacher Code	Alessandra
Gender	Female
Teaching area	Prep / 4-5 year old
Teaching experience	10
Career stage	Lead
Date portfolio prepared	2007
School	Primary
Availability	Restricted
Tool	Learning management system

Alessandra had provided three pieces of evidence in her digital portfolio (shown in Table 6). Each was selected to highlight specific features and to ensure coverage across the DPL indicators.

Table 6: Alessandra DPL Evidence

DPL Heading	Item 1	Item 2	Item 3
(a) Title	Plants	Medieval	Communication
ICT Approach used	Interactive whiteboard (IWB) Digital photography	Created movie	Email
(b) Date of implementation (d) Year level	2006 Prep/ 4-5 yo	2007 Prep / 4-5 yo	2007 Prep / 4-5 yo
(c) Evidence	Unit plan Photographs - student work	Unit plan Student work Movie Photographs of work Invitations	Unit plan Email tasks Photographs Communication wall of fame
(e) Item overview	Early maths Language learning	Language and communication Active learning process Health and physical learning Early Maths Social and personal learning	Social and personal learning Health and physical learning Language learning and communication Early maths Active learning processes
(f) Reason for inclusion	Display large images on IWB Triple code - real life, internet and books	ICT became whole learning experience Used ICT to solve problems eg costume consistency	ICT an avenue for students to use a range of communication tools
(g) Development and planning (h) Curriculum links (i) Central focus of student learning	Student initiated idea Student negotiated curriculum Play based Intellectual quality Connectedness	Idea student initiated Student negotiated curriculum Play-based Whole language Triple coding Connectedness	Teacher initiated Knowledge integration
(j) Sequence of learning (k) Teaching and learning approach	Research Labelling plants and seeds Science experiment	Research Electronic storyboarding Costume capture Movie making Editing Premiere invitations Premiere showing	Role-play Communication wall of fame Travelling pet Email
(k) Teaching and learning approach - assessment	Observing child with ICT Photographs as evidence of professional observations	Observing child participating in Movie creation Photographs as evidence of professional observations Checklist for specific tasks	Observation Reflect with students individually Digital photos Checklist for letter recognition
(l) My learning (m) Further reflections and information	Revisit work completed Use of camera difficult for students Time to test equipment Use photography more More PD	Learnt software use Confidence of using IWB Costume making and consistency was a problem Technological problem with video camera	Communication wall of fame Linking families with the class Blog idea was not suitable Email addresses for parents collected at start of year

Evidence for Item 1 was on a unit entitled 'Plants' that she used in teaching her Prep (4-5 years old) students. She had used the interactive whiteboard, digital photography and a play based curriculum approach. She emphasised that this unit was student negotiated to develop early maths and language learning skills. She tripled coded the learning with real life examples, Internet use and the reading of books. Evidence for Item 2

was on a unit titled ‘Medieval’ for her Prep students. The students created a movie where they developed their: language and communication skills; social and personal learning; health and physical learning; and early maths. The students used technology to capture and then review their learning while Alessandra was able to use the images for assessment and providing feedback to parents. Unit 3 was title ‘Communication’ where students used a range of technology tools to learn the importance of communication. This unit used communication as a strategy to include parents in their children’s learning experience. She reflected that in all of her three items, the use of technology for that age group would need to be reviewed as the students experienced difficulties in using some of the technologies.

For all of their evidence provided in their DPL, the teacher was required to demonstrate that their pedagogy aligned with the DPL indicators. Table 7 includes an excerpt from Alessandra’s DPL to show how she had mapped her response to the Professional Value Indicator 1 (PV1). This example is taken from her belief statement and refers to her professional values.

Table 7 - Example mapping to DPL Indicator

Criteria	Professional Values
Indicator	PV1
Indicator description	PV1 I am committed to developing my digital pedagogy to improve through reflection on my practice to inform learning goals.
Teacher	Teacher
Found in DPL	Belief Statement
An example of a teachers response	“I therefore seek to facilitate students’ learning through contextualized, stimulating and relevant experiences which they share with others, drawing, where possible, on prior knowledge and experience. PV1”

The research project

This doctoral research project has investigated the pedagogical reasoning of nine teachers who significantly use technology in their teaching. The aim of this research project is: *To understand how teachers reason with technology and what influences their development of technological pedagogical reasoning.* This research has used a qualitative frame to obtain the voice of practicing teachers. Ethics approval was gained from the university and Department of Education, Training and Employment prior to any data collection tasks being completed. The teachers purposely selected have diverse teaching contexts and are at differing points in their teaching careers. Data has been collected in the form of video stimulated interviews, think aloud concept mapping and the SCPDF digital portfolios (Smart, Sim, & Finger, 2012, 2013a, 2013b). This paper has been prepared to describe in more detail the Digital Pedagogical License portfolio and what has been learnt from this digital portfolio approach that can be used to inform teacher education.

Informing teacher education

After thematically reviewing the data, this section presents a number of factors from the SCPDF that could inform teacher education. The first describes how a formalized portfolio structure, based on evidence, can provide a more meaningful layout for the teacher education portfolio. The second theme shows how an informal mentoring and review structure was established to support the development of digital portfolios. For teacher education, the practicum experience could be enhanced with use the digital portfolio where discussion is directed on the collection of evidence and mapping to the professional standards. The SCPDF created a network of mentor teachers that shared their DPL’s with other teachers and therefore allowing other teachers to see their teaching evidence. For pre-service teachers the opportunity to view an experienced teachers digital portfolio would provide valuable opportunities for professional conversations to improve practice. Finally, the SCPDF asked teachers to a prepare a digital portfolio based on two or three items of evidence and that evidence was presented in a formatted structure. The digital portfolios were built around the evidence and mapped to the indicators unlike most pre-service teacher portfolios where the structure is based on the professional standards with multiple pieces of evidence included in the discussion.

Formalised structure

As shown by the adoption figures in Table 1, many state teachers throughout Queensland prepared a digital portfolio. The approach relied on early adopters spreading the message within their schools to encourage/mentor

other teachers to complete their ICT Certificate or Digital Pedagogical License. The department or school principals never mandated the initiative but school technology funding was linked to the number of certificates issued to teachers at the school.

The completion of the Digital Pedagogical License was not a simple cut and paste task, it required the teacher to think about their teaching and using technology along with gathering evidence to support their ideas. Evidence needed to be critically reviewed to ensure it covered all of the indicators for professional knowledge, professional relationships, profession values and professional practice (as shown in Table 4). The indicators were checked to ensure all were captured in the portfolio (for example in Table 7 the mapping of PV1).

Although the SCPDF did not use the professional standards as a framework, the SCPDF used a technology focus to encourage teachers to improve their practice of using technology for teaching with many teachers taking up the challenge to prepare a digital portfolio. They were offered no rewards apart from personal satisfaction and a formal certificate distributed via the principal in recognition of their effort. The sad news is that with a change in government and funding to support the program was significantly reduced. A message from Alessandra was that it was assumed that teachers were using technology now and so did not need to complete the SCPDF digital portfolio process.

The message for teacher education is that a formal structure for a digital portfolio does not necessarily have to rely on professional standards. Currently, for Australian higher education institutions, the format and approach for preparing a digital portfolio has most commonly been conceptualized on the *Australian Professional Standards for Teachers* (AITSL, 2011). Pre-service teachers prepare a response for each standard including details of the evidence they have collected to support their response. As teaching is a complicated process, many items of evidence are repeated for each standard with little explanation to explain the item in depth, the context of where it was collected and what it means for the pre-service teacher. The focus is on showing competency to the standard and little regard to how the evidence is discussed and presented. The structure and headings used for the DPL are focused on telling a story of the evidence in the context in which it is situated. Intermingled in the evidence are references to the indicators when the teacher is talking about values, knowledge, relationship and practice. Maybe this approach could be used in teacher education, where students describe evidence items and references are made in the evidence description to the professional standards. The items headings shown in Table 3 provide a framework for reviewing the evidence and focus areas that are important for pre-service teachers to understand. Only three items of evidence were used in the DPL and that was sufficient for an experienced teacher to be able to explain their practices. Pre-service teachers could use three items of evidence to explain their emerging teaching practice and they could collect that evidence on their practicum experiences.

Assessed by a network of peers and generate conversations

The program relied on a set of early adopters spreading the message within and across schools. Many of these early adopters were assigned roles of *Accredited Facilitator* and were responsible to peer review and mentor teachers to complete the SCPDF. These facilitators participated in a supported network to share experiences and provide feedback about the framework across schools/regions. They were not designated positions separate from their teaching roles; many facilitators were still full-time classroom teachers. In Queensland, maybe universities could target SCPDF certified teachers to supervise pre-service teachers.

Portfolios that are prepared as part of a pre-service teacher education are usually developed as a solo exercise in evidence gathering to show competence against the professional standards. However they have the potential to be used to generate conversations around teaching practices and obtaining suitable evidence. This would facilitate professional dialogue between the pre-service teacher and practicing teachers in the practicum schools. Wolf, Whinery, and Hagerty (1995) emphasised the importance of professional conversations around portfolio development focusing on artefacts and using portfolios “built around a specific and extended teacher enterprise” (p. 30). These professional interactions are evidence of the importance of being part of professional communities. Shulman (1992) suggests that portfolios “institutionalise norms for collaboration, reflection and discussion” (p.396). Professional conversations around digital portfolios give the conversation shape and scope rather than leaving it to each to start the discussion.

Open viewing of pre-service teacher practices

Many pre-service teachers prepare a digital portfolio based on professional standards in line with their university requirements as part of assessment, for registration or for marketing of their teaching practice for recruitment. The SCPDF used a network of teachers to review, assess and mentor teachers to complete their

digital portfolio. This process required teachers to share their digital portfolios with other teachers, making visible the hidden technology practices of these teachers. As stated in the previous point, this would generate conversations around what that teacher was doing, how they did it and what response they got from their classroom experiences. This open viewing of teaching practices provides valuable opportunities for professional conversations around teaching that the pre-service teacher can benefit from. The traditional approach of keeping teaching practice private (especially for a novice who is afraid to expose vulnerabilities) is reversed to making it open and therefore open to mentoring to improve professional practice.

Change focus of digital portfolio

Pre-service teachers complete school based practical experience as part of their teacher education. For many, this is their first experience as a teacher in a school. Practicum also provides opportunities to collect evidence of their teaching experiences for inclusion in assessment and their portfolios. As portfolios are usually set as end of teacher education requirement, the chances to collect valuable evidence may have been missed in previous practicums. Pre-service teachers need to be aware of the requirements of the digital portfolio before their practicum to ensure they are aware of what evidence and when to collect the required evidence to be able to complete a *treasured* digital portfolio. This should not be a checklist of evidence items. Teacher education needs to change the focus of the digital portfolio as a container of evidence to a reflective tool, which is continually updated through teacher education and enhanced while on professional practice. Wolf (1994) suggests that portfolios should not be: resumes listing activities and accomplishments; overflowing containers of evidence indiscriminately collected; or scrapbooks of assorted mementos filled with personal meaning. He purports that portfolios need to be places of serious self-reflection and allow opportunities for critical examination by self and others. Changing the focus of the portfolio from assessment to reflection tool would make the portfolios richer for the pre-service teacher and reviewer (academics, supervising teacher, peers and potential employer).

Conclusion

This paper has provided a detailed description of a digital portfolios approach used by Queensland teachers. The format and approach had been developed to encourage teachers to review their teaching practices and incorporate technology. Over half of Queensland state employed teachers took up the challenge and completed either an ICT certificate or the more advanced DPL. Using this approach it is suggested that digital portfolios can be used to review and renew professional knowledge, values, relationships and practice and conceptualised and supported as a continuous process of reflection and renewal. It is important for the teacher to have a sense of agency to update, review and improve their digital portfolio over their teaching career. As digital portfolios offer this great opportunity to capture aspects of teacher's work, they can be used as reliable data sources for educational research.

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Please cite as: Smart, V., Sim, C., & Finger, G. (2014). Effective practice of using digital portfolios: how can Queensland teachers inform teacher education practice? In B. Hegarty, J. McDonald, & S.-K. Loke (Eds.), *Rhetoric and Reality: Critical perspectives on educational technology. Proceedings ascilite Dunedin 2014* (pp. 302-311). <https://doi.org/10.14742/apubs.2014.1104>

Note: All published papers are refereed, having undergone a double-blind peer-review process.



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