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An eportfolio environment to enhance reflection in pre-service teachers: What worked, what didn't and why?

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Abstract

This research paper details some results of a doctoral study that was designed to enhance reflection in pre-service teachers by scaffolding an action research project within the eportfolio-based learning environment. It reports on a unit level implementation of the PebblePad eportfolio platform in a Western Australian university, and focuses specifically on the levels of student engagement when guided by prompts placed within PebblePad as part of a scaffolded learning environment. The paper also examines the barriers to engagement that were identified through the data collection. The key findings indicate that the students were most engaged with the prompts that had a direct link to assessment tasks, followed by the activity tasks that specifically focused on reflective writing. The primary barriers to engagement were identified as the students' unfamiliarity with the platform and the timing of the introduction of the eportfolio. The research identified some recommendations for future implementation of such environments, specifically including a more integrated approach to the use of an eportfolio from the beginning of students' degrees.

Introduction

Reflection is a difficult construct to define and develop, yet it is central to many courses in higher education, particularly those in the field of humanities that include teaching. For decades, pre-service teachers have been asked to reflect, typically using written formats, on both literature read as part of their courses and practical experiences gained whilst completing school-based placements. For students, reflection has been portrayed as an important tool for forming links between theory and practice as they complete their teaching degrees (McBride, Xiang, & Wittenburg, 2002).



Despite the ongoing focus on reflection, recent research has labeled the current attempts to develop the reflective abilities of pre-service teachers as superficial (Barton & Ryan, 2012). It has been identified, by several sources, that new methods to enhance reflection are required within higher education settings (Atherton, 2011; Boud, 2006). The advances in eportfolio platforms may offer a solution to this requirement, as they have the potential to be utilised as electronic learning environments. The PebblePad platform is designed as an individually-based learning environment and offers the templates and structures within the program that have reflection embedded within them. The platform has the capability to provide an integrated learning approach for students within which they can collect, collate and reflect upon a range of artefacts they collect throughout their degrees. It was this capability that led to PebblePad being trialed within this research study.

This research report details a unit-based application of the PebblePad platform that targeted the enhancement of reflection in pre-service teachers in a Western Australian university. The unit required the students to complete an action learning project in a topic area of their choice. The student projects were scaffolded via a series of prompts through an eportfolio-based learning environment within PebblePad. These prompts were placed within a Gateway Blog and provided (1) examples for the assignment submissions, (2) opportunities for the students to interact with one another, and (3) additional activities aimed at the development of reflective skills. The three areas of examples, interactions, and activities were implemented as an Enculturation Teaching Model proposed by Tishman, Jay, and Perkins (1993). The Enculturation Teaching Model was developed to promote higher order thinking abilities of students after it was identified that a disposition for thinking was required, rather than merely a set of skills. This work by Tishman and others (1993) on higher order thinking draws parallels with reflection, in that while students may understand and acquire the skills required for reflection, many may not be able to reflect effectively as they are not disposed to higher levels of reflection.

The implementation of the research followed the cyclic model of the eLearning lifecycle developed by Phillips, McNaught, and Kennedy (2011). This model was designed to provide a framework by which to develop and review electronic learning environments, and as such was applicable to the eportfolio-based learning environment implemented in the research study being discussed in this paper.

The focus of this research paper is the suitability of the prompt-based approach within the eportfolio-based learning environment for the scaffolding of reflection in pre-service teachers. It identifies the level of engagement within the platform based on the data collected through a mixed methods approach, and includes discussion of the barriers the students identified to their engagement with the platform. From these barriers, recommendations are made for the improvement of future implementations of this and similar ePortfolio-based learning platforms.



Literature review

In a conceptual review completed by Rogers (2001), no fewer than 15 terms were found within the literature to describe reflection. The concept of reflection can include reflective thinking (Dewey, 1933), reflective learning (Boyd & Fales, 1983), reflective teaching (Bailey, 1997), critical reflection (Mezirow, 1997), or mindfulness (Tremmel, 1993) depending on the focus of the author. There are some similarities across these ideas: most involve a sequence of levels or hierarchy of reflection, and most discuss the process as being based on a review of practice or experience. In researching reflection, it is important to clarify how the term 'reflection' is defined and identified at the commencement of the investigation.

For this research study, the key definition that was used came from the work of Dewey (1933) who defined reflection as "active, persistent, and careful consideration of any belief or supposed form of knowledge in the light of the grounds that support it and further conclusions which it tends" (p. 9). A later definition that was also useful was that proposed by Tripp and Rich (2012) of "a self-critical, investigative process wherein teachers consider the effect of their pedagogical decisions on their situated practice with the aim of improving those practices" (p. 678). These two definitions highlight reflection as a complex and active process based on the review of knowledge and experience within a given situation or setting.

The complexity of reflection has been identified as a contributor to the difficulties faced by institutions that aim to develop reflective practitioners. In education, reflective practice is seen as "important to preparing thinking practitioners who show that they can adapt" (Parkes, Dredger, & Hicks, 2013, p. 99). Teachers are educators whose role includes an expectation that they will transform young people, and to do this they "must possess the dispositions to teach the person" (Wenzlaff, 1998, p. 564, 565). This requires the ability to adapt to the increasing complexity of their roles (Hawkes, 2001) in "the rapidly changing knowledge society" (Gikandi, 2013, p. 8).

Despite the importance being given to reflection, the development of it within teacher development programs "fall[s] short in allowing opportunities for reflection" (Barak, 2006, p. 133). Many teacher education courses also do not always allocate enough time to effectively teach the required processes (Ryan, 2011).

Some researchers have identified the need for a significant change to the practices surrounding the development of reflection. They claim that, perhaps, what is needed is a complete review of how reflection is 'taught' within education settings. Atherton (2011) argues that the focus of reflection as an individual act is detrimental to learning as it does not encourage students to access possible 'better ideas,' and also reduces the attention to detail applied in the process of checking evidence. He concludes that reflection requires much more knowledge and experience than pre-service teachers possess and so is more suited to experienced practitioners (Atherton, 2011). A more balanced approach to the changing of reflective practice in higher education came from Boud (2006) who proposed that "the idea of reflection should be relocated in the



context of practice” (p. 2). This viewpoint is supported by others who have identified the need for opportunities to be offered for authentic reflection that is based upon the students’ practice. Both of these perspectives suggest some form of disruption to the current practices towards the development of reflection.

One possible solution that could have positive effects is that of the electronic portfolio or eportfolio. Much of the research conducted to date on the use of eportfolios has focused on the platforms suitability for assessment purposes and demonstration of skills and evidence against required competency standards (MacEntee & Garii, 2010; Moran, Vozzo, Reid, Pietsch, & Hatton, 2013; vonKonsky, Oliver, & Ramdin, 2009). However, another rapidly growing area of research is the investigation of ways in which to utilize the capabilities of the platforms for learning (Barrett, 2005; Strampel & Oliver, 2010).

The electronic portfolio has increased in use throughout the developed world, and although much of the early research focused on assessment, more recent work has demonstrated potential to be used as a complete learning environment that contains several layers for different purposes (Housego & Parker, 2009; Stefani, Mason, & Pegler, 2007). The personal layers of the eportfolio, and the ability of these platforms to collect and collate evidence of practice, have demonstrated a capacity to use the platforms to enhance reflection in a more authentic way (Parkes et al., 2013; Raison & Pelliccione, 2006). There does remain, however, the need to focus on “the pedagogy within which the ePortfolio is embedded” (Parkes et al., 2013, p. 99).

Environments such as PebblePad offer the opportunity to facilitate learning environments to students by allowing the provision of scaffolded tasks within the platform. These tasks can be developed and disseminated within the platform for the students to complete. In doing so, the students build upon their individual asset stores and develop artefacts that can be used for additional purposes into the future. Reflection is a central component of the PebblePad platform, and many of the templates are designed as a means of enhancing the reflective process for those who are engaged with it (Pebble Learning Ltd, n.d.). The difficulty remains, however, of how to further scaffold this process and engage learners with the platform.

Method

The methodology employed in this research study involved the implementation of the eLearning Lifecycle (Phillips et al., 2011). This framework was developed for utilization in the design and evaluation of electronic learning environments and was structured based on the ideals of both action and design-based research models (Phillips et al., 2011). The designers of the lifecycle describe it as being developed from a “pragmatic paradigm” which was “the most appropriate approach for evaluation research of the effectiveness of e-learning” because it used “the best features of each paradigm and applied them to the research problem being studied” (Phillips et al., 2011, p. 79). Figure 1 provides a visual representation of the stages of this model.



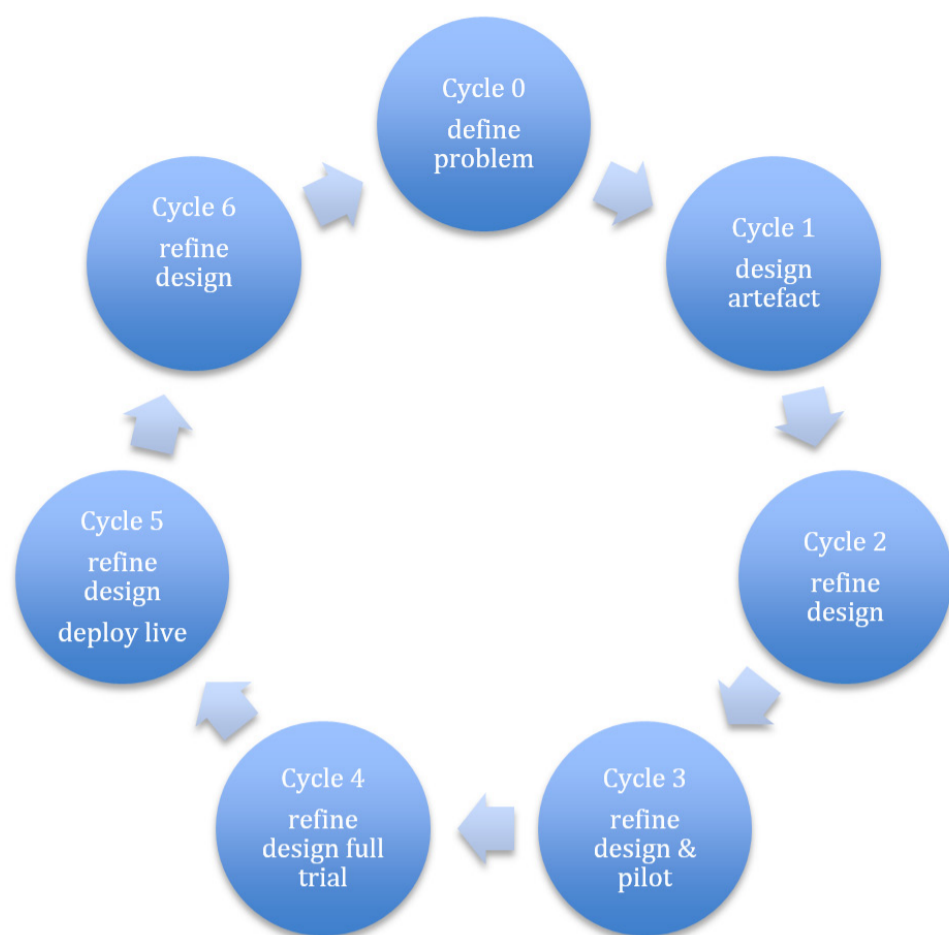


Figure 1: The stages of the eLearning Lifecycle (Phillips et al., 2011)

Although the model is shown here as a full cycle to be implemented in stages from Cycle 0 to Cycle 6, the framework was designed to be flexible. This was to allow the process to begin and end at any point within the pictured stages, depending on the requirements of the research being undertaken. For the research study discussed in this paper for example, Cycles 1 and 2 were expedited by the use of the existing PebblePad platform including the templates and Gateway provided, and adapting a pre-existing 4th year action research project unit to the eLearning environment. Cycle 3 was implemented with one cohort of students as the pilot study with changes made to the environment for a new student group the following year for Cycles 4, 5, and 6.

The pre-service teachers involved in the research were 4th year Bachelor of Education students completing either an early childhood or special needs minor as part of their final year of study. The cohort comprised of 80 students across two campuses of the university. There was a mix of mature age and younger students in the group with a predominantly female population.

The students were completing a compulsory unit of study for their degree that comprised of an action research project. This teaching unit was offered only in the external teaching mode with optional on-campus meetings held throughout the study period. In studying this unit, the students were required to select an area of their teaching practice they were concerned with, then complete an action research project towards improving this area. A requirement of the project was to visit a school setting for a minimum of 30 hours to implement the research project and reflect on the experience.



The students were required to complete the process and assessment pieces for their action research projects within the PebblePad platform. This was the first time the students had used the platform and for many, it was the first time they had completed an external unit within their Bachelor of Education degrees.

To provide the scaffolding to the students for both the use of the PebblePad platform and the newly introduced process of action research, a Gateway Blog was developed in the Resources section of the PebblePad environment. The version used in this research was PebblePad 2.0/Classic, which meant that there was limited flexibility with the formats available. Within this Gateway Blog, prompts were placed for the students to access as a scaffold for both their action research projects and the enhancement of reflection. The prompts were designed as either exemplar or activity in nature.

The exemplar prompts provided guidelines and step-by-step instructions for the completion of the required submissions within the PebblePad platform. In contrast, the activity prompts were not assessed as part of the action research project unit but were provided as stimulus for the enhancement of reflection. The activity prompts were designed after a review of literature into the development of reflection, and facilitated the areas identified by Colton and Sparks-Langer (1993) in their Framework for Teacher Reflection as being important to reflective practice. Table 1 provides the list of prompts provided to the students within the Gateway Blog with the source and purpose for each prompt included. The shaded rows of the table indicate those prompts that were provided to the students as exemplars to assist with assignment submission.

Table 1: Prompts provided with source and purpose

Activity Prompt	Source	Purpose
Reflection on teachers	Phillips & Carr, (2006)	The students are asked to describe and share what they think are the attributes of a good teacher.
Something to talk about	Previous experience	This prompt was designed to encourage the students to use the blog for discussion. It gave options to set up small discussion groups within the platform.
Reflective Journal as a Blog	Spalding & Wilson (2002)	Reflective writing can promote reflective thinking because it is a permanent record of thinking, is an outlet for feelings, and can open up dialogue.
Plan/Rationale Outline	Previous experience	This was an outline for the assignment submission. It provided step-by-step instructions for the students to complete their assignments. It was designed to provide the format of the submission so the students could then focus on the content.



Time to refine		This activity was incorporated when there was a delay in placements to complete their projects. It was designed to provide them with guidance to continue to interact with the platform while they were waiting.
Adding ethics checklist	Student questions	The students were concerned with how to attach documentation to their submissions. This prompt gave the instructions of how to complete this action within the platform.
Progress report	Previous experience	This was the outline for the second assignment submission and was included for the same reasons as the Plan/Rationale prompt.
Uploading evidence	Student questions	This prompt was again added due to questions from students regarding how to utilize the uploading options of the platform.
Reflective writing review	QUT DRAW Project (2011)	This activity is a link to a platform for evaluating the level of reflection in student writing. Students completed these entries, and reflected on their writing against the determined criteria can make improvements to the writing.
Outline of 4R Framework	Ryan (2011)	This provided the graphic of the 4R framework mentioned in Prompt 9 for the students to use.
Video Review	Jensen, Shepston, Connor, & Killmer (1994)	The students will be asked to video or audio record a teaching experience and review their practice with the review statements. Permission must be gained before recording and only the students will view these recordings.
Verbal 3 step framework	Donaghy & Morss (2007)	The students complete a mini action research cycle on one event in their experience. The process will be completed in the form of a verbal report to a peer for immediate feedback.
Reflective journal review	O'Connor & Diggins (2002)	As the students begin to put their projects together, this prompt aims to get them to go back over their entries to add further detail or extra links to theory.
Conclusion questions	Phillips & Carr (2006)	This will assist the students to bring their projects together and provide an overall review towards their concluding chapter. It is aimed at getting them to think about the bigger picture and to take the project beyond the focus of assessment.



Final report	Previous experience	As with the Plan/Rationale and Progress Report, this prompt gave the guidelines for the assignment submission.
Attachments	Student request	This provided students with instructions to upload evidence and forms required with their submissions.

Once all of the prompts had been provided and the students had completed their action research projects, a range of data collection methods were implemented. The data was collected to review the students' perspectives on the effectiveness of the eportfolio-based learning environment and the impact this may have had on their levels of reflection. The data collection included an online survey, focus group and individual interviews, examination of usage log data from within the PebblePad platform, and the review of student work samples.

The data was reviewed using a constant comparative approach, firstly in terms of the a priori codes of exemplars, interactions, and activities, and then from the categories identified from further examination the student responses. Of the categories that were identified through this coding process, two key categories were selected as the focus of this paper. These were (1) the reported level of student engagement with the prompts in the environment and (2) the barriers to this engagement that the students identified. These categories provided insight into what worked within the ePortfolio learning environment, what did not work, and why.

Results

A number of results were determined from the data analysis in terms of the effectiveness of the eportfolio-based learning environment. The key data sources for the two focus areas of (1) engagement and (2) barriers were the usage statistics from within the PebblePad platform and the results of the online survey, as well as the feedback gained through the focus group and individual interviews.

Firstly, in terms of engagement with the prompts, the online survey results highlighted the level of utilisation the students reported with each of the provided prompts in the completion of their action research projects. These percentages were considered a determinant of the level of student engagement with the eportfolio-based learning environment. Table 2 provides the percentages of reported use of the prompts by the students who ranked their use on a provided Likert scale. These results were based on 25 student responses from the total student cohort that equated to a return rate of 32%.



Table 2: Reported percentage of use of prompts

	Didn't Look	Read only	Read and Used in project	Read and completed	Shared
Reflection on teachers	46.7	46.7	6.7	0	0
Something to talk about	33.3	60	6.7	0	0
Reflective Journal as a Blog	26.7	53.3	6.7	13.3	0
Plan/Rationale Outline	6.7	13.3	66.7	13.3	0
Time to refine	40	40	13.3	6.7	0
Adding ethics checklist	6.7	6.7	60	26.7	0
Progress report	0	6.7	66.7	26.7	0
Uploading evidence	0	7.1	57.1	35.7	0
Reflective writing review	0	42.9	42.9	14.3	0
Outline of 4R Framework	6.7	33.3	60	0	0
Video Review	46.7	53.3	0	0	0
Verbal 3 step framework	42.9	57.1	0	0	0
Reflective journal review	20	60	13.3	6.7	0
Conclusion questions	26.7	26.7	40	6.7	0
Final report	0	0	73.3	26.7	0
Attachments	0	21.4	42.9	35.7	0

This table shows that the students reported much higher levels of usage of the exemplar prompts (the shaded sections) as opposed to the activity prompts. By combining the reported use of the prompts for the scale items 'read and used in project' and 'read and completed activity' the exemplar prompts had an average reported usage rate of 82.6%, while only an average of 21.2% of usage was reported for the activity prompts. These figures were supported by the data collected from the usage statistics generated within the PebblePad platform.

The graph of the assets created by the student cohort (Figure 2) indicated the full student cohort created 250 Webfolios. This was the asset type students were directed to use for the three assignment submissions. This was within expectation for 80 students (80 x 3 = 240).



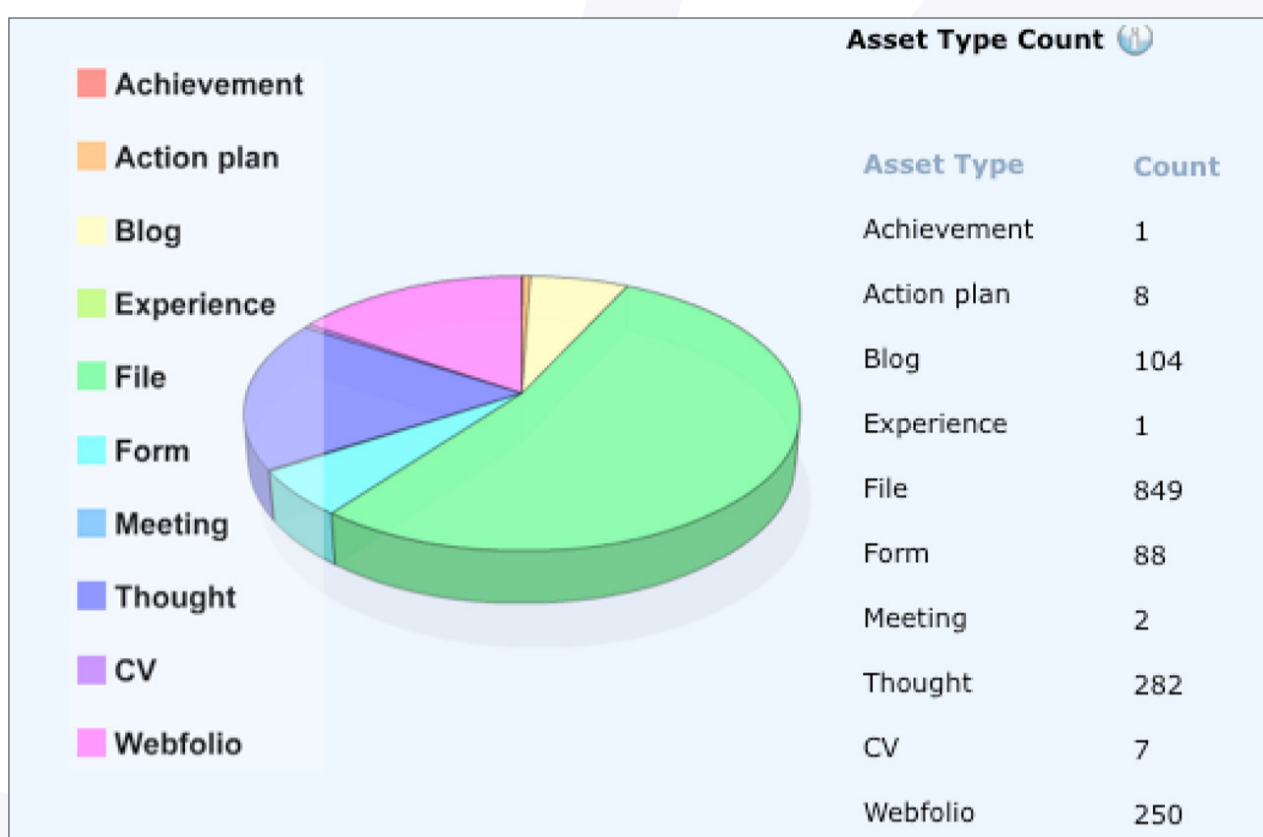


Figure 2: Asset graph for full student group

Further support for the use of the exemplar prompts came from the focus group and individual interviews in which many students commented on the value of these prompts for the completion of their assignments.

"If that (the exemplar prompts) didn't happen [they] would have been lost and...would have been panicking."

(Focus Group Interview 2)

"[The prompts stopped me] getting really stuck on the layout of the assignment[s]."

(R- LMS Post)

Further examination of the data concerning the activity prompts revealed that the students reported being more engaged with those relating specifically to reflective writing. The higher percentages of reported use of the exemplar prompts were:

- Reflective writing review – 57.2%
- Outline of 4R framework – 60%
- Reflective journal review – 20%

These three prompts provided the students with a model for the hierarchical levels of reflective writing developed as part of the Developing Reflective Approaches to Writing project (DRAW) completed by Queensland University of Technology (QUT). Students highlighted these prompts as being beneficial to the completion of their projects. Many students who responded to the online survey, or were interviewed, specifically mentioned the 4R framework as being the most



useful of the prompts that were provided, and indicated it would have been valuable to have from the beginning of their studies.

"It gave precise details of how to reflect."

(H24 - Online Survey)

"I think that (the 4R model) had a big impact in making it (reflection) improve because throughout the past, like, in all the different units, they told us how to reflect and gave us little things that we are supposed to do but they didn't actually explain like how to properly do it."

(Ta – Individual Interview)

The use of these prompts by the students demonstrates that the prompts placed in the Gateway Blog were an effective format for the dissemination of the examples and activities. There was, however, feedback on why the usage of these prompts was not as high as hoped. These aspects also needed to be examined.

Despite the reported use of the prompts placed within the environment, there were a number of barriers to engagement identified by the student group. These barriers prevented the students from becoming fully engaged with the eportfolio-based learning environment and the PebblePad platform. The main barriers were identified as the difference of the PebblePad platform to others the students were more familiar with, and the timing of the implementation in their final year of study.

The Webfolio template was chosen for the assignment submissions within the PebblePad platform as it offered formatting options that were very similar to those found in Microsoft Word. Despite this, the students did not use the platform for the drafting of their reflective journals and assignment submissions. This was evidenced by the usage statistics (Figure 2) and the responses given in the interviews.

Figure 2 detailed the assets created by the student group and showed that 104 Blogs were created by the student cohort. This figure was encouraging until further examination of the graph showed that only 282 Thoughts were created by this same group. As each item that is added to a student blog is also recorded as a Thought, this number (282) indicated a limited use of the Blogs once they had been created. In the interviews the students reported that they had set up the blogs within PebblePad as directed in the Reflective Journal as a Blog prompt, but then completed their journals either as hand written notes or as typed documents in other platforms. The use of other platforms was also evidenced by the number of File uploads attributed to the student cohort. The 80 students in the group uploaded 849 files during the study period, with the most prevalent format being Word documents (453 .doc or .docx).



During interviews, students reported that they used Word to draft their work and then would either upload the file directly to PebblePad or use a 'copy and paste' action to transfer the text into their Webfolio asset template.

"I did it all in a Word document and then just copied and pasted it."

(Focus Group Interview 2)

The use of other platforms in this way reduced the amount of time the students spent within the PebblePad platform thus further reducing their engagement with the options and affordances the environment provided. It also reinforced the difficulty in requiring students to learn a new platform in the last year of their degree.

A major barrier that the students identified to their level of engagement within the PebblePad platform, and the structure of the eportfolio itself, was that it was introduced at such a late stage in their degrees. Many students commented that if they had of used the platform from first year they would have been more comfortable in using it and therefore engaged with it more fully.

"I found the use of PebblePad quite frustrating. I would have preferred to use PebblePad prior to my last year of uni rather than have another hurdle to try and overcome."

(M- email feedback)

"Take on such a program as PebblePad university wide...This would allow more time for students to actually practice refining their reflective thought and practicing this before entering the "real world". "

(A14- Online Survey)

The use of the eportfolio at this point in the students' degrees had an impact on the results of the research study. It did, however, provide some encouraging findings on the effectiveness of the eportfolio-based learning environment.

The data collected showed that the provision of the prompts was effective in that the students were able to access the tasks and complete the activities as defined in the prompt. The focus on the prompts for the assessment tasks, followed by those related to reflective writing, reinforce the need for a scaffolded approach to these practices. The barriers identified, however, need to be addressed for the future success of this type of eportfolio-based learning environment.



Discussion

The results examined in this research showed positive trends for the use of a prompt-based approach to scaffolding learning in an eportfolio environment. The usage of the prompts within the platform by the students demonstrated that the medium for sharing these prompts was effective. The students were able to access the prompts within the Gateway Blog and the exemplar prompts, in particular, provided clear examples to the students and assisted them in the completion of assignments within the PebblePad platform.

Although the students reported higher levels of engagement with the exemplar prompts, those classified as 'activity' were read by a percentage of the cohort. The tendency of students to focus primarily on the assessment tasks within the environment is a common problem in online learning and requires further examination of how to motivate students to complete tasks they view as extra. Particularly with online learning tasks, students need to identify the value of the task to their learning to begin to engage with that task (Chmielewski, 2010). A more structured approach that embeds the eportfolio within more of the students' practice may assist with this.

The current version of the PebblePad platform can continue to facilitate this structured approach through a scaffolded environment utilising Workbooks. These multi-layered resource templates allow tutors to provide ongoing support and learning tasks to students on a weekly or fortnightly basis. The students could work through the tasks as part of action learning projects similar to the one implemented in this project, or a range of other process and content areas. The ongoing use of the platform in this way would increase the time spent within the eportfolio. This, in turn, may provide the students' with more confidence in using the platform. For the continued success of these environments, however, some adjustments need to be made to address the barriers identified from the data analysis.

The barriers the students reported in this research study could perhaps be overcome through a more integrated implementation of the platform from earlier in the students' degrees. If the students used the PebblePad platform from their first unit of study when entering university, and developed their study habits within this learning space, they may be more comfortable and confident using the platform and would develop a much more comprehensive asset store throughout their studies.

Research has shown that students are reluctant to use platforms that differ even slightly from the Word formats they are most used to (Janosik & Frank, 2013). Even though the Webfolio template was used (as it was the closest to Word) the students showed a preference for drafting in Microsoft Word and then uploading or completing a 'cut and paste' action with their text. If the students used the platform in an integrated way as they were developing their tertiary study habits, they may begin to view the processes within PebblePad as 'normal' and internalize the formats and structures more easily.



An integrated holistic approach would also alleviate the concerns over the timing of the introduction of the platform. If students began using PebblePad from the first semester of their degrees, by the time they completed their final year, they would have a whole repository of documentation of their learning and development. This large resource store could then provide the evidence that may be required for employment or further study. This collection would also remain as a reference library for the students as they continue to develop as teaching professionals, and possibly be used for promotion in the future.

This integrated approach is recommended by much of the research in this area (Beishuizen et al., 2006; Hallam et al., 2010; Hiller et al., 2007). To be successful, however, such an implementation requires support from all levels of the university (Hallam et al., 2010; Lorenzo & Ittelson, 2005; Plaza, Draugalis, Slack, Skrepnek, & Sauer, 2007).

Based on the results of this research study, the key recommendations for future implementation of eportfolio-based learning environments using the PebblePad platform in higher education settings include:

1. Implementation of the eportfolio in as many units as possible throughout the degree starting from the first year the students begin their studies;
2. The embedding of as many tasks as possible within the eportfolio platform.

To specifically enhance reflection in pre-service teachers, the results support:

1. The utilization of the enculturation teaching approach incorporating exemplars, interaction, and activities with the Workbook offered to encourage students to gain not only the skills of reflection but also dispositions of reflective practitioners;
2. Structured scaffolding of the processes of reflective writing.

Through the implementation of the PebblePad platform, in the way outlined above, it is believed student engagement would increase and with it the success of any scaffolding processes implemented. This scaffolding could continue to be applied to enhance not only reflection, but other process or content areas within a range of degree programs.



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