# ePortfolios: Beyond assessment to empowerment in the learning landscape

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The purpose of education is to allow each individual to come into full possession of his or her personal power (Dewey, 1938, p. 10).

Over the past decade, Universities in Australia have experienced a shift towards outcomes-based education. Since 2000 in particular there has been an increased emphasis on core, generic skill development as this relates to course outcomes in individual programs. This paper investigates the implementation of ePortfolios as a means of assessing student achievement and development in the Bachelor of Education Program at a Western Australian University. The complex process of embedding and developing the ePortfolios is discussed, including the stages throughout the four year degree where they are assessed. The key factor of student ownership is examined as one of the most powerful elements of building such an assessment protocol. This paper describes the outcomes of a content analysis which has been conducted upon two of the major course outcomes as represented in the ePortfolio student sample. The students also participated in an open-ended questionnaire which asked them to reflect upon their experiences with the development of their ePortfolio in terms of intended and unintended outcomes as well as their attitudes towards the process used, how the ePortfolios related to overall learning outcomes of the program and their perceptions of future ePortfolio use.

Keywords: ePortfolios, assessment, empowerment, outcomes-based education

## How and why is assessment in higher education changing?

Much of the recent research into assessment procedures in higher education asserts that there is a need to align assessment strategies to complex learning patterns. Yet it remains that much of what we do in universities relies upon testing knowledge and understanding and ignores the need to develop and assess students' abilities to form judgements (Biggs, 1999). How do we define the concept of quality in higher education? Quality is a complex concept and one which is linked to individualised and personal perceptions of learning. Quality is a difficult concept to define given the use of a traditional assessment framework and it cannot be simply reduced to a set of easily quantified learning outcomes. Students learn in different ways and assessment which supports learning needs to be flexible and take into account the needs of individuals in order for them to make sense of feedback in the context of their own environment.

In Australian higher education (as in many settings in the west) there has been a shift towards outcomes-based education. The changing context for higher education (along with schools) has been towards an understanding that these educational settings are conceived as a preparation for employment. Universities have been engaged in re-defining curricula and assessment in order to assess 'key skills', generic skills' and graduate attributes' instead of assessing the acquisition of knowledge. The focus is upon creating 'work-ready' graduates through the alignment of curricula with graduate attributes learning outcomes and the needs of industry.

Currently the university which is the focus of this paper has embarked upon a curriculum review process known as Curriculum 2010 (c2010). The major aim of the review is to ensure that the university's nine graduate attributes are the source for all learning outcomes and as such will assist in the production of graduates who are highly employable. The graduate attributes ensure that graduates know their discipline, have key employability skills (critical thinking, information, communication technology, lifelong learning and professional skills), an international perspective and intercultural understandings (Curtin University of Technology, 2005). Interestingly the university seeks to emulate the alignment of learning outcomes with graduate attributes, a process that has long been achieved by the Vocational Education and Training

(VET) sector. The history of this approach to assessment in VET has been well documented. Two Australian reports in the early 1990s advocated a 'competencies in education' approach: The *Finn Report* by the Australian Education Review Committee (AEC) in 1991; and the *Mayer Report* by the Australian Education Review Committee (AEC) and Ministers for Vocational Education Employment and Training (MVEET) in 1992. Both reports concluded that there was a need for an educational paradigm shift towards measuring competencies in education. The reports recommended the need for the establishment of 'key competencies' that would prepare students for the world of work. The *Mayer Report* stated that the competencies were 'concerned with outcomes and were defined as precisely as possible with various levels to indicate the variety of individual attainment' (AEC & MVEET, 1992, p.10). Educational theorists at the time highlighted potential problems with such an intensive focus on competencies in education. It now appears that the system of interpreting and assessing what is competent and what is not that was originally designed for implementation in the VET sector has gained popularity in schools and higher education.

It remains that although traditionally, standards and reliability for assessing conventional student output in universities has been 'patchy' and often linked to subjective perceptions of student ability and knowledge, standards are even less well articulated and transparent when assessing generic skills. Academic staff may have at least some idea of what a reasonable test result looks like but are at a loss to agree on what exemplary 'group skills' look like (Gibbs, 2004). Whether we like it or not higher education is in the throws of a re-conceptualisation of curricula that prioritises generic skills as central to the overall learning experience of students rather than as peripheral undertakings or vocationally linked extras (Barrie, 2004). The change in understandings regarding the nature of tertiary education will lead naturally to a re-examination of assessment procedures. Biggs (1999) also advocates for assessment tasks that reflect situations the student will encounter in their chosen work place/profession. This reflects the path that the university which is the focus of this study has recently taken regarding the favoured approach to learning and teaching known as the 'Triple I curriculum model' (West Australian, 02/06 2008).The model is designed to promote greater industry links, intercultural awareness and interdisciplinary study. The major aim of the model is to increase work placements, internships and work-related learning for students as they progress through their programs of study.

This overt alignment between university study and the requirements of industry will undoubtedly begin to impact upon assessment strategies for higher education. Assessment choices can have a direct impact upon how particular courses are perceived as well as student motivation and the way in which they approach their study. Students are far more likely to strive for achievement in units of study where a graded result is awarded as opposed to a pass/fail. In schools for example, learning areas that don't embed assessment are less likely to be perceived as being worthwhile than those that do (Gibbs, 2004). As increasing attention is being paid to accountability and quality control in higher education it should follow that academic staff will need to take a more professional approach to assessing student learning outcomes. Already in the United Kingdom for example an increased focus on assessment for learning through formative assessment is occurring. The prime interest is in developing an approach to assessment that enhances student learning (Black & Wiliam, 1998; Torrence & Prior, 1998). The move towards formative means of assessment and away from traditional end-of-course examinations in higher education points the way towards an 'assessment for learning' approach. Those who work in higher education need to plan and implement new ways of achieving continuous assessment in units of study with a focus on matching assessment to the key aims and preferred student learning outcomes of each course. This approach is what is commonly known as 'authentic assessment'. If course designers operate from a basis of an 'assessment for learning' philosophy rather than an 'assessment for grading' philosophy then their choice of assessments that are seen to be 'authentic' and can be built into the course structure in an integrated way is more likely (Gibbs, 2004).

## ePortfolios as formative learning activities

> The process of developing a portfolio requires that teacher candidates become more responsible for integrating and documenting the knowledge, dispositions, and skills learned through their courses and experiences. The process of reflecting and documenting what they learned is highly empowering and contributes to their self-confidence as novice teachers. (Costantino & De Lorenzo, 2006, p. 5)

If universities are moving further towards an emphasis on 'assessment for learning' and formative learning then various approaches to paper-based portfolios and ePortfolios should naturally emerge across discipline areas. According to Robinson and Udall (2004b) learners are able to best engage with curriculum when they are able to record their own progress, self-assess against learning outcomes and

reflect critically upon their development over time. This approach provides students with the opportunity to become stakeholders in their own progress and also provides an environment for deep learning to occur. An ePortfolio approach that spans a course of study and beyond to a professional setting allows participants to originate and maintain 'conversations' about their learning and by doing so they become active in formative assessment rather than passive receivers of graded results. Formative learning activities such as ePortfolios shift the focus of the traditional higher education paradigm as students are encouraged to take responsibility for what and how they learn. Throughout the development of the ePortfolio over the four years of an undergraduate Education degree for example, students are encouraged to ask questions and identify key points of their development with regard to both course and generic learning outcomes. Feedback as an integral component of formative assessment is critical to student learning. When feedback is purely driven by the teacher students fail to engage fully with the process. When however, the feedback process is driven by the student's own critical reflection it has a far more powerful and lasting effect. It also helps the student to align their own learning with the intended outcomes of the unit of study. Robinson and Udall (2004b), stress that the implementation of this approach is fundamentally important for students to take full responsibility for, and ownership of their learning. Each activity builds upon other tasks so that over time a personal learning resource is achieved. The resource, such as a portfolio can be used to validate the extent of student engagement with the learning outcomes and it can also serve as a form of summative assessment prior to the completion of each unit of study, course, as a pathway to graduation and also as an ongoing professional tool once engaged in the workplace for the purposes of appraisals, assessments and revalidation/accreditation.

Helen Barrett (2005, p. 7) who has a long history with the development of both portfolios and ePortfolios notes that if organisations are to use portfolios effectively for assessment, they need to develop a culture of evidence. She also raises concerns regarding the apparent focus on accountability as opposed to the more important issues surrounding reflection, collaboration and individuality. Are students utilising the portfolios as merely checklists to demonstrate a variety of skills or are they developing a richer document that truly represents their journey throughout a course of study? (Barrett, 2005). She continues to warn that those engaged in using a portfolio approach must ask themselves whether the process is being used as an assessment *of* learning (a high stakes assessment model) or as an assessment *for* learning (as a tool to bring about self-awareness and metacognition)? (Barrett, 2005). The ePortfolios that have been embedded as part of the Bachelor of Education course have focussed upon both. The ePortfolios continue to assist in an assessment *of* learning while an assessment *for* learning is addressed at particular checkpoints (certain core units) throughout the four years of the degree.

## ePortfolio Process

As part of the curriculum reform process within the School of Education ePortfolios were embedded within designated core units in the Bachelor of Education Primary and Early Childhood. The ePortfolio process involves students developing and revising their ePortfolio at four distinct stages throughout their four year course. The ePortfolio is presented to the students as one of their assessment tasks within the designated core unit and thus awarded a grade which contributes to the overall mark for the unit. Table 1 provides an overview of the ePortfolio stages, the designated core units and the information presented to the students within the unit outlines.

ePortfolios had been piloted with students in a number of technology elective units during 2002 – 2004, and during the initial pilot stage a combination of Costantino and Lorenzo's (2002) three phase process for developing portfolios (Getting Started; Enhancing Your Documents and using Your Portfolio) and Ash's (2000) guide to developing portfolios (Identify Purpose and Audience, Collect, Select, Reflect and Project) were adopted. The piloting of ePortfolios became invaluable as it helped to clarify the purpose and intended audience and ultimately develop the most appropriate process for the pre-service education students at the School of Education. The process identified in Table 2 (on the following page) is now being used to introduce and develop ePortfolios in the School of Education as on ongoing form of assessment for learning which includes formative and summative approaches.

## Research approach

The research utilises a qualitative, interpretive case study approach. Case studies may be more interested in describing the activities of the group or the characteristics of a program rather than identifying shared patterns of behaviour. A case study approach does not necessarily identify cultural themes but focuses on the in-depth exploration of the actual case. According to Creswell (1998) a case study is an investigation of a bounded system. The bounded system can be an event, a program, an activity, a group of individuals

**Table 1: ePortfolios within the Bachelor of Education Course**

| ePortfolio stage one - Year one, Semester one, ICT In Education |
| --- |
| Using PowerPoint you are to develop an original electronic portfolio (ePortfolio) to reflect your skill and knowledge development with specific reference to the School of Education Outcomes. The purpose of this ePortfolio is for you to continue to add to this throughout your course of study and hopefully when you are out teaching. In essence, this will be your ongoing living Curriculum Vitae. Further dimensions of your ePortfolio will be discussed and negotiated in class. The ePortfolio will eventually contain a combination of text, graphics, video, audio and hyperlinks. Value: 30% (ICT in Education, Unit Outline) |
| **ePortfolio stage two - Year two, Semester two, Technology & Enterprise Learning Area** |
| This assessment task will provide you with the opportunity to re-examine the ePortfolio you developed in first year and continue to reflect upon your professional development. The ePortfolio should provide a window into who you are, your skills, knowledge and values with specific reference to the School of Education Outcomes. You will re-examine the key elements of design, navigation, dimensions, selection of artefacts, reflections and modify them accordingly. In addition to any modifications, the focus of the ePortfolio Stage 2 will be on the following key ingredients: An updated introductory video; A 2 – 4 minute digital story comprising of graphics, sound and text (where appropriate); Critical reflections influenced by the guided questions and log sheet introduced in class; Certificates and assessment documents to validate statements and work-samples; Well development navigation. Value: 30% (Technology and Enterprise Unit Outline) |
| **ePortfolio stage three - Year three, Semester two, Literacy Education II** |
| Update your professional portfolio to reflect your learning to date. Consider work that you have covered in all units and use this as evidence to demonstrates your professional growth and learning. This will be marked in collaboration with other staff members and should be a reflection of you as a beginning teacher. Value: 15% (Literacy Education II Unit Outline) |
| **ePortfolio stage four - Year four, Semester one, Action Learning** |
| Update and finalise your professional portfolio to reflect your learning to date. This must include the action learning research that was conducted throughout the final year of your degree. The presentation of the research at the conclusion of the Action Learning unit needs to also include a discussion of the most salient strands of personal development as they relate to the course learning outcomes for the Bachelor of Education. The presentation will illuminate your development over time in relation to two student-selected course outcomes. Value: 15% (Action Learning Unit Outline) |

or a process. The case may also represent a process that consists of a series of steps that form a sequence of activities such as an investigation of a particular curriculum.

As this is a pilot study the focus of this research is to examine a small convenient sample of student ePortfolios in relation to two key course outcomes over a period of three years (2005-2007). The sample comprised four students and their development regarding the two course outcomes: *Are self-motivated, critical and reflective in their approach to teaching and learning; Can plan, implement and evaluate a range of teaching, learning and assessment practices.* The researchers interrogated the student-initiated text for each course outcome over the three years of their ePortfolio and conducted a content analysis which was guided by the levels of reflection outlined by Brown and Irby (2001). These levels of reflection include: *Selecting* the artefact; *Describing* the contextual characteristics of the artefact; *Analysing* the choice of selection and how it demonstrates the outcome/standard; *Appraising* the appropriateness of the artefact in terms of how it relates to knowledge; and *Transforming* existing practice by identifying how the artefact will influence future practice. The researchers also included an initial level of reflection which involved the students' personalising the course outcome by re-organising the textual meaning onto their own subjective reality and re-naming/coding the outcome to enhance their own personal meaning. The students in the sample were also asked to respond to a short open-ended questionnaire comprising five items that related directly to the perceived outcomes of the ePortfolios, the perception of educational impact and usability of ePortfolios, the students' attitudes towards the ePortfolio process and their overall feelings regarding their changes in awareness of learning outcomes throughout the duration of their study. The students' responses were subjected to a content analysis and

**Table 2: The ePortfolio process adopted at the School of Education**

| Process | Details outlining the process |
|---|---|
| Background: Portfolios in Education | Prior experience with portfolios, Definitions, Benefits/Challenges, Portfolios in Higher Education/ Teacher Education/ Schools, Demonstrate Examples<br>A variety of Web resources are made available to students through a purposefully designed webpage that is linked to our Learning Management System (WebCT). |
| Determine a Purpose | Map their own personal and professional development over time; Engage in self reflection and goal setting; Presents a holistic view of the individual; Formative and summative assessment; Internalise the ePortfolio process for transition into the school environment and their own lifelong learning |
| Identify the Framework | The School of Education Outcomes that reflect the University Graduate Attributes and the State Professional Teaching Standards are non-negotiable. The School of Education has nine course learning outcomes that they must address. Other dimensions are negotiable – most of the students usually include a cover page, welcome, navigation instructions, education background, teaching philosophy, interests, and field experience. |
| Artefacts<br>• Gather potential artefacts<br>• Select and Reflect<br>• Link to Outcomes | The majority of the artefacts used by students are the assessment pieces submitted for other units within the course. Students are encouraged to include the lecturer and peer feedback to validate the artefact if it is an assessment piece. In the first and second year technology units students are taught how to present artefacts in a variety of media – text, video, digital stories, websites, animation.<br>An artefact log sheet and reflection guide is used to scaffold student reflections thus helping them to make clear links between the artefact and the outcome itself. This artefact log sheet operates in much the same way as a diary whereby students can record their ongoing evidence. |
| Identify readily available technology resources and technology skills | The ePortfolios produced by these Education students are privately owned and contain personal contact details and assessment pieces that understandably can not be shared with other students. These privacy and copyright issues along with ease of access and use help dictate the software employed to produce the ePortfolio. At this stage PowerPoint is being used.<br>The core technology units during stage one and stage two of the ePortfolio are held in a computer lab which provides students with access to hardware and software facilities required to create their ePortfolio. Students are also taught how to use PowerPoint, Inspiration (concept mapping software), PhotoStory and MovieMaker. |
| Determine how you will present your portfolio | The students are asked to submit their ePortfolio on a CD. PowerPoint has a facility which enables you to burn the PowerPoint including all of the linked files directly to the CD (File/Package for CD). This facility also includes the PowerPoint Viewer, which allows the presentation to automatically load when the CD is placed in the computer. |
| Plan the structure of your ePortfolio | Students are shown a variety of ePortfolio models and are encouraged to critique them as a group. Concept mapping software and story boards are used to help students plan the structure of their ePortfolio. Students are encouraged to begin with their contents page and include internal navigation links. |
| Create your own personal design | Students are shown a variety of techniques to create their own design.<br>Good design principles are also covered. |
| Construct your ePortfolio | During the first two stages of their ePortfolio students are given the opportunity to construct their ePortfolio during scheduled class time in the computer lab with the support of the lecturer and their peers. |
| Self evaluate your ePortfolio | Prior to submission the students evaluate their ePortfolio using the assigned rubric designed by the students and the lecturer. |
| Revisit, Review and Revise | At each ePortfolio stage students are given detailed feedback through an assessment rubric on their ePortfolio as well as an assessment grade. The feedback is emailed to the student and included as part of their ePortfolio. Students then have the opportunity to address the feedback in the following ePortfolio stage. |

are discussed in terms of frequency of comment and major themes. Three students responded to the questionnaire.

This pilot study investigates the ability of ePortfolios to operate as a tool to demonstrate student development and reflective practice in relation to selected explicit undergraduate course outcomes over a period of three years. The aim is to provide insights to student perceptions of the ePortfolio process and also to gather data which reflects students' impressions of the usefulness of this approach to both personal and professional learning as well as a tool for the assessment of learning.

## Research data and analysis

This section presents the research data with relevant findings. The text analysis for two of the outcomes is presented through one student example to reflect their development according to Brown and Irby's (2001)

framework for reflective comments over the three years. This is followed by a summary of the comments made by the sample. A summary of the questionnaire is also noted in this section.

## ePortfolio Reflective Comments

A screen capture of Luke's ePortfolio with the coded data identified in the following [MANNER] for each year for outcome 2 *(Are self motivated, critical and reflective in their approach to teaching and learning)* is represented in Figure 1 and Figure 2. It is important to note that the ePortfolio entries for year one and year two are exactly the same and thus is represented by Figure 1.
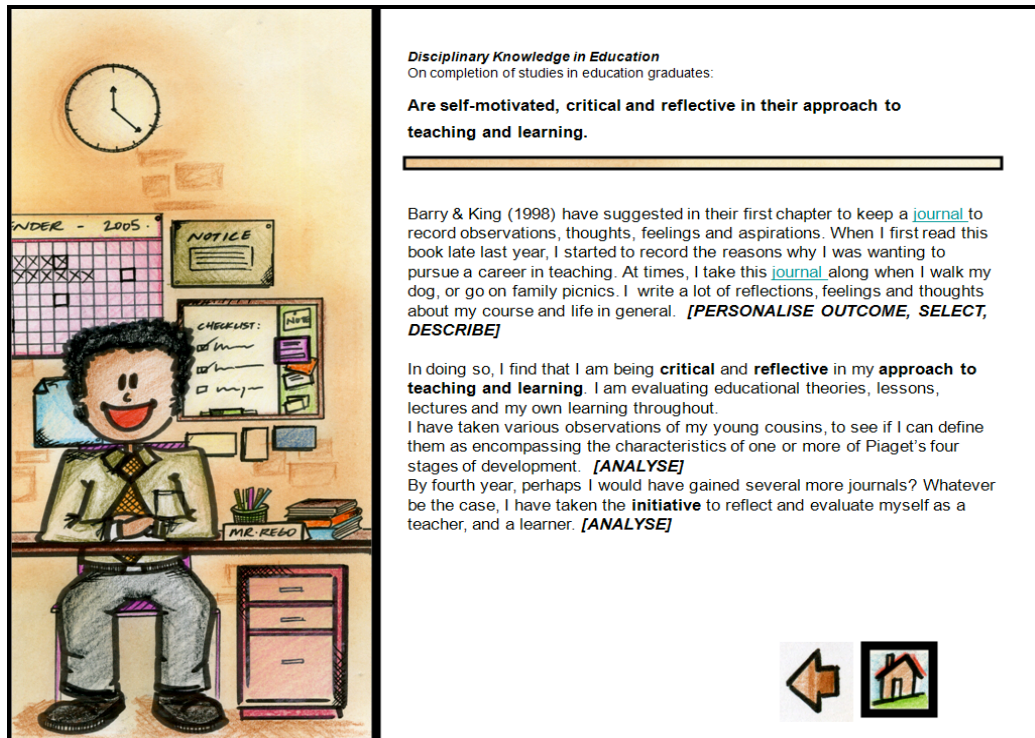


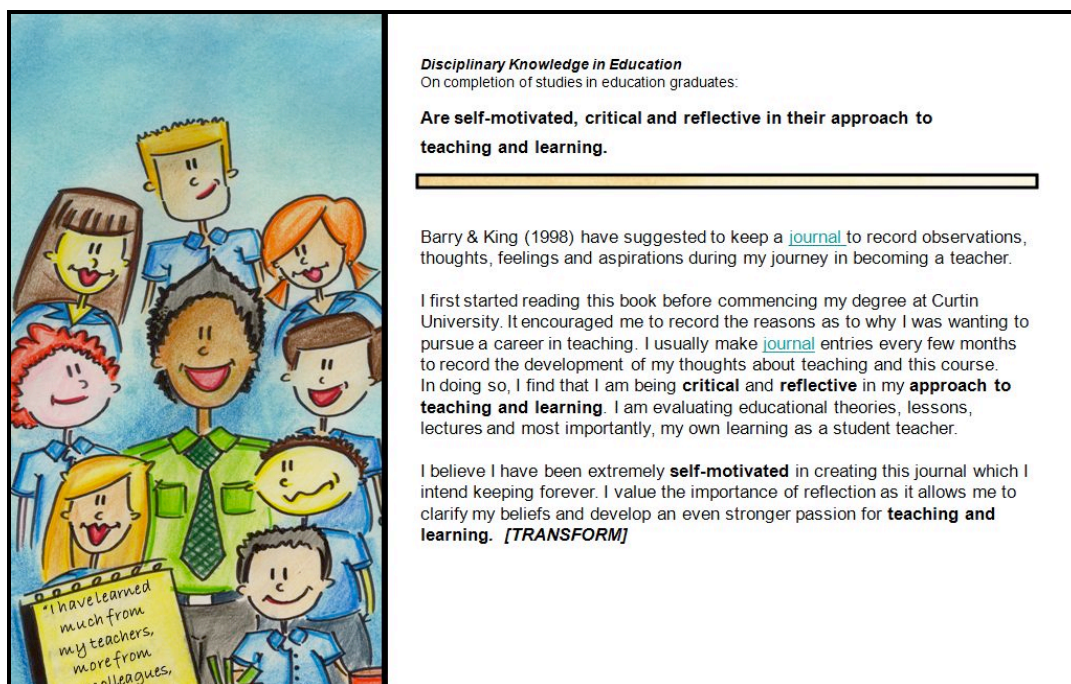**Figure 1: Luke, Year one and Year two: Outcome 2**



**Figure 2: Luke, Year three: Outcome 2**

Following the content analysis that was undertaken on the ePortfolio work of student one (Luke) it is clear that he entered the program bringing with him the ability to fulfil the expectations of the first four levels of Brown and Irby's (2001) framework as well as the initial stage which has been introduced by the researchers and that is the ability to personalise the outcome in the first instance. It appears that as this student entered the program at a significantly high cognitive level in year one the demands of the portfolio as represented in year two remain unchanged. In other words the student reached an experiential and an academic plateau where he remained in his first two years of the degree in relation to this particular outcome. However, in year three he emerged with the ability to work at a transformative level as evidenced in Figure 2. Student one's ability to work at a high level initially is reflected in the fact that by his own choosing he implemented a reflective journal as his evidence to demonstrate his achievement toward the outcome. This student's graphic representation moves from a singular orientation in year one and two to one including himself and colleagues, as well as students in the final year. This is representative of his broadening perspective in terms of his development of a teacher. Table 3 represents a summary of the reflective statements made by the sample of students for outcome 2.

**Table 3: Summary of reflective statements for Outcome 2**

| Outcome 2: Are self-motivated, critical and reflective in their approach to teaching and learning. | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Personalised Outcome | Select | Describe | Appraise | Analyse | Transform | Total |
| Year One | 4 | 4 | 5 | 3 | 4 | 2 | 22 |
| Year Two | 5 | 5 | 6 | 9 | 8 | 5 | 38 |
| Year Three | 3 | 2 | 3 | 4 | 4 | 9 | 25 |

In general, the trend is that the students were given the opportunity to develop and apply a deeper level of analytical skills (appraise, analyse and transform) as there was a noticeable difference between year one and year two of their ePortfolio. It appears that the reflective tool (identified in the process) that was introduced to students at each stage of their ePortfolio made an impact on their ability to articulate how their learning would transform their future practice. This reflective tool is designed to focus on 'transformative' practice in year three.

A screen capture of student two's (Anna) ePortfolio with the coded data identified in the following [MANNER] for each year for outcome 3 *(Can plan, implement and evaluate a range of teaching, learning and assessment practices)* is represented in the following three paragraphs.

**Anna Year one: Outcome 3 reflection**

> From our first day at university we encouraged to understand the importance of planning, implementing and evaluating. **[PERSONALISE OUTCOME].** We gained experience in the implementing of the lesson during reflective practice by participating in multiple Microteaching experiences. **[SELECT, DESCRIBE]** We had a strong focus on planning in Intro to Curriculum and the unit concluded with each of us presenting a series of lesson plans we had developed. Please click on the link below to view my series of lesson plans. **[SELECT, DESCRIBE]**
> **Sequence of lesson plans (hyperlink)**

**Anna, Year two: Outcome 3 reflection**

> From our first day at university we encouraged to understand the importance of planning, implementing and evaluating. **[PERSONALISE OUTCOME].** We have gained much experience through all our units and in particular our practical experiences. A recent example of this is the case study we completed in Maths, second semester of second year, where we planed, implemented and evaluated tasks to assess a students fractional knowledge. **[SELECT, DESCRIBE].** This was an extremely challenging task but I found it exceptionally rewarding in the knowledge I gained not just about fractional learning but the process of planning, implementing and evaluating. **[ANALYSE]** I feel this task demonstrates my developing ability to plan, implement and evaluate a range of teaching, learning and assessment practices**. [APPRAISE, ANALYSE]**
> **What do children know about fractions? (hyperlink)**

**Anna, Year three:Outcome 3**

> From our first day at university we were encouraged to understand the importance of planning, implementing and evaluating. **[PERSONALISE OUTCOME]** We have gained much experience through all our units and in particular our practical experiences. A recent example of this is the case study we completed in Maths, second semester of second year, where we planed, implemented and evaluated tasks to assess a students fractional knowledge. [**SELECT, DESCRIBE**] This was an extremely challenging task but I found it exceptionally rewarding in the knowledge I gained not just about fractional learning but the process of planning, implementing and evaluating. **[ANALYSE]** I feel this task demonstrates my developing ability to plan, implement and evaluate a range of teaching, learning and assessment practices as had I not been able to do any part of the process it would not have been so successful. **[APPRAISE, ANALYSE]** As a result of this assessment when I next have to opportunity to go on field experience or indeed when I am teaching, I am going to use explicit checklists like the one used in this task so that my planning and implementation of teaching, learning and assessment practices links directly to the curriculum framework. **[TRANSFORM] What do children know about fractions? Marking Key (hyperlink)**

Student two demonstrated her ability to work at the first two levels of Brown and Irby's (2001) framework as well as the initial stage 'personalising the outcome' in year one. This would be expected as this is a content based outcome and stage one of the portfolio process is introduced in first semester of the first year. In year two she displayed an expected advancement to demonstrate her ability to not only 'select' and 'describe' artefacts, but also to 'analyse' their content and application. This is also evidenced by her selection of artefact from year one to two. Year one involved a simple sequence of lesson plans, whereas year two progressed to a deeper analysis of 'What do children know about fractions'. In year three this student progressed to a transformative discussion of the same artefact as year two, however the reflection which is demonstrated in the portfolio is of a much deeper nature. In year three she also included the assessment feedback (marking key) from her lecturer. This external piece of evidence was included to support and validate her reflection and development of the outcome. It is interesting to observe that while this student's design basically remained the same throughout the three years, in the third year she has begun to embed elements of her own teaching philosophy, similar to student one. Table 4 provides a summary of the reflective statements made by the sample regarding outcome 3.

**Table 4: Summary of reflective statements for outcome 3**

| Outcome 3: Can plan, implement and evaluate a range of teaching, learning and assessment practices. | | | | | | |
|---|---|---|---|---|---|---|
| | Personalised Outcome | Select | Describe | Appraise | Analyse | Transform | Total |
| Year One | 4 | 4 | 4 | 2 | 3 | 0 | 17 |
| Year Two | 4 | 4 | 5 | 9 | 7 | 0 | 30 |
| Year Three | 4 | 4 | 4 | 8 | 7 | 2 | 29 |

It is clear from the contextual analysis of the examples of the portfolios that the ePortfolio process caters for students at different and fluctuating levels of development. Interestingly the actual nature of the outcome drives the level of attainment per student. For example, outcome 3 is content based and towards the end of the three year degree from a developmental perspective the students in this sample are more likely to achieve a transformative level in their understanding and application of each particular learning outcome. It would be expected as can be seen from Table 3 and Table 4 students are more likely to achieve high levels of understanding as their experiences progress. This is particularly obvious in Table 4 where there is very little evidence of transformative practice as students have had a limited experience within the classroom environment and have difficulty making connections between the content knowledge and actual practical application of this knowledge.

## Questionnaire

An open ended questionnaire was used to gather further valuable data. Three students returned the questionnaire and responded to the following five questions: *What were the intended and unintended outcomes of the portfolio?; What factors influenced your use of the portfolio?; What are your attitudes towards the portfolio process?; What changes in your awareness of learning outcomes have occurred as a result of the portfolio process?; and Do you think you will continue to use a portfolio to reflect your professional development when you are a qualified teacher?*

*Intended outcomes*
A number of intended outcomes were identified and one of the most common being to capture the development and document student skills and knowledge throughout the four year degree. One student noted the importance of monitoring their own progress toward the course outcomes, while developing an awareness and understanding of the course outcomes were identified as intended outcomes by all respondents. The sample recognised that they were being asked to be self reflective and critical.

*Unintended outcomes*
The unintended outcomes were identified as being more prepared for professional interviews as well as a greater awareness of their own personal growth and self revelation through the ePortfolio process. This same student noted that the ePortfolio provided a holistic view of themselves, not just their academic achievements. Interestingly, one of the respondents identified how the ePortfolio process made her more critical regarding the value and purpose of other assessments within the course.

*Factors*
The questionnaire revealed that the potential for improving career prospects for the students and the ability to encourage reflection influenced their use of the ePortfolios.

*Attitude*
The respondents' comments revealed a positive attitude toward the adoption of ePortfolios in the Bachelor of Education course, in particular the structure and more importantly the incremental nature of the ePortfolio process where the students were able to review, revise and reflect. Interestingly, one of the respondents found this ongoing nature difficult to grasp. The notion of submitting an unfinished product was quite foreign to many students. *Making the eportfolio 'flow' was pretty difficult – it was like making/ producing a book/ art folio (for me at least) (Luke, Questionnaire).* In addition, student number three (Patrice) also noted the value of being able to revise her design in year two. Her comments reflect a deep level of self awareness. This ability to use symbols to represent her persona involves a high level of self knowledge. She mocks her initial ePortfolio design.

> Having the opportunity to change my design was fantastic. In first year, I chose hot pink. I drew a squiggle down the side. By second year, looking at that hot pink squiggle made me feel ill. I wanted something symbolic - something which showed the reader who I was and why I chose teaching, I wanted my portfolio to tell the reader something... this shows a huge development from my initial first year thought - hmm - teaching... writing... squiggle. I had learnt teaching was so much more and I got to represent this change in my portfolio. It was also helpful to read and cringe at what I had written in the previous year, and have the chance to change it. I have to say, detailed assessment rubrics from the unit controller helped me see where I had gone wrong in the past and how I could improve my portfolio in the future. (Patrice, Questionnaire)

*Learning outcomes*
It is quite clear that the ePortfolio process develops students' understanding and awareness of the course outcomes. The process encouraged the students to examine each of the components of the degree as 'building blocks' and how each component contributed and connected to the big picture.

> To start with, without it (ePortfolio) I would barely have been aware of the learning outcomes. Through it I've become aware of the learning outcomes. Through it I've become aware of them, and how the units are designed to meet them. (Anna, Questionnaire).

> I was far more aware of the learning outcomes as a result of the portfolios. In every other unit, the learning outcomes have been read out in the first tute, (prior to telling students about assessments, mind you, so who knows how many people actually are listening) and never really referred back to. However, in creating the portfolio, we were required to look at the learning outcomes and reflect back to how we had achieved them. This required us to consider, rather than our tutor to tell us, how we had covered certain aspects as students, and I think this was really helpful in me understanding the purpose for many tasks and assessments at uni. Realising this also gave me a sense of achievement. I don't think I could have told you much at all about the learning outcomes if it wasn't for the need to reflect and write about them in the portfolio. (Patrice, Questionnaire)

*Future ePortfolio use*

Two of the three students noted that they would continue to use a portfolio to reflect their professional development. Interestingly, these two students have updated their ePortfolios in preparation for future employment prospects of their own accord. Once again, they believed that the ePortfolio provided a holistic view of themselves and thus enable the viewer a deeper understanding of their beliefs, skills, knowledge and values.

> Creating a portfolio was one of the greatest skills I learnt at uni. It required me to reflect on why I wanted to be a teacher and it was the first opportunity I had to create a teaching philosophy. It demonstrated to me that we are lifelong learners, that as teachers we need to be, and it has left me with a tool which I am extremely proud of as is, but also that I am able to easily adjust and amend, and I am able to feel fine about doing that because it was modelled to me throughout the degree. I can't wait to be at a school, all ready for a performance review with my teacher and be able to pull out a disc of how I have achieved the outcomes or elements of review. In short, I will continue to use the portfolio throughout my career, but I will also replicate the process to achieve my own purposes and hopefully that of my students. (Patrice, Questionnaire)

## Conclusion

Throughout this research it has become clear that there are several advantages to implementing an ongoing and comprehensive approach to the development of ePortfolios in undergraduate education programs. Not only do they encourage the explicit alignment of organisational generic student outcomes with those of individual programs but it appears that student engagement with this form of selecting, describing, analysing and appraising each chosen artefact empowers students to become the drivers of their own development. The ePortfolio is a flexible process by which each student can work at their own intellectual and maturation level to produce a series of personal reflections which they align to the overall learning outcomes for the four years of their undergraduate degree. Instead of conceptualising each unit of study as being separate and individually defined where the learning outcomes are 'mentioned' at the start of each semester and not (or rarely) examined again, the students in this case study have indicated that through the construction of their ePortfolios they have begun to view the Bachelor of Education Program as a holistic learning experience. Instead of viewing their engagement with the program as working through discrete 'blocks' of learning that may or may not connect to each other, the students in the study described how they were able to 'see the whole picture' and therefore 'make sense' of their learning over the duration of the degree. Making these connections between units of study has enhanced the students' ability to create meaning for their learning. In this way, the ePortfolio as it aims to work towards the transformation of current practice to future practice, plays a role in the development of each individual towards a sense of self actualisation. The research has indicated that through engagement with this process students experience a greater sense of ownership and control not only of the design of the ePortfolios but of their learning in general. The sample in this study have been able to monitor their own learning goals and as a result have emerged towards the completion of their degree with an improved level of understanding of what they have experienced over the past three to four years. They have been able to reflect upon their experiences and link these to their preparation for the transition from student to professional educator.

The ePortfolios also play an integral role in the evaluation cycle as they represent an important component of curriculum review. This form of authentic student feedback augurs well for the ongoing re-design of curriculum as required by the university's c2010 process which is currently underway. The changing demands upon higher education to produce 'work-ready' graduates and the increased attention being given to forms of authentic 'assessment for learning' methods of program design seem to indicate that a portfolio approach to assessment can be useful. It is not only an effective means of gaining powerful feedback from students in terms of their ability to develop and achieve learning outcomes but it also allows them to self-assess against outcomes and develop high order skills in critical reflection. As much of the research discussed in this paper indicates, if the growing emphasis in universities regarding effective assessment is moving towards the notion of assessment *for* learning whereby formative approaches become a more important resource, the use of paper-based and /or electronic portfolios may well be the most readily adopted method.

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