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Special educational needs, e-learning and the reflective e-portfolio: implications for developing and assessing competence in pre-service education

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This article reports on the use of e-portfolios to assess aspects of a one year, post-graduate pre-service teacher education programme in Northern Ireland within the specific context of special needs education. The rationale for using an e-portfolio for programme assessment and the potential it offers in demonstrating a range of teaching competencies is examined, with participants in the study challenged to develop their individual e-portfolios by selecting and presenting evidence for assessment drawn from a wide range of sources. In so doing they were asked to reflect upon their personal, academic and pedagogical learning and development across the pre-service year. The article also reports on the individual student experience of building an e-portfolio and attitudes towards its use for assessment purposes within pre-service education and beyond. Finally, it considers the potential for using e-portfolios across all phases of teacher education.

Keywords: assessment; e-portfolios; pre-service education; special educational needs (SEN)

Introduction

The UK has seen a relentless growth in the use of technology to support many aspects of teaching and learning in higher education. More recently, the emergence of the electronic portfolio or e-portfolio has also offered a sophisticated and increasingly flexible means of assessing student learning in a variety of educational contexts.

A portfolio may be defined as a personally selected compilation of artefacts and reflections presented as a means of evidencing learning and professional practice. Its use is not uncommon, often utilised by practical subjects where collections of work are gathered and presented to demonstrate student progress and learning. It has also been used for assessment purposes in medical education (Snadden and Thomas 1998) and in teacher education (Shulman 1998). Advances in technology however, have facilitated the diversification and easy portability of the e-portfolio for an increasing range of purposes while also making it accessible, whereas

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required, to a worldwide audience. As a multidimensional construct it can be used for communication, for presentation of individual and/or collaborative activities, for various forms of evaluation and also as a means of showcasing work related achievements (Winsor and Ellefson 1995).

A portfolio which is used for assessment purposes should strongly reflect the aims of a course, including the range of knowledge and skills that are inherent to it. In the context of teacher education such portfolios should record 'authentic assessment over a period of time and a range of classroom contexts' (National Research Council 2001, 255). Using this approach allows for staged assessment so that the final outcome is then an accumulation of results and achievements gathered over a period of time, with the additional benefit of being developmental in nature.

During all stages of teacher education it can be used as a way of demonstrating professional development and commitment to lifelong learning (Delandshere and Arens 2003; Shulman 1987) as well as offering a means of cataloguing or showcasing qualifications (Ziechner and Wray 2001). Learning to be a teacher is a complex process and a developmentally based portfolio that is open-ended, performance-based and authentic (in that it is classroom based) offers a multi-dimensional approach to assessment that acknowledges this complexity (Urquhart and Danielson 1993). Research suggests that the portfolio can provide a fully comprehensive and integrated system of assessment of learning and practice, particularly during pre-service (Arter and Spandel 1992; Paulson et al. 1991; Shulman 1987). The development of a professional portfolio allows the performance of student teachers to be assessed in different ways by offering the means to collect, organise, interpret and reflect on their learning and practice (Wise 1994). Importantly, the use of portfolios can also make a considerable contribution to helping the student teacher understand and reflect upon the expectations of professional standards (Darling-Hammond and Snyder 2000).

During the last decade many pre-service programmes have moved to embrace the pedagogical use of information communication technology (ICT). In line with this development digital portfolios (hereafter e-portfolios) have begun to be used to enhance learning and assessment (Barrett 2000; Woodward and Nanlohy 2004). For example, Britten, Mullen and Stuve (2003, 43) suggest that the goal of an e-portfolio is 'to meet the learning and competency objectives of the programme through a student-centred reflective process that ultimately benefits all stakeholders.' They go on to assert the hope that the quality of student reflection 'will become richer and more complex as they continue in the programme providing quality information that can be used to examine growth and progress over time.' Other researchers interested in the benefits of e-portfolios for assessment purposes have identified a range of types: *A dossier or showcase portfolio* is one that provides for a mandatory record of achievement or evidence to satisfy specified professional standards; *A learning or training portfolio* offers a collection of evidence collected during a course and demonstrating the knowledge, skills and competences gained; *A reflective portfolio* is an individually constructed (rather than being prescribed) portfolio designed to demonstrate development and growth in a specified way with emphasis on self evaluation and reflection while a *personal development portfolio* offers a reflective account of development over time and can be used as a basis for refining and structuring future development (Greenberg 2004; Smith and Tillema 2003). As an assessment tool for pre-service teachers it is likely that the development of a digital or e-portfolio may inevitably incorporate aspects drawn from all these elements.

Orland-Barak (2005) makes the distinction between a product and a process based portfolio, identifying the product type as the means to document evidence that demonstrates achievement, while the process portfolio sets out to document learning processes. The actions and processes involved in creating an e-portfolio may also provide the means to enhance pre-service teachers' ICT skills through a growing familiarity and experience of general e-learning pedagogy. An effective e-portfolio then, needs to be more than simply a personal homepage with links to examples of completed work. To be used as a course assessment tool the author of the e-portfolio needs to have considerable freedom to choose and manage the selection of work, artefacts or evidence of learning to be displayed. Smith and Tillema (2003) go so far as to suggest that mandatory portfolios can never be reflective and therefore the inherent danger of an e-portfolio where the contents have been overly prescribed by the course tutor is that important aspects of the student author's creativity and individuality may be lost.

This article reports on a study that evolved from longitudinal research that initially set out to examine the factors influencing student teachers' attitudes towards special needs education and inclusion in Northern Ireland. The findings had indicated that whilst pre-service teachers articulated support for the philosophy of inclusion, the influence of actual school based experience alongside proactive approaches to training and preparation for inclusive teaching also had strong influences on perceptions as to how inclusive education would work in practice (Lambe 2011a; Lambe and Bones 2006a, 2006b). Responding to the findings of this research led to the development and evaluation of a problem-based e-learning approach to training provision (Lambe 2007) and an examination of the effectiveness of permeated pre-service models and the role of the teacher tutor in promoting inclusion within pre-service (Lambe 2011). The current phase of the study examines the use of the e-Portfolio as a potential tool for assessing pre-service teachers' competence within an SEN and Inclusive Education context and it is this element of the research programme which is presented here.

Assessment in pre-service education: special needs and inclusive education

Expectations about what pre-service teachers should learn in relation to the education of children and young people with special educational needs (SEN) and how that learning should be assessed have evolved in the past decade. This has been in response to a combination of socio-economic and technological changes and the pressure of the standards-based reform movement that has influenced approaches to assessment within the broader educational context in the UK. The movement towards social and educational inclusion has had a long history which has been evidenced in a raft of policy and legislation in England (see DFEE 1997, 1998; DES 2004; DfES 2002). This movement has been reflected in parallel developments in Northern Ireland, particularly by the adoption of The Code of Practice on the Identification and Assessment of Special Educational Needs (DENI 1998) and the Special Needs and Disability Order (NI) (2005). These have strengthened the right to social and educational inclusion of children and young people with SEN in Northern Ireland. 'Inclusion' today is clearly about embracing values that relate to diversity, equity and social justice (Moran 2007) and is now the well-established 'keystone' of the UK's government policy on education (Booth et al. 2000, 15).

There are many variables, including those relating to family, community and society, that will influence positive educational outcomes. In school, however, it is the teacher who is arguably the most important factor influencing educational outcomes, making it desirable to have a highly skilled and competent teaching profession (OECD 2005).

Studies of both pre-service and in-service teachers have shown that attitudes towards inclusive education were influenced by the type of education and academic preparation they received (Lambe and Bones 2008; Avramidis et al. 2000; Wilczenski 1993). Positive attitudes are not on their own sufficient however to ensure effective practice (Cook 2002). Developing well considered, quality and innovative learning experiences during pre-service education can help promote positive attitudes by equipping beginning teachers with the skills, dispositions and confidence necessary to teach effectively in an inclusive classroom setting (Lambe 2007, Wilczenski 1993). Such programmes need to include the possibility for student teachers to critique and challenge accepted perceptions of difference in educational models where disability is regarded as deficit (Barton 2003). Slee (2001, 120) for example, suggests that pre-service programmes should provide ‘interdisciplinary studies of exclusion and inclusion’ with the aim of ‘weaving the preparation for inclusive teachers right across the fabric of their teacher-training curriculum.’

The PGCE programme: a competency model

The Post Graduate Certificate in Education (PGCE) at the University of Ulster in Northern Ireland is an intensive one year programme designed as an integration of school based experience and reflective academic study. Throughout the year the focus is on the acquisition of defined competences that will lead towards a smooth transfer into the first year of a teacher’s induction programme

The pre-service teacher spends only 12 weeks in the university divided into two six week blocks either side of two nine week school based placements. Northern Ireland currently operates an academically selective system for post-primary education (by examination at age 11) and the first six weeks spent in the university is used as preparation for the first teaching experience, which is in a non-selective school environment. It is during this placement that the pre-service teacher is likely to gain most experience of pupils with SEN within a relatively inclusive setting. The second school experience (in an academically selective school) tends to focus more specifically on assessment and on working with pupils studying for external examinations.

The requirement to engage in evidence-informed reflection on issues of both theory and practice is central to the professional standards and competences set out by those responsible for teacher education across the UK. Pre-service education in Northern Ireland is designed around a teacher competency model and the PGCE programme aims to foster the development of pedagogical competences in the following areas:

- Professional values and practice
- Professional knowledge and understanding
- Professional skills and application.

The PGCE post-primary programme is designed to address 27 competences set out by the General Teaching Council for Northern Ireland (GTCNI 2005). The aim is to ensure the student teachers are prepared for the classroom through being able to:

- Plan, teach and assess worthwhile learning activities in their subject area(s) in schools in Northern Ireland;
- Acquire the knowledge, understanding and skills that are essential for the promotion of learning among pupils;
- Assume responsibility for developing as competent reflective practitioners, able to monitor and evaluate their teaching performance;
- Realise a commitment to ongoing personal and professional development in pursuit of sustained pupil learning and school improvement.

It has been suggested that focusing closely on the achievement of skills or competences can be at odds with the development of a trainee teacher's reflective capabilities (Calderhead 1991). The General Teaching Council of Northern Ireland however, takes the view that the 'teacher as researcher' is central to the development of a teacher's professional identity and not just something that is 'bolted on as an additional skill' (GTCNI 2007, 12).

Assessing competence

In seeking to improve existing practice, an elective programme designed to support student teachers' learning in the context of SEN and Inclusive Education was developed to support student teachers completing the post-primary PGCE. Whilst constructed to integrate three pedagogies (problem-based, face-to-face teaching and e-learning), it is underpinned by the recognition of learning as a social process, with human interaction considered essential so as to maintain the synergy that face to face contact creates. Asynchronous and synchronous discussion is used to complement face-to-face work and to facilitate opportunities for personal reflection and professional dialogue. Because learners do not learn in isolation programme activities were designed so as to encourage collaboration and to help the students construct and integrate new learning with prior learning and experience.

In evaluation, the key benefits of this programme had been cited by the student cohort as offering opportunities for both individual and collaborative activities, in helping to develop strategies for teaching and learning and the help and support of a range of face-to-face speakers and experts online. Students also felt that the opportunities it offered to complete set activities (including discussions) without the restrictions of a traditional classroom setting were positive and unique aspects of the programme design (Lambe 2007).

The use of alternative teaching pedagogies which use more open-ended tasks and call on pre-service teachers to apply their knowledge and skills to create a product or solve a problem have inevitably led to the search for alternatives to the limitations of more traditional assessment modes. Wiggins (1998) proposes that:

Before we can change our system into one that serves all our needs, we require something more educative and exemplary to which to aspire—something vivid and

provocative that makes us see the deficiencies in our time-honoured practices, something designed to promote excellence, not just to measure efficiently. (7)

Performance assessment for example, requires students to engage in ‘authentic’ tasks that involve the application of combined knowledge and skills within the context of a defined project (Lindquist 1951). The National Research Council suggests that to design assessments of student learning that will provide useful evidence requires the coordination and alignment of three key components: *cognition*, which refers to a model of the thinking and learning of students within the subject domain, *observations*, the tasks or activities that students engage in that provide evidence of learning, and *interpretations*, the process or methods for making sense of the evidence. Changing any of the three elements individually must inevitably affect the coherence of any adopted system and so ‘how they interrelate must be considered together’ (NRC 2001, 31). Effective assessment should also present tasks that will challenge student teachers to say, do, or construct, something that demonstrates important knowledge and skills acquisition. Designing tasks without clearly thinking about if and how those tasks will require students to demonstrate the targeted knowledge and skills may result in outcomes that fail to address learning intentions. Alternatively, tasks that are designed without a considered method of analysing performance may make it difficult to distinguish a student’s strengths or weaknesses.

Assessment is not an isolated part of the learning process. The National Assessment Group describes assessment for learning as ‘the process of seeking and interpreting evidence for use by learners and their teachers to decide where the learners are in their learning, where they need to go and how best to get there’ (Assessment Reform Group 2002, 3). What is to be measured and how the information is used is also dependent on the curriculum taught and the instructional methods adopted. Webb (1997) proposes that effective educational practice should involve an alignment of three things: *curriculum*; *instruction* and *assessment*. Every assessment, therefore, regardless of purpose, rests on how the learner re-presents acquired knowledge and personal competence in the subject domain, or in set tasks or situations that allow for the observation and interpretation of performance.

A critical aspect of expertise is the ability to extend and transfer knowledge and skills beyond the contexts in which they were acquired. Research suggests that knowledge transfer is not automatic however (Bjork and Richardson-Klaven 1989; Lave 1988). Much of what is learned and internalised is developed through both discourse and interaction with others. This may occur when learners share similar goals and are enabled to work collaboratively to develop a community of practice (Wenger 1998). Studies of the social context of learning show that within a responsive social setting learners can adopt the criteria for competence through observation of others and then use this information as a means to judge and perfect their own competence. Shared performance can promote a sense of goal orientation, while the social context for learning can make the thinking of the learner apparent to teachers and other students. It can then be examined, questioned and built upon as part of constructive learning. There has been considerable research about the potential advantages that e-learning pedagogy can bring to teaching and learning in teacher education programmes. It can offer a forum for shared reflection on professional practice while promoting reflective thinking and encouraging debate (Austin 1997; Galanouli and Collins 2000) and offering opportunities to foster, ‘high quality

professional dialogue' (361) when used early to support student teachers in pre-service programmes (Lambe and Clarke 2003).

Given this background the present study examines how the e-portfolio can be utilised as an assessment tool in pre-service education, specifically for the assessment of student teachers' learning and competence in practice relating to special needs education and inclusion.

Context

Participants in this study were a cohort of 22 pre-service teachers drawn from a population of 108 who were completing a one year post-primary Post-Graduate Certificate in Education (PGCE) programme. The research cohort represent eight curriculum subjects: Art and Design; English; Geography; History; Home Economics; Music; Physical Education; and Technology and Design. This group had chosen to enrol on a short elective programme designed to develop their skills and competence in supporting learners with SEN.

The SEN and Inclusion elective was developed to last for the 12 weeks the students spend in the university with three hours each week allotted to programme activities. These activities were also designed to be continued across three school-based placements one of which was in a special school setting. An e-portfolio was designed by each pre-service teacher and presented as evidence for programme assessment.

Conceptual framework for e-portfolio assessment

E-portfolios that are used within the context of higher education tend to be institutionally developed systems. The advantages of this lie in security, storage and general accessibility even from remote locations. Research however, suggests that unless a student feels a sense of ownership most e-portfolios will come to an end once a particular period of study is completed (Jafari 2004). This can be the main disadvantage if the system is created as a Personal Development Programme (PDP) designed to fulfil general university requirements rather than the more specific needs of a professional or vocational (and importantly long term) Career Development Plan (CDP). In regard to teacher education a successful e-portfolio needs to be functional, adaptable and portable. It should also be able to span across each stage of working life.

The pre-service cohort who took part in this pilot study were asked to present their e-portfolio for assessment using PebblePad (<http://www.pebblepad.co.uk/>). This is a web-based repository which provides a customisable interface allowing the user the facility to present evidence of learning in a variety of forms. The PGCE programme is cyclical in nature. The work of the first learning cycle (Semester 1: September–January) provides a foundation for learning which is built upon and developed during the second cycle (Semester 2: January–June).

The elective aims to build the confidence and competence for inclusive classroom practice of pre-service teachers preparing specifically to be subject specialists in the post-primary sector. It uses a blended problem-based learning approach, which combines face to face with online activities), with the aim of creating future subject specialists equipped with the skills, competences and values to become subject leaders who are also effective inclusive teachers. The programme sets out to

enable participants to build their knowledge of special needs education, their understanding of issues relating to inclusive education and to provide practical, collaborative support during time spent on school based practice. The module is underpinned by the belief that educational inclusion is the responsibility of all teachers including subject specialists and that learning difficulties are challenges for teaching and not deficits to be identified, categorised or labelled. It is designed to meet the Initial Teacher Education requirements of the Northern Ireland Teacher Education Competency Framework and the activities are structured around the creation of a personal e-portfolio. The conceptual framework for the programme assessment is presented as Figure 1.

The programme’s e-portfolio assessment requires the author to select and present evidence of their learning development across both cycles of the PGCE year. Importantly, it allows control of the e-portfolio to lie in the hands of the user while still allowing for reliable assessment by the teacher/tutor. The author can create a ‘menu’ of headed pages on which the evidence for assessment is stored. Each ‘page’ also facilitates a narrative with links leading directly to evidence of competence which can be presented in a range of ways. It may include selected written documents; screen shots of online discussion and reflective activities; photographs; moving images; audio clips; assignments (both individual and collaborative); resources designed and used during classroom practice; lesson planning documents and evaluations; tutor and school observations of classroom practice; case studies; evidence of good practice and so on. The list is not prescriptive and the author has total

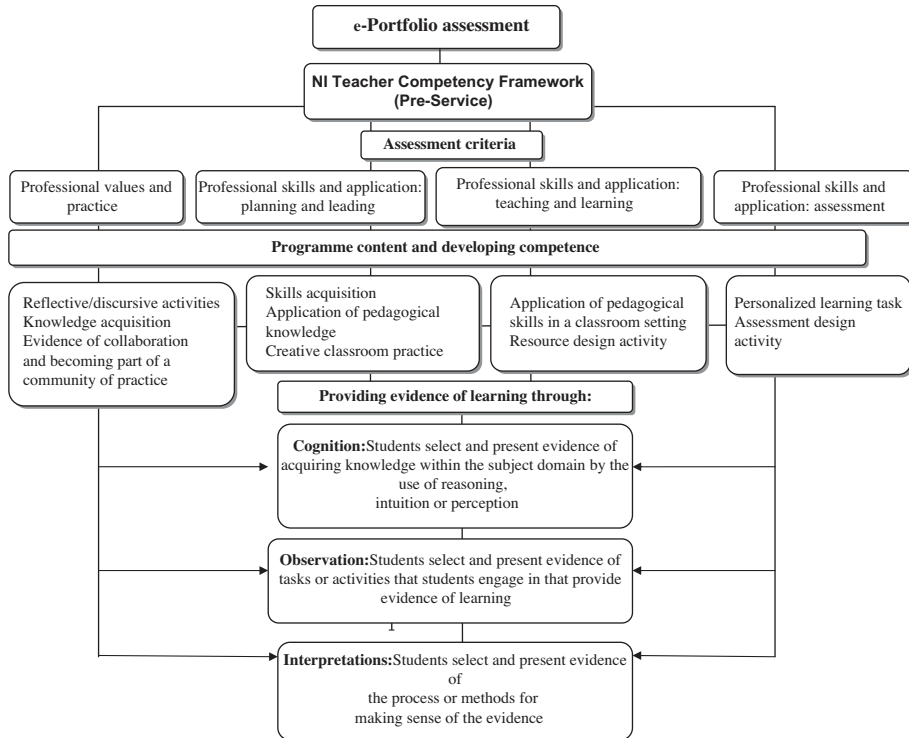


Figure 1. Conceptual framework for assessment: SEN and Inclusion Programme.

freedom to choose a range that they feel best fulfils the requirements of the programme assessment criteria.

Table 1. Possible sources of evidence.

Cognition

Select and present evidence of learning through cognition: acquiring knowledge within the subject domain by the use of reasoning, intuition or perception.

Evidence of having reading and critiquing current literature and research on issues and pedagogy relating to special needs education and inclusion and had gained a working knowledge of key legislation and policy.

Evidence of individual responses to reading and research activities relating to teaching strategies to support pupils with a range of SEN within mainstream classrooms.

Evidence of knowledge and understanding the range of SEN found in mainstream classrooms.

Evidence of lesson planning for inclusive classroom settings.

Evidence of knowledge target setting activities informed by pupils individual learning plans.

Evidence of written and electronic based research so as to underpin and inform the development of resources to support learning in the context of special needs education using variety of media: DVDs; Internet; multimedia resources

Evidence drawn from workshops and seminars supporting learning for pupils with English as a second or additional language

Evidence of having read, analysed and synthesised key literature on assessment.

Observations

Select and present evidence of learning through observations based on tasks or activities you have engaged in:

Evidence of contributions to online discussions that reflected on key issues drawn from observations and experiences on school-based practice.

Evidence drawn from both collaborative and individual learning tasks for developing effective strategies for inclusive teaching using case studies, innovative resource design to support individuals or groups of pupils with specified SEN.

Evidence of critical evaluation of experiences of inclusive teaching.

Evidence drawn from written assignment on themes relating to theories of learning

Evidence drawn from online tutor- and peer-led discussion groups to support students when on school based experience (communities of practice).

Evidence of the development of assessment rubrics to support and monitor learning in an inclusive classroom setting.

Evidence of familiarity with using individual educational plans to support learning.

Interpretations

Select and present evidence of learning through Interpretations: the process or methods for making sense of the evidence.

Evidence that show the ability to articulate beliefs and values about inclusion informed by acquired knowledge (possibly drawn from online reflections, written assignments, preparation for and reflections on classroom practice and lesson evaluations).

Evidence of testing and evaluation of innovative resources during classroom practice.

Evidence of making interventions and using empirical research to support practice.

Evidence of employment and critical evaluation of innovative teaching strategies during classroom practice.

Evidence of moving effectively from theoretical knowledge into practice.

Presentation of evidence drawn from professional teaching file identification of effective teaching strategies to support inclusive teaching including review, evaluation and critical reflection on learning

Sources of evidence for the e-portfolio

A bank of suggested evidence indicators was offered to the cohort for consideration when constructing their e-portfolio (Table 1). While not a prescriptive list the aim was to encourage the cohort to reflect fully on their learning so as to provide a range of evidence that showed cognition, observations and interpretations gleaned from the programme.

Evaluation of the e-portfolio as a method of assessment

Evaluation methodology

The use of the e-portfolio as a means of course assessment was evaluated by the participating group of 22 pre-service student teachers. There were two methods of data collection. The first took the form of an online asynchronous (threaded) discussion around perceptions as to the value of using the e-portfolio for assessing learning on the elective programme. PGCE students at the University of Ulster are very familiar with the use of asynchronous discussion as it is used regularly during the year and also as a means of tutor and peer support during long school placements. The rationale for its use is that it offers the means to articulate and share thoughts and perceptions on a range of issues in a considered and reflective manner even when the students are not on campus. Using threaded discussion as a method of data collection also has the benefit of allowing discussions to be archived so the transcripts can be reviewed by both the participants and researcher as part of the analysis process, so ensuring the reliability and validity of themes. Data were also gathered through the use of a short survey. Five open-ended questions were used to examine student reflections on the general use and functionality of the e-portfolio, and its potential (from their perspective) in supporting career development beyond their pre-service programme.

Data analysis followed a qualitative approach. Key themes or common threads were identified by reading, re-reading and coding the archived discussion and responses to the survey. The students' own words drawn from the threaded discussions were used to illustrate and add support to the findings.

The study conforms to the guidelines provided by the School of Education at the University of Ulster Research Ethics Information Code of Practice (2006) and the researchers were required to obtain the permission of the participants prior to the beginning of the research (Creswell 2003). All participants were fully informed as to the procedures and purpose of the research before completing the surveys or engaging in interviews or discussions and they were also made aware that anonymised direct quotations taken from their work would be used appropriately within the research. Participants were each coded by number (1–22) and data from each participant in the form of survey responses and threaded discussions are identified as such in the findings.

Findings

Student reflections on the value of e-portfolios for assessing learning in pre-service education

Examination of the threaded discussion archives revealed that the cohort were very positive about the rationale for developing their individual e-portfolio and presenting

it for assessment. As pre-service teachers they were already very aware of the purposes of assessment not only to gauge competence but also to provide an informed baseline for future learning (Assessment Reform Group 2002). In particular they were positive about the extent to which the e-portfolio allowed for a very individual approach, for example:

It was good to be able to create a portfolio that reflected me as an individual. The guidelines for selecting content were helpful but not too prescriptive and gave me plenty of choice about what I could put into it to show what I had learned during the year. For example I was able to draw on different experiences and show case work I had done in all my school-based placements. These are completely individual to me. While we have had general learning experiences during the programme and you can show aspects of this in the portfolio, I thought it is also very important to be able to show what is different about me and my learning. That's a very good thing because I wouldn't want to have a CV that just shows I'm the same as the next person. (4)

All the respondents commented on how the e-portfolio had allowed them to show their learning in a diverse manner. The assessment criteria required the individual to sift and select from their learning experiences and present these in a variety of written, visual or audio formats. There was also a recognition that there was a clear emphasis on critical reflection as opposed to a description of events or a simple show casing of completed tasks such as essays or resources. For example:

There is a lot of emphasis on reflecting on what you have learned during a PGCE course. I didn't really understand what was meant by that or even how to do it at the start. Having to choose what you are going to put into your portfolio requires you to reflect. There is no point in just choosing lots of the same thing. I think the process of thinking about what your selection says about what you have learned was a help in itself. (7)

Reflection is a complex activity (Boud and Walker 1998) but is also an essential part of the process of learning to be an effective teacher (Mezirow 1981; Schön 1983).

Overall the pre-service teachers were very positive about the use of the e-portfolio as a qualitative assessment tool for the Special Needs and Inclusive Education programme. Specifically it was seen as an 'authentic' approach to assessment that reflected the inherent nature of a teacher education programme which requires participants to show how they can effectively weave theory and practice together. Responses showed that individuals also felt a sense of achievement in how the e-portfolio could be used to showcase their learning to a wider audience that might extend beyond their tutor. The following comment illustrates this:

I really felt quite proud of my portfolio when I was finished compiling it. It even surprised me how much I had learned during the year and how many examples I had been able to gather. I had such a range of things to select from. Being able to see everyone else's portfolio was also good. You could see the different experiences we all had even though we were doing the same course. We were all able to make comments on each other's completed portfolios and that was a pleasant surprise. Overall it was a very good experience. It made assessment a fairly non-threatening experience. It was very much in the spirit of assessment for learning which we talk about a lot on a PGCE programme. (1)

General use and functionality of the e-portfolio programme

Overall the group were also very positive about the use and functionality of 'Pebblepad' as the format for creating their e-portfolios. A tutor-led workshop had been used to introduce the facility and students had been given regular support at different points over the year to reinforce this introduction. This was seen as both helpful and necessary. One respondent commented:

'Pebblepad' is quite straightforward and intuitive to use and the workshop at the start of the year was helpful. The main problem for me was that as the year progressed I just forgot how to use it. I didn't see the point of creating it too early mainly because I knew I would have ended up replacing lots of things I had collected as I learned more and my experience increased. I just needed a bit of revision once I was ready to bring it all together. (1)

Most of the pre-service teachers approached their e-portfolio in this way. This cohort experienced few difficulties in utilising 'Pebblepad' to create their e-portfolio, requiring only moderate technical support. Additionally, there was a sense that the format of 'Pebblepad' allowed for significant individualism when reflecting on work from a range of subjects within the context of special needs education.

Supporting career development beyond Initial Teacher Education

All of the respondents felt that the rationale of creating an e-portfolio for assessment was clearly stated and purposeful. The ease of use they had experienced added to the generally positive attitudes expressed towards extending the use of e-portfolios beyond this limits set by the elective programme. During the last decade advances in technology and investment in infrastructure, accompanied by increased student familiarity and skills in handling software and hardware, has made it increasingly possible for many educational institutions to embrace the use of electronic as opposed to paper-based portfolios. The various electronic portfolio programmes now on offer are increasingly user friendly, while many institutions have developed 'in-house' programmes which can be used throughout the student's university 'lifetime.' The research participants however, also recognised the potential for an e-portfolio to be used for various purposes across all phases of their teaching career. Some respondents saw its potential for employment purposes, one commenting that:

The e-portfolio would be a really efficient way to store all your achievements and experiences beyond this PGCE year. For example, I could see it being used as part of a job application. I could keep my qualifications and references in a section and teaching and general work experiences in another. These would be really easy to access for a potential employer...this way you could easily be applying for a job on the other side of the world. (15)

There was also an acknowledgement that future building on the e-portfolio could offer support for assessing aspects of continuing professional development (CPD) beyond the pre-service year:

...as you would be adding to your experience over the years you would be selecting from it for your portfolio. You would be able to build up a real bank of evidence

showing the kind of teacher you are and the kind of experiences you have had through a whole range of sources, words, film, photographs and so on. All sorts of things could be included. It would then be a lifetime's work portfolio. (20)

Discussion

There has been a seismic movement towards adopting inclusion as a model for education, which reflects the many changes within the broader field of international social policy during the past three decades in the UK. Given the UK government's expectations that teachers should be equipped to teach all learners with SEN (DfES 2004) then there is today an expectation that the delivery of pre-service programmes should promote the principles of inclusive education so as to ensure that all beginning teachers are prepared to teach effectively in an inclusive classroom environment (Lambe 2007, 2011; Kurz and Paul 2005; Martinez 2003). The use of online environments to support teaching and learning has also increased during the last decade in the UK and there has been much written around the pedagogical benefits that e-learning approaches can provide for almost any educational context (Rhodes 2011; Gilbert and Dabbagh 2005; Lambe and Clarke 2003).

Alongside these developments, there is also an increased awareness of the potential benefits of developing e-portfolios for assessment purposes on higher education programmes. The benefits range from simple aspects of security and storage to more complex issues related to providing evidence of connectivity in learning. For those on pre-service programmes an assessment e-portfolio can help establish important connections between evidence, experience and reflections so providing a full and rounded picture of progress and development (van Tartwijk et al. 2007).

While opportunities to gain specialist knowledge and skills are essential there must equally be opportunities to reflect critically on how this theory translates through the experience of classroom practice. This said, e-portfolios can be utilised as an authentic means of promoting at the earliest phase of teacher education the belief that to be a critically reflective practitioner is a career-long 'professional duty' (Lambe 2011, 97). Consequently, the rationale for this study required the participants to provide a reflective e-portfolio linked to evidence which has been specifically selected to show the individual learning and progress specifically within an SEN context.

As a 'product' the participants in this study reported a sense of pride and ownership when presenting their e-portfolio for assessment and strongly appreciated the self-directed nature of the process. Furthermore, because of the potential for the e-portfolio to be shared with a wider audience the pre-service teachers set high standards for themselves. There was a clear sense of personal and professional pride evidenced in the care taken over the individual e-portfolios. The very nature of refining and selecting also encouraged a thoughtful and well considered approach to the reflective process. Evidence was drawn from the many online discussions (when in university or on school-based practice) that were conducted throughout the year. These were specific examples chosen to illustrate various aspects of competence. The use of online discussion environments was particularly useful for reflective work because it facilitated the development of critical and reflective thinking by providing opportunities for engagement, collaboration, social negotiation and 'high quality professional dialogue' (Lambe and Clarke 2003).

The findings of this study suggest that developing an e-portfolio at this stage can offer multiple benefits as an assessment tool, allowing assessment to be a

continuous process, developmental and performance based. It has the potential to support both formative and summative assessment throughout the PGCE year while providing the means for the tutor to assess the interweaving threads that make up a competency-based teaching model. The participants in the study were very positive about the rationale for creating an e-portfolio to assess their competence, which has encouraged the researchers to recommend developing their use in other areas of the PGCE course. It must be acknowledged that, as a pilot study, the size of the sample was small and therefore conclusions should always be tentative if applied to a different context. The authors believe, however, that the outcomes of the study can offer a helpful contribution to current knowledge regarding assessment in this general research area.

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