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# Information Technology Across the Teacher Education Curriculum:

## More claims than evidence

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*The call for the inclusion and integration of Information and Communication Technologies (ICT) in the teacher education curriculum is almost a mantra. It is included in course reviews, ministerial advice, competency statements and handbooks as a motherhood statement that cannot be challenged. What is missing in the rhetoric is actual evidence of authentic integration of ICT in practice. This paper describes one attempt at integration through the use of electronic portfolios (e-folios).*

### INTRODUCTION

This paper describes an innovation in which teacher education students at the School of Teacher Education at CSU Bathurst are constructing an electronic portfolio of their professional learning. Electronic portfolios are much more than an expression of the technical aptitude of pre-service teacher education students. They constitute an attempt to get teacher education students to synthesise their learning across academic subjects and the practicum. Along the way they gain valuable ICT skills in a realistic context.

The e-folio project at CSU had its origins in course reviews of the B.Ed (Primary) and B.Ed (Early Childhood). Both reviews attempted to address the integration of ICT through a process whereby the Department of Education and Training New South Wales (DET) ICT competencies were mapped across all the subjects in the course (DET 1998). Significantly, any subjects that concentrated on teaching ICT skills in isolation were removed from both courses. This forced into action the policy of ICT integration. Policy enacted is often a long way from policy espoused and there were doubts about ICT being integrated across all subjects in the courses. These doubts are recognition of the significant technical, pedagogical and resourcing barriers that needed to be overcome.

The e-folio seemed to be a way of effectively integrating ICT without placing too many demands on the limited resources at our disposal. A pilot of the implementation of the e-folio was trialed with a third year Science and Technology Education subject so we were confident of overcoming any technical issues that may arise. On the strength of this confidence, it was decided to implement a four-year e-folio project with the incoming first year students. A subject, entitled *Language as Social Practice*, is common across first year in all our separate education courses. This subject in the old courses, before the review, had an add-on information technology component that was basically an introduction to the computer. Components of this add-on included lab sessions on word processing, Powerpoint presentations and other basic ICT skills. The revision of the subject allowed the focus to move to multi-literacies, which is much more in accordance with the socio-cultural view of language development promoted as the main emphasis of the subject. An introduction to the web design skills required for e-folios then became an authentic part of the multi-literacies focus. Students then take the ICT skills learnt in this first semester subject to build upon their e-folio in ensuing semesters. Lecturers in subsequent subjects can concentrate on scaffolding and strengthening the conceptual links between disparate subjects in the course rather than technical skills.

### DISCUSSION

This section of the paper discusses what we believe to be the benefits of using e-folios as a pedagogical vehicle to not only integrate ICT across the teacher education curriculum but also to integrate and coordinate what are often disconnected and disparate subjects in teacher education courses. The e-folio represents an effort to ensure that graduates are far more confident and competent in the use of ICT across and within the curriculum areas in their classroom.

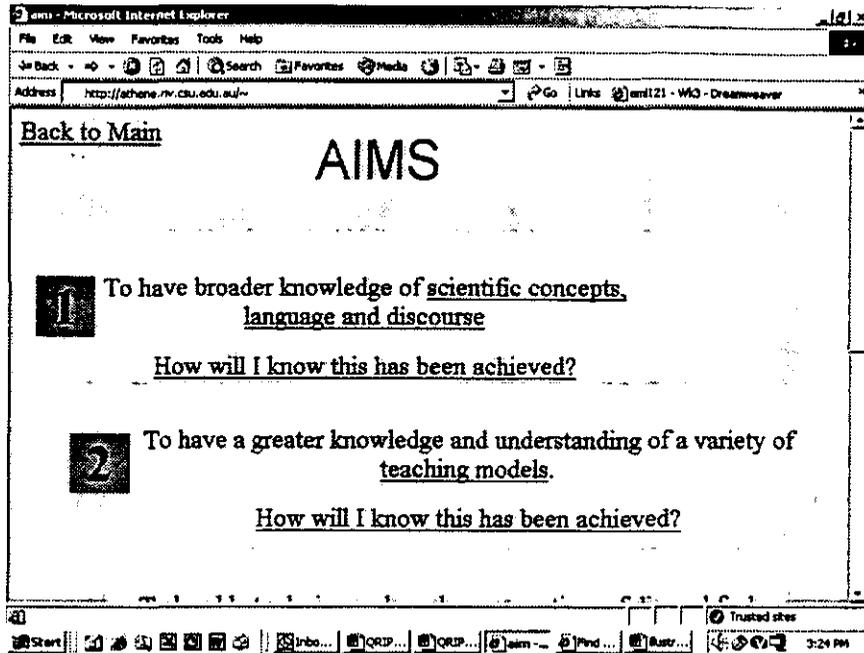
The first and most obvious benefit in using e-folios is that they use ICT for a meaningful purpose rather than learning web design as an end in itself. Research suggests that integrated approaches are far more effective than isolated ICT skills subjects for students to make use of ICT in their teaching (Downes et al. 2002). Students will be able to transfer the web-design skills learnt in creating an e-folio to other areas of their professional experience. One example of this positive transfer has been student construction of annotated links pages that demonstrate a growing awareness of their discerning use of online resources for teaching and learning.

Another benefit of e-folios is that they are an embodiment of constructivism, a theory of learning that is promoted implicitly and explicitly throughout curriculum subjects in our courses. We expect our students to construct their own evidence of attainment in response to the scaffolding provided by the NSW DET professional standards (1998). These standards are broad enough to allow a wide variety of evidence to be presented in support of their attainment. In this case the DET standards suited our purpose even though the use of externally defined goals could be seen as instrumentalist. We also believe that a closer connection between the goals of the major employing body of the

teaching profession and that of the teacher education institutions is a positive thing. It may well be that the faculty of the school of teacher education at Charles Sturt University decide to add to the DET standards with reference to important goals of the course like a commitment to social justice and equity at a later date. We would regard any initiative that gets faculty to speak of shared goals as an excellent spin-off of the e-folio project. Indeed the literature on the use of e-folios in primary schools emphasises that shared vision and culture are a necessary prerequisite to the establishment of student portfolios. The coalition of essential schools project in the US (Niguidula 1997) suggests that "first and foremost, a school needs to determine what capabilities all of its graduates should possess". We would like to imagine a future whereby the faculty would not only discuss but enact this vision by way of e-folios. The e-folio initiative, along with other projects driven by the school's teaching and development committee, has already resulted in lecturers talking openly about the assessment in their subjects. This is evident in the four subjects comprising the first semester of the Bachelor of Education (Primary) course where two of the subjects, the language and practicum units, have a combined assessment task and a third applies the skills learnt in the ICT strand in a mathematical context. The combined assessment task is assessed using outcomes from both the digital literacy and practicum subjects. This move towards an opening up of the traditional closed and private nature of discipline based university teaching is another benefit of using e-folios.

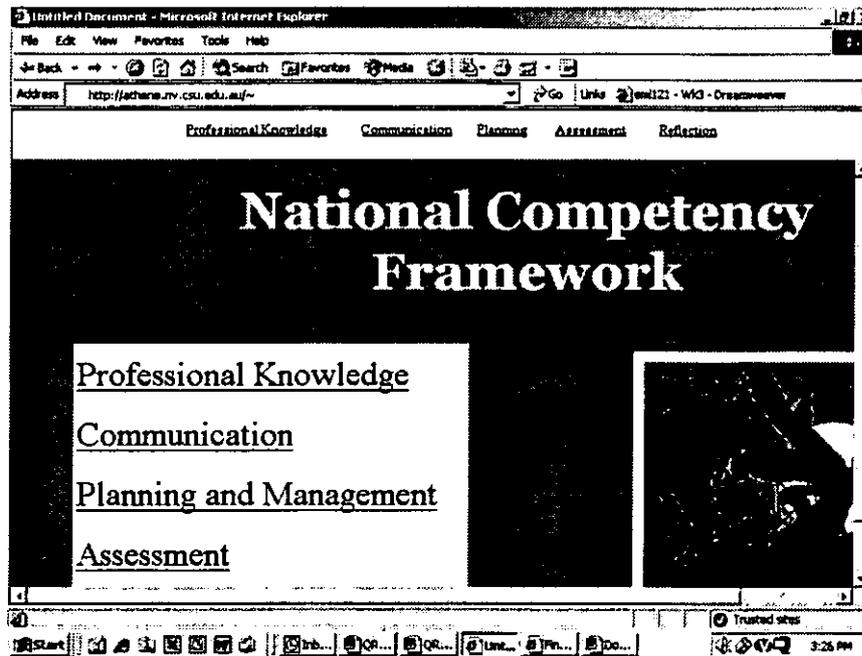
E-folios also give teacher education students experience with the use of portfolios as an assessment tool. This form of assessment is current in schools and we are showing to students that assessment is "integral to the teaching/learning process itself" rather than "something that is simply added on" (Fleer & Hardy 2001, p.187). The Queensland School Reform Longitudinal Study identified that more work could be done to help current teachers develop what they term "assessment literacy" based on their data that suggested a "practical misalignment between pedagogies and assessment tasks" (Education Queensland 2001, p.iii). Put plainly, their research found that teachers employing productive pedagogies in their classrooms could not implement productive assessment tasks to complement them. We have found the same lack of assessment literacy among pre-service teacher education students, many of whom can plan and teach very commendable lessons. The lack of assessment literacy is not surprising given that outcomes based assessment is only a ten year old initiative. A lack of familiarity with the processes of outcomes based assessment is also evident among many of the more experienced members of the education faculty of our university. So the e-folio project could be a very effective way of enhancing the assessment literacy of both our pre-service students and university teachers alike.

Portfolios in primary schools show academic progression as well as achievement (Board of Studies 1998; Elliott 1999). This is a very effective way of communicating to students and parents academic development over a year, or the entire primary school grades. In the same way our e-folio will show a progression in our student's professional development. We suspect that the teaching philosophy espoused as a result of their first observation practicum (<http://athene.riv.csu.edu.au/~nsteve06/Primary%20Practicum.htm>)



and academic subjects will be significantly strengthened after completing four teaching practicums and the full complement of academic subjects. The evidence of academic progression may be more useful as a metacognitive aid for students in the tertiary sector than a proof of development as it may be used in the primary school. Students will be able to reflect on their learning as they move through the course in a way that the present disparate subjects of the degree prevents. They are then able to make explicit links between different aspects of their learning. These claims will be investigated as part of a longitudinal study of the use of efolios in pre-service teacher education.

The electronic nature of an e-folio allows students to show a wide range of learning artefacts. Students have efolios that contain audio, text, animated graphics and photos. The use of video, particularly of their practice teaching, may be used in ensuing semesters. We were careful in the students' first semester not to over-emphasise the technical wizardry of web design. We wanted to focus on the idea of web design as a part of a broader literacy as this fitted in with the model of language development taught in the subject. These teacher education students, just like primary school students we have taught, are attracted to the exciting aspects of the technology. Despite the fact that we had deliberately only shown the students the basic features of the Dreamweaver (Macromedia 2002) web design application we started to notice advanced web features appearing on some of the student's sites. Some of these features, like flash buttons, spread rapidly through the class without direct teacher instruction. It reminds us of the community of learners described by Seymour Papert in his early experiments with computer mediated learning (Papert 1980).



Papert (1980) found that primary students using interesting computer programs, like Logo, actually interacted with each other as much as they did with the computers. Student initiated design ideas rapidly spread around the classroom. This finding refuted the notion that computers in education would decrease social communication.

Observing how our teacher education students developed their understanding of web based literacy made us reflect on our own existing academic bias towards print-essayistic literacy (Green 2002). This thought has been reinforced through work undertaken with a third year cohort working on a specific science and technology education e-folio. We have to constantly examine our teaching to see if we are trying to have students "just put mini-essays online" as one of our students described it. There is no doubt that the analysis and synthesis outlined in the assessment criteria promotes essay type literacy. We have also been focusing on analysis and synthesis in response to what we saw as mere artefact accumulation happening in some of the e-folios.

The collection of artefacts, like journal entries, reading responses, notes from lectures and tutorials, interesting lesson ideas and relevant websites is just the first step in constructing an e-folio. The students must then impose their own order on their primary data. This is what they find difficult. Some students request more scaffolding in this process. We suggest some examples of organising frameworks. For the science and technology students we suggested that the main themes of the subject might well be a suitable framework. Of course, different students identify different themes such as

science and technology content or science and technology pedagogical content knowledge. We contend that the e-folios in the science and technology students still represent their own interpretation of their learning in the subject. However, the use of the DET standards for the e-folio that will attempt to encompass the whole course might well constrain student interpretation of their learning. It might well be that some students will choose to construct their own framework that better describes their own learning. At this stage, the DET standards provide a useful scaffold for students new to the idea of using an e-folio to represent learning.

Writing for the Web also moves students beyond the print essay style. Students from their own experience of the Web know that most browsers will not scroll down past one screen of text. The left-right emphasis of print text becomes a top left-bottom right focus. That is, anything of importance on a web page should be placed in the top left. Anything buried away in the bottom right might not be seen on the screen. Students must think about visual literacy and the combination of text and graphics on their page. The use of hyperlinks also encourages students to build associations of ideas rather than logically present an analytical argument (Herbert 2000). We would argue that web design allows students to present complexity as well as logical association of ideas. For example, one student was trying to separate a concept into three different headings but realised at the same time that she wanted to show how these ideas were connected. The use of hyperlinks to allow the reader to make the connections between the conceptual ideas seem to solve this dilemma.

## CONCLUSION

This article analyses an attempt at Charles Sturt University to integrate mandated ICT competencies across the teacher education curriculum rather than simply addressing these competencies in a discrete clearly identified subject. The vehicle used for achieving this integration is electronic portfolios. The introduction of student e-folios has been more successful than originally expected and in a number of areas that were not originally envisaged. Students report a significant increase in their competence in the use of ICT and it has had the impact of moving students beyond the print-essay style of recording an assessment and of integrating learning across the teacher education curriculum. This level of expertise also ensures that graduates have the skills, understanding and confidence to adopt an integrated approach to the use of ICT in the teaching and learning of the school classroom.

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