

# Developing digital portfolios: how ICT can facilitate pupil talk about learning

K. Wall, S. Higgins, J. Miller & N. Packard

*Centre for Learning and Teaching, University of Newcastle, UK*

## Abstract

The Digital Portfolio Project at Newcastle University aimed over one year (2002/2003) to support teachers in producing, storing and accessing assessment portfolios of learner's work using ICT. A major element of this was the investigation of the impact that these portfolios had on teachers and learners, particularly focusing on how they could be used to facilitate pupil talk about the learning process and metacognition. This paper draws on evidence of pupil views collected as part of 14 teacher-led case studies exploring digital portfolio development in classrooms across the primary age phase (3-11 years). The teachers all approached the task in different ways and the variety of end products was large; however, the common result was the value placed on using the portfolio as a tool of reflection and celebration of children's learning. As part of the data collection teachers were encouraged to gather pupil views about the digital portfolio learning process. These comments provide an interesting and surprisingly analytical perspective of the research and learning process not commonly considered in the academic community. They reveal astute comprehension regarding the possible implications of using ICT to document achievements, the positive effects of recording classroom activities using digital media and how using this evidence to reflect on the activities can be a meaningful and worthwhile process. The pupils recognise the important role that ICT takes in this process and also appreciated the possibilities for themselves and their peers as learners. This paper documents the pupils' views and uses them to review the strength of the Digital Portfolio process and the benefits of using it in the primary classroom.

*Keywords: collaborative learning, innovative use of ICT, pupil views, digital portfolio, formative assessment.*



## 1 Developing thinking and learning through metacognition

The project drew on a number of strands of educational research, in particular developing thinking and learning through thinking skills approaches and metacognition [1, 2] improving learning through formative assessment [3] and the development of self-regulated learning [4]. There is also a wealth of literature into the effective use of ICT in schools (see, for example the British Educational Research Association ‘professional user review’ [5]) and the use of digital portfolios in particular. Some key influences from each of these areas are outlined below. The literature also suggested that an action research approach was likely to be an effective means to support development in schools as such approaches had already been tried and evaluated in the area of formative assessment [6], ICT generally [7] as well as with digital portfolios in particular [8].

There has been considerable research into metacognition or ‘thinking about thinking’ which suggests that teaching needs to make explicit the process of learning as well as the curriculum content [9]. The goal of such approaches is to develop positive dispositions towards learning so that learners believe that, with sufficient effort and effective strategies, they can learn and understand challenging material [10, 11]. One way of doing this is to review learning and help pupils to see their successes. A number of thinking skills approaches have demonstrated impact on learners’ attainment drawing on this theoretical background [12].

The potential of formative assessment in schools has been heralded as offering an effective means to improve learning and raise standards by developing more effective feedback to learners in order to help them understand and apply assessment criteria to their own work [3]. In the forefront of development in schools were Torrance and Pryor [13] who identified the importance of paying close attention to verbal interaction in classrooms and teachers’ changing thinking about events in the classroom. Clarke’s work has also had significant impact [14, 15]. She has shown how collaborative work between pupils can enhance learning through making learning objectives and success criteria explicit as well as indicating the support possible from a range of people in giving assessment feedback.

However, it also has to be acknowledged that the impact of ICT on teaching and assessment practices is complex [16] as it is challenging for teachers to develop new pedagogical approaches at the same time as developing new ICT skills [17]. Our view in this project was that the integration of new equipment and tools may provide a window for change that can support professional development.

Overall the impact of ICT on standards of attainment is perhaps somewhat disappointing considering the enthusiasm and expense that has been invested in this area [5]. Our premise was that ICT on its own would not have an impact on teaching and learning, but that its use would need to be integrated effectively into teaching and learning in classrooms and that this would involve teachers in making complex choices about when and where to use ICT [17]. This, in turn,



would be influenced by their skills and confidence in using ICT and by their beliefs and thinking about teaching and learning more broadly [18].

The idea of digital portfolios in education is not new. Early work tended to focus on the potential record keeping aspects of portfolios or on the benefits of multimedia to record aspects of learning. There have been few evaluations of impact on learners' attainment or research into the effects of using portfolios on teachers, pupils or the curriculum. Positive benefits are usually reported for the development of skills and attitudes [19]. There is some evidence that learners benefit from collaborative use of web-based portfolios [20] and that pupils of primary age in particular may need teacher and peer support to make the most of the opportunities offered by digital media [21]. Other benefits include learners reporting better understanding of assessment as well as developing understanding of how to manage their own learning [22].

One project in the Washington DC area of the United States examined the use of digital student portfolios as an instructional, assessment and evaluation tool. The project illustrated the processes by which pre-service and in-service teachers were able to work with primary age pupils to create their own digital portfolios using the HyperStudio authoring program. Evaluation of these portfolios showed a significant improvement in student achievement, and teachers reported these portfolios to be a valuable tool in monitoring student behaviour and communicating future educational goals to parents, administrators, and other teachers [23]. Most studies also highlight the need for support to be available for teachers to develop their ICT skills as well as support for technical issues which will inevitably arise [8].

This analysis of the research literature suggested that digital portfolios have the potential to support formative assessment in primary classrooms and that this might develop pupils' awareness and understanding of their own learning. This process was also likely to support the development of pupils' ICT skills and, if an action research approach was used, it should support the professional development of the teachers involved, both in terms of their ICT skills and confidence as well as broader impact on teaching and learning. However, there were also a number of studies that suggested there might be some challenges in terms of the existing skills of both pupils and teachers which would need support in order to ensure that the potential of such an approach was achieved.

## **2 An overview of the project**

The main objective of the project was to explore the feasibility of using ICT, particularly digital images, video and voice recordings, to capture assessment information which would help learners reflect on their learning and that would help teachers record and store aspects of learning which might otherwise be difficult to collect. The key task was to identify and to try out activities or 'snapshots' of learning that could support the development of metacognitive talk in the classroom through the use of ICT. The main intention was that this information could be used as part of the process of teaching and learning in the classroom to help learners review and identify their learning. The broad aims



were to support teachers in producing, storing and accessing assessment portfolios of learners' work in order to develop practical approaches to formative assessment with teachers.

A secondary and longer term aim of the project was to investigate the practicality of collecting and storing such information in a database or 'electronic album' to store samples of formative and summative assessment. Views might then be available for different users such as learners who could see their own work and the teacher's feedback, class teachers who would need to see the work of all of the pupils in their class, subject co-ordinators and managers in the schools (e.g. head teachers and deputy heads) who might want to review summaries by class and National Curriculum level, and parents who might see the work of their own child, the child's comments and the teacher's evaluation of how their child was progressing.

An important part of the project was engaging with the participants' perspectives on the learning which was enhanced or supported by the use of digital technologies. At the core of the project are case studies undertaken by the teachers themselves. To extend the research and evaluation of the potential impact of digital tools to support learning, information was also collected from pupils as a way of identifying what impact the development work was having on their thinking as learners. Some of the schools involved also involved or informed parents about the work that was being undertaken and this provides an additional perspective.

### **3 Pupils' views on their learning and the value of the digital portfolio work**

This paper focuses on pupils' views which emerged as an interesting and valuable aspect of the evaluation. Blanchard [24] recently observed:

“Whenever one tries to find out and understand pupils' perceptions, there is an implicit message that their views count and that they have a valued role to play in deciding how to organise things. When such communication takes place within the curriculum, as part of the teaching and learning, it is all the more powerful in building pupils' confidence to express themselves and pursue what they want to achieve.” (p.265)

This quotation summarises the vision of the Digital Portfolio Project with regard to the importance placed on the pupils' perspectives, not only in the learning process, but also as part of the research. It was felt that the pupils provided an interesting and analytical view of the research and learning process; one that is not commonly considered in the academic community, although it is an increasingly popular research strand in the UK [25, 26]. This is an important perspective because it is so closely associated with the underpinning philosophy of the project.

When their comments are summarised they reveal astute understanding regarding the possible implications of ICT to document their achievements, the



positive effects of recording classroom activities using digital media and how using this evidence to reflect on activities can be a meaningful and worthwhile process. Pupil views document a critical part of this investigation: the process of and the learning outcomes which the digital portfolios facilitated.

Most research into pupil views has been completed by undertaking interviews with children either individually or as groups (focus group), this can be problematic as pupils, and young children in particular are usually eager to please and will therefore answer questions, especially from a teacher, in a way that they think will please them. Interviewing pupils is also time consuming and difficult to manage in lesson time. As this project was teacher-led the collection of pupil views needed to be structured in such a way that could be implemented by teachers in their classrooms.

The data collection method that was used had its foundation in a piece of research done by Hanke [27], where the perceptions of Year 1 children towards the Literacy Hour were investigated through the use of response templates. These templates represented the 4 sections of the Hour and required the children to draw in the faces of the pupils, with emphasis put on the expression which was chosen, with added speech/thought bubbles to provide an explanation for their interpretations. The findings of Hanke's research show pupils, even at this young age, have great empathy with other children in the class and a well-developed perception of the processes involved in the Literacy Hour.

The idea of response templates was adapted to incorporate the different learning and/or ICT-based activities that might be associated with the Digital Portfolio process. A key idea was that of reflection with an emphasis on the learning process that was closely associated.

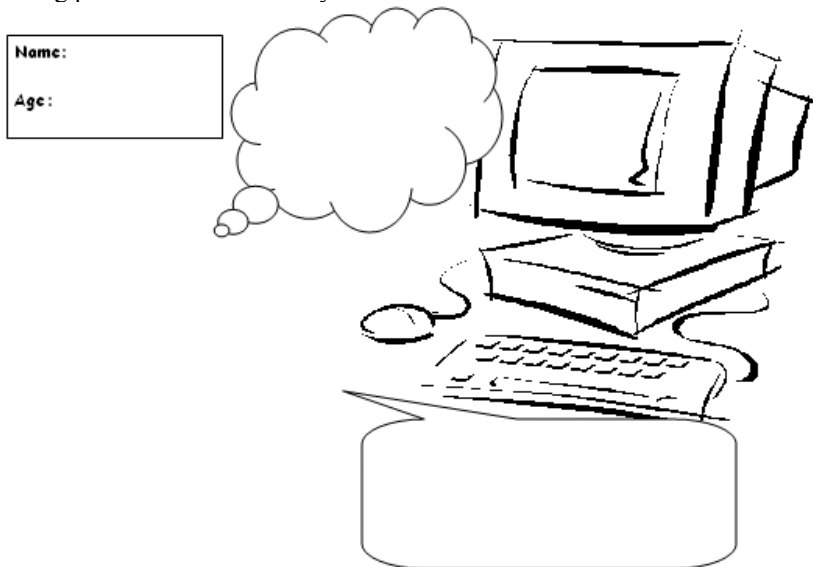


Figure 1: One example of the response templates used in the project.

The templates were designed to promote and capture the elements of reflection on learning or metacognition in particular both the internal elements (what the child feels is going on inside his or her head; what they think they have learnt, what skills they have achieved, and, importantly, how they have achieved their goals) and the external elements (what they think the benefits are more generally and what they would tell other children about the activity).

The templates had to find a balance between being specific enough to support pupils' thinking and reflection on their learning during particular tasks and general enough to be used across the great variety of work going on in classroom under the auspices of the Digital Portfolio Project. The common feature of all of the templates that were designed was the use of a speech bubble to express external elements and the thought bubble to express internal elements. These cartoon-like icons were kept constant, even though the particular scenario shown might be different (such as working with a video camera or on a computer). The intention was to make the data collection as comparable across situations as possible, but whilst offering support (in the form of pictures) to remind the pupils about the specific digital tools that they had used.

A key theme from the pupil comments is the recognition that the process of creating a Digital Portfolio and the final end product are equally important as part of the learning process. With regards to the process, many of the children commented on the importance of reflection and how the collection of evidence using digital media was beneficial.

*“Using the video made us look back and check our work”*

*“You can see what you are doing and it helps me to see mistakes. If I didn't use the video I couldn't see the mistakes I was doing”*

This was particularly the case in subjects of a more practical nature, such as design and technology, where this evidence collected became central to the 'do and review' process.

*“Photographs helped us with the designing of the Scilliewiggle.”*

*“I think you should use digital blues because you can look back and see what the next step is and to remember things.”*

In these more practical subjects the children also recognised the advantages of having a digital record of their work, images of the product at different stages during its creation and the finished result. These might have been lost or damaged if more traditional methods had been relied upon.

*“At the end you see all the different bits and how they make a finished product.”*

The pupils observed that reflection could help learning in a number of ways, such as supporting discussions between themselves and their teacher:

*“It was good checking the learning objectives and when your teacher told you that you had got them”*



It can support discussions with their peers as part of group work:

*“I have learned that working in a group you work together to reach what you are achieving.”*

*“It was good working with different people. My partner that I worked with was someone that I didn’t know but because we were helping each other with recording video, I got to know him really well.”*

It can be used as evidence to support the achievement of attainment targets and learning objects for assessment purposes:

*“It was good that we got to show where we met the learning objectives. It was like a success criteria.”*

The children also acknowledged that it could help them reflect on their skills, whether ICT, subject related or more general:

*“It’s a great way to learn and to look back on your work. You can look back at methods you’ve used, for example in maths. It also helps you to learn a lot about computers and that’s good because computers are needed.”*

Or sometimes awareness at a more personal level about their confidence and sense of achievements:

*“I’ve done something that I have acquired myself”*

*“I’d like to show it to my teacher at Middle School but just the teacher and me. She can tell me how I can improve then.”*

*“To learn more. To enjoy and have fun. To show your skills to everyone and not be shy. Help people to learn new things.”*

As the children learnt and mastered these skills there was also an element of independent learning and achievement which was recognised by the children as important. The pupil-led focus of the digital portfolios that many of the participant teachers wished to work towards and aimed to achieve was obviously something that the pupils valued.

*“It was good because the children did it not the teachers”*

As well as benefiting the reflection process, the pupils identified that the use of ICT meant that their work could be easily shared with others. This was a frequent comment, particularly with reference to involving parents and sharing with the wider school community.

*“This is me and mum and dad watching me on the computer. We are smiling”*

*“On computers you can put it on a floppy disc and use it at home and show your family.”*



*“I’m going to tell my mam, I’ve got something really special for you, you can see me at school.”*

On occasions pupils showed remarkable empathy in making observations regarding the suitability of using ICT as a method of recording achievement for pupils who find writing difficult and with special educational needs.

*“It is easier on the computer than on a display because you can listen rather than read. It is useful for disabled people.”*

Although the learning of ICT skills was not a focus of the project it is obvious from the comments made by pupils that this has been an important outcome. Many remarked on the different hardware and software that they had used and the new things associated with them that they had learnt.

*“I have learnt how to edit and think about not to delete things that you want. To think about putting clips in order.”*

*“As well as things I have learnt in the lessons, I have learnt how to work the video camera, use the sound recorder and PowerPoint.”*

Finally many of the comments relate to their enjoyment of the project:

*“I would tell children that this project is great fun and you will learn a lot.”*

## 4 Conclusions

This aspect of the Digital Portfolio Project has meant a number of important conclusions can be made. Firstly, asking pupils about how they learn and how a process of developing learning tools affects them is a valuable activity. The comments they have made are both informative and astute. The research has shown that pupils’ views can provide influential insight into the processes involved in learning and, more specifically, how ICT can facilitate this.

Secondly, the Digital Portfolio Project has demonstrated the way in which multi-media can be used to facilitate children’s talk about their learning. The combination of a digital portfolio and thinking skills has been revealed to be a powerful one with plenty of scope for development in the primary classroom. The reflective nature of the pupils’ comments regarding their learning and achievement as part of the digital portfolio give valuable evidence to support formative assessment theory [3, 14]. The role of ICT in this assessment adds an interesting new development.

Thirdly, a digital portfolio has the potential to create independent learners who are responsible for the collection of their own evidence of achievements across the curriculum and that this process has an impact on the pupils and how they perceive themselves and their learning. Evidence from the project indicates how ICT can be used effectively to support the learning of pupils and help to enhance their autonomy [22].





## References

- [1] Biggs J.B. (1988) The role of meta-cognition in enhancing learning. *Australian Journal of Education* **32(2)**, pp. 127-138.
- [2] Higgins, S. (2001) *Thinking Through Primary Teaching* Cambridge: Chris Kington Publishing
- [3] Black, P. and Wiliam, D. (2003) 'In Praise of Educational Research': formative assessment *British Educational Research Journal* **29(5)**, pp. 623-637.
- [4] Zimmerman, B. J. (1989). Models of self-regulated learning and academic achievement. In B.J. Zimmerman & D.H. Schunk (Eds.), *Self-regulated learning and academic achievement: Theory, research, and practice*. New York: Springer-Verlag.
- [5] Higgins, S. (2003) *Does ICT Improve Learning and Teaching in Schools?* Nottingham: British Educational Research Association
- [6] Torrance, H. & Pryor, J. (2001) Developing Formative Assessment in the Classroom: using action research to explore and modify theory, *British Educational Research Journal*, **27(5)**, pp. 615 - 631.
- [7] Somekh, B. & Davis, N. (Eds.) (1997) *Using Information Technology Effectively in Teaching and Learning: Studies in pre-service and in-service teacher education* (London & New York, Routledge).
- [8] Kankaanranta, M. (2001) Constructing digital portfolios: teachers evolving capabilities in the use of information and communications technology, *Teacher Development*, **5(2)**, pp. 259-275.
- [9] Berardi-Coletta, B., Buyer, L. S., & Dominowski, R. L. (1995). Metacognition and problem-solving: A process oriented approach. *Journal of Experimental Psychology--Learning, Memory, and Cognition*, **21**, pp. 205-223.
- [10] Pressley, M., El-Dinary, P.B., Marks, M.B., Brown, R. & Stein, S. (1992). Good strategy instruction is motivating and interesting. In K.A. Renninger, S. Hidi, & A. Krapp (Eds.), *The role of interest in learning and development*. Hillsdale, NJ: Erlbaum.
- [11] Jausovec, N. (1994). Can giftedness be taught? *Roeper Review*, **16**, pp. 210-214.
- [12] Higgins S, Baumfield V, Lin M, Moseley D, Butterworth M, Downey G, Gregson M, Oberski I, Rockett M and Thacker D (2004) *Thinking skills approaches to effective teaching and learning*. Research Evidence in Education Library. London: EPPI-Centre, Social Science Research Unit, Institute of Education.
- [13] Torrance, H. & Pryor, J. (1998) *Investigating Formative Assessment: teaching, learning and assessment in the classroom* Buckingham: Open University Press.
- [14] Clarke, S. (1998) *Targeting Assessment in the Primary Classroom: strategies for planning, assessment, pupil feedback and target setting* London: Hodder & Stoughton.



- [15] Clarke, S. (2001) *Unlocking Formative Assessment: practical strategies for enhancing pupils' learning in the primary classroom* London: Hodder & Stoughton.
- [16] Moseley, D., Higgins, S., Bramald, R. Hardman, F., Miller, J., Mroz, M., Tse, H., Newton, D., Thompson, I., Williamson, J., Halligan, J., Bramald, S., Newton, L., Tymms, P. Henderson, B. and Stout, J. (1999) *Ways Forward with ICT: Effective Pedagogy using Information and Communications Technology in Literacy and Numeracy in Primary Schools* Newcastle upon Tyne: University of Newcastle upon Tyne.
- [17] Moreland, J., Jones, & Northover, A. (2001) Enhancing Teachers' Technical Knowledge and Assessment Practices to Enhance Student Learning in Technology: A Two Year Classroom Study, *Research in Science Education*, **31**, pp. 155 - 176.
- [18] Higgins, S. and Moseley, D. (2001) Teachers' thinking about ICT and learning: beliefs and outcomes, *Teacher Development* **5(2)**, pp. 191-210.
- [19] Chang, C. (2001) Refining Collaborative Learning Strategies for Reducing the Technical Requirements of Web Based Classroom Management, *Innovations in Education & Teaching International.*, **38(2)**, pp. 133 - 143.
- [20] Chang, C. (2001) A study on the evaluation and effectiveness analysis of web - based learning portfolio (WBLP), *British Journal of Educational Technology*, **32(4)**, pp. 435 - 458.
- [21] Frank, M., Reich, N. & Humphreys, k. (2003) Respecting the human needs of students in the development of e-learning, *Computers and Education*, **40**, pp. 57 - 70.
- [22] Chen, G., Liu, C., Ou, K. & Lin, M. (2000) Web Learning Portfolios: A Tool For Supporting Performance Awareness, *Innovations in Education & Teaching International.*, **38(1)**, pp. 19 - 30.
- [23] Irvine, S.E. & Barlow, J. (1998) The digital portfolio in education: an innovative learning and assessment tool, *Journal of Information Technology for Teacher Education*, **7(3)**, pp. 321-330.
- [24] Blanchard, J. (2003) "Targets, Assessment for Learning and Whole School Improvement." *Cambridge Journal of Education.* **33(2)**, pp.257-271
- [25] MacBeath, J., Demetriou, H., Rudduck, J. and Myers, K. (2003) *Consulting Pupils: A Toolkit for Teachers.* Cambridge: Pearson Publishing
- [26] Clarke, A., McQuail & Moss, P. (2003) *Exploring the Field of Listening to and Consulting with Young Children.* London: DfES Publications
- [27] Hanke, V. (2000) "Learning about Literacy: children's versions of the Literacy Hour." *Journal of Research in Reading.* **23(3)**, pp.287-297.

