



## Digital forms of assessment: Assessing what counts, the performance

**Alistair Campbell**

Edith Cowan University

Future generations will look back at current assessment practices and wonder why it took so long to replace pen and paper assessment with quality digital forms of assessment. Digitization of the assessment process, from student work to the recording of marks is occurring now but haphazardly and is often only a replication of the paper assessment. The desired goals and aims of learning have rarely been fully achieved with pen and paper assessment. Could digital forms of assessment finally achieve them?

This paper begins with a background to the failure of traditional forms of assessment based on pen and paper to assess what counts and then argues through research findings that it is time that we in education catch up with the rest of society and move into the digital world especially when considering assessment. While many parts of education have abandoned the analog world for the digital one, assessment has not been one of them. This lack of digitization of assessment is holding back what is learnt and taught in all fields of education, as the form of assessment drives what is learnt and taught.

Our research has shown that high stakes assessment can be successfully digitized from the capturing of authentic student performance, to high stakes comparative pairs marking. Not only have we demonstrated this with current technology but that the reliability, validity, manageability and scalability are as good as or better than current practices.

Key words: innovative, technology, authentic assessment, performance, digitization

### Introduction

The digitization of the assessment process offers the possibilities to drive learning and education in positive directions through the capture of authentic student work in both standard and non-standard forms, and to assess students more efficiently, reliably and in different ways. Traditional marking methods of assessment and specifically those of non-standard forms have been time-consuming and costly. Non-standard forms of assessment cover a variety of formats from PDF to videos that can capture authentic student work (performance). This recording and capturing in real-time of authentic student work introduces the possibility to view and assess the process and not just the product of the student work, and this can be over an extended time period or a fixed time as in an exam situation.

Digitization of the assessment process is being implemented throughout the world but often haphazardly, only within specific parts of the assessment process and often only replicating the paper process, for example converting multiple-choice questions. However, research into the digitization of the whole assessment process from the student work through to the marking process is now being undertaken. This presentation will highlight the findings from one of these research projects.

## Background

Future generations will look back at current assessment practices and wonder why it took so long to replace pen and paper assessment with *quality* digital forms of assessment. The desired goals and aims of learning have rarely been achieved with pen and paper assessment. Further, pen and paper assessment tend to drive learning in directions that are often detrimental to the goals of learning and education. At all levels of education in Australia, pen and paper are currently the preferred method of assessment for both the recording of student work and the assessment of it, whether they are high- or low-stake assessments. Yet the rest of society at all levels have embraced the digital world wholeheartedly; very little is left of the analog world. Most students have access to many different types of digital devices and all teachers have access to Personal Computers. Yet both student and teachers are forced to use pen and paper in the assessment process. This has led to the ludicrous situation of students needing to practice hand writing under exam conditions, as Year 12 exams and many university exams require hand-written answers.

Assessment is important for all stakeholders and drives what is learnt and taught (P. Knight & Yorke, 2007). As Winter (Winter, 2003) states, it is the ‘core business’ of education and is often used to “convert learning into credentials” (p 112). To change education one must change the assessment process. The current use of pen and paper to assess students greatly distorts and is detrimental to what the research literature claims should be learnt, taught and assessed. The focus of assessment is on what can be explained and described textually, despite the fact that we know this is not what we want to teach and assess. While research into assessment (P. T. Knight, 2002) and management of assessment in higher education (HE) (Yorke, 1998) has found that these areas have been neglected in terms of both research and funding, the research that has been carried out into assessment has highlighted the fact that it often poorly done (Boud, 1995; Brown & Glasner, 1999; Ramsden, 1992), concluding that:

There is probably more bad practice and ignorance of significant issues in the area of assessment than in any other aspect of higher education. (Boud, 1995a) (p 35)

In this presentation the term ‘assessment’ has been divided into two distinct areas: the task assessment and the assessment of the task. The task assessment is what the student is required to do to complete the assignment; for example, the task might be an essay, a poster presentation or, as this paper is proposing, an authentic digital performance. The task assessment is what the tutor or marker does, that is, the marking. This paper will highlight some of the benefits and synergies that can be achieved by combining the digitization of both processes. This has previously been demonstrated by the work of Kimball (Kimball, 2007) with the use of E-scape technology.

## Assessing what counts

The digitization of the whole assessment process offers many innovative possibilities to drive learning and education in positive directions, through the capture of authentic student work, and to assess students more efficiently, reliably and in different ways. Within the assessment task area, non-standard forms of assessment cover a variety of formats – from PDF to video – that can capture authentic student work or performance over time. Within the task assessment area, the digitization of the marking process or task assessment provides the opportunity to reduce the busy and clerical work associated with it and provides the opportunity for effective and innovative forms of marking from self- and peer-marking, to comparative-pairs marking.

### The assessment task

Digitization of the assessment task allows students the opportunity to demonstrate and perform in authentic situations what they have learnt. For the first time, the student thinking process can be captured as they progress from the start of the task to the finished work or product. The following two examples from an RCA-funded three-year-study demonstrate the variety and range of performances that can be captured. They are high-stakes complex tasks in two senior secondary courses of study: Engineering Studies and Physical Education Studies.

The Engineering Studies task was a two-hour exam involving a scenario or problem to which the students had to design a solution. A number of development cycles were built into the task to allow

students to refine their design. The whole process was captured digitally via text, graphics, voice and video. This process not only allowed the students' final design to be displayed and described via a video clip and pictures, but also provided evidence of the students' development process involved in the final design. The technology used to capture this variety of digital information is shown in Figure 1 and ranged from text, picture of drawing designs and models, annotation of the drawings on the screen, and video. All this digital information was captured via the Internet.



**Figure 1: Technology used in the engineering exam**

The Physical Education Studies assessment was conducted over two sessions. The first session had two parts: first, in the computer lab, students answered questions using text and drawings of the sport field to demonstrate their understanding of the theory and skills needed in the sport; then, a number of videos were recorded in the sport field to capture their skills and game performances. Three video cameras were used to capture student performance and were then combined into one feed, as shown in Figure 2. This multiple image allowed the viewing of the same performance from different angles and distances. The second session took place a week later and gave the students an opportunity to reflect on the video performance, and to record via text and drawings their responses to questions on their skills and game plan. Currently, a number of different sports have been investigated including swimming, cricket and volleyball.



**Figure 2: Video clips captured by three cameras**

The response of both students and teachers to this type of digitization of student performance has been very positive. Issues of reliability, validity, manageability and scalability are being investigated and results are so far very encouraging.

### **The task assessment**

All student digital performance results were assessed in three ways: the teacher assessed the students' work using their own analytical marking key; two external markers assessed the work using a digital-rubric marking key; and five markers assessed the work using comparative-pair marking. The Engineering digital rubric-marking key, Figure 3, shows the marking key on the left with the student work on the right. The marker records the student's results by clicking on the radio buttons shown in

the figure and can easily move between students by selecting a list view of students and select the next one to mark. The process involves no paper handling and the marker can move seamlessly between the students' work. Figure 4 shows an example of the comparative-pairs marking window used for the Physical Education Studies exam. All the marker is required to do is to judge which piece of work is better based on agreed upon criteria, a large number of comparisons are made by a number of markers, and the software ranks the students' work based on the results of the series of comparisons.

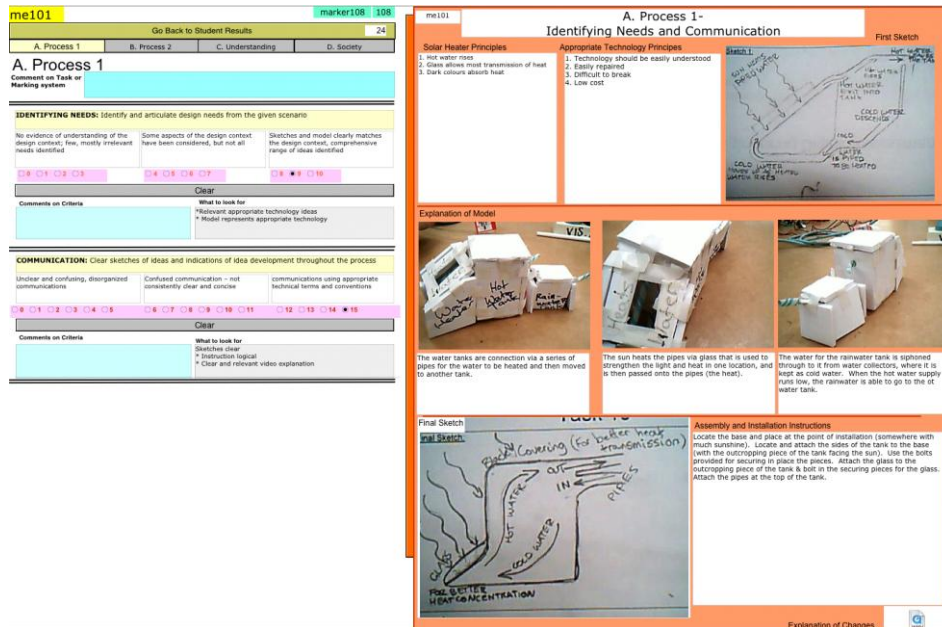


Figure 3: Marking window, showing part of the Engineering rubric marking key

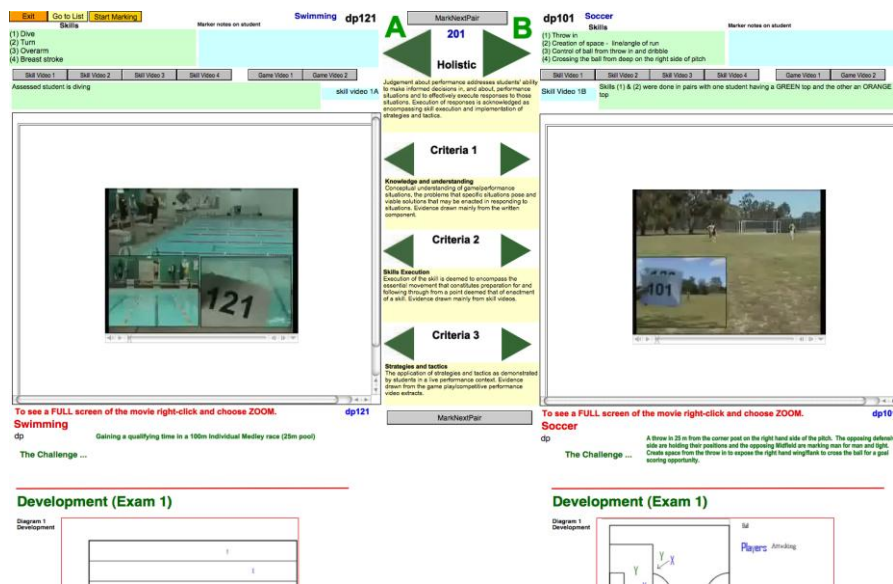


Figure 4: Comparative-pairs marking tool

Aspects of reliability, validity, manageability and scalability were investigated within and between the three marking processes. The findings suggest that the two analytical markers' results and that of the comparative-pairs marking are reliable and valid. Manageability and scalability issues are still being explored but preliminary findings are promising.

## Conclusion

Only through research into digital assessment can we successfully move away from the current analogue models of assessment, which distort the learning process by limiting what is being taught to what can be captured via pen and paper. Digital assessment, on the other hand, provides the means to capture students' knowledge and performance in many different ways, and in an authentic environment, and to assess them more robustly and in innovative ways. Digital assessment provides the means to improve the efficiency and effectiveness of the assessment process (Anglin, Anglin, Schumann, & Kaliski, 2008).

## References

- Anglin, L., Anglin, K., Schumann, P., & Kaliski, J. (2008). Improving the Efficiency and Effectiveness of Grading Through the Use of Computer-Assisted Grading Rubrics. *Decision Sciences Journal of Innovative Education*, 6(1), 51-73. <https://doi.org/10.1111/j.1540-4609.2007.00153.x>
- Boud, D. J. (1995). *Enhancing learning through self assessment*. London: Kogan Page.
- Boud, D. J. (1995a). Assessment and learning: contradictory or complementary? In P. Knight (Ed.), *Assessment for Learning in Higher Education* (pp. 35-48). London: Kogan Page.
- Brown, S., & Glasner, A. (1999). *Assessment matters in higher education: choosing and using diverse approaches*. Buckingham, UK: Open University Press.
- Kimball, R. (2007). e-assessment in projecte-scape. *Design and Technology Education: an International Journal*, 12(2), 66-76.
- Knight, P., & Yorke, M. (2007). *Assessment, Learning And Employability*. Maidenhead: McGraw-Hill International (UK) Ltd.
- Knight, P. T. (2002). The Value of a Programme-wide Approach to assessment. *Assessment & Evaluation in Higher Education*, 25(3), 237-251. <https://doi.org/10.1080/713611434>
- Ramsden, P. (1992). *Learning to Teach in Higher Education*. London: Routledge.
- Winter, R. (2003). Contextualizing the Patchwork Text: Addressing Problems of Coursework Assessment in Higher Education. *In ovations in Education and teaching International*, 40(2), 112-122. <https://doi.org/10.1080/1470329031000088978>
- Yorke, M. (1998). The Management of Assessment in Higher Education. *Assessment & Evaluation in Higher Education*, 23(2), 101-116. <https://doi.org/10.1080/0260293980230201>

### Author contact details:

Alistair Campbell  
Edith Cowan University  
Email: [a.campbell@ecu.edu.au](mailto:a.campbell@ecu.edu.au)

**Please cite as:** Campbell, A. (2010). Digital forms of assessment: Assessing what counts, the performance. In C.H. Steel, M.J. Keppell, P. Gerbic & S. Housego (Eds.), *Curriculum, technology & transformation for an unknown future. Proceedings ascilite Sydney 2010* (pp.159-163). <https://doi.org/10.14742/apubs.2010.2145>

Copyright © 2010 Alistair Campbell.

The author(s) assign to ascilite and educational non-profit institutions, a non-exclusive licence to use this document for personal use and in courses of instruction, provided that the article is used in full and this copyright statement is reproduced. The author(s) also grant a non-exclusive licence to ascilite to publish this document on the ascilite Web site and in other formats for the *Proceedings ascilite Sydney 2010*. Any other use is prohibited without the express permission of the author(s).