1-1-2011

Improving assessment outcomes through the application of innovative digital technologies

Julia Wren
Edith Cowan University

Alistair B. Campbell
Edith Cowan University

John Heyworth
Edith Cowan University

Christine Lovering
Edith Cowan University

Wren, J. J., Campbell, A. B., Heyworth, J. N., & Lovering, C. A. (2011). Improving assessment outcomes through the application of innovative digital technologies. Paper presented at the Australian Technology Network - Assessment Conference. Curtin University WA. Available here

Improving assessment outcomes through the application of innovative digital technologies

Julia Wren (j.wren@ecu.edu.au)
Edith Cowan University

Alistair Campbell (a.campbell@ecu.edu.au)
Edith Cowan University

John Heyworth (j.heyworth@ecu.edu.au)
Edith Cowan University

Christine Lovering (c.lovering@ecu.edu.au)
Edith Cowan University

Assessing students' live performances is challenging because the marker needs to make complex judgements, often very quickly, while at the same time recording information and watching the performance. This is further challenged when multiple markers are involved and moderation of marks is required. It can be difficult to maintain good assessment principles, such as fairness and validity and to offer students quality and timely feedback.

This paper describes a two phase, qualitative, action research project that trialled the use of an innovative, digital technology supported, assessment tool designed to improve the efficiency and effectiveness of assessment and moderation of live performances. The digital assessment tool enabled students to engage with the assessment and feedback from tutors and peers multiple times. The project was initially trialled with 170 pre-service teachers (in phase one) and then 200 pre-service teachers (in phase two) enrolled in an arts education unit in the third year of their Bachelor of Education course.

Literature is abundant with references of digital technology which is used to automate scoring and marks (Clarke-Midura & Dede, 2010), however, use of digital technology in this project does not replace the marker. Instead, it provides the marker with a tool with which to conduct and easily record rich observations of complex learning and it does so in a paperless, highly efficient and engaging way.

Keywords: cloud, digital assessment, iPad   **Go to Program**

Conference Themes: ③ Practical solutions   ④ Student Engagement

Introduction

Our Bachelor of Education students (pre-service teachers) are training to be teachers of eight learning areas and work with children ranging in age from 4 to 13. They are required to undertake two units of arts education study over two semesters in the third year of their course. The students are required to showcase the quality and scope of their learning in these units through a number of ways. One way is through short, live, group performances which incorporate visual art, music and drama. Ensuring that the assessment of a large number of groups is effective and efficient while underpinned by the principles of being fair, valid and consistent is a significant challenge. This was particularly so because it involved three markers (who were the tutors) marking the same performances simultaneously. Each marker assessed against the same criteria (creativity, skills, group work) but within a different art form (art, music, drama) which in turn has its own content.

Performance based assessment is specifically chosen for these units as it is best suited for assessing our students' complex intellectual and psychosocial knowledge and skills (Clarke-Midura & Dede, 2010). The challenge of capturing deep learning and recording the required evidence that has occurred is particularly problematic where the performances are short and ephemeral; such as a speech, a song, a dance or a play. It is easy for markers to get distracted by the need to write/type to record information about the learning *in situ* (often in low-light conditions) or the need to communicate with other markers to discuss immediate impressions. These types of

activities during performance often distract both markers and performers and increases inaccuracies in marking because the markers have to frequently take their eyes off the performance.

The challenge of providing timely feedback to students after the performances is crucial as research shows that formative feedback soon after the performance is far more effective than if it is delayed (Wiggins, 1993). The challenge of giving feedback to large numbers of students in a relatively short timeframe was significantly delayed by the 'behind the scenes' process we had. This process included the scheduling of face to face moderation meetings with markers, manual sorting and amalgamation of assessment records from the three markers, as well as printing and distributing feedback to students. Transferring individual student's marks from spreadsheet records onto marks submission forms created 'busy-work' type of workloads for the markers which took time away from the more professional work associated with assessing which markers perceived as being essential to provide a higher quality of marking and feedback.

Quality of feedback is crucial (Earl, 2003) if it is to enhance learning. Yet, like many educators, we found that despite our best efforts, many of our students did not fully engage with the feedback that we carefully crafted for them. Instead, they seem focused on the final mark (McGuire, 2005). Students told us that they felt external to the assessment process because it was directed by the markers. Wren, Sparrow, Northcote and Sharp (2009) found that higher education students expressed greater anxiety and dissatisfaction with the assessment when they felt external to the assessment process.

Aims of this study

We sought to develop a more efficient and effective method of assessing performance-based learning where multiple markers and a large number of student groups are involved. Wireless access to marking keys during the performance and videos of performances embedded into each group's marking sheet available immediately afterwards and during the moderation process, offers the possibility of a more reliable and instant access to each marker's comments and results. Online communication between tutors during and after the performances can enable the assessment and collation of marks to be an expedited process. Marks and feedback can be distributed back to students with ease and in less time.

This new and innovative approach to assessment can also contribute to student learning by involving the learners in assessment *as* and *for* learning. This can be done by having them analyse videos of previous performances and explicitly discuss and compare the quality of learning evident in these performances. By analysing previous performances, students are also clarifying what is expected of their own performances. This is also relevant for when they partake in group based peer marking and moderation of live performances.

This effort for 'digitalising' the process of assessing performance is a two phase study. We have now completed both phases.

Phase one research questions were:

- To what extent can the marking of student performances be streamlined by allowing each tutor to instantly see each other's marks and comments at the time of marking (during the performance) and to enable tutors to communicate with each other via the web, rather than in person during the performance;

- How effectively can the moderation of performances be conducted via the web so that tutors do not need to have face-to-face meetings but rather review and modify their marking by communicating with each other via the web at times suitable to each tutor;

- To what extent can the feedback process be made more educative by embedding the video of each group's performance into the marking key so that students can view their performance and engage with the tutor's marks and comments which are placed directly beside the video;

- What is the impact on turn-around time for feedback and marks for the 'digitalised' process which includes having the marking keys and videos emailed to students?

Phase two of research questions were:

- To what extent can mobile technology be used by tutors and students to enable them to safely (without cables) access best viewing points around the room during performances;

- To what extent can peers be engaged with the assessment process by being included in the live marking and to what extent is it technologically feasible to make their comments and marks instantly visible to tutors during the marking;

- How beneficial is it to enable the access and sharing of recorded videos to streamline the assessment process?

Methodology

We employed qualitative action research. Action research is most suited to this project as it requires the teacher/s to be the researcher/s, working collaboratively in a partnership with one another, the students and technical staff. All were to engage with critical analysis through reflection and to systematically collect evidence to bring about an immediate, innovative change to their practice to enhance learning of students (Cohen, Manion & Morrison, 2011; Wisker, 2001). A cyclical timeline was developed which involved the design, trialing, evaluating and improving the assessment tool. The project was evaluated throughout the semester with the coordinator, tutors and students being interviewed individually and/or through focus group discussions. The students also completed a voluntary online survey at the end of the semester.

Table 1 - showing the action research cycle over two years

2010

Design and development of digitised assessment tool

Trial of the digital assessment tool during rehearsal performances

Implementation of the assessment tool during performances by markers

Review and evaluation of the assessment tool and process

Recommendations made to improve the digital assessment tool and assessment process

2011

Refinement of the digital assessment tool and assessment process

Students view and assess exemplar videos

Trial of the digital assessment tool during rehearsal performances

Training of iPad2 by markers and students

Implementation of the assessment tool during performances by markers and peer groups

Review and evaluation of the assessment tool and process

Recommendations made for future research

Participants

Pre-service teachers

Phase one: 170 education students in the third year of a four year program in 2010.

Phase two: a new cohort of 200 third year education students in the same program in 2011. The students' performances were assessed in groups of 5 or 6 students. There were 28 groups in 2010 and 36 groups in 2011.

Marker/Tutor participants

The markers in this study were the tutors in the program. In 2010 the three tutors each taught a different aspect of the arts (music, drama and visual art). In 2011, the music and visual art tutors who taught in 2010 were teaching again, but the drama tutor was new. However, the previous drama tutor (although teaching elsewhere in 2011) was still involved with the reflective practices of this project.

The internet based assessment tool

Through the two phases of the project's action research, we were able to design, develop, trial and refine an internet based assessment tool. Reflecting upon and learning from our experiences in phase one of the project, as outlined in 'Improving marking of live performances involving multiple markers assessing different aspects' (Wren, Campbell, Heyworth & Bartlett, 2010), we came to the conclusion that we needed to be able to position ourselves around the performance room to gain best views of each performance for greater assessment accuracy. We found that the iPad2 provided us with an opportunity to trial portable technology. It also enabled incorporating student peer assessment. The touch screen technology of iPad2 enabled tutors and peers to quickly record information by tapping the screen to highlight a box on a rubric and also copy/paste comments from a comment-bank eliminating the need to take eyes off the performance for relatively long periods of time during which time a key aspect of a performance might be missed. The marking key also provided a space for each of the markers to type in additional comments if needed which, communicated feedback to the learner that was specific and critical to their point of need. Quality and precise feedback enables better communication about the learning (Absolum, Munro-Keene & Phillips, 2009) and enhanced motivation towards the learning (Denton, 2001). These comments were generally quickly captured immediately after the performance and refined afterwards.

The Internet-based assessment tool functioned as a password protected marking key with criteria specifically based on the unit outcomes, which were made explicit to students throughout the assessment process. Where the links between the learning and expected outcomes are made explicit to learners, the quality of learning is improved (Brunvand, 2010).

Each marker had instant access to all running totalled marks throughout the marking process. Information was automatically saved so they could also instantly access comments from other tutors and the peer group. In addition, at the tap of a finger, a marker had access to the whole cohort data spreadsheet where they could view each of the assessment criteria marks as well as total marks. This enabled individual markers to compare how they are marking from group to group and in comparison to the other markers. Access to these spreadsheets was usually made during the time immediately after the performance and later during moderation more so than during the performance.

The digital assessment tool imports the names of all students from the central university system and groups them according to their predetermined group number. It then instantly allocates the group marks to each individual in that group. The spreadsheet is downloaded and copied into university spreadsheets in the matter of minutes ensuring no human errors are made in the transfer of marks.

The peer groups (of about 5 individuals) sat together when assessing the live performance. They were familiar with the rubric content from previous work and could see it on the iPad2 while watching the performance. Groups chose to either share the responsibility of recording on the rubric by passing it around or they selected a leader to so. The peer assessing was in itself an assessed task. We needed a record of attendance and this was done simply and quickly by each group holding up the iPad2 and photographing themselves. The photo instantly embedded in the rubric alongside their names.

The students were not at any stage able to see the tutors' assessments but the tutors could see theirs. Having the tutors able to see the peer assessments sometimes gave the former insights into aspects that might otherwise have been overlooked. In a few instances, it alerted us to investigate these aspects further during moderation.

The tool enabled markers to begin the moderation process in the short breaks between performances. This was done via a confidential markers' chat box located on the digital assessment tool. As markers were frequently in different parts of the room, comments were posted by markers and instantly accessed by the others. This not only started the moderation process but recorded immediate and prominent observations which were recalled at a later moderation time. In addition, a few times during performances, markers could alert each other via this chat box to information about the group as was necessary.

The process of assessment using the digital assessment tool

As iPad2 technology was new to many, we scheduled the dress rehearsal week of the tutorial time to give ourselves and the students practice using the iPad2. We conducted 'dummy assessment runs' to test the assessment tool on dress rehearsal performances.

The performance assessment criteria were designed to measure the students learning across the unit outcomes, e.g. their use of 'creativity, artistic skills, group work and collaboration'. Each criterion was elaborated for music, drama and visual art and gave a clear indication of what it might address at various levels of achievement. The students were provided with two 2010 video exemplars of performances of different standards with the permission of those student groups in the videos. This was done so that students had the opportunity to identify and make a judgement about the quality of learning these performances showed. They assessed the videos using Microsoft PowerPoint incorporating Keepad 'clicker' technologies (LUL Technology, 2011) during the lecture time.

For example: *How well did you understand the content and purposes of the performance?*

1 = Unsatisfactory 2 = Satisfactory 3 = Commendable 4 = Exemplary

The process of assessing video performances engaged students in discussion about the criteria and assessment requirements. Seeing the trends and engaging with the tutors' commentary regarding expectations and assessment process enabled this assessment to be made explicit and educative.

The students' peer assessment rating scale on the iPad2 required the students to consider a different set of criteria to that of the tutor/markers. Their focus was less complex and more targeted at a specific set of outcomes. An example is shown in Table 2.

Table 2 - Rating scale used by students to assess peers' performances in 2011

Student rubric			
The content and purposes were difficult to understand	The content and purposes were only somewhat understandable	The content and purposes were clear and understandable	The content and purposes were exceptionally clear and easy to understand
How well did you understand the content and purpose of the performance?			
Unsatisfactory	Satisfactory	Commendable	Exemplary
How convincing was the performance?			
Unsatisfactory	Satisfactory	Commendable	Exemplary
How well did the performers maintain your focus and engagement?			
Unsatisfactory	Satisfactory	Commendable	Exemplary
How well did the performers use all the arts aspects of visual, musical, sound & dramatic?			
Unsatisfactory	Satisfactory	Commendable	Exemplary

During the two performance days, performances and peer assessments were scheduled so that every group had the opportunity to perform one week and peer assess on the other. The tutors assessed all groups on both days. Each video was then immediately separated from the rest and labelled its group number. At the end of the day, each video was compressed and embedded into the marking key. Markers had access to the password protected marking keys with the embedded videos within a short time. Markers moderated online at times convenient to each, over one week. They were able to communicate with each other via the chat box, amend their own marks and comments and view each other's marks and comments.

The process of embedding videos and converting the documents to PDF was done manually. However, collating marking keys from peers and tutors and emailing them to relevant individuals was automated using FileMaker Go (Filemaker, 2011) and this step required little time overall.

True to the nature of action research, the tutor-researchers engaged with ongoing reflection throughout the project cycles by discussing the research processes such as the intervention and the gathering of data. This engagement was done formally and informally, both in person and via email and phone. Notes were taken at these meetings and used to inform future actions.

Student surveys

The students were asked to anonymously complete a survey at the end of their peer assessment task and prior to receiving their marks and feedback. The survey asked questions about the whole assessment process; the use of exemplar videos to make the assessment explicit, the use of iPad2 for group peer marking and if they could see the application of the assessment Internet based tool in their own teaching practice with primary school children.

Results

Streamlining the assessment process:

The process of marking was streamlined because the Internet based tool automatically combined data bases from each tutor. Markers could quickly view how others were marking, what the group feedback and marks looked like and how the group being marked compared with other groups of their cohort. The whole cohort spreadsheet was accessible without delay at any time during and after performances. The data recorded by each tutor was automatically saved to a server and easily accessed from anywhere.

As well as the 'student view record' specifically designed for the students in their groups, the tool also provided a 'tutors view' of each record for drama, art and music. In this space, each tutor created their 'bank of comments' prior to and during the marking process. These comments were inserted in instances where the same comments applied to multiple groups.

The assessment tool enabled the streamlining of the process as it was paperless; busy work associated with preparing and distributing student feedback was eliminated.

As markers, we found that assessing 'in the cloud' on the iPads was highly satisfactory. We all liked the fact we could view each other's marks and comments at any time. We found that, for most part, we only looked at how each other marked after we had marked on our own. We kept notes about points that needed to be referred to later, particularly if the student peer markers noticed something we had not. We felt reassured that we could easily access and review the videos along with our assessments at any time and any place. We only reviewed the videos or parts of videos we felt we needed to. Doing so, did not significantly add to the time we spent assessing, though, as commented, the video touchstones increased our confidence in marking.

Typing on the iPad was a little cumbersome (one tutor had access to a wireless keyboard) but in a short time we got better at it. Several times the wireless connection was cut and it was reassuring that our work was being automatically saved.

Moderation via the web

The moderation process was highly effective as, in both phase one and two of the project, it provided the convenience of not having to arrange a face to face meeting. Moderating via the web provided us with the opportunity to engage with the moderation process on multiple occasions as we each logged on and reviewed the marking for varying periods of time when it was most suitable for individuals. As a result, all tutors felt that the moderation process was far more comprehensive than previously where we had limited times in which we could meet. The tutor chat box provided a confidential and silent method of communication between tutors during performance so it did not distract performers. It saved our comments to jog our memories later, so questions that arose *in situ* could be researched and addressed later.

Feedback to students

Majority of students, who responded, all reported that they liked their feedback returned to them electronically. They felt that "it is an incredible use of technology" (Student correspondences, 2010) and that it is unique and easy to access on and off campus.

Most of these students reported that they engaged with their feedback multiple times. Miels (1999) emphasises the positive effects and the value that is added to the learning when students are given multiple opportunities to view their videos.

The most common comment received, referred to students seeing value in being able to watch their own performance from the audience perspective and have the tutors' feedback beside the video for a quick reference. The video recordings of each performance provided visual evidence of the learning. For some students, this challenged or confirmed personal perception of how evident and explicit they had showcased their learning (Romano & Schwartz, 2005). The use of videos is common in performance-based assessment and research confirms their benefits to reflective and higher order learning (Brunvand, 2010; Ladson & Billings, 1998; Song & Catapano, 2008; Romano & Schwartz, 2005; Miels, 1999; Rich & Hannafin, 2009).

Some students reported that they shared their feedback with peers in other units as well as with family. For example,

> *The rubric and video were a fantastic way to present our marks. It was good to see what we looked like from the audience's perspective as it is so different when you are up on stage, also it is nice to have something to show for your work. The family all had a good laugh too!* (Student correspondence through survey, 2011)

Several students saw further potential of this electronic feedback and planned to present it as evidence of learning in their electronic resume. In phase two of the project, the students were surveyed on whether they could see themselves using this assessment tool in their own teaching. Over 90% indicated that they saw it as useful to them in multiple of ways. Some students provided a number of creative ideas which went beyond the arts. This level of engagement with their feedback is significantly improved. Prior to this project, evidence

indicated that fewer students engaged with their tutor's feedback, with emphasis and interest mostly on the final mark.

In the subsequent arts unit, next semester, students will be encouraged to use this feedback from tutors and peers to inform their own future learning goals. Constructivist theory underpins the learning in this course and using assessment *for* and *as* learning is the process by which students continuously inform themselves about their own learning progress (Stiggins, 2005). A shared view by many students is summed up by one below.

> *The embedded video was a very convenient and innovative way to organise the assessment information. It was the first time I had seen it used in a unit and I was quite impressed. The feedback was relevant and comprehensive and having the video itself there to view at the same time, was extremely beneficial. The provision of the video will also aid the ability of our group to assess ourselves and reflect on our performance in more detail.* (Student correspondence through email, 2011)

Mobility of technology

In phase two of the project, the mobile technology allowed the tutors freedom to move to vantage points around the performance room, where they had greater access to view the performance. The tutors could sit among the audience members rather than as judges at a fixed place in the drama room. Some students reported that they felt nervous seeing the three tutors marking so being able to 'blend' in with the audience may have eased some nerves.

A problem that arose from this was that the wireless connection was stronger in some parts of the room than others. Walking into a dark spot meant that the connection was lost and time had to be spent in re-connecting and logging back on. These dropouts happened several times to several markers.

Sitting among the audience members often seemed to invite prying eyes from those around to see how tutors were marking. Tutors reported feeling as if they had to hide their iPad2 screen while marking.

Peer marking

iPad2 enabled the students to take a group photo of themselves, which was embedded into their peer marking layout on FileMaker Go, as proof of attendance at the peer assessment task. As marks were associated with this, it meant that tutors did not have to take attendance records. The photo was only available to markers and not the performing groups, although the performers could see the peer marking group during performance. There were extensive discussions (within another unit where students were learning about assessment and evaluation) about how to give constructive, honest and useful feedback to learners. This was their opportunity to practice this skill in an authentic setting.

The students largely reported that the iPad2 was a useful tool. However, there were a number of problems with the assessment process. Firstly, the wireless connection was severed several times when students walked around with the iPad2. Secondly, some students held onto the iPad2 and did not give an opportunity for other students to use it. Thirdly, some of the text on the screen was too small for all group members to see it at the same time. Some students suggested that 2 or 3 iPads per group would have been better. A few students reported that they were very confident with using iPad2 and some felt that they needed far more training.

> *I don't feel that the 5 to 10 minute introduction conducted in one tute was sufficient. As the technology becomes more familiar, I think this will provide a valuable tool to use in peer assessments.*

> *I'm still getting used to all this iPad technology myself, but as we are now living in our technological age when going out into schools we are soon going to be faced with it, so, to have a glimpse of it now was very helpful. From a marking point of view is extremely quick and easy to use.*

> *I'm not sure if it is because we were unfamiliar with the iPads but I actually found that they made it difficult to peer assess. Since the iPads were difficult to use, we weren't able to get much feedback to our peers as was difficult enough to write and say a few words.*

> *The iPad was clear and easy to follow. We just had to click the buttons and then write a comment-it was very effective in the way of collecting feedback; it just took some groups a long time to do it.*

(Student correspondences through survey, 2011)

The survey response regarding receiving peer feedback embedded onto their marking key was positive. Many students reported that they appreciated their peers' feedback about their performance, particularly as they had all watched each other's performances evolve as they worked side by side throughout the semester.

With past peer marking tasks, we often found that peers' marks were mostly generous, particularly if they were not anonymously given. With this assessment process, however, we found the peers' marks comparable to ours. It may be that the exemplar marking and extensive discussion about giving feedback supported this. This is an area of this research which needs further close study.

It is interesting to note that the final peer assessments matched our assessments as follows:
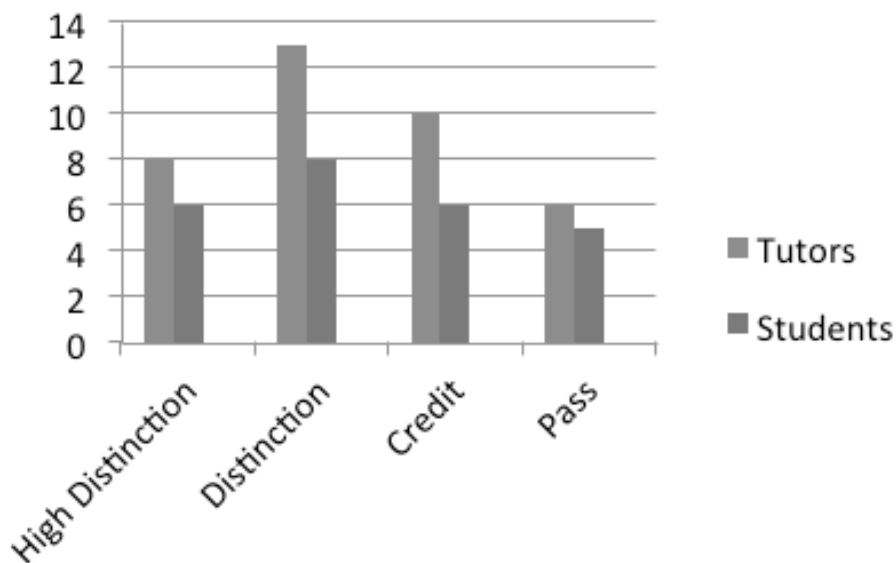

Figure 1 - showing similarity of grades awarded for performances by tutors and peers

The assessment process

The whole assessment process included the students through participation of peer assessment, assessment of exemplars, and their feedback contributions to surveys and other forms of communication, such as email and personal conversations. A large number of students felt strongly that the process of using exemplar videos, although valuable, was somewhat compromised when they were asked to assess last year's performances on this year's criteria (which were marginally different). The singular focus of these few students on the criteria differences meant that they may have missed the benefits of exemplar marking to their own learning.

> *Viewing the previous videos was a good idea, however as the criteria was different in some aspects I wasn't able to draw much inspiration from them. In a way, it helped me to see if we were marking the same as the tutors and what to expect when we mark.*

A moderate number of students felt they needed to view more performances. A few students did not know how to use key pads. Most indicated that more time to discuss the results would have been beneficial.

Conclusion and future directions

The *Horizon Report* (2007) states that "the environment of higher education is changing rapidly"(p. 3) and that "higher education is facing a growing expectation to deliver services content and media to mobile and personal devices." (p.5). This action research project enabled us to use technology as a tool to improve the way in which we assess our students when the capture and evidence of complex learning is required. Our students tell us that they learn better when assessment is clear and explicit, they know what evidence is being collected by the markers and they are involved with the assessment process. Modern mobile technology assisted us in involving them in a practical way.

Assessment can be a time consuming, cumbersome activity where 'busy work' is required to sort, collate and distribute feedback and marks to students. Using technology to streamline these tasks frees up valuable time and energy for the markers to engage with a more comprehensive marking and moderating activity. Their comments suggest that this technology-enabled process gave the markers a greater sense of satisfaction with the overall assessment process. In addition, being able to moderate anywhere and anytime meant that markers moderated on short but multiple occasions, rather than just once or twice as with face-to-face meetings. This gave markers a time to reflect and incubate ideas for more critical and comprehensive feedback. This did not seem to add time to the process. It did engage the markers more because they felt they were being more productive.

The students in our course are generally quite familiar with some technology such as accessing emailed attachments. The convenience of receiving their feedback and marks via email, particularly a week after semester's end, meant that they did not need to travel on campus to collect their marks. This promoted a greater engagement with feedback as did the embedding of the video of their performances.

Many people are visual learners (Gault, 2005) and our experience indicates that technology can help make learning and assessment stimulating because it allows easy access to images, video clips and sounds which can illustrate or consolidate key points. Therefore, other technologies we incorporated into this study, including the use of Keepad Interactive clicker technology, afforded increased interactivity, allowing for individual participation and instant feedback on assessment exemplars in the lecture theatre. In addition, with new and easier ways for lectures to be recorded and turned into podcasts, there is potential here to meet an increasing demand for online course delivery and assessment (Sprague, Maddus, Ferdig & Albion, 2007). New technologies offer efficiency and flexibility that will benefit student learning into the future.

The assessment, although developed over two phases of action research, needs further development in a number of areas. Chiefly, we need to (1) reassess the amount of training students require to use iPads, (2) check wireless connection in the performance room to ensure it does not cut out, (3) increase the amount of time each group has to peer assess and (4) discuss with students the value of marking exemplar videos so more see the benefits to their own learning.

The web based tool was refined in phase two and still requires further refining to reduce the time needed to resize and separate videos. The implications of our findings are that the digital assessment tool enables the capture of student learning when the nature of that learning is showcased through ephemeral performances such as talks, speeches, plays, skill demonstrations and presentations. The streamlined marking process utilises the technology to do the manual tasks associated with marks and feedback recording, collation and distribution to students. This frees the marker to invest their time in making professional judgements about the quality of learning. The feedback students receive is educative and engaging.

This technology and assessment process could be used in a variety of education settings from the youngest students to adults, across a range of learning areas. At present, we have three teachers (one in early childhood, one in primary and one in a secondary setting) who have expressed an interest in trialling this tool in their context.

We see a future use of this tool with a range of educational levels used inside and outside classrooms, where students are required to demonstrate complex learning through performance and where assessment is designed to be educative.

References

Absolum, Munro-Keene & Phillips. (2009). Definition of Narrative Assessment. Evaluation Associates Available from www.evaluate.co.nz/Modules/Resources/Download.aspx?ID=212 -

Brunvand, S. (2010). Best practices for producing video content for teacher education. *Contemporary Issues in Technology and Teacher Education, 10(*2), 247-256.

Clarke-Midura, J., & Dede, C. (2010). Assessment, Technology, and Change. *Journal of Research on Technology in Education, 42*(3), 309-328.

Cohen, L., Manion, L., & Morrison, K. (2011). *Research Methods in Education.* (7th ed.). Routeledge. London.

Denton, P. (2001). Generating Coursework Feedback for Large Groups of Students Using MS Excel and MS Word. *The Royal Society of Chemistry.* (1-7).

Earl, L. M. (2003). Assessment AS Learning: Using Classroom Assessment to Maximize Student Learning. Thousand Oaks: Corwin Press

Filemaker. (2011). *Filemaker Go.* Retrieved July 7th, 2011 from http://www.filemaker.com/products/filemaker-go/

Gault, B. (2005). Music learning through all the channels: Combining aural, visual and kinaesthetic strategies to develop musical understanding. *General Music Today,19*(7), 7-10.

Landon-Billings, G. (1998). Teaching in dangerous times: Culturally relevant approaches to teacher assessment. *The Journal of Negro Education* Summer 1-2.

LUL Technology Pty. Limited (2011). *Keepad Interactive.* Retrieved July 7th, 2011 from http://www.keepad.com/index.php

LUL Technology Pty. Limited (2011). *Turning Point.* Retrieved July 7th, 2011 from http://www.keepad.com/tp_software.php

McGuire, L. (2005). Assessment using new technology. *Innovations in Education and Teaching International, 42*(3), 265-276.

Miels, J. (1999). Videotaped teaching segments and the pre service teacher: Developing reflective practice. *The Teacher Educator, 34*(3), 181-188.

New Media Consortium, & Educause Learning Initiative. (2007). *The Horizon Report.*

USA: The New Media Consortium.

Rich, P. J., & Hannafin, M.J.(2008). Examining Pre-service Teacher Decision-Making though Video Self-Analysis. J*ournal of Computing in Higher Education*, *20* (1), 62 – 94.

Romano, M. & Schwartz, J. (2005). Exploring technology as a tool for eliciting and encouraging beginning teacher reflection. *Contemporary issues in Technology and Teacher, 5*(2), 149-168.

Song, K. & Catapano, S. (2008). Reflective professional development for urban teachers through videotaping and guided assessment. *Professional Development in Education 34*(1), 75-95.

Sprague, D., Maddus, C., Ferdig, R. & Albion, P. (2007). Online Education: Issues and Research Questions. *Journal of Technology and Teacher Education, 15*(2), 157-66.

Stiggins, R. (2005). Assessment for Learning Defined. *Proceedings of the ETS/Assessment Training Institute's International Conference: Promoting Sound Assessment in Every Classroom,* (pp. 1-3). Portland OR.

Wiggins, G. (1993). Feedback. In Assessing Student Performance: exploring the purpose and limits of testing (Ch. 6 pp. 182-205). San Fancisco: Jossey - Bass

Wisker, G. (2001). *The Postgraduate Research Handbook.* Palgrave. New York.

Wren, J., Campbell, A., Heyworth, J., & Bartlett, R. (2010). *Improving marking of live performances involving multiple markers.* Paper presented at the Ascilite 2010 conference jointly hosted by The University of Technology Sydney, The University of Queensland and Charles Sturt University. Sydney.

Wren, J., Sparrow, H., Northcote, M., & Sharp, S. (2008). Higher Students' Perceptions of Effective Assessment. *The International Journal of Learning, 15* (1), 11-24.