

**THE COMPUTERIZED PEER-
ASSESSMENT OF DIGITAL
STORYTELLING IN HIGHER
EDUCATION**

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The Computerized Peer-Assessment of Digital Storytelling in Higher Education

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Abstract

The use of Digital Storytelling has recently been developed (in a limited manner) as a means of developing student reflective skills in higher education. This paper reports on a study where students developed a Digital Story that was to be peer-assessed. The development and use of a menu-driven computerized peer-assessment system CAPODS (**C**omputerized **A**ssessment by **P**eers **O**f **D**igital **S**ories), which was based upon the original CAP system (Davies, 2000), is included and the results are presented that indicate the effectiveness of the peer-assessment process. Student feedback is included and some suggestions are made with regard to the suitability of using Digital Storytelling for assessing technically related subjects within the UK Higher Education sector.

Introduction

This study was performed with a small group of post-graduate students studying at the University of Glamorgan (2008), as part of their assessment within a 20 credit rated E-Learning module. This part of the assessment process constituted 40% of the module mark (the other 60% being equally split between a later piece of coursework and examination). The mark for this assignment was further sub-divided into 15% for initial peer-derived average mark, 20% for final tutor mark and 5% related to peer-marking quality and consistency achieved.

The intention of the coursework was to interleave together the development of a Digital Story (including academic referencing) with a Computerized Peer-Assessment process. There are numerous definitions available that attempt to define exactly what is a Digital Story?, but as Robin (2006) suggests “they all revolve around the idea of combining the art of telling stories with a variety of digital multimedia, such as images, audio and video”. It has been proposed by the Centre for Digital Storytelling (CDS, n/d), that there are seven main elements that comprise a digital story (taken from Robin, 2006), as shown in Table 1. However, this particular study is interested in utilizing Digital Stories in an ‘academic context’, therefore the elements of citations, referencing and possibly multimedia use will need to be considered as well.

Table 1: The Seven Elements of Digital Storytelling

The Seven Elements of Digital Storytelling
1. Point of View – what is the perspective of the author
2. A Dramatic Question – a question that will be answered by the end of the story
3. Emotional Content – serious issues that speak to us in a personal and powerful way
4. The Gift of Your Voice – a way to personalize the story to help the audience understand the context
5. The Power of the Soundtrack – music or other sounds that support the storyline
6. Economy – simply put, using just enough content to tell the story without overloading the viewer with too much information
7. Pacing – related to Economy, but specifically deals with how slowly or quickly the story progresses.

As McKillop (2004) notes “we remember stories with ease and struggle to make sense of abstractly presented facts and figures.” Therefore if we were able to develop these Digital Stories in a way that related to both the developer and viewer, we could make use of a rich new media to provide a learning and/or assessment object. Ohler (2008, pp 9) suggests that “stories become the cornerstone of constructivist learning, in which students become heroes in their own learning adventures.” Williams et al (2006) recognize that “Storytelling, one of the oldest media for transmitting and creating human knowledge, has paradoxically come full circle, returning to prominence and creditability as a mode of deep learning in the digital era”. Therefore, if as tutors we are able to integrate these Digital Stories into our curricula then there are possibly significant learning benefits to be achieved.

One of the key benefits offered by the use of Digital Stories is their inherent ability to be used as a mechanism to incorporate ‘Emotion’ within their presentation. Moon (2006, pp 18) states that “Emotion is considered to be in all learning”, and this is supported by McDrury & Alterio (2003, pp 26) who point out that “the most significant learning frequently takes place during or after powerful emotional events”. If we can capture this emotion and incorporate it within a student assignment, then we have developed a medium that is not just instructional but is powerful. A student is able to immerse themselves within a Digital Story rather than merely report abstract facts. By encouraging students to become ‘part of an experience’ we are developing “opportunities for students to gain new insights into their practice experiences” (McDrury & Alterio, pp 121). We can get the students to reflect on what they are developing as an end product for assessment purposes and give meaning to what would normally be static data.

The use of multimedia opens up new avenues for students to be able to fully demonstrate their understanding of a particular assignment, and permit them to include ‘feeling’ which is a fundamental human experience, and as McDrury & Alterio (2003, pp 42) emphasize this aspect of feeling “can no longer be ignored in education sectors”.

In the preface of Ohler (2008), whilst attempting to explain where technology and story meet, it is noted that “story without digital works, but digital without story doesn’t”. It is important therefore that there ‘is’ a story to tell and not that it becomes an exercise in multimedia development. The students should “use the technology to server the story and not the other way around” (Ohler, 2008, pp 6).

Digital Storytelling is currently being used mainly as a medium for providing an outlet for society to present aspects of life that in the past have been constrained to books and audio. The BBC is currently (2008) involved in numerous projects, such as Capture Wales (BBC, n/d), that promotes an on-line social history of various communities and people within these communities. There are some developments and links in using Digital Stories within UK higher education (Glam, n/d) (Pathfinder, n/d), yet the use of these links is currently having minimal impact on general student learning or assessment. The Centre for Digital Storytelling (CDS, n/d) in the USA is also involved in developing such outlets for groups to publicize and promote their communities and issues, but the majority of their links with education are mainly centred in the primary age sector.

What the assessment reported in this paper is attempting to achieve is to amalgamate the presentation media, include the powerful personal emotions, develop academic credentials and then assess the students. Whilst it is quite challenging it is important to recognize that the student and educational benefits are significant. Recognizing as Falchikov (2005, pp35) notes when discussing the limitations of traditional assessment such as essays and exams, “weaknesses in the traditional system do not prove the superiority of newer methods”, but the need to try to ‘move with the times’ and incorporate methods and resources that present day students are comfortable with (such as multimedia), is an essential need of higher education.

This study incorporates a means of the students being able to reflect on the methods that they have personally used to learn a skill and then by means of a Digital Story ‘explain’ to others (possibly in quite an emotive and personal manner) how they have learnt it. The students within the Digital Story must show academic credibility by including citations that reflect upon their personal learning style with the available academic literature.

Part of this assignment expected the students to perform assessment (both marks and comments) on the Digital Stories of their peers. In order to provide appropriate criteria for this assessment process, resources were sought off the web. Numerous rubrics were found, however these tended to be related to the ‘traditional needs’ of a Digital Story rather than to develop assessable criteria. A table of feedback (based upon a Rubric taken from: <http://www.umass.edu/wmwp/DigitalStorytelling/Rubric%20Assessment.htm>) was used as a base, with two additional categories being included, namely Academic Referencing and Use of Appropriate Multimedia Content (Table Two).

Table 2

MSc E-Learning Digital Story Feedback Rubric

CATEGORY	GOOD 0	1	2	POOR 3
Point of View - Purpose	Establishes a purpose early on and maintains a clear focus throughout.	Establishes a purpose early on and maintains focus for most of the presentation.	There are a few lapses in focus, but the purpose is fairly clear.	It is difficult to figure out the purpose of the presentation.
Voice - Pacing	The pace (rhythm and voice punctuation) fits the story line and helps the audience really "get into" the story.	Occasionally speaks too fast or too slowly for the story line. The pacing (rhythm and voice punctuation) is relatively engaging for the audience.	Tries to use pacing (rhythm and voice punctuation), but it is often noticeable that the pacing does not fit the story line. Audience is not consistently engaged.	No attempt to match the pace of the storytelling to the story line or the audience.
Economy	The story is told with exactly the right amount of detail throughout. It does not seem too short nor does it seem too long.	The story composition is typically good, though it seems to drag somewhat OR need slightly more detail in one or two sections.	The story seems to need more editing. It is noticeably too long or too short in more than one section.	The story needs extensive editing. It is too long or too short to be interesting.
Grammar	Grammar and usage were correct (for the dialect chosen) and contributed to clarity, style and character development.	Grammar and usage were typically correct (for the dialect chosen) and errors did not detract from the story.	Grammar and usage were typically correct but errors detracted from story.	Repeated errors in grammar and usage distracted greatly from the story.
Academic Referencing	Numerous citations have been provided throughout the story in order to provide rigorous support for assumptions and points being made.	A number of citations have been used throughout the story, however some assumptions and/or points have not been clearly supported.	There have been few relevant citations included within the story to support assumptions/points being made.	Few if any relevant citations included within story to support assumptions/points being made
Use of Appropriate Multi-Media Content	The story is enhanced by the inclusion of appropriate multi-media resources throughout	Areas of the story are enhanced/supported by the inclusion of appropriate multi-media resources.	The inclusion of multi-media has provided only limited if any enhancement of the story	The inclusion or exclusion of multi-media resources has detracted from the overall quality of the story.

Based upon a Rubric taken from: <http://www.umass.edu/wmwp/DigitalStorytelling/Rubric%20Assessment.htm>

Assessment stages

The actual assessment process comprised of a number of key stages that were undertaken over a period of six weeks. Initially the criteria to be used for assessment purposes were developed through discussion with the student cohort. The tutor initially presented a comments/feedback matrix as a base for these discussions and it was decided to enhance this matrix by adding two additional areas within the feedback criteria (as previously shown in Table Two). The actual marking criteria to be used comprised of three main areas, namely:

- The overall way the digital story has been presented including aspects such as clearly presenting objectives, ensuring the digital story flows at an appropriate speed and the detail of the content is appropriate. 30%

- The use of appropriate multi-media and textual resources in presenting a clear and aesthetically pleasing story. 30%
- The use and presentation of appropriate academic citations to support the quality of the story. 40%

The actual coursework specification is provided below:

Produce a ‘Digital Story’ (using Powerpoint) that will identify a ‘skill’ (preferably in the area of computing/multimedia but alternatives may be agreed with lecturer) that you have learnt (at a particular age). You will be expected to demonstrate and explain how you learned this skill and relate it within your story to appropriate researched Learning Styles. The duration of the story should be approximately 5 minutes and MUST include valid academic citations.

A discussion board was set up to support this assignment and ensure that the students were provided with appropriate support throughout the various assessment stages. This group of students’ attendance was limited to one session a week, therefore the use of a discussion board provided a tangible means of support and ensured that all the students received equal support.

The students were provided with a time slot of three weeks to complete their digital story and then submit it and any accompanying files in a zipped folder via Blackboard’s Digital Dropbox facility. Having received these files the tutor then placed the relevant presentations into a shared network folder with each student’s work included within a randomly allocated named folder aaaa-h. The students then were allowed a 45 minute session where they were permitted to view the various Digital Stories. This was intended to serve two purposes, namely:

- a) for the student to be able to check that their own Digital Story and ancillary files were linked appropriately and worked within the university laboratory.
- b) for the student to be able to view the ‘quality’ of their peers’ work prior to performing the assessment process. This form of assessment was totally new to this group of students (as it would have been to most students) and this opportunity of viewing others work would help them to develop their own levels and expectations based upon the marking and feedback assessment criteria shown above in Table Two.

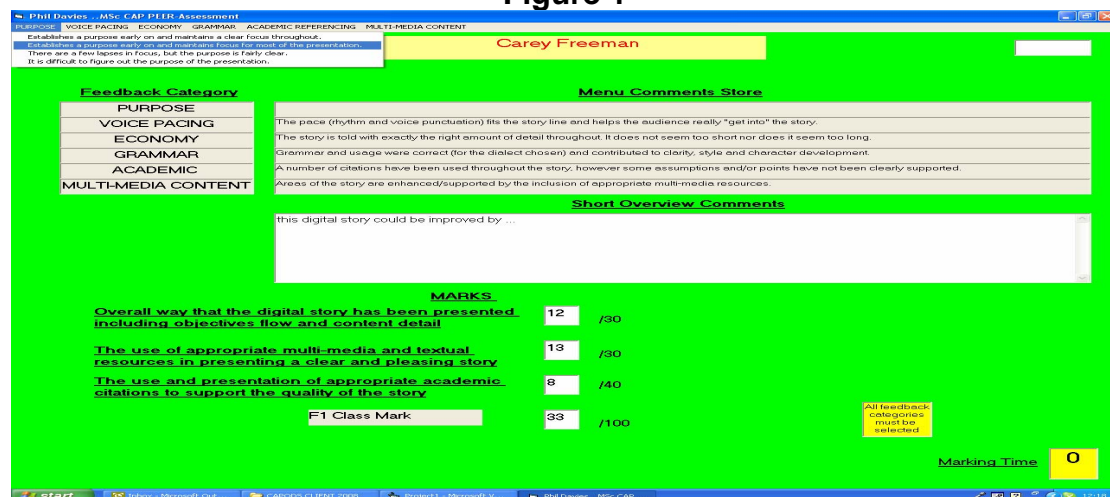
The students were then provided with a session of 20 minutes when they were expected to make use of the CAPODS system (Figure One) to perform a self-assessment of their own work. Having completed this process the tutor changed a server option and the students were then presented with the work of their peers in random order. They were then expected to mark and comment the work of their peers (again making use of both the menu driven and free text area) using the CAPODS system. The tutor after a period of 20 minutes noted that some of the free-text comments were decidedly limited and reminded the group that they were to be judged themselves on the quality

of their peer-marking and peer-feedback. This appeared to have the required effect and the free-text feedback appeared to improve and become more detailed and constructive in nature. Eventually after a maximum time period of two hours all of the peer-marking was completed.

The next stage of the assessment process was for the students to receive the peer-feedback from their peers prior to their submission of their final Digital Story to the tutor a week later. In order to accomplish this, the tutor simply emailed each student with a spreadsheet created from the marking database detailing the comments (not marks) of their peers. Having viewed this feedback and also having viewed other students' work from performing the peer-marking process, the students were permitted to review their Digital Story and re-submit prior to their presentation session with the tutor.

Having presented their Digital Story to the tutor (the following week), the students were provided with verbal feedback from the tutor, a tutor agreed mark and also were presented with data highlighting the consistency and appropriateness that they had shown in performing the peer-marking process. They were then requested to fill in a questionnaire to provide some qualitative data in order to assess the outcomes of the assessment process.

Figure 1



Results

It should be noted from Table Three, that the self-assessment marks produced by the students were 'quite' high with an average of 78.63%. Bearing in mind that these are post-graduate students, it would have been expected that the students possessed enough experience to have been able to critically reflect upon the standard of their own work. The average peer-mark produced was 63%, which appeared on the surface to be a better estimate of the quality of the student work (the tutor's average mark being 58%). Having received peer-feedback and having gone through the peer-marking process, the students were permitted to modify their Digital Stories and have them assessed by the tutor. This produced an average grade of 62.25%. The students were also to be judged on the consistency that they

showed in performing the peer-marking process (this is fully explained in Davies, 2007). The Mark-Difference column of Table Three indicates that there was a wide range of student markings varying from a student who on average over-marked their peers by +23.57, to one who on average under-marked by -18.7. However what is looked for is consistency in their marking, as shown in the Mark Consistency column where a low value indicates good consistency and a high value indicates poor consistency. Table Five presents the actual marks provided for each student by their respective peer. Further analysis will be undertaken in the future to assess whether any specific trends can be identified.

Table 3: Overall results from the study

Stud No.	Self-Assessment	Peer-Assessment	Tutor Original Mark	Tutor Final Mark	Mark Difference	Mark Consistency
1	82	82	78	80	-18.7	9.65
2	89	45	35	52	-9.85	6.59
3	75	47	50	50	+8.86	8.77
4	85	51	54	55	+15.57	4.28
5	65	55	55	58	+7.29	3.12
6	74	80	68	70	-8.86	7.02
7	90	69	60	65	+23.57	7.28
8	69	75	64	68	-6.28	6.39
	78.63	63.00	58.00	62.25		

It should be remembered that the feedback and its quality in providing appropriate constructive direction to the students is important. In the CAPODS system a pull-down menu is provided in each of the six categories. Each of these categories has four feedback options varying from Good (0) to Bad (3). If the these comments were to be quantified for each Digital Story then the results would be expected to correlate with the marks given i.e. a good Digital Story (high mark) would have a subsequently low feedback index (low number). Table Four shows the average quantified feedback scores for each of the produced Digital Stories. The correlation between the comments and the marks presented shows as expected a highly significant negative correlation of -0.91 due to a low mark in comments feedback being best comments. This is shown graphically in Figure Two.

Figure 2: Negative Correlation between Peer Marks (high good) and Peer Comments (low is good)

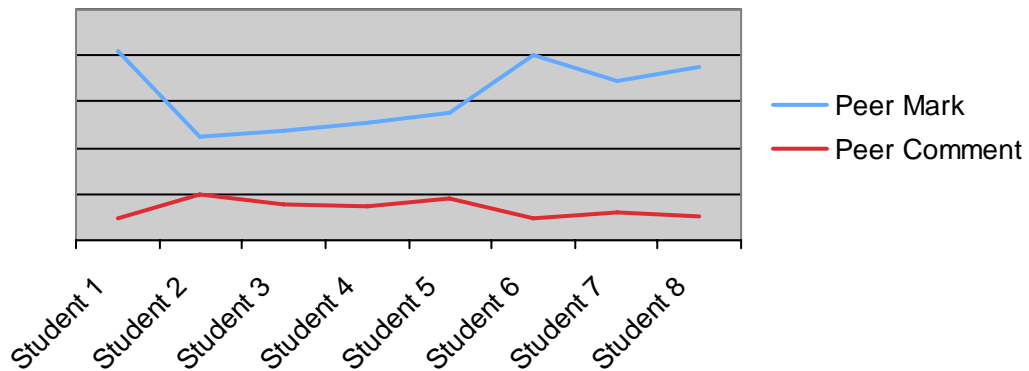


Table 4: Average Menu Driven Comments per Digital Story

Student Number	Point of View - Purpose	Voice - Pacing	Economy	Grammar	Academic - Referencing	Appropriate Media	TOTAL	Peer Mark Awarded
1	1.6	2.0	1.9	1.1	1.3	1.9	9.71	82
2	3.0	4.0	3.4	2.6	2.6	3.9	19.43	45
3	2.0	3.0	2.4	2.0	3.7	2.3	15.43	47
4	2.0	2.0	2.3	2.1	3.6	2.3	14.29	51
5	2.6	4.0	3.4	1.7	3.0	3.0	17.71	55
6	1.4	1.3	1.9	1.1	1.7	1.7	9.14	80
7	1.7	1.7	1.9	2.0	3.1	1.9	12.29	69
8	1.6	1.6	1.6	1.4	2.3	1.6	10.00	75
Avg	2.04	2.00	2.30	1.77	2.66	2.30	13.5	63

Table 5: Marking Consistency Results

		Digital Story Owner							
		(Original Average Median Peer Grade Awarded)							
		1	2	3	4	5	6	7	8
Student Marker / Marker Average Difference / Mark Consistency		(82)	(45)	(47)	(51)	(55)	(80)	(69)	(75)
	1 (82) -18.71 / 9.65		19 (-26)	34 (-13)	32 (-19)	20 (-35)	75 (-5)	38 (-31)	73 (-2)
	2 (45) -9.85 / 6.59	67 (-15)		47 (0)	40 (-11)	34 (-21)	75 (-5)	69 (0)	58 (-17)
	3 (47) +8.86 / 8.77	75 (-7)	50 (-5)		80 (+29)	55 (0)	80 (0)	87 (+18)	92 (+17)
	4 (51) +15.58 / 4.28	89 (+7)	50 (+5)	73 (+26)		80 (+25)	95 (+15)	88 (+19)	90 (+15)
	5 (55) +7.29 / 3.12	91 (+9)	45 (0)	65 (+18)	67 (+16)		86 (+6)	71 (+2)	75 (0)
	6 (80) -8.86 / 7.02	82 (0)	29 (-16)	40 (-7)	51 (0)	54 (-1)		43 (-26)	63 (-12)
	7 (69) +23.57 / 7.28	93 (+11)	62 (+17)	92 (+45)	90 (+39)	81 (+26)	92 (+12)		90 (+15)
	8 (75) -6.29 / 6.39	68 (-14)	40 (-5)	40 (-7)	48 (-3)	58 (+3)	78 (-2)	53 (-16)	

Feedback

Following on from the completion of the assessment process the students were presented with a feedback questionnaire. As noted previously the students were given spreadsheets containing peer-comments concerning their initial submissions. Out of the 8 students involved, 2 did not modify their digital stories, however out of the other 6 students the areas that were changed included modifying the quality and content of the voice over and also the inclusion of more references and citations within the body of the story. Two of the students made substantial changes based upon their feedback. One student interestingly went through the peer-feedback and modified 'common' suggestions i.e. attempting to satisfy the target audience.

Prior to performing the initial self-assessment of their stories, the students were permitted to 'view' all of the digital stories of their peers. They were asked if this had any effect upon them with regard to self-assessing their own work. In general, this aspect of the assessment process proved to be beneficial with a couple of students recognizing that there were major flaws in their own work. These 'flaws' may not have been recognized merely by their own 'viewing' of their story. The difficulty in having to develop a 'product' without having 'model' solutions against was alleviated by being able to view work of their peers.

Having performed the peer-marking process (often the first time that the student had been required to perform this form of assessment) the students were asked to recall some positive and negative experiences. From the positive perspective one student was 'entirely positive with no negative aspects'. The use of Powerpoint as a presentation tool was commented upon as being a very positive experience for some students who were 'unaware' of the possible functionality it offered. Two students commented upon how their confidence improved throughout the peer-marking process. Their ability to be constructive in their evaluation of the work of their peers was identified as being a significant positive. One student mentioned how he would have liked to have been able to go through his markings for a second time. This has been identified in the past (Davies, 2007) as being something that could be of benefit to the peer-marking process. The main negative points made identified the concerns that students had in being 'fair' and consistent in their peer-marking. As this was a new experience to many of the students (and in a new area such as Digital Storytelling) then the most common concern was 'am I doing this right?' As mentioned previously the ability to 'Review' peer-marking (Davies, 2007) has been identified as a positive and its inclusion in future uses of this assessment tool will be considered. However, it must be noted that by including a 'Review' stage then it will elongate the overall assessment process and as one student commented 'the time was limited in doing the coursework'. Some students felt 'restricted' by using Powerpoint rather than using tools such as I-Movies or MovieMaker. It was decided to use a 'common' tool for all in an attempt to minimize the impact 'technical knowledge and experience' would have upon the functionality of the final product to be assessed.

In past uses of computerized peer-assessment (Davies, 2000 & 2007) the 'need' for maintaining anonymity throughout the peer-marking process has always been identified as being 'of key concern'. However, in the production of these digital stories the 'personalization' of the end product is clear for all to see. However, the actual production of comments and marks is still anonymous. The students were asked whether knowing the owner of the digital story has any impact upon their marking. The students did not feel that knowing the person who produced the story had any effect upon the comments or marks they gave, but some felt that it might not have been so 'easy' to do if the owner had been able to trace comments that they had made about them.

One student identified how the receipt of negative feedback had initially been 'very de-motivating'. However this was qualified by 'until I sat back and analysed the situation' and made them think about their own role as an assessor. A couple of students felt that they had developed as reflectors on their own work because of having been put in the position as 'an assessor' for the first time. One student who is dyslexic identified clearly in their own mind the different ways in which peers learn – particularly compared with him. On being asked did going through this reflective practice (as set in the assignment) had on the whole been a 'real eye opener' for the majority of the students in that they'd 'never thought about how I learn things'.

The students were asked if they'd enjoyed being assessed in the manner described in this paper. The idea of doing an assignment 'in un-chartered territory' was really motivating. The students appeared to really enjoy the subject area, the development of a digital story and the peer-assessment process had been 'so much more stimulating than writing a traditional essay'. Of course there were some suggestions as to how the process could be improved, namely 'smartening up the CAPODS interface, provide more tutorial support with regard to Powerpoint functionality, offer a 'Review' stage in the peer-marking process and give more time.

One of the main positive aspects of the CAPODS marking tool was the support framework of provided comments. A couple of students identified how they would 'have liked to modify some of these pre-defined comments'. This is supported in the CAP tool (Davies, 2007) but was considered to be inappropriate for the assessment of the Digital Stories as again it would have elongated and possibly complicated the assessment process. In performing the peer-marking some of the Digital Stories were identified as having 'gone off at a tangent' and meant that some of the commenting categories were superfluous to needs. It may be suitable in future to permit the peer-marker to leave some of the comments categories free. A free text area is available for summary holistic feedback but this may need to be re-considered in future studies.

Finally the students were asked what they thought overall of doing digital stories as part of their assessment. The responses were unanimous in their support for this method of assessment with comments such as 'a fascinating project – would love to do more in this field', 'unique and useful in improving my skills', 'very useful tool', 'develops creativity and real skills' and 'it made me more confident and responsible for my work'.

Conclusions

Obviously with such a small and limited sample it would be inappropriate to draw any real significant conclusions from this study. From student feedback the development of a Digital Story has been both motivating and highly reflective. The use of the CAPODS system has provided the necessary framework to support peer-assessment, and also by having a number of pre-

defined stages within the assessment process has aided and promulgated student reflection.

By using the emotive and personalised aspect of Digital Storytelling the possibility of plagiarism has been removed. In past uses of Computerized Peer-Assessment using the CAP system, anonymity has been maintained with regard to the owner of the work to be assessed. This has been removed in using Digital Stories, however from student feedback alone this has had little bearing upon the marks and comments provided.

The students being able to 'modify' their initial submission based upon peer-feedback has proven to be highly productive, with the students noting how reflecting upon their initial work and taking into account the views of others has really helped them to become more self-critical and reflective.

The introduction of Digital Stories as a means of assessing a more technical subject area raises an interesting question as to its suitability and validity. Do technical related subjects lend themselves to be assessed in this manner? In parallel to this study an assessment was produced for under-graduate computing students in presenting the issues of specific needs in Web/ICT access. The students had to 'pretend' to be a student with a specific need and produce a Digital Story that identifies the problems that they are having in using technology. This required the students to perform research on the issues associated with accessibility and then include these references within their Digital Story. At time of submitting this paper, this assignment is still ongoing, but initial student feedback again has been very positive with regard to the students having to formulize a presentation that 'incorporates themselves' (in an emotive way) as the teller.

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