On campus and distance student attitudes towards paperless assessment and feedback

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It is generally accepted that the use of paperless submission and return of university assignments has potential advantages for reducing delays in each direction, especially for students studying part-time, online or at a distance. There are also potential advantages in terms of the quality of feedback and also potential cost savings through reduced printing either by the student or by the institution. A number of studies have explored the use of technologies to assist with the process of submission, marking or return of student assignments, but to date there is little information available about student attitudes to its use. This paper reports on a survey of students who participated in a large-scale trial of paperless submission, marking and return of assignments. The results suggest that students in general are strongly in favour of paperless approaches. Advantages identified included reductions in time delays, ability to retrieve feedback while away from home, improved legibility of feedback, reduced printing, and more convenient storage of past assignments. Disadvantages identified included the cost of printing returned assignments and problems with uploading over slow Internet connections. There was no significant difference between preference for paperless marking of students studying on campus and at a distance, with the majority of students in all study modes responding positively. Students were divided in their preference for receiving feedback via email (ie. using a push model), versus downloading their feedback themselves (ie. using a pull model), indicating that both alternatives should be made available.

Keywords: paperless marking, online assessment, electronic grading

Introduction

It is generally accepted that the use of paperless submission and return of university assignments has potential advantages for reducing delays in each direction, especially for students studying part-time, online or at a distance. There are also potential advantages in terms of the quality of feedback and also potential cost savings through reduced printing either by the student or by the institution. A number of studies have explored the use of technologies to assist with the process of submission, marking or return of student assignments, but to date there is little information available about student attitudes to its use.

This paper reports on a large-scale trial of paperless submission, marking and return of assignments at Charles Sturt University (CSU) in 2005. The trial included 20 internal, distance education and offshore Information Technology (IT) subjects, with 545 enrolments and 1023 student assignments. Students were strongly encouraged to submit their assignments and receive their feedback electronically and more than 99% of students chose to do so. Using an online questionnaire, students were asked questions about their preference for electronic versus paper-based submission of assignments, word-processed versus hand-written comments, and electronic versus paper-based return of assignments. They were also asked questions about the effectiveness of the submission and return systems used in the trial and open ended questions about aspects of the process. One hundred and fourteen questionnaire responses were received and the data from these responses is summarised in this paper.

Background

The standard workflow for the assessment of student work in tertiary education has been relatively stable for a very long time, with students submitting work on paper, lecturers annotating this work with comments and possibly completing an additional feedback sheet and students collecting their work in class. The shift towards blended learning incorporating face-to-face and online environments, along with the widespread availability of Internet technologies, have led to a reassessment of this standard approach

by many educators. There is widespread interest in the use of online marking (see for example Oliver & Mitchell, 1996; Price & Petre, 1997; English & Siviter, 2000; Hansen, Salter, Simpson & Davies, 1999). Behrens and Jones (2003) argue that the incorporation of technology into the marking process could potentially address many of the problems of traditional approaches as well as facilitating a wide range of new practices. However, they point out that a great deal of the innovative work reported in the literature is limited to a small scale and often relies on the involvement of committed staff. Valcke (1999) argues that with the advent of technologies the instructor is no longer considered as the sole actor responsible for the assessment and evaluation process, and notes that the availability of computer-based test systems helps students to monitor their learning process. Nipper (1989) highlights the particular importance of assessment and evaluation for universities involved in distance education. The shift from face to face to blended learning raises the importance of quality feedback in a similar way. A range of alternatives to the standard approach to assessing student work have been proposed and these have been summarised in Figure 1. Examples of each approach are described in the following paragraphs.

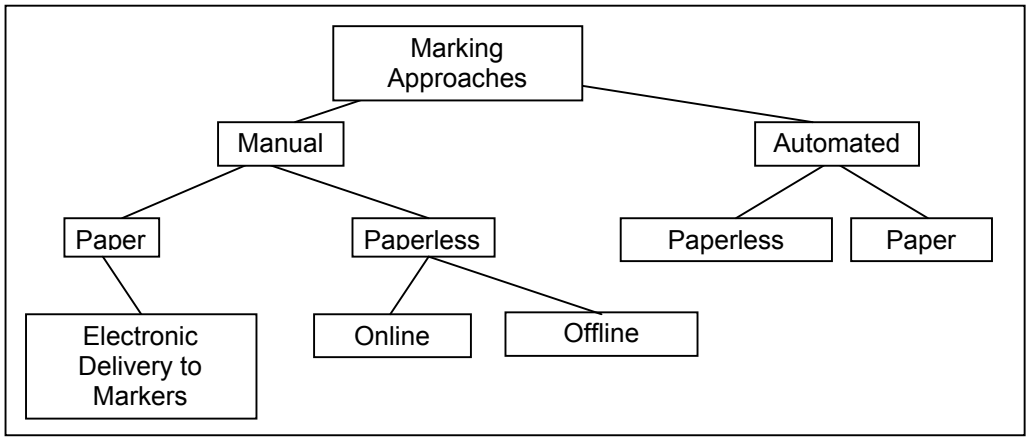

Figure 1: Marking approaches facilitated by technology

A simple extension of manual paper-based marking is the use of technologies to digitise and deliver the paper submissions to remote markers. Ward (2004) describes a large-scale project involving the establishment of offshore exam marking centres in countries such as South Africa. The Cape Peninsula University of Technology at the Bellville Centre has established a marking centre of 2,200 markers that will be marking one million examination scripts. Another extension of paper-based submission and feedback is the use of Optical Character Recognition (OCR) equipment to automatically mark multiple-choice test papers. This technology has been in use for decades and is still very widely used. An alternative is the use of online quiz systems which provide immediate feedback to learners. However, many prefer traditional paper-based assessment for examinations for logistical reasons. Both of these approaches can be limited in the types of outcomes that can be assessed and consequently the overuse of such approaches has been criticised by some researchers (see for example Eason, 2002).

Due to the limitations of multiple-choice assessment there will be a role for human marking of student work for some time to come. The major benefit that technology can provide in this context is in supporting the process of submitting, marking and returning student assignments. Electronic submissions of students' work can be marked either in an online or offline state. In the online state, the assessment is marked while linked to the server usually via the Internet. Online marking systems tend to be limited in their capabilities for providing feedback embedded within the students' work, and can involve usability problems. Offline marking systems, which involve downloading the students' work and then marking it using desktop tools, before uploading the marked assignments have the potential to provide a richer range of marking options and improved usability. Plimmer & Mason (2006) describe three offline marking alternatives: providing comments in a separate document; annotation within the text of the original document; or "ink-over" techniques, where a tablet computer with appropriate software can be used to write directly over the top of a student's assignment.

A number of purpose built online assessment tools have been developed, including *Classmate* (Baillie-de Byl, 2004), *Penmarked* (Plimmer & Mason, 2006) and a tool for marking C programs and simple prose developed by Mason and Woit (1999). The alternative approach that has been adopted in this study is to make use of the document editing features of conventional desktop applications such as Microsoft Word and Microsoft Excel. Yohon and Zimmerman (2004) discuss the use of the Track Changes, Comments and AutoCorrect functions of Microsoft Word. They argue that online edits allow for enhanced critiques beyond those traditionally provided with hard-copy edits.

Price and Petre (1997) in an evaluation of electronic and paper assignment marking found that the nature and quality of feedback were comparable. They identify benefits of electronic marking to be improved legibility over hand written feedback, the ability to more clearly correct students' work, the ability to revise and undo erroneous corrections and generally better presentation in the feedback provided to students. They reported that 22% of students found hand-written comments difficult to read. Mason and Woit (1999) in an evaluation of their online marking tool noted that markers identified speed of marking, lack of customisation and general interface design issues as problems. Surprisingly, Jones & Jamieson (1997) found that online marking was taking 20-30% less time than marking traditional assignments although they acknowledge that there was a familiarisation overhead. Preston and Shackelford (1999) investigate the process of marking within the context of developing an on-line marking system. They suggest that the marking interface should allow for a big-picture view of the students' work, hiding and displaying implementation details when needed. They also mention mechanisms for navigation through the students' work and annotation features as important.

Byrnes and Ellis (2006) conducted a survey of 391 academics across 34 Australian universities and other higher degree institutions. They found that 71% of the respondents conducted units with some form of online component, but that the use of online assessment was not as widespread. The most commonly used type of online assessment was assignment drop boxes (and emailed assignment submission), followed by online forums, and then online quizzes. The use of tools to facilitate the paperless marking and return of students' work by lecturers seems to be very limited. Palmer (2005/6) reported on a limited evaluation (27 questionnaire responses) of online assignment submission, marking, and return in an Engineering subject, with speed, timeliness and ease of operation reported as commonly identified positive aspects of the process. Further research studies are needed which explore the degree to which students see such tools as important to provide guidance to other institutions considering adopting such approaches.

The CSU context

At CSU students enrol in subjects either in Distance Education (DE) mode or Internal (on campus) mode. The study mode they enrol into determines to an extent the resources and online support they have access to. DE students are provided with three options when submitting written assignments. They can hand-deliver their assignments to a CSU campus, mail them, or submit them via CSU's purpose built Electronic Assignment Submission and Tracking System (EASTS). EASTS offers comparable functionality to commercial systems like WebCT and Blackboard for uploading assignments electronically; this feature is often referred to as an assignment or digital drop box. Normally assignments submitted via EASTS are printed by CSU's central Learning Materials Centre (LMC) and then delivered via internal mail to the academic for marking. Once marked, academics return the printed assignments to the LMC, who then mail them back to the students. Internal students normally submit their assignments in a printed form and have them marked in the traditional paper-based way before collecting them during class time.

The following problems and deficiencies are identifiable in the above paper-based operations:

- There are substantial time delays for distance students. The delay in delivering an assignment to an academic and returning a marked submission to a student (not including the marking time) is estimated at being at between five to eight working days, or substantially longer for overseas students.
- The percentage of DE assignments handled by EASTS is increasing. For example, it increased from 40% of all DE submissions in 2001 to 60% of all DE submissions in 2003 and is currently estimated to be greater than 85%.
- The cost of printing and despatching electronically submitted assignments to academics is greater than $100,000 annually.
- Internal students are inconvenienced by having to travel to the campus to submit assignments with the requirement to submit assignments during working hours being an additional inconvenience to some students.

The use of entirely paperless submission, marking and return of assignments has the following potential advantages over the existing approach:

- Substantial reductions in the delays incurred by students in receiving returned submissions;
- Streamlining of the process of making assignments available to external casual markers, some of whom are located remote from the campus;
- Substantial reduction in the printing costs incurred by the University;

- Reduction in the likelihood of lost assignments, especially if a central database driven submission and return system is used;
- Provision of better quality feedback to students; and
- More systematic identification of plagiarism and collusion.

One purpose of this large-scale trial of paperless assessment was to determine the degree to which students perceived an advantage of paperless assessment as well as to identify any unanticipated problems with its use from a student perspective.

Method

Overview

The project commenced in Spring session 2004 with the exploration of hardware and software configurations prior to purchase. In Autumn session 2005, paperless marking was undertaken in seven Internal, one DE and three dual mode subjects with a total enrolment of 254 students using 21 different assessment items and a total of 554 student assignments. A variety of assessment types, feedback styles and hardware and software configurations were trialled. Marking was undertaken by members of the project team as well as by external markers. Students in the subjects involved were asked to complete a survey on positive and negative features of paperless marking and on the capabilities of the EASTS system. In Spring 2005, paperless marking was undertaken in three Internal, three DE and three dual mode subjects with a total enrolment of 280 students using 18 different assessment items and a total of 469 student assignments. Once again a variety of assessment types, feedback styles and hardware and software configurations were trialled.

The subjects included in the trial were all Information Technology (IT) subjects reflecting the teaching area of the project team. An earlier pilot study identified a number of usability problems with the EASTS system for paperless return of marked assignments and it was our view that a trial with students with limited IT skills may have resulted in an overly negative impression of paperless marking due to problems with this system rather than of paperless marking per se. Additionally, it was our view that for academics with limited IT skills to undertake paperless marking, substantial support and resources beyond those currently available would have been required, and consequently it was unreasonable for such academics to participate in the trial at this stage. Nevertheless, we recognise that the sample used in this study will lead to limitations in generalising the results and follow up studies using a wider student and academic sample are essential.

Tools and techniques used

The paperless marking process consists of three separate processes, namely submission, marking and return. In each case there are a number of alternative approaches that can be used. For example assignments could be submitted via email or through an online web site. Electronically submitted and marked assignments could then be returned either through email, through a web site or in a traditional printed form. When marking assignments electronically, the marker has the options of inserting comments into the student's work, providing a separate feedback sheet, or annotating the student's work with comments, for example using a pen-based or tablet computer. Our earlier trials of paperless marking had found that it had the potential to be more time consuming than paper-based marking. We believed that this inefficiency could be reduced through appropriate use of hardware and software and through appropriate marking techniques. Our views diverged, however, on which hardware, software and techniques would be the most effective in this context and a key aspect of the trial was to explore and compare a number of approaches. This section describes and summarises the main hardware configurations, software packages, file formats and feedback styles included in the trial. Our conclusions about the relative effectiveness of each are outside the scope of this paper, but will be separately reported.

Submission formats
Different assignment types lend themselves to different submission formats and consequently a number of different submission formats were trialled, including Microsoft Word, Excel and PowerPoint. Additionally in IT subjects it is quite common for students to be required to submit program code or database files, in addition to documentation and in these cases students submitted a number of files as a single compressed Zip file.

Marking hardware
There were four main hardware configurations trialled consisting of desktop and tablet computers with and without dual monitors. A desktop computer with dual monitors provides a single screen area spread across the two monitors, with the user able to move the mouse smoothly between the two monitors. Additionally, separate documents can be displayed on each monitor so that a student's assignment can be displayed on one monitor and a feedback sheet or marking rubric can be displayed on the other. Similarly, a Tablet computer with an external monitor acts as a dual monitor machine because the external monitor displays an extension of the desktop area displayed on the built in monitor. Some members of the project team also used a laptop computer. Because the capabilities provided by a laptop or notebook computer are identical to those provided by a desktop computer, they have been treated as a single configuration.

Return mechanisms
The two approaches to assignment feedback available to us were return using email and return by uploading to the EASTS system. In this trial, all markers used EASTS for feedback return. When marked assignments are uploaded to EASTS, students are automatically sent an email notifying them that their assignment is available for collection. They can then download it from the EASTS system at a convenient time.

Returned file formats
Assignment feedback, whether paper-based or paperless tends to consist of the student's work annotated with comments and marks and/or a feedback sheet or marking rubric showing the student's marks for each of a series of criteria, along with comments. The actual file formats returned to students varied depending on the nature of the assignment, the file format of the student's submitted work, the software used for marking and the marker's individual preference. The most common return file format was Microsoft Word. Some members of the project team used Word to annotate the student's work and to create a feedback file but preferred to convert the returned file to PDF using Adobe Acrobat. Where assignments were marked by writing directly on the student's work using the tablet computer, it was necessary to convert the feedback file to PDF to allow the student to read it. The alternative of providing students with a free reader for the tablet computer's Windows Journal file format was considered too cumbersome. **Table 1** lists the return file formats used in the trial.

Table 1: Return file formats

Return File Format	Description
Word	Word document with inserted comments and marks
Word PDF	Word document with inserted comments and marks converted to PDF file
Excel PDF	Excel spreadsheet with inserted comments and marks converted to PDF file
Access PDF	Access application created specifically for recording student marks and feedback with output converted to PDF
Word Zip	Word document with inserted comments along with feedback file containing marks converted to Zip file
Tablet PDF	Tablet journal file with written annotations and marks converted to PDF

Evaluation techniques

Data relating to student perspectives was gathered using an online survey. All students involved in the paperless marking trial were asked to complete the survey using a combination of face-to-face reminders in class, emails and online forum messages. In all, 56 out of 254 students responded to the survey in Autumn session and 58 out of 280 students responded in Spring session. The survey consisted of six Likert scale questions, one yes/no question, and five questions allowing the student to write free-form comments elaborating on their answers. Questions related to the students' preference for paperless versus paper-based submission and return of assignments as well as the capabilities of the EASTS system for assignment submission and retrieval. **Table 2** lists the seven closed questions included. For the first six questions a seven point Likert scale from very strongly agree, to neutral to very strongly disagree was provided. For the seventh question the options were undecided, yes, and no. Questions five and six relate specifically to the EASTS system and are considered to be outside the scope of this paper. The responses to these questions have been reported in Dalgarno, Miller, Chan, Adams and Roy (2006).

In the online survey the closed questions shown in **Table 2** were followed by open ended questions designed to allow the students' to provide feedback on the issues of interest in their own words. These are listed in **Table 3**.

Table 2: Closed questions on student questionnaire

1. I prefer electronic submission through the EASTS system to conventional submission of assignments (via post for distance students or through an assignment box for on campus students). 2. I prefer typewritten or word processed feedback on assignments to hand-written feedback. 3. I prefer to receive my assignments back via email or the web rather than by conventional means (in the post for distance students or in class time for on campus students). 4. If assignment feedback is to be electronic, I would prefer to download it myself from an online system rather than having it emailed to me. 5. The existing EASTS system is an effective tool for electronic submission of assignments 6. The existing EASTS system is an effective tool for the electronic retrieval of assignment feedback 7. Do you think that electronic paperless assignment feedback should be used more widely?

Table 3: Open ended questions on student questionnaire

8. If you answered yes to this question (or you are uncertain of your answer), please provide up to three reasons for the wider use of electronic paperless assignment feedback: 9. If you answered no to the above question (or you are uncertain of your answer), please provide up to three reasons why conventional printed assignment feedback should be retained: 10. Please give us any additional comments or suggestions you have about the ease of use of the EASTS system for **assignment submission**: 11. Please give us any additional comments or suggestions you have about the ease of use of the EASTS system for **retrieval of assignment feedback**: 12. Please give us any additional comments or suggestions you have about **the way paperless marking was used in your subjects this sessio**n:

Results

Electronic submission

Students were asked to indicate their degree of agreement with the statement "I prefer electronic submission through the EASTS system to conventional submission of assignments (via post for distance students or through an assignment box for on campus students)". The results, shown in **Table 4** suggest that respondents, regardless of study mode, would overwhelmingly prefer to submit their assignments electronically.

Table 4: Student survey responses to "I prefer electronic submission through the EASTS system to conventional submission of assignments"

Study Mode	Very Strongly Agree	Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree	Very Strongly Disagree
Internal	25	7	7	1	2		
Domestic Distance	37	5		1		1	
Offshore Distance	9		1				
Unspecified Mode	11	3	2		1		1
Total	82	15	10	2	3	1	1

One of the interesting aspects of these responses is that there is a clear preference towards electronic submission by the Internal students. While the Distance education students have been able to submit assignments electronically for some years, the Internal students were only given access for the first time when they took part in this trial. With any innovation adoption which requires change in behaviour, there is often some resistance to change. In this case the Internal students show a clear preference for electronic submission, despite having the option of continuing with their current behaviour of submitting their assignments by hand.

Form of feedback

Students were asked to respond to the statement "I prefer typewritten or word processed feedback on assignments to hand-written feedback". This question was designed to determine whether typewritten feedback was important irrespective of whether the feedback is then printed or provided electronically.

The results are presented in **Table 5**. Clearly there is a very strong preference for typewritten feedback again irrespective of study mode.

As outlined, electronic feedback was provided in a range of formats across the subjects used for this study. This included embedded comments, a separate marking sheet and feedback structured using a custom designed database application. While some students commented that the typewritten feedback was easier to read, the themes of storage, retrieval and access flexibility were more common and these are explored later in the Discussion section.

Table 5: Student survey responses to "I prefer typewritten or word processed feedback on assignments to hand-written feedback"

Study Mode	Very Strongly Agree	Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree	Very Strongly Disagree
Internal	17	8	10	3	3		1
Domestic Distance	15	9	11	6	2		1
Offshore Distance	4	5		1			
Unspecified Mode	5	2	1	5	1	1	3
Total	41	24	22	15	6	1	5

Feedback delivery

Students were asked to respond to the statement "I prefer to receive my assignments back via email or the web rather than by conventional means (in the post for distance students or in class time for on campus students)". This question was intended to focus on the delivery of the feedback rather than the form of the feedback. The results are presented in **Table 6**. Although there is a clear preference for electronic feedback, there is a sizable minority of students (especially Internal students) who either would prefer to receive their feedback through conventional non-electronic means, or are uncertain of their preference.

Table 6: Student survey responses to "I prefer to receive my assignments back via email or the web rather than by conventional means"

Study Mode	Very Strongly Agree	Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree	Very Strongly Disagree
Internal	15	5	11	4	6		1
Domestic Distance	22	10	5	3	3		1
Offshore Distance	7	2		1			
Unspecified Mode	7	4	3	3			1
Total	51	21	19	11	9		3

Students were asked to respond to the statement "If assignment feedback is to be electronic, I would prefer to download it myself from an online system rather than having it emailed to me" and the results are presented in **Table 7**. There are about equal numbers of students who would prefer web based retrieval and those who would prefer emailed return of assignments.

Table 7: Student survey responses to "If assignment feedback is to be electronic, I would prefer to download it myself from an online system rather than having it emailed to me"

Study Mode	Very Strongly Agree	Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree	Very Strongly Disagree
Internal	11	3	5	6	11	2	4
Domestic Distance	9	5	10	12	6	1	
Offshore Distance	1	2	1	2	3		1
Unspecified Mode	4		4	4	3	1	2
Total	1	25	10	20	24	23	4

The breadth of responses to this question is indicative of a long running debate amongst those who provide electronic content about whether the push or pull model is better. This probably suggests that the

system should allow either for students to choose how their assignments are to be returned or for assignments to automatically be both emailed and posted to the web. There are many individual factors which are likely to influence the preferred delivery method. These include speed and quality of Internet access, file receive limits and restrictions on work email addresses and the fact that distance education students have very individual study patterns which fit around their work and family commitments. It is worth noting that there is also an institutional consideration of being able to track the return of assignments to students. This could be problematic in an email only delivery system where technical problems could see the email 'bounce' back to the University.

Overall preference

In the final closed response question, students were asked "do you think that electronic paperless assignment feedback should be used more widely?" The intention of this question was to get a single overall positive or negative response to the idea of paperless feedback. The results, as shown in **Table 8** show that students are overwhelmingly in favour of the wider use of paperless assignment feedback. An ANOVA comparing Internal, Distance and Offshore Distance responses indicated that there was no significant difference between the proportion of students in each group answering Yes to this question ($F=0.367$, $p=0.777$).

Table 8: Student survey responses to "Do you think that electronic paperless assignment feedback should be used more widely?"

Study Mode	No	Yes	Undecided
Internal	2	33	7
Domestic Distance	2	36	6
Offshore Distance	1	9	
Unspecified Mode	2	14	2
Total	7	92	15

Themes identified in open ended responses

Many of the comments related to the electronic paperless submission and feedback on assignments revolved around the advantages it offered students studying by distance education who are often based overseas.

> It is easy to use. You can hand in the assignment no matter where you are, as long as you have access to a computer and the internet.
> I can work while travelling.
> We can get access to the feedback from anywhere in the world in no time
> Speedy feedback is crucial for distance learning students in order to proceed/improve subsequent submissions.
> DE students (particularly those of us who live overseas) can get feedback much more quickly.

Having the flexibility to access their assignment feedback while travelling for work was seen as a huge benefit for these time poor students. A related theme was the fact that when the feedback was provided in an electronic form all students had access to their feedback within the same timeframe, whereas overseas based students often encounter significant delays when receiving their assignments via the postal system.

> In my case I am living overseas and receive assignments later than everybody else due to travel time. Electronic distribution would make it fairer as everybody would have the same amount of time to review their work.
> For distance students, they will receive feedback approx. a week earlier than they would normally
> DE students live various distances away from Uni and therefore receive their feedback at different times if sent by mail. It is good for all students to get their feedback at the same time and more quickly than is possible with the mail service

The equity issue was also raised by the Internal students at the submission end of the assignment process. They felt the Distance students were given an advantage because they had until midnight of the due date to submit, whereas an Internal student needed to submit by 5pm due the on-campus buildings being locked at that time.

> As an internal student my assignments have to be in by 5pm in the assignment box, where as with EASTs you have till midnight.
> Same set of submission conditions as DE students, more fair.

Many students felt the electronic format gave them flexibility in storing and retrieving their assignments as needed.

> Can retrieve past assignments anywhere anytime.
> Easier to find and review assignment feedback.
> I can keep my feedback (marked Assignment) electronically, stored on disk with the submitted Assignment. At the end of my studies I'm hoping to a single CD with all my submissions and results.
> If for some reason the assignment and attached marker comments were to be lost they would have been saved by the marker in an electronic format that could them easily be resent.

For others there was comfort in being able to confirm their assignment had been received immediately.

> You know for sure that your assignment has been received immediately

Some students also felt it was just a waste of paper to print all the assignments.

> It saves trees!
> Less paper wastage
> It saves paper (more environmentally friendly). My last assignment with screen shots and source code ended up being over 100 pages - I think it's totally crazy to print something like that out, just to return it with a few comments.

As well as saving paper, there are certain assignments which are better presented in an electronic form like presentations, programs and those with a lot of graphical content.

> Also a printer is not needed, so high graphic images are presented better.

Interestingly, some students commented on the high cost of printing. Some saw this electronic process as an advantage because it saved them having to print the assignment to submit it, as was traditionally the case for Internal students.

> Many assignments can be VERY long, and require lots of ink and paper to print, thus causing greater expense to the student.

While another felt the cost of printing the electronically returned assignment was shifted back to them.

> It puts the cost on to us, the student to print it out, because we all like to keep paper records of things.

While not a common theme, it was interesting that one student raised the issue of the security of the assignments once the process was moved to a paperless electronic cycle.

> One thing that worries me is security. If it were used more widely, students could hack and get other students' marks. This can invade students' marks and privacy.

Another issue to moving to a purely paperless electronic process was that not all students necessarily have good quality Internet access.

> Too slow! For submitting about 4MB assignment, It may be timeout, it need to be submitted several times.
> Retrieval was pretty easy. It would be difficult however for those with a dial up system.

While a number of students commented that the paperless electronic feedback meant they could read the lecturer's feedback.

> No issues trying to understand handwriting.

Conclusion

This paper has reported the results of a survey of students who participated in a large-scale trial of paperless assignment submission, marking and return. The results suggest that students are very positive about the use of paperless approaches to marking. Key advantages identified include reductions in time delays, ability to retrieve feedback while away from home, improved legibility of feedback, reduced printing, confirmation of receipt of assignments, more convenient storage of past assignments and the ability to obtain a replacement copy of lost assignments. Some disadvantages identified included the cost of printing returned assignments, problems with uploading large assignments over slow Internet connections and the possibility of students hacking into each others work.

There was no clear difference between the preference for paperless marking of students studying on campus and at a distance, with the majority of students in all study modes responding positively. This was considered interesting because Internal students have the least to gain from paperless submission and return but are still overwhelmingly positive about it, perhaps reflecting a change in the patterns of work and study for these students. One other interesting finding was that many students expressed a strong preference for receiving feedback via email (ie. using a push model), while many other students expressed a strong preference for downloading their feedback themselves (ie. using a pull model). This suggests that paperless return systems should provide students with a choice of how to receive their feedback.

Acknowledgements

Support for the project has been provided by Charles Sturt University Division of Information Technology.

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Please cite as: Dalgarno, B., Chan, A., Adams, P., Roy, P. & Miller, D. (2007). On campus and distance student attitudes towards paperless assessment and feedback. In *ICT: Providing choices for learners and learning. Proceedings ascilite Singapore 2007*.
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