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Enhancing Student Learning Experience through a novel Electronic Coursework Assessment and Feedback Management System

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***Abstract**: Recent National Student Surveys revealed that many UK university students are dissatisfied with the timeliness and usefulness of the feedback received from their tutors. Ensuring timeliness in marking often results in a reduction in the quality of feedback. In Computer Science where learning relies on practising and learning from mistakes, feedback that pin-points errors and explains means of improvement is important to achieve a good student learning experience. Though suitable use of Information and Communication Technology should alleviate this problem, existing Virtual Learning Environments and e-Assessment applications such as Blackboard/WebCT, BOSS, MarkTool and GradeMark are inadequate to support a coursework assessment process that promotes timeliness and usefulness of feedback while maintaining consistency in marking involving multiple tutors.*

We have developed a novel Internet application, called eCAF, for facilitating an efficient and transparent coursework assessment and feedback process. The eCAF system supports detailed marking scheme editing and enables tutors to use such schemes to pin-point errors in students' work so as to provide helpful feedback efficiently. Tutors can also highlight areas in a submitted work and associate helpful feedback that clearly links to the identified mistakes and the respective marking criteria. In light of the results obtained from a recent trial of eCAF, we discuss how the key features of eCAF may facilitate an effective and efficient coursework assessment and feedback process.

Introduction

The 2006 National Student Survey (NSS) revealed that roughly 40% of UK University students are not satisfied with the feedback from their tutors (Surridge, 2007, p. 20). Surridge's (2007) report also revealed that 50% of the respondents did not think that the feedback on their work had been prompt and 49% of them did not agree that the feedback helped to clarify things that they did not understand. Amongst the various subject disciplines, Historical and Philosophical Studies, Mathematical Science and Languages are the top three scoring subjects in assessment and feedback while Computer Science, Engineering and Technology and Architecture, Building and Planning are the poor performers as they appeared in the lower quartile and were amongst the bottom five worse-scoring disciplines (Surridge, 2007, p. 32). These results have led to the recognition for urgent changes on assessment and feedback practices across the UK Higher Education (HE) sector.

Five years on, the situation has improved slightly, with the NSS 2011 results showing that 32% of UK University students are not satisfied with the feedback received from their tutors (HEFCE, 2011). While Engineering and Technology and Architecture, Building and Planning remain in the first quartile, Computer Science has moved up to the second quartile, with a mean satisfaction score on assessment and feedback of 3.60 (Unistats, 2011), ie an increase of 3.6% from 2006. Despite the continuous efforts in improving student's learning experience, the overall level of satisfaction in assessment and feedback remains low when compared with the results from other aspects in the NSS. As was pointed out by David Willetts, Minister for Universities: '*clearly there are some areas, such as the quality of feedback, where many institutions could do better*' (HEFCE, 2011). A closer look

at the 2011 NSS results reveals that lengthy turnaround time and the helpfulness of feedback remain the core causes of concern for Computer Science students.

Results from the NSS have successfully served as a wake-up call to the UK HE sector. This has led to a significant change in attitude towards assessment and feedback in the sector: rather than viewing assessments as a means to classify students' performance in a course into categories, increasingly the significance of assessments in promoting learning are being recognised across the sector. Over the years, concerted efforts to improve assessment and feedback have been made, not just by individual assessors, but also at the departmental and even institutional level. For example, to improve timeliness of feedback, the Department of Aeronautical and Automotive Engineering at Loughborough University has introduced policies on the timing and even quality of feedback coupled with a stringent administrative process to enforce the policies. Even then, as noted by Horner (2010), further improvement is unlikely to be possible unless the policy insists on giving individual feedback.

While NSS results helped to identify issues, they do not indicate how the issues could be alleviated. Suitable use of policies and a positive shift in attitude towards assessment and feedback incentivise assessors to provide students with timely and helpful feedback. While "*the spirit is willing, the flesh is weak".* Giving detailed feedback to coursework or any written assignment is a laborious task. Ensuring timeliness of feedback often results in a reduction of its quality and helpfulness, especially when the class size is large. Suitable use of Information and Communication Technology (ICT) can help assessors to maintain consistency in marking by reducing the cognitive load. It can also enable tutors to produce more timely feedback by taking away the repetitious, tedious and mechanical tasks from them. However, our experience in using conventional Virtual Learning Environments (VLEs) such as Blackboard/WebCT shows that they do not adequately support our coursework assessment and feedback practice. Other e-assessment packages such as *OpenMark* (Ekins, 2006) supports instant assessment and release of helpful study advice, but it is tailored for assessing online quizzes rather than programming coursework or other written assignments. To close this gap, we have developed a novel electronic coursework assessment and feedback management system, known as *eCAF*, to facilitate coursework marking and help tutors to give detailed, personalised formative feedback to students.

This paper introduces the eCAF system by outlining the assessment and feedback process it supports. To evaluate eCAF's ability to assist the production of timely, consistent and helpful feedback on coursework and its general acceptance by students, we have carried out a trial in 2010/11 at Aston University. Students who received feedback through eCAF were surveyed. This paper reports on the results and findings. It concludes with the planned future work and our vision for eCAF. Before we go into detail about eCAF, let us review some of the related work and explain why they are inadequate to support a coursework assessment process that promotes timeliness and usefulness of feedback while maintaining consistency in marking involving multiple tutors.

Current Coursework Assessment Systems: A Comparison

Assessing programming coursework is a time-consuming task. Our experience shows that while assessing a 100 page report typically takes no more than two hours, assessing a 2000 line programming coursework may require 30-60 minutes, especially when the solution contains many errors, omissions and points of misunderstanding. While automatic assessment systems such as *BOSS* (Joy *et al.*, 2005), *Ceilidh* (Foxley *et al.*, 1999) and the OpenU system (Thomas *et al.*, 2005) can take away the burden of marking from tutors, they typically focus on assessment *of* learning, as they are designed for assessing program correctness rather than for giving formative feedback to students which will help students to improve their learning. Such automatic systems have the tendency for leading students to feel that their work had not been assessed fairly (Joy *et al.*, 2005). The application of such purpose-built automatic assessment systems is also rather limited in that, typically, they can effectively handle the assessment of specific types of coursework, eg ER diagrams for the OpenU system and programming for BOSS and Ceilidh. Furthermore, even those with expert subject knowledge may find such systems difficult to utilise (Joy *et al.*, 2005).

To promote learning, it is important to provide students with timely feedback that is clearly linked to the tasks and their performance (Black & Wiliam, 1998; Wong, 2010). Formative feedback that points out mistakes, corrects misconceptions and indicates how to improve is particularly beneficial to learning practical skills such as programming. Indeed, Wong & Beaumont (2012) have reported that such formative feedback is considered to be most helpful to learning and leading to higher student satisfaction. Existing automatic coursework assessment systems cannot provide learners with suitable

formative feedback. The involvement of human markers in the assessment process is therefore paramount. Over the years, various computer-aided human marking systems have been developed, eg *CLEWS* (Williams, 2007), *GradeMark* (iParadigms, 2012) and *MarkTool* with *WebCTConnect* (Heinrich, 2006), for facilitating the giving of detailed, personalised formative feedback to students. All of them support the creation of a marking scheme to guide the assessment process. However, the style of marking schemes supported by these systems are rather basic: an *N*-by-*M* grid where *N* is the number of criteria and *M* is the scale. It is not possible to subdivide a marking criterion. Such a lack of structure means that tutors will not be able to create an elaborate marking scheme which is needed for ensuring consistency in marking when multiple assessors are involved. Some of them (eg CLEWS and MarkTool) support second assessing and peer-assessment; while others (eg GradeMark) focus on supporting single assessor per coursework submission. Though one obvious advantage of computer-aided coursework marking is the ability to reuse feedback (Denton *et al.*, 2008), not all systems are equipped with a feedback bank (eg CLEWS). Even when a feedback bank does exist, assessors need to build up its contents explicitly (eg GradeMark and MarkTool) and there lacks an easy-to-use search facility for assessors to locate the required feedback item.

Most contemporary computer-aided human marking systems are Internet-based, with the exception of MarkTool which is a standalone desktop application. Zhang & Heinrich (2005, p.91) defended their design choice by stating that "*it allows teachers/markers to mark assignments at any place and time independently from the availability of a network"*. This was based on the assumption that fast and reliable Internet access was not always available. With the advance of broadband networks, wi-fi and mobile devices, this argument is no longer valid. In fact, being a desktop application raises a portability issue. Assessors cannot use various computing devices to mark the same coursework without installing MarkTool on all devices and synchronising the data manually across all devices.

Though both MarkTook and GradeMark provide effective onscreen support to annotate a coursework submission with formative feedback, each submission is limited to a single file only. With programming coursework which typically contains several files per submission, these tools are inadequate to support the need for programming coursework assessment.

eCAF

Electronic Coursework Assessment and Feedback (eCAF) is an Internet application designed for facilitating human marking. It enables tutors to give feedback to students' work anytime, anywhere using a web browser. It aims at assisting assessors to give fair, consistent, informative and timely feedback to students. Although it was originally designed for assessment of programming coursework, it is also suitable for assisting a tutor in assessing any open-ended written assignments, eg essays, reports and design documents. eCAF does not handle the submission of coursework electronically. Students are expected to prepare their work in PDF, plain text and/or various image formats such as JPG and PNG, and submit it to the institution's VLE such as Blackboard/WebCT. Tutors are expected to obtain all coursework submissions as a ZIP archive from the VLE and upload it to eCAF.

When assessing large numbers of coursework submissions, Brown (2001) suggests delegating some of the marking to other tutors or mentors. eCAF enables tutors to delegate marking to others by subdividing a cohort into groups and assigning each group a different assessor. The uploaded coursework submissions will then be automatically put into their respective groups, ready for the designated assessors to commence marking. During the marking process, each assessor may also download individual submissions from eCAF so as to perform automatic checking, eg for compilation errors.

Supports the creation of elaborate, hierarchical marking schemes

Unlike MarkTool and GradeMark, eCAF does not restrict the creation of marking schemes to linear ones only. It supports the creation of elaborate, hierarchical marking schemes. This allows tutors to design the kind of marking schemes which best suit their needs. Furthermore, this feature provides the assessors and students with structured marking criteria which also serve as a means to provide formative feedback to students. We have previously reported on the detailed design of eCAF's marking scheme creation feature (Wong *et al.*, 2008), hence we simply highlight the key concepts here.

In eCAF, marking criteria are organised in a hierarchical structure. Each marking criterion can be subdivided into a set of criteria. At the lowest level of the hierarchical structure are sets of performance levels, with each set modelling the scale of a marking criterion. eCAF enables the inclusion of

alternative marking criteria through special constructs known as *And* and *Or*. An *And* models a section of marking criteria whereas an *Or* specifies mutually exclusive marking criteria. Figure 1 shows a sample marking scheme and explains how it can be modelled in eCAF.

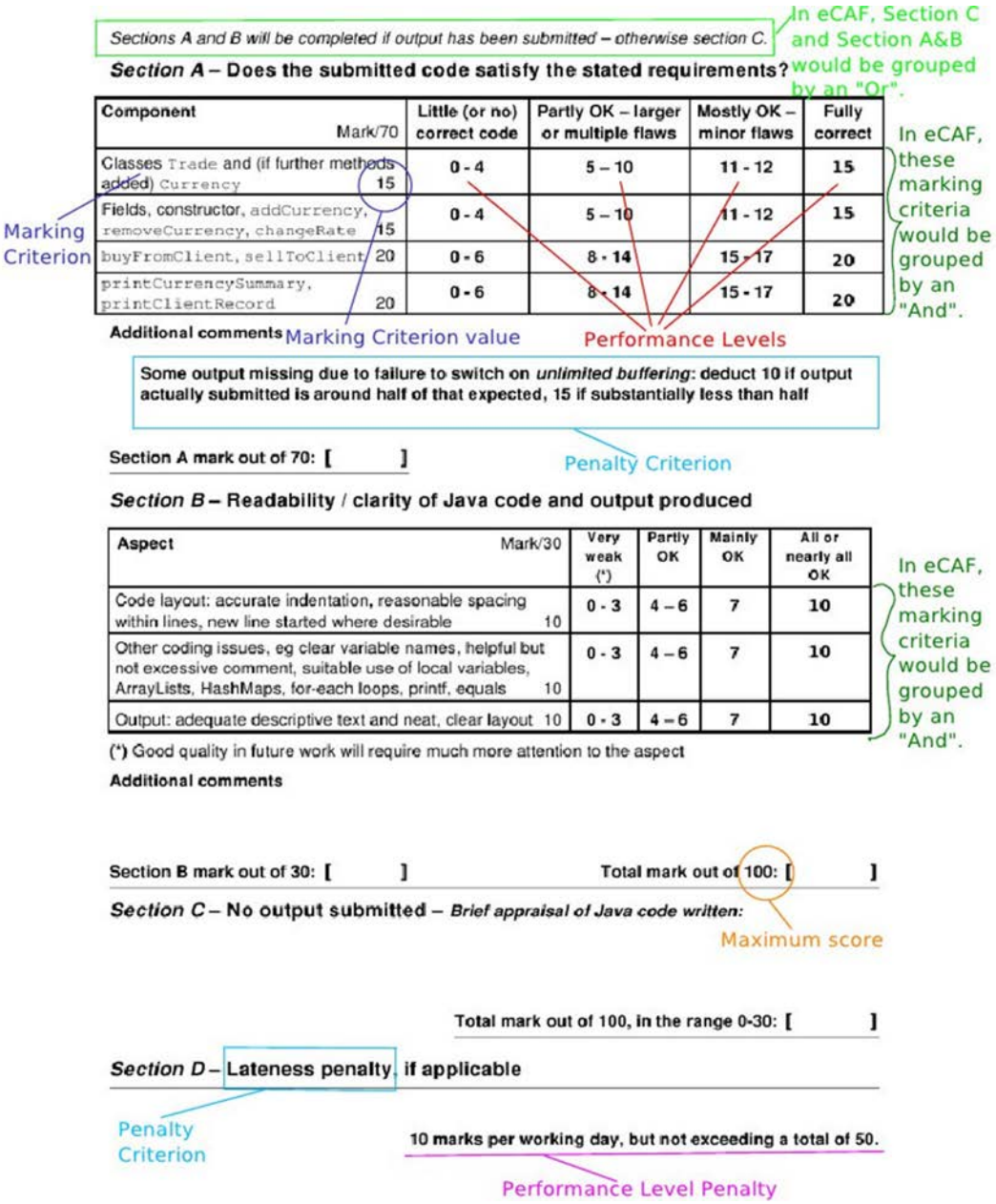

Figure 1: Sample marking scheme and how it can be modelled in eCAF

To help tutors to speed up the marking scheme creation process and to avoid introducing errors into the marking schemes, eCAF is also equipped with an automatic performance level generation feature and an automatic marking scheme validation feature.

Flexible marking scheme editing

A marking scheme defines the criteria by which a piece of work is to be assessed. Typically it is defined without any prior knowledge of the actual work completed by the students. Hence, it might not empower the tutor to reward students with innovative ideas appropriately. Conversely, the pre-defined set of marking criteria might not address the issues in a piece of work adequately. A tutor might wish to alter the marking scheme slightly after some submissions have been marked. For this reason, eCAF allows marking schemes to be modified even after some submissions have been marked. Such modifications include altering the name and/or description of marking criteria and adding new

alternative marking criteria. Assessors will not need to remark any previously marked coursework submissions after applying such modifications to the marking scheme. All assessors for the coursework will also be able to utilise the most up-to-date marking scheme without any extra work.

Formative feedback linked to marking criteria

Denton *et al.* (2008) observed that "*linking comments directly to the marks led to a greater degree of marking consistency*". eCAF is designed to support criterion-referenced marking. It aims at making it easier for tutors to pinpoint shortcomings in students' work and to provide explanation and suggestions on how to improve. In eCAF, tutors can give a general, overall formative feedback to each submitted work, but they are encouraged to link each formative feedback item with a marking criterion and the exact point in the submitted work against which the feedback item was directed (cf Figures 2 & 3).

eCAF supports various annotation styles to all supported submission file types, including box annotations, underlines, highlighting with different colours, etc (cf Figures 2 & 3). This enables tutors to associate multiple feedback items with the same point in a submission.

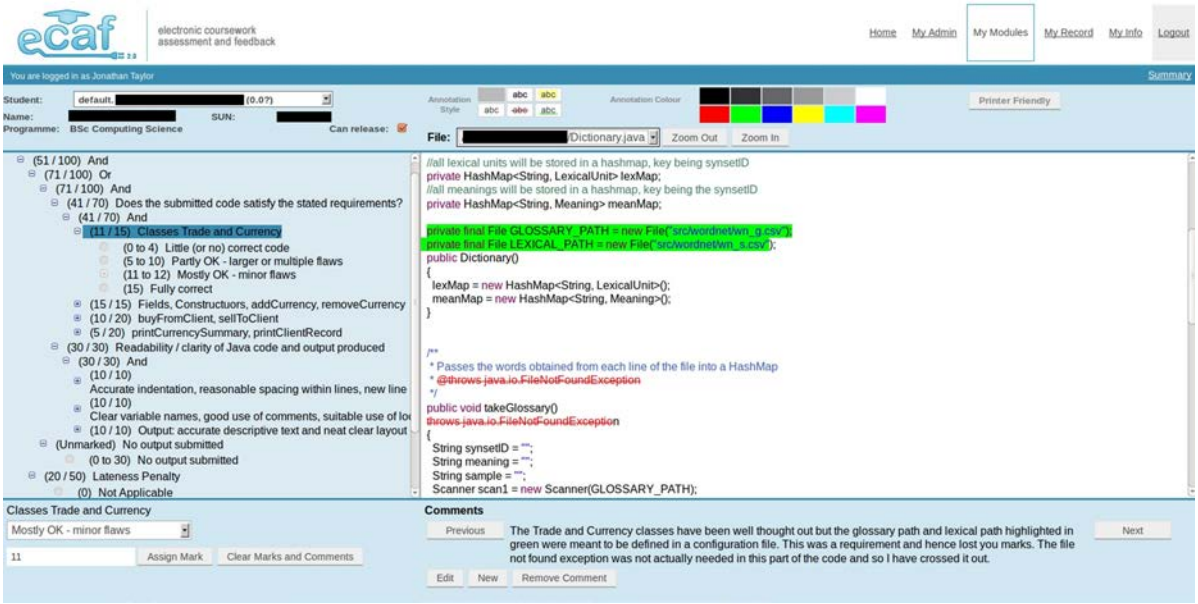

Figure 2: Assessing a Java program using eCAF

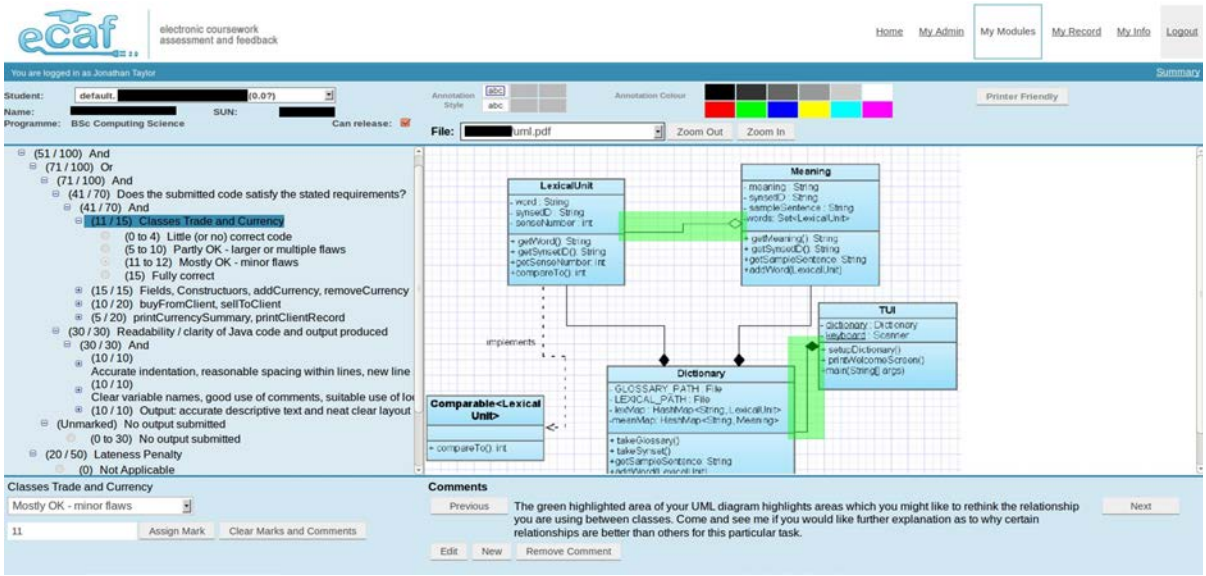

Figure 3: Assessing an UML diagram in PDF format using eCAF

Feedback bank

To help improve timeliness of feedback and to avoid overloading students with too much detailed information, Bloxham & Boyd (2007) suggested that tutors should consider limiting the number of formative feedback items given to each piece of work to just three or four. Our experience shows that this may work well for essay-type assignments, but is more likely to lead to student dissatisfaction with practical work such as programming. Computer Science is a technical subject whose teaching ethos relies heavily on *learning by doing* (Ylijoki, 2000). Students often rely on learning from their own mistakes. It is important for students to know where they have made mistakes in their work and how to improve it (Wong, 2010). The use of an electronic feedback bank speeds up the writing of feedback and help to maintain consistency in marking (Bloxham & Boyd, 2007; Denton *et al.*, 2008). eCAF is equipped with a sophisticated feedback bank facility. As tutors write formative feedback to each piece of work, the written comments are added to the feedback bank automatically, allowing them to be reused in subsequent submissions. Tutors can search for a specific feedback item by keyword or regular expression. The resulting feedback item can then be reused or further modified to suit the submission. Furthermore, eCAF keeps a tally of the frequency of use for each feedback item. Tutors can then use this information to direct their teaching.

eCAF in Action

eCAF aims at making it easier for tutors to:

1. assess large classes more consistently and transparently using detailed marking schemes;
2. include structured personal formative feedback, which is clearly linked with specific points within the submitted documents;
3. reduce the turnaround time of feedback to learners so that its effect is maximised.

eCAF also aims at enabling the archiving of assignments and feedback for internal or government inspection and quality assurance purposes.

To gauge the ability of eCAF to achieve the above aims, we have conducted a trial of eCAF in 2010/11 using four Computer Science modules across different stages of undergraduate studies at Aston University. Each of these modules were taken by students from various Science, Technology, Engineering and Mathematics (STEM) programmes, ranging from Electronic Engineering to Mathematics, with an average of 71 coursework submissions per module. Tutors were asked to assess their coursework using eCAF and the respective students then received individual coursework feedback via eCAF. None of them were given any specific training on how to use eCAF.

All 284 students who received coursework feedback via eCAF were invited to participate in a survey designed to gauge how satisfied they were regarding the feedback received from their tutor through eCAF. The questionnaire contains 30 Likert-type, multiple-choice, yes/no and open-ended questions. The Likert-type questions used a standard 5 point scale, ie 1 to 5, with 1 being strongly dissatisfied and 5 being strongly satisfied. 75 out of the invited 284 students responded to the survey. Figure 3 shows the results of the Likert-type questions.

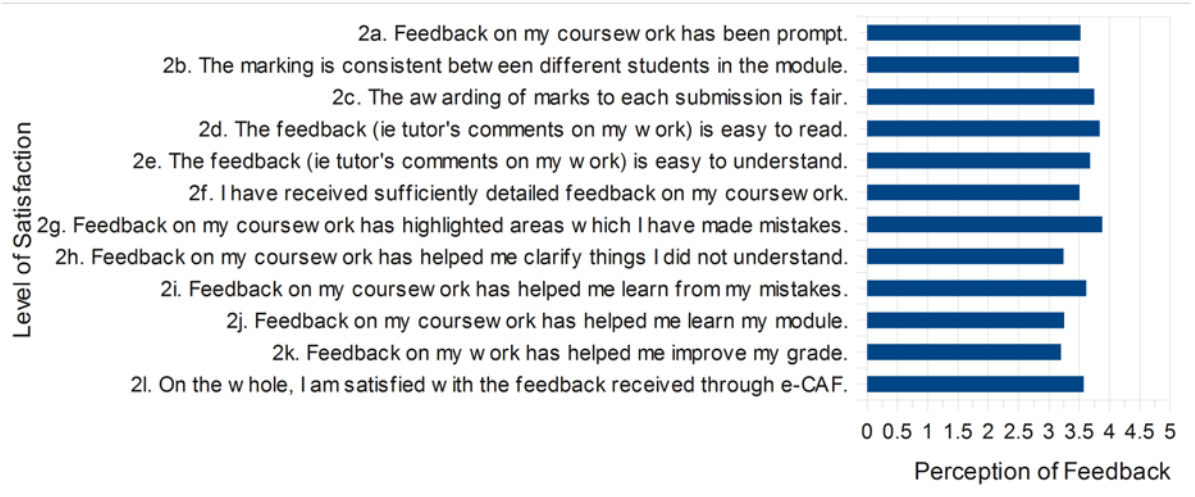

Figure 3: Level of satisfaction on the feedback received via eCAF

The respondents were asked, based on their own experience, whether they preferred to receive feedback to their coursework through eCAF over conventional means. They were also asked to give a reason for their preference. 69.3% of the respondents preferred eCAF. The given reasons were categorised manually and the outcome is shown in Table 1. The category *Others* includes isolated reasons such as "*I don't mind*", "*it's the same as receiving it on paper*" and nil responses.

Table 1: Reasons for like and dislike receiving coursework feedback through eCAF

Preferred eCAF?	Reason	Number of Responses	% of Responses
Yes	Clarity and helpfulness of feedback	25	33.33%
Yes	Ease of access	18	24.00%
Yes	Others	9	12.00%
No	Technical issues	9	12.00%
No	Insufficient feedback	6	8.00%
No	User Preference	5	6.67%
No	Others	3	4.00%

The main reason for the respondent's preference to receiving coursework feedback from eCAF was due to the clarity and helpfulness of feedback given to their work when compared with other forms of coursework feedback previously encountered, eg:

"The layout is clear. It is clear for me to see and distinguish the parts of the code which I have succeeded in and which I need to improve on. On the whole this process of receiving coursework is quick and helpful."

"There is a greater structure to the eCAF system as opposed to hand written notes entered on a submitted script. Even without comment the eCAF system indicates where a mistake has been made and the relevant topic that the mistake has been entered for allows the understanding of what has been done wrong."

"It is precise and comments are with every line of code."

"It allows me to easily locate sections in which I did not complete to a high standard. The area which explains how many marks are awarded for each section is also very helpful. As it helps identify weaknesses within my coursework."

"The feedback is very thorough, and highlights errors/places for improvement well. It also helped to understand what lecturers are asking for in assignments."

"It helps to distinguish each different type of mistake and provides corrections."

The two main reasons for some respondents not preferring to receive feedback via eCAF were that:
they found the user interface of eCAF was not sufficiently intuitive, and
the feedback they received was too brief.

For examples:

"Using eCAF obviously means you can access feedback instantly but I think the layout is quite poor and it is hard to read."

"The layout of eCAF is sometimes confusing and makes it hard to read comments."

"eCAF was not fully functional when I tried to access my coursework marks and feedback. I liked that it was broken down in sections."

"I was impressed by how modern the method was of how I received feedback, however it wasn't as detailed as I would have liked it to be."

"I think the feedback given on eCAF is too brief. For example, some feedback will only state when something is wrong and not why it is wrong. The feedback is very general."

A few respondents did not prefer to use eCAF to receive feedback because they value face-to-face feedback much more, eg:

"The site needs to be easier to use and/or promoted better - the system works well, but it can't, in my opinion, replace the depth of discussion a face-to-face meeting can have. It's certainly better than emails, though. Only chose the 'no' option for this question because there was no "Other" option."

"I prefer the tutor go through the marks with you individually. Even for 5 minutes it would be better because I personally think interaction between student and lecturer make students feel more connected and able to ask mistake directly."

Does eCAF reduce the turnaround time of coursework feedback?

We have compared the timeliness of feedback for Computer Science coursework at Aston University in 2010/11 assessed using eCAF against those using traditional methods. For each module which had at least one coursework, we noted its coursework submission deadline and the release date of individual feedback. We then computed the turnaround time for feedback in terms of both the number of weeks and working days. For modules with more than one coursework, we computed an average turnaround time. Table 2 shows that modules with coursework assessed using eCAF had a slightly shorter turnaround time than those assessed using traditional methods.

Table 2: Turnaround time between coursework assessed with eCAF and those without

Coursework Assessment	Average Number of Submissions per Module	Turnaround Time (in weeks)		Turnaround Time (in working days)	
		Mean	Standard Deviation	Mean	Standard Deviation
With eCAF	71.00	4.00	1.51	18.92	6.64
Without eCAF	65.68	4.65	1.89	19.75	9.02

Note that the computing coursework assessed by eCAF were all programming coursework, eg Java programming, whereas those not assessed by eCAF included programming coursework, essays/reports, design documents, etc. Our experience indicates that, in general, giving detailed helpful feedback to programming coursework is more time-consuming than giving detailed feedback to other types of coursework.

Does eCAF facilitate a consistent and transparent coursework assessment and feedback process?

The four modules took part in the survey involved different number of assessors in the marking process. Table 3 shows the characteristics of these modules.

Table 3: Modules using eCAF

Module	Number of Tutors involved in Marking	Number of Student Submissions	Sample Size	Response Rate
CS1020	6	142	41	28.87%
CS1310	3	74	12	16.22%
CS2310	1	50	17	34.00%
CS3250	1	16	5	31.25%

Questions 2b & 2c in our survey investigate whether the respondents found the marking consistent and fair. Figure 3 shows an overall satisfaction of 3.49 for consistency and 3.75 for fairness across the four modules in the trial. Figure 4 shows a breakdown of these results by module.

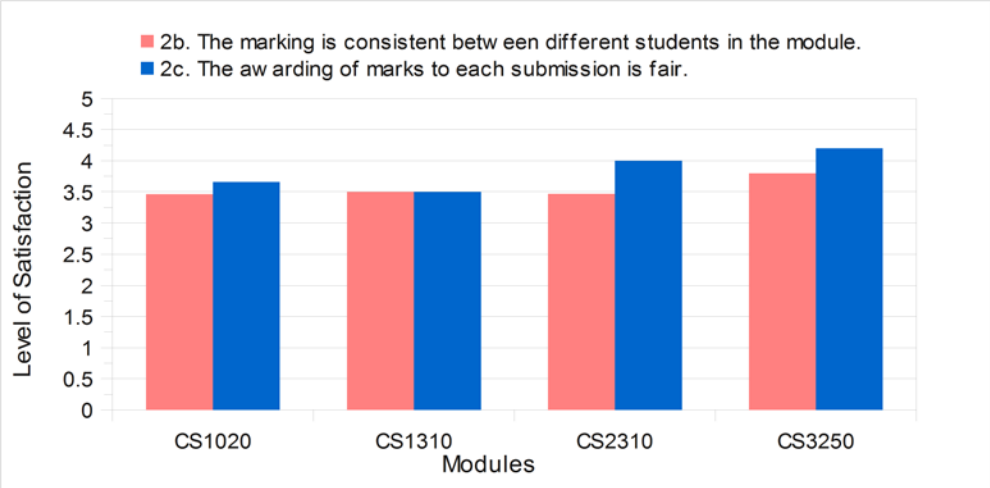

Figure 4: Perception on consistency and fairness for feedback received via eCAF

The results from our survey shows that the respondents were fairly satisfied with the consistency and fairness of the marking. Table 3 and Figure 4 show that though the respondents' satisfaction drops as the class size increases, the level of satisfaction across modules with a large class size and a small class size does not differ significantly. Furthermore, the increase in the number of assessors does not affect the consistency and fairness of the marking significantly. This indicates that using eCAF, tutors can maintain consistency and fairness in marking regardless of the class size or the number of tutors involved in the marking.

Does eCAF facilitate the preparation of helpful feedback?

The results for Questions 2e-2k indicate that the respondents found the feedback received through eCAF helpful to their learning. In particular, eCAF's ability to link formative feedback with specific points in each coursework submission makes it easy for tutors to highlight areas in which students have made mistakes. This is confirmed by the result of 3.88 for "*Feedback on my coursework has highlighted areas which I have made mistakes*". The respondents also found that the feedback received via eCAF was easy to understand and helped them learn from their mistakes (cf Questions 2e and 2i in Figure 3).

Discussion

While Gibbs (2002) found that most students are only interested in their marks, Wong (2010) reported that the overall score was considered as the most important type of feedback to students, whereas formative feedback that highlights the exact location of mistakes in the submitted work and gives advice on how to rectify the mistakes was considered the most helpful to learning and the second most important to students. To verify these results, the respondents to our survey were given 13 forms of feedback ranging from summative feedback which shows an overall score to formative feedback that gives advice on how to rectify the identified mistakes. They were asked to indicate the types of feedback that they found most important and most helpful to their learning. The largest group (ie 28%) expressed that feedback that highlights the exact locations in their submitted work where mistakes were made and gives advice on how to rectify the mistakes was the most important form of feedback to them. Furthermore, 33.3% also found that such forms of feedback were most helpful to their learning. As eCAF was designed to do just that, 67% of the respondents were satisfied with the coursework feedback received through eCAF.

To establish how our results in Figure 3 compare with the national average for Computer Science, we have computed the mean score and percentage of agreement for the 2011 National Student Survey (NSS) data. The results are listed in Table 4.

Table 4: Student satisfaction on feedback and assessment for computer science students: eCAF versus NSS (2011)

Question	NSS Mean Score	eCAF Mean Score	eCAF Mean Score (Second Year Students only)	eCAF Mean Score (Final Year Students only)	NSS % Agree	eCAF % Agree	eCAF % Agree (Second Year Students only)	eCAF % Agree (Final Year Students only)
Assessment arrangements and marking have been fair.	3.92	3.75	4	4.2	76.32%	70.67%	88.24%	80%
Feedback on my work has been prompt.	3.42	3.52	4	4.2	56.02%	60.00%	82.35%	80%
I have received detailed comments on my work.	3.52	3.51	3.76	4	59.26%	60.00%	70.58%	80%
Feedback on my work has helped me clarify things I did not understand.	3.53	3.24	3.24	3.6	58.70%	42.67%	41.18%	60%

In terms of promptness and being detailed, our results are slightly better than the national average. In terms of the ability of the feedback to clarify things students did not understand, our results are worse than the national average. This, however, may be affected by the fact that our respondents are predominantly first year students whose general understanding on the subject area was not yet as well-established as final year students who took part in the NSS. Furthermore, first year students who were used to smaller classes and more accustomed to heavily-guided learning might also have a different expectation than final year students when assessment and feedback are concerned. Indeed, of the 30.7% of the respondents who did not prefer to receive feedback via eCAF, the ratio of like versus dislike in each study year shows that there is a much higher proportion of first year students who disliked eCAF (33.96%), comparing to 23.53% and 20% of second year and final year students, respectively.

eCAF is designed to be a system for facilitating human marking, rather than machine marking. The quality of feedback received by students is dictated by the assessor's ability to write clear and helpful feedback. As one of the respondents who did not prefer to received feedback via eCAF noted:

> *"It can be a great system, showing where programs went wrong etc. but it is reliant upon markers taking enough time to provide sufficient feedback and lecturers providing a clear mark scheme to correlate."*

It is therefore not surprising that some respondents did not find their feedback helpful:

> *"It is easy access to finding out the mistakes I made on my coursework and it is fairly detailed however sometimes I don't understand the descriptions made."*

At the time of the system trial, eCAF was in its beta release and it had a few known teething troubles. Table 3 shows that the majority of the respondents who did not prefer to receive coursework feedback via eCAF were due to those teething problems. Since the system trial, eCAF has been undergoing further development to address these issues, including improving the user interaction, extending the range of annotation styles that can be used for giving feedback, making existing features more stable and robust, etc. Figures 2 & 3 show the "new look" eCAF.

Our ethos behind the design of eCAF is that computer systems should not dictate how the users work, but it should be sufficiently flexible to support the need of most, if not all, potential users. Hence, eCAF does not require each assessor to provide formative feedback that is linked to the exact locations of each student's submitted work, it simply provides assessors with features that make it significantly easier and quicker to write clear and helpful feedback. The results of our survey indicate that the

respondents found the feedback received through eCAF clear, helpful, consistent and fair. A comparison with the turnaround time of coursework feedback showed that eCAF enables helpful feedback to be given to coursework submissions without jeopardising the timeliness of feedback. This explains why 69.3% of the respondents preferred receiving feedback through eCAF.

Conclusion and Future Work

We have presented eCAF, a novel Internet application for facilitating coursework assessment and feedback. This application was trialled in 2010/11 and we have presented the key results of the trial in terms of the students' experience. A majority of the students who took part in the survey reported that they prefer receiving feedback through eCAF as the feedback was easy to read and it highlighted the areas where they had made mistakes.

Suitable use of ICT facilities reduces the turnaround time of feedback (Denton *et al.*, 2008) and hence improve the timeliness of coursework feedback. However, ICT facilities to date cannot guarantee the production of clear and helpful feedback that would promote learning. We have reported the results of a study which indicates that students considered formative feedback that highlights the exact location of mistakes in the submitted work and gives advice on how to rectify the mistakes most helpful to their learning. This result also confirms a similar finding by Wong (2010). As eCAF is designed to highlight mistakes made in submitted work, it has the potential to assist tutors to construct feedback that promotes learning.

The current version of eCAF is designed to facilitate assessment of individual coursework with an emphasis on giving clear, detailed, personalised and helpful feedback. The “new look” eCAF is scheduled to undergo further trials in 2012/13. In future, we plan to extend eCAF to address the assessment needs for group work. Our vision for eCAF is to develop it into an electronic coursework assessment framework which will support a component-based marking procedure across several coursework items. This will then enable a detailed profile of students’ work to be recorded and analysed during the students’ lifetime in an institution, and hence facilitating the detailed tracking of students’ progress in learning.

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