

## Motivating students to learn through good and helpful coursework feedback

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**Abstract:** *The 2008 National Student Survey revealed that: 44% of full-time students in England did not think that the feedback on their work had been prompt nor did they agree that the feedback on their work helped them clarify things that they did not understand (HEFCE, 2008). Computer Science and Engineering & Technology have been amongst the poorest performers in this aspect as they ranked in the lower quartile (SurrIDGE, 2007, p.32). Five years since the first NSS survey, assessment and feedback remains the biggest concern. Dissatisfaction in any aspect of studies demotivates students and can lead to disengagement and attrition. As the student number grows, the situation can only get worse if nothing is done about it.*

*We have conducted a survey to investigate views on assessment and feedback from Engineering, Mathematics and Computing students. The survey aims at investigating the core issues of dissatisfaction in assessment and feedback and ways in which UK Engineering students can learn better through helpful feedback. The study focuses on collecting students' experiences with feedback received in their coursework, assignments and quizzes in Computing Science modules. The survey reveals the role of feedback in their learning. The results of the survey help to identify the forms of feedback that are considered to be helpful in learning and the time frame for timely feedback. We report on the findings of the survey. We also explore ways to improve assessment and feedback in a bid to better engage engineering students in their studies.*

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### Introduction

The “Ripples on a pond” model to learning emphasises that learning is not a simple sequential process, but a complex one in which the events “wanting/needing”, “doing”, “digesting” and “feedback” interact with each other constantly to make learning happen and to motivate students to learn more (Race, 2007) . “Feedback”, being at the outermost layer of event in the process, is important to the entire learning process because it helps students to digest their learnt concepts and to take their learning further. Giving feedback is not an easy task. When feedback is administered inappropriately, not only improvements cannot be brought about, it would even decrease performance. Kluger and DeNisi (1996) observed that one third of feedback interventions decreased performance.

Within the UK (and indeed in institutions all over the world), feedback remains the biggest concern amongst educators and learners. It is also the single most important source of dissatisfaction amongst UK students in Higher Education (HE). The 2008 National Student Survey (NSS) revealed that: 44% of full-time students in England did not think that the feedback on their work had been prompt nor did they agree that the feedback on their work helped them clarify things that they did not understand (HEFCE, 2008). The results in Scotland, Wales and Northern Ireland were worse. Computer Science and Engineering & Technology have been amongst the poorest performers in this aspect as they ranked in the lower quartile (SurrIDGE, 2007, p.32). The 2009 NSS figures showed a minute improvement of 1% in promptness and helpfulness of feedback, but overall the figures remain disappointing, especially when compared with other aspects of teaching and learning shown in the

NSS figures (HEFCE, 2009). Five years since the first NSS survey, assessment and feedback remain the biggest concern.

What are the core issues that prompted UK students to express such a level of dissatisfaction in assessment and feedback? It is generally believed that long turnaround time and insufficient feedback are considered the two major causes of concern in assessment feedback. In practical subject areas, a substantial amount of coursework is required to adequately address the needs of learners. To promote learning, particularly the acquisition of practical skills such as programming and engineering, formative feedback should be timely and clearly linked to the tasks and their performance (Black & William, 1998).

Various issues regarding giving feedback to students have been fairly widely researched upon. For example, Gibbs (2002) found that most Open University students are only interested in their marks. Glover and Brown (2006) observed that at Sheffield Hallam University and the Open University '*most feedback is mark-loss focused, not learning-focused, serving primarily to justify grade*' and '*there is a lack of explanation of what students have done wrong*'. Orsmond et al. (2002) reported that Biology Sciences students at Staffordshire University used feedback to '*enhance motivation, enhance learning, encourage reflection, and for clarification of understanding*'. There have also been studies to investigate the types of feedback that are considered to be useful by students (e.g. Nakariakova, 2008). However, such studies are often focussed on a specific subject domain, e.g. German, Biosciences and Physical Sciences. Ylijoki's (2000) finding on disciplinary cultures and the moral order of studying showed that each discipline has its own core characteristics and moral order which defines the basic beliefs, values and norms. As perception on what is regarded as good and helpful feedback is a subjective matter, studies based on different subject domains may well lead to very different outcomes. In the current literature, there appears to be lacking any study on perception and usefulness of feedback in the Computer Science and Engineering subject domain.

To better understand how Engineering students view the feedback that they have received on their programming assignments, a dedicated survey into the assessment and feedback has been carried out. The survey investigates what is perceived as feedback by Engineering and Applied Science students from Aston University and the types of feedback that are considered to be helpful to their learning. This paper reports on the findings and explores means to motivate Engineering students to learn through good and helpful feedback.

## Methodology

A study to collect views on assessment feedback was conducted in Spring/Summer 2009. The study was designed to find out students' experience towards effectiveness of feedback on their learning. The goal was to discover factors that have a negative effect on facilitating learning and to find ways to alleviate or remove them. In order to investigate how feedback affects the respondents' learning of a subject, this study focuses on feedback given to continuous assessments, ie coursework, assignments and quizzes, rather than terminal assessments.

The tools of the study include two focus group meetings and a questionnaire. The focus group meetings served as an open forum for students to express their positive and negative experiences on feedback received in different forms of assessed coursework and project work. They also informed and inspired the design of the questionnaire.

The questionnaire contains 21 Likert-type, ranking and open-ended questions on assessments and feedback. It was designed to collect information about the respondents' past experience and their views on feedback and assessment. The questionnaire also aims at revealing the impact of feedback on learning and a range of factors that constitute timely and helpful feedback.

The questionnaire was designed and administered using the Bristol Online Surveys (BOS) system (ILRT, 2010). The data was analysed using the facilities provided by the BOS system, including ranking statistics (ie median, mean, variance and standard deviation). The answers to the open-ended questions were collated and categorised manually.

## Subjects

The study was carried out in the School of Engineering and Applied Science at Aston University. All undergraduates (excluding those who are on industrial placements) who took at least one computer science (CS) module in the academic year 2008/9, which amounted to 617 students, were invited to express interest in participating the focus group meetings. Out of the 30 who expressed interest, 12

were selected. The selected participants were from various years and degree programmes, eg Maths, Electronic Engineering, Computing Science, Computing for Business, etc. Some of them have completed an industrial placement. Such a selection encourages a good spread of experiences amongst the participants so as to maximise the chance for collecting a well-rounded view.

All of the 617 undergraduates were invited to fill in the questionnaire. They were asked to focus on their learning experience in taking CS modules when completing it. The majority were undergraduates doing a computing-major degree programme, with about 20% of students doing combined honours with computing, eg business & administration, psychology and mathematics. 92 students responded which amounts to a response rate of 14.9%. Table 1 shows the profile of the respondents.

**Table 1: Profile of the respondents.**

Characteristics	Profile
Gender	Male: 65.9%; Female: 34.1%
Age	18-21: 73.6%; 22-35: 25.3%; 36-50: 1.1%
Year of study	Year 1: 44.4%; Year 2: 30.0%; Final Year: 25.6%
Degree programmes	Computing Science: 55.6%; Combined Honours: 12.2%; Computing for Business: 11.1%; Maths major: 11.1%; Electronic Engineering & Computer Science: 5.6%; Multimedia Computing: 3.3%
Tuition fee status	Home/EU students: 94.4%; International students: 5.6%
Ethnic origins	White: 53.1%; Asian: 30.9%; Black: 7.4%; Chinese: 3.7%; Others: 1.2%
Highest previous qualification	A-Levels, Highers or Equivalent: 90.8%; Higher National Diploma: 2.3%; Access Course: 2.3%; HE or higher: 1.1%; Foundation Course: 1.1%; Others: 2.3%

The forms of assessments that the respondents encountered frequently are: end-of-term examinations, individual programming coursework, online quizzes and group programming coursework.

## Results and Findings

To investigate the importance of assessment and feedback to learning, the respondents were asked to identify the single most important thing that facilitates their learning of a subject. 90 relevant responses were collected and they were manually summarised into a set of factors such as good and helpful tutors (12.92%), access to good learning material and learning resources (27.97%), revisions, especially on doing past exam papers (5.38%), etc. Doing practical work (21.51%) and engaging in continuous assessments (13.98%) were amongst the frequently identified factors; whereas feedback on their work constitutes to 9.68% of the responses. This shows that the respondents recognised that doing practical work, engaging in continuous assessments as well as receiving feedback from their work were important to their learning.

### Helpfulness of different types of feedback to learning

To find out the types of feedback that promote learning, the respondents were asked to rank 7 types of feedback. Not all respondents have encountered the given 7 types of feedback. Table 2 shows the results of the ranking. The higher the mean rank, the more helpful the type is rated on a scale 1-7.

**Table 2: Helpfulness of different types of feedback**

Types of feedback	Mean rank	Percentage of respondents who had not encountered such type of feedback
A combination of summative & formative feedback	5.41	3.00%
A combination of detailed summative & formative feedback guided by a marking scheme	5.39	22.80%
Summative feedback	5.36	0.00%
Formative feedback	5.34	9.80%
Detailed summative feedback guided by a marking scheme	5.33	13.00%
General feedback on all submissions	4.29	14.10%
Electronic verbal feedback (ie using recording)	3.53	60.90%
Peer assessment & feedback	3.43	55.60%

Table 2 shows that summative feedback was the most common type of feedback and the respondents found a combination of summative and formative feedback most helpful to their learning. The respondents also found feedback that ties in with the marking criteria shown in the marking scheme helpful, but such type of feedback was less common.

### General past experiences on feedback

Six Likert-type questions were used to collect the respondents' past experience on feedback. The results are shown in Table 3. A mean value close to 5 means that the respondents agreed to the statement; a value close to 1 means that they disagreed.

**Table 3: General past experience on feedback**

	Percentage of respondents agreeing or strongly agreeing	Mean (Standard Deviation)
Feedback on my work has been prompt.	34.10%	2.9 (1.1)
I have received sufficiently detailed feedback on my work.	48.40%	3.2 (0.9)
Feedback on my work has highlighted areas which I have made mistakes.	68.80%	3.6 (0.8)
Feedback on my work has helped me clarify things I do not understand.	27.70%	2.9 (1.0)
I usually received feedback on my work before my exam.	47.30%	3.1 (1.1)
On the whole, I am satisfied with the feedback on my work.	56.00%	3.3 (1.0)

Note that 68.8% of the respondents had received feedback which highlighted their mistakes and 48.4% agreed that the given feedback was sufficiently detailed. However, only 27.7% found that the feedback helped to clarify their misunderstanding. This indicates that the feedback might not have been written in a level that is accessible to the recipients. Assuming that there is no fundamental

problem in the teaching itself, the above results also suggest that the required subject concepts might be too difficult for the students to grasp and/or the students did not possess the necessary prerequisites for understanding the required concepts.

The majority of the respondents did not find that feedback on their work had been prompt. The respondents were given an opportunity to define what is meant by prompt feedback. Table 4 shows the results.

**Table 4: The perception on “promptness” in receiving feedback.**

	For coursework, assignments and paper quizzes	For online quizzes
< 3 working days	8.70%	41.30%
3 – 4 working days	4.30%	34.80%
1 working week	33.70%	21.70%
2 working weeks	31.50%	2.20%
3 working weeks	14.10%	0.00%
4 working weeks	5.40%	0.00%

For coursework, assignments and paper quizzes, while the majority defined promptness as one working week, a turnaround time of two weeks was regarded as acceptable. For online quizzes, feedback returned after one working week would be considered as late.

When asked about waiting time for receiving feedback on coursework, 42.4% of the respondents thought that 2 working weeks would be reasonable.

### The single most important thing about assessment feedback

In an open-ended question, the respondents were asked to identify the single most important thing about assessment feedback for them. 88 relevant responses were collected and they were summarised using 10 classifiers manually. Each response was summarised by no more than 3 classifiers. The 10 classifiers altogether were used 121 times to summarise the 88 responses. Each classifier was then ranked according to their frequency of occurrence. The frequently occurred classifiers and their frequencies are shown in Table 5.

**Table 5: The single most important thing about assessment feedback.**

	Frequency of occurrence	Percentage (%)
Identifies weaknesses and/or strengths	53	43.8
Brings about improvements	48	39.67
Indicates learning progress	6	4.96

The most important thing about assessment feedback, as reported by the respondents, was to help them to identify their strengths and weaknesses in knowledge acquisition. Amongst them, 83.02% stated that feedback that shows their mistakes or misunderstanding is the most important. A majority of the respondents also think that feedback needs to help them identify areas of improvements, to clear their misunderstanding and show them how to better grasp the subject concepts.

Many respondents commented that summative feedback alone does not help their learning because it does not bring about improvements:

*“Making it detailed enough to let me know what areas I need to improve on, rather than just ‘you are only good enough to get a x% mark’.”*

*“to let you know where you have gone wrong. sometimes i receive grades with no idea how or why i got that mark this is not only frustrating but is not helping me to improve my areas of weakness.”*

*“Feedback needs to say what we did wrong, how it should be changed and why it should be changed. An overall mark isn't that helpful without some context. Dividing marking criteria up is good, but if for example we get 7/10 on one section of a coursework, give a specific account of what would be needed to get the full 10. General statements aren't that helpful.”*

Many respondents also pointed out that the presentation and format of the feedback is important to facilitate learning:

*“Detailed feedback on what I have done well and where I have lost marks and what could be done in the future for me to improve on my weaker areas.”*

*“Making available the original transcript I presented, with annotation from the marker”*

The respondents prefer feedback presented in the context of a detailed marking scheme, showing them precisely where their performance falls short in achieving the learning outcomes, and how to improve.

The promptness of feedback was not widely regarded as the most important thing by the respondents. Only 3.41% of the responses stated promptness as the most important.

### **What prevents assessment feedback from facilitating learning?**

The respondents were given an opportunity to identify the single most important thing that prevents assessment feedback from facilitating their learning in an open-ended question. 91 responses were collected, 5.49% of which were not answering the question and their answers were therefore ignored. 12.09% of the respondents thought that any form of feedback is good and cannot be a hindrance in their learning. 5.49% of the respondents cannot think of any factor.

The remaining 70 responses were analysed and classified manually into four categories. The results are shown in Table 6.

**Table 6: The predominant factors that prevents assessment feedback from facilitating learning.**

<b>Factors</b>	<b>Frequency of responses</b>	<b>Percentage (%)</b>
Lack of (formative / detailed / personalised / specific) feedback	45	61.64
Long delay in receiving feedback	24	32.88
Negative feedback	3	4.11
Other students' lack of care on feedback	1	1.37

Feedback that is of poor quality and requires a long waiting time were identified as two predominant factors. The lack of feedback ranges from not receiving any feedback at all for an assessment to not receiving personalised feedback. Some respondents also recognised that their tutors' heavy workload had prevented them from getting quality feedback. Feedback that was general, shallow and non-specific to the submitted work was not welcomed by the respondents because they did not know how well they had learned the subject. Summative feedback without the backup of any formative feedback were seen as a hindrance to learning. It was seen to be particularly harmful when only a single mark or grade was given, without a breakdown of the mark components, because the recipient cannot tell where the mistakes lie and how to improve:

*“The fact that sometimes you feel you've done really well in a piece of submitted work, only to have it returned later with an average mark, without being told why, exactly.”*

Only a small proportion of the respondents found negative feedback not helpful to their learning because it damages their confidence and is not constructive.

It was reported that sometimes the feedback was given after the terminal assessment of the subject, and hence rendered the feedback obsolete for bringing about any improvement to the learning of the subject. The long waiting time also led to an unsettling feeling, leaving the respondents wondering where they had made mistakes in their learning:

*“The length of time before we receive feedback is a disadvantage as it leads us to believe the way we did a certain coursework was correct for so long before we are told that it in fact was not, which*

*will result in the students using such understanding in other pieces of coursework and affecting the quality of work there.”*

## The effect of continuous assessment feedback on learning

The respondents were asked whether feedback on their continuous assessments plays any role on their learning. 91.3% of the respondents confirm that such feedback is useful. In an open-ended question, they were also asked to state how such feedback affected their learning. Apart from two responses which were not directly related to feedback, their experiences were fairly similar and were summarised into 7 main categories. The frequency of occurrences in each category are shown in Table 7. Note that the results are drawn from 82 responses. Each response was summarised using at most 3 of the 7 categories.

**Table 7: The effect of coursework, assignments and quizzes feedback on learning.**

How does feedback on continuous assessments affect learning?	Frequency of responses	Percentage (%)
Identifies weaknesses	49	37.4
Guides learning	32	24.43
Brings about improvements	29	22.14
Acts as an indication of current learning progress	7	5.34
Clears misunderstanding	6	4.58
Consolidates learning	5	3.82
Motivates learning	3	2.29

According to the respondents' past experience, the three main effects of feedback on learning were: feedback helped to point out mistakes one made in learning a subject; it provided practical guidance on overcoming one's weaknesses in learning the required concepts and hence brought about improvements; and it also gave pointers on where further efforts should be placed in future. This result is somewhat predictable as the key aims of feedback ought to help students to identify their strengths and weaknesses and to show them how to perform better in future. The interesting point, however, is the level of awareness among the respondents on how feedback affected their learning positively. According to an informal survey amongst colleagues in HE, one persistent view amongst tutors who refuse to give detailed feedback on student's work is that students do not appreciate feedback on their work. These tutors also believe that students are only interested in knowing their grade and would not even read their feedback. The results from this study have disproved such a false belief. The overwhelmingly positive experiences of the respondents showed that many students recognise the importance of detailed formative feedback for their learning. They value feedback that helps them understand the subject better and brings about improvements.

## What do students want?

The results of the survey revealed that students prefer to receive written feedback. 38.9% prefers feedback to be written directly on their submission so that their mistakes can clearly be identified and 36.7% prefers receiving written feedback electronically. Feedback should be prompt and easy to read, but the respondents felt that it is even more important for the marking to be consistent and fair. The respondents felt that it is more important for feedback to be constructive than affirmative.

For each type of feedback, the respondents were asked to rank how helpful such type of feedback is to their learning and how important it is to them. The mean rank and the standard deviation of the importance and helpfulness of each type of feedback are shown in Table 8. A value close to 1 for importance means that it is very important; whereas a value close to 7 for helpfulness means that it is very helpful.

**Table 8: Helpfulness and importance of different types of feedback**

<b>Types of feedback</b>	<b>Importance (scale: 1-13)</b>	<b>Helpfulness to learning (scale: 1-7)</b>
The overall score	<b>3.4 (3.4)</b>	5.9 (1.7)
The average score	8.6 (3.6)	4.5 (2.0)
The highest score	9.9 (3.3)	3.9 (2.2)
The lowest score	10.9 (3.1)	3.8 (2.2)
A detailed breakdown of the overall score	4.2 (3.0)	5.9 (1.4)
The marking scheme and the score against each marking criterion	<b>4.1 (2.4)</b>	<b>6.1 (1.3)</b>
A summary of the tutor's comment	5.1 (2.7)	<b>6.0 (1.4)</b>
Formative feedback that highlights the areas of mistakes	5.2 (2.9)	5.8 (1.4)
Formative feedback that highlights the exact location of mistakes in the submitted work	5.1 (2.7)	5.8 (1.4)
Formative feedback that highlights the exact location of mistakes in the submitted work AND gives advice on how to rectify the mistakes	<b>3.7 (3.1)</b>	<b>6.2 (1.5)</b>
Sample solution	7.4 (3.1)	5.4 (1.5)
Formative feedback that highlights common mistakes made by all students	8.8 (3.0)	4.9 (1.6)
Formative feedback that highlights common mistakes made by all students AND shows how to rectify/avoid those mistakes	8.1 (3.5)	5.2 (1.7)

The respondents felt that the overall score of their work is very important, but it was not very helpful to their learning. The two types of feedback that were considered to be both important and very helpful to learning are:

- Formative feedback that highlights the exact location of mistakes in the submitted work AND gives advice on how to rectify the mistakes
- The marking scheme and the score against each marking criterion

The results also show that the respondents were not interested in knowing how well they perform when compared with their peers nor how to avoid making common mistakes. They valued detailed individual personalised feedback more than general feedback. While sample solution is generally considered as a valid form of feedback because students can compare their work against the solution to identify mistakes and areas of improvements, the respondents did not value such type of feedback.

### **Additional Comments**

The respondents were given an opportunity to give any additional comments regarding assessment and feedback. Out of the 34 responses, about 44% were not directly related to assessment and feedback, rather on general teaching and learning issues such as timetabling, general support and availability of past exam papers. Of those that were related to assessment and feedback, the main concerns were in the areas of consistency and transparency in marking, helpfulness and timeliness of the feedback. Out of those four areas, consistency of marking and helpfulness of feedback were of larger importance:

*“Being a students the speed with which courseworks are marked is very important, however consistency and valuable feedback is much more important to students. It is no use to receive coursework marks within a week of submitting if the students do not understand what they did wrong.”*

*“I don't find assessment feedback useful to my learning. Courseworks and exams rarely (and indeed, shouldn't) focus on the same topics, so I can't really learn from one and apply it to the other. I would, however, like to know where I've gone wrong, and it's nice to get feedback sooner rather than later.”*

*“Marking is mostly never transparent, neither for coursework nor for the actual exams. You walk away from the exam or submit a piece of coursework feeling you've done a good job, only to get an average mark back. We're not told why or what we did wrong, and the overall feeling is that we need to do better...except we don't know in what area, exactly.”*

Though timeliness of feedback is important, the quality of feedback must not be jeopardised. For feedback to be truly helpful to student's learning, the feedback must point out mistakes and provide guidance on rectification and to facilitate improvement. The respondents also found that feedback on terminal assessments, especially exam marks, needs to be timely, ie it should be released well before their next set of terminal assessments for other subjects.

Some respondents also noted the difficulty in maintaining fairness and consistency in marking when group work is involved. Concern was also raised regarding consistency of marking by multiple tutors. With a marking scheme that is not sufficiently prescriptive it is easy for different markers to interpret the marking criteria differently, hence resulting in inconsistency in awarding marks.

## Summary & Discussion

Providing timely, adequate and effective assessment feedback to students have been a national and international issue (HEFCE, 2009; The McGraw Center, 2009). To address this issue, some institutions publicise tips to providing feedback to students, e.g. Brissett and Heffernan (2009), The McGraw Center (2009) and Walk (n.d.). Such tips are words of wisdom drawn from tutors' own experience. Their effectiveness to learning are often unattested and may be discipline-specific.

In the hope of finding ways to motivate students to learn, this study investigates the role of coursework feedback in learning and what students regard as helpful feedback to their learning. The results show that students used coursework feedback to: (i) identify the strengths and weaknesses in their learning and their current learning progress, (ii) indicate their current learning progress, (iii) guide their future learning, (iv) bring about improvements, (v) clear misunderstanding, and (vi) motivate them to engage in learning. This result is encouraging as it shows that students recognise the importance of their tutors' formative feedback to their learning and have been using it to facilitate their learning. This is contrary to Gibbs (2002), as Cowan (2003) puts it: *'In effect, [Gibbs] suggests that these diligent tutors might as well be saving their breath to cool their porridge.'*

This study confirms that, to facilitate learning, assessment feedback needs to help students identify their own weaknesses and strengths so that they can better focus their effort in subsequent learning. This study shows that students particularly value feedback that pinpoints the exact locations where they have made mistakes in their work as well as explains clearly how they can improve in future. They preferred such feedback to be written directly on their submissions. Feedback should not be wordy, but concise and clearly formulated so as to clarify misunderstanding. This study reveals that tutors have been relatively effective in highlighting mistakes made in students' work but less so in giving feedback that helped students clarify things they did not understand. Hence, the gap between actual performance and the reference level remains unbridgeable. To alleviate this shortcoming, Orsmond et al. (2002) recommends tutors to *'evaluate how their feedback to students is utilised'*, hence increasing their awareness of how their students learn so as to enable them to write more effective feedback in future. This study also reveals that tutor's general comment on a piece of work was seen as less helpful and relatively unimportant. Hence, when preparing feedback to computing coursework, more effort ought to be put in pinpointing mistakes and expounding on potential future improvements. Unlike Orsmond et al.'s (2002) finding, this study indicates that, in computing, students prefer written feedback to verbal feedback. With hand-written feedback, the writing must be legible. Illegible feedback causes unnecessary frustration to students in their learning.

The respondents found detailed individual personalised feedback particularly helpful. This study confirms that feedback needs to be timely, but its quality must not be jeopardised as this would reduce

its usefulness to learning. For assessment feedback to be useful in bringing about improvement, it must be released before subsequent assessments. Feedback received after the terminal assessment was generally considered unhelpful, no matter how detailed and clearly it was written. Only a very small number of respondents found that feedback in one module helped their learning of other modules. Regarding timeliness of feedback, though most respondents considered a turnaround time of one week prompt, a turnaround time of two weeks was generally regarded as sufficiently prompt and they would wait longer for quality feedback.

Consistency in marking was regarded as important. While structured marking schemes are generally considered an effective means to facilitate consistency in marking, some respondents observed that structured marking schemes do not automatically ensure consistency in marking. To maintain consistency, marking criteria need to be precise, written in clear, unambiguous language and leaving no room for difference in interpretations. This can be achieved by adopting a better approach to developing marking criteria (Seymour, 2005).

A practical way to reduce turnaround time in marking, while ensuring marking consistency and the production of helpful assessment feedback, is to use a suitable software system for facilitating the marking process. Suitable use of Information and Communication Technology (ICT) can help tutors 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. For example, ICT can facilitate the design and management of flexible marking schemes, a better organisation of feedback banks and a flexible annotation of submitted documents. ICT can also improve the accessibility of feedback for students (Barrett & Luca, 2002) and provide a better archiving facility for students' work. Software systems such as MarkTool (Zhang & Heinrich, 2005) are known to help marking and allow tutors to provide students with more detailed and relevant feedback when compared with the traditional paper-based approach.

An initial trial on the use of e-CAF (Wong et al, 2008) to mark a range of programming coursework showed that the time to give relevant, personalised and helpful formative and summative feedback to students was reduced by at least 20%. The larger the class size, the higher reduction in the speed of marking. Such a time reduction in giving helpful feedback was enabled by the specially-designed features of e-CAF which (i) facilitates the design of a detailed, prescriptive marking scheme and enables tutors to produce detailed personalised feedback that is clearly linked to both points in the assessed documents and to individual marking criteria; (ii) enables feedback given to one student to be reused and re-tailored easily for the need of another student.

## Conclusion and Future Plan

This study suggests that relevant and helpful feedback motivates students to learn. It is therefore worth investing time and effort in giving helpful feedback to students. This study has identified the type of coursework feedback that was regarded as helpful by students taking computing modules and the time frame for giving prompt feedback to coursework. Current literature shows that suitable use of ICT facilitates the process of giving timely, consistent and effective feedback (Barrett & Luca, 2002; Zhang & Heinrich, 2005). To bring about solid improvements in assessment feedback, perhaps more radical assessment approaches and procedures would need to be adopted (Cowan, 2003).

Comparing the current findings with the current practice, it is recognised the following changes may be beneficial:

- To maximise the potential for coursework to provide timely formative feedback about students' learning progress, students will be required to submit coursework around mid-term, rather than at the end of the teaching period.
- Individual feedback to coursework will be returned to students within two weeks of submission.
- Feedback to coursework will include formative feedback that highlights the exact location of mistakes in the submitted work and gives advice on how to rectify the mistakes. It will also include a detailed marking scheme and summative feedback with the actual score against each marking criterion.
- Whenever appropriate, a sample solution to the coursework will be released immediately after the cut-off date for submission.
- To reduce the administration delay, coursework should be submitted electronically whenever possible.
- Exploit the use of ICT such as e-CAF for coursework assessment and feedback whenever possible.

- It is planned that the above changes to the current assessment process will be trialled in subsequent academic years.

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