Open mentor: Supporting tutors with their feedback to students

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OPEN MENTOR: SUPPORTING TUTORS WITH THEIR FEEDBACK TO STUDENTS

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Open Mentor: Supporting Tutors with their feedback to students

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Abstract

Assessment is one of the major challenges for higher education today. This is partly because it traditionally squares the desire for improved constructivist learning against the demand for institutional reliability and accountability. The call for a pedagogically-driven model for e-Assessment was acknowledged as part of a vision for teaching and learning in 2014 (Whitelock and Brasher 2006). Experts believe that such a model will allow students in Higher Education to take more control of their learning and hence become more reflective. These are indeed laudable aims but how can they be implemented in practice?

One of the problems with tutor feedback to students is that a balanced combination of socio-emotive and cognitive support is required from the teaching staff, and the feedback needs to be relevant to the assigned grade. Is it possible to capitalise on technology to build training systems for tutors in Higher Education, that will support them with their feedback to students, and which will encourage their students to become more reflective learners?

Introduction

One of the challenges of today's education is that students are expecting better feedback, more frequently, and more quickly. Unfortunately, in today's educational climate, the resource pressures are higher, and feedback is often produced under greater time pressure, and often later. Although feedback is considered essential to learning, what is it and how can tutors be supported to provide pertinent feedback to their students?

Feedback is, put simply; additional tutoring that is tailored to the learner's current needs. In the simplest case, this means that there is a mismatch between students' and the tutors' conceptual models, and the feedback is reducing or correcting this mismatch, very much as feedback is used in cybernetic systems. This is not an accident, for the cybernetic analogy was based on Pask's (1976) work, which has been a strong influence on practice in this area (e.g., Laurillard, 1993).

Because feedback is very much at the cutting edge of personal learning, we wanted to see how we could work with tutors to improve the quality of their feedback. To achieve this, we have been working on tools to provide tutors with opportunities to reflect on their feedback. The latest of these, Open Mentor, is an open source tool which tutors can use to analyse, visualise, and compare their use of feedback.

In particular, we wanted to consider feedback not as error correction, but as part of the dialogue between student and tutor. This is important for several reasons: first, thinking of students as making errors is unhelpful – as Norman (1988) says, errors are better thought of as approximations to correct action. Thinking of the student as making mistakes may lead to a more negative perception of their behaviour than is appropriate. Secondly, learners actually need to test out the boundaries of their knowledge in a safe environment, where their predictions may not be correct, without expecting to be penalised for it. Finally, feedback does not really imply guidance (i.e., planning for the future) and we wanted to incorporate that type of support without resorting to the rather clunky 'feed-forward'.

In this paper, we will describe Open Mentor, and the processes that we worked through as we developed it. We started the process by checking with our stakeholders, i.e. tutors and students, that our tutoring model was one they recognised and welcomed.

Background

In order to provide feedback, Open Mentor has to analyse the tutor comments.

The classification system used in Open Mentor is based on that of Bales (1970). Bales's system was originally devised to study social interaction, especially in collaborating teams; its strength is that it brings out the socio-emotive aspects of dialogue as well as the domain level. In previous work (Whitelock et al., 2004) we found that the distribution of comments within these categories correlates very closely with the grade assigned.

Bales' model provides four main categories of interaction: positive reactions, negative reactions, questions, and answers. These interactional categories illustrate the balance of socio-emotional comments that support the student. We found (Whitelock et al., 2004) that tutors use different types of questions in different ways, both to stimulate reflection, and to point out, in a supportive way, that there are problems with parts of an essay. These results showed

that about half of Bales's interaction categories strongly correlated with grade of assessment in different ways, while others were rarely used in feedback to learners. This evidence of systematic connections between different types of tutor comments and level of attainment in assessment was the platform for the current work.

The advantage of the Bales model is that the classes used are domain-independent – we used this model to classify feedback in a range of different academic disciplines, and it has proven successful in all of them. An automatic classification system, therefore, can be used in all fields, without needing a new set of example comments and training for each different discipline.

Others (e.g., Brown & Glover, 2006) have looked at different classification systems, including Bales, and from these developed their own to bring out additional aspects of the tutor feedback, bringing back elements of the domain. In practice, no (useful) classification system can incorporate all comments. We selected, and still prefer, Bales because of its relative simplicity, its intuitive grasp by both students and tutors, and because it brings out the socio-emotive aspects of the dialogue, which is the one aspect tutors are often unaware of.

A second point is that Bales draws out a wider context: we found that as we started to write tools that supported feedback, we began to question the notion of feedback itself. Instead, the concept seemed to divide naturally into two different aspects: learning support and learning guidance. Support encourages and motivates the learner, guidance shows them ways of dealing with particular problems.

Understanding the stakeholders needs

In order to build the first storyboards for Open Mentor and to ensure the software would meet the needs of both tutors and students, we devised two questionnaires, one for tutors and the other for students. 44 tutors from Kings College London, Manchester Metropolitan, The Open University and Robert Gordon University completed the tutor questionnaire while 47 students from The Open University and Robert Gordon University responded to a questionnaire which was designed to understand how students reacted to tutor feedback.

The first set of questions raised with both students and tutors perceptions about when written comments on assignments were read by the students. All student respondents indicated that they look at the marks first (rather than comments) and this fitted with the tutors' perceptions.

Most students indicated that they read all comments (Chi Square 12.4 $p<0.02$), while some skimmed comments and few read each point in detail. However, the majority of tutors thought that students mainly skimmed comments (Chi Square 21.636 $p<0.001$) while some did not read them often or read all or in detail. Here, students' responses and tutor perceptions did not

agree. In fact they did not believe the students paid as much attention to their feedback as reported by the students.

The vast majority of students reported that they read comments immediately (Chi Square 22.638 $p<0.001$) but never again and this corresponds with tutors' judgments (Chi Square 59.905 $p<0.001$) as to how they thought students behaved. However 19 students reported that they later refer back to comments, an observation that is not reflected in the tutors' judgements.

Both tutors and students agreed that comments should reflect the grade awarded, which is a basic premise of the Open Mentor system.

The majority of tutors involved in the study judged themselves to be experienced tutors. The majority of student respondents did not judge there to be a difference in feedback from new and experienced tutors. However, some students reported that new tutors provided more feedback than experienced tutors.

The majority of tutors indicated that new tutors provide students with the greatest amount of written feedback while a significant number felt that there was no difference between tutors. With respect to the quality of feedback however, the majority of tutors felt that experienced tutors provided higher quality (Chi Square 10.878 $p<0.004$) while a significant number felt that there was no difference between experienced tutors and others. This result is the opposite of student judgements where a majority felt that there was no difference between new and experienced tutors, while a significant number (Chi Square =19.0 $p<0.01$) thought that experienced tutors provided better comments.

A large majority of tutors and students indicated that a software tool to assist with commenting would be of help to tutors and in training tutors. All tutors felt that software tool would help them reflect upon feedback to students but tutors were divided about how such a tool might help with the management of resources. However, a significant majority of tutors felt that a software tool would be of help with Quality Assurance (Chi Square = 18 $p<0.01$)

Responses to open ended questions were very diverse among both students and tutors. However, both groups indicated that students most value constructive positive comments even if critical. Similarly both groups felt that there is little value in negative comments and unsubstantiated comments. Both groups indicated that feedback should be improved through more detail and that comments should be meaningful, constructive and relate to the actual assessment. Finally, there were consistent comments that experienced tutors have a better understanding of students while new tutors might be more enthusiastic.

Questions which tested the underlying pedagogical model for Open Mentor

Previous work by Whitelock, Watt, Raw and Moreale (2004) on student feedback has postulated that work that is awarded high grades should attract

feedback from tutors that is high in praise, has few questions and does not ask the student to reflect on their work. Conversely, work that is awarded low grades should attract less praise, more questions and suggestions and invite more reflection. A number of questions in the Open Mentor Evaluation Study are able to throw light on these postulated outcomes and the results are summarised below.

A significant majority of both students and tutors respondents indicated that they expected high grades to attract more positive comments and low grades to attract more answers, suggestions and questions. Tutors gave a strong indication that they expected assessments with low grades to attract negative comments. Student responses followed a similar trend that was however not statistically significant. Students also indicated strongly that they expected no difference. All these findings support the pedagogical model postulated by Whitelock et al.

A further analysis, using cross tabulation revealed:

- Both students and tutors who feel that low grades would result in more questions also indicated that low grades would attract more answers
- Tutors who judged that high grades attract more positive comments also indicated strongly that low grades attract more answers and suggestions
- Tutors who felt that low grades attract more questions also indicated that low grades attract negative comments
- Both students and tutors felt that lower grades should attract more detailed comments and a deeper level of explanation. Higher grades should attract more positive comments

These findings from both groups of stakeholders supported a pedagogically driven development process which is described below.

The design of Open Mentor

We followed a process that began with developing scenarios of use, then storyboards, and then putting in place an implementation which would follow closely the pattern of these storyboards.

The idea behind the design of Open Mentor is fairly straightforward: it goes through tutor assignments, extracting tutor comments, and classifying them. We used pre-determined benchmarks (from Whitelock et al., 2004, although these can be adapted to different institutions) to estimate ‘ideal’ distributions of comments for each category, and then display the difference between the actual and the ideal. In practice, this is a bit of a simplification – the actual logic is pretty complex, but most of this is hidden. Although there are ‘normal’ bands of comments of each type, these vary (significantly) depending on the quality of the individual submissions and the number of submissions involved.

A large proportion of positive comments in one context may be inappropriate in a second, and coincidental in a third.

Open source was initially an external requirement, but subsequently became a way of life. The two rounds of the project were funded by JISC, which mandated open source where possible. Initially, this meant re-using other people's code where we could, basically to save us having to do the work ourselves. Ultimately, though, open source changed the way we designed the system into a far more open structure than we had initially conceived.

The resulting Open Mentor architecture is based on the following main components:

- A data source for course information and lists of students and tutors
- A data source for use within Open Mentor, to store assignments, submissions and classified comments
- A classifier which can categorise tutor comments
- An extractor which can read tutor comments from word processed files
- An evaluation scheme description which defines the classes of comments, the grading bands and the expected benchmarks
- A logic component which applies the evaluation scheme to the classified comments

The advantage of this is that different institutions can write their own components and add them into the system without having to do any modification of existing code – this reduces the risk of errors and other problems.

How does Open Mentor work?

Open Mentor reads and opens assignments written in Microsoft Word to extract the tutor comments. However, it does not use Word itself. A standard charting component is used to provide interactive bar chart views onto the tutors' comments showing the difference between actual and ideal comment distributions as shown in Figure 1 below. It provides the tutor with feedback about the types of comments s/he has given to the student with respect to the mark awarded. If there is not enough praise or constructive feedback for improvement then the tutor will be alerted to this finding.

The implementation of Open Mentor

Open Mentor is implemented using Java, and runs as a web application, enabling people to use it in any location. A screen snapshot of the system is shown below in figure 1.

Again, open source influenced the direction of the project; initially we had used open source as a kind of library of components that we could re-use.

Later, particularly when we moved to Spring, we found our system became much smaller, as we could plug our developments more easily into larger frameworks. We also moved to a point where we can contribute to open source: our developments of the Apache POI-based code for extracting text from Word files exceeded the capabilities of the standard distribution. UK higher education has an important new dissemination route for its developments in these channels – however, the same resourcing issues that led to this situation still need to be addressed.

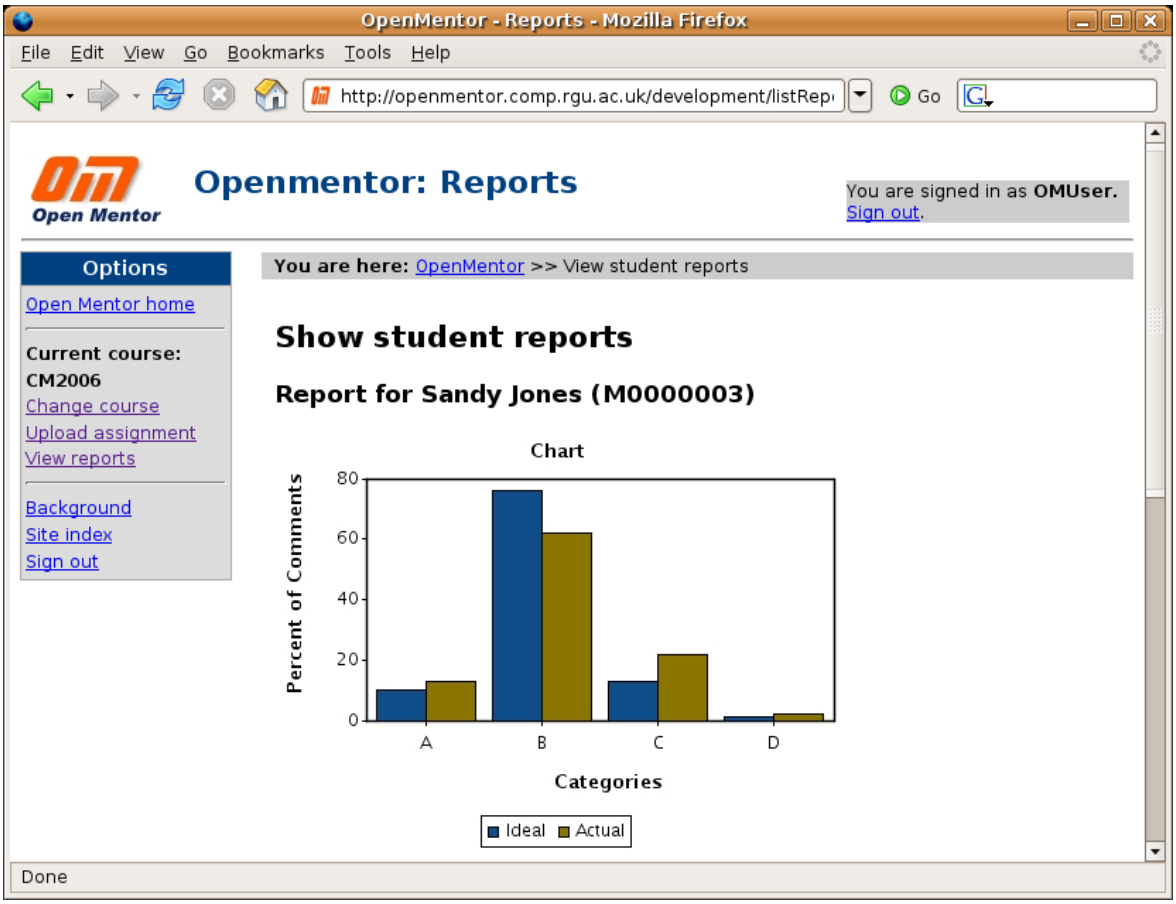

Figure 1: Screen snapshot of Open Mentor

In our original implementation, we used Open Office to read Microsoft Word files, converting them to the Open Office (then) standard .sxw files, which in practice are zipped XML files. Open Mentor would ask Open Office to convert the file, then it would unzip the resulting .sxw file, parse the XML, and extract the tutor comments. Although this worked, it made the server dependent on Open Office, which proved to be too unstable for a reliable system. The current version of Open Mentor uses a separate comment extraction component, based on Apache's POI (a library for working with Microsoft OLE-based documents, especially Excel). This means that Open Office does not need to be running, and everything can be managed within a single Java application, improving reliability considerably.

The currently implementation uses the Spring framework to divide the system into a larger body of components, each of which can be used, replaced, or

wrapped independently, making the overall system easier to integrate into an existing framework. Each of the blocks in the diagram above were represented by one or more components.

Other than this, the implementation is a fairly standard Java-based open source framework. We used JSTL to implement the web pages, and Hibernate to map business objects into a relational database. We also used a few other tools to support the method, and especially, we used Maven – an advanced Java build management tool, which enabled us to track the quality of the development work in a distributed team. Subversion proved a great alternative to CVS which worked well through our somewhat complex firewall arrangements.

Discussion

What of the connection between education and technology? As a development team we were fortunate, as many of the team combined both technical expertise and long experience of innovation in pedagogy. This enabled us to let the needs of the tutors and students drive the technology. In more traditionally structured teams this would have been either impossible or frustrating, and quite likely both – as control within teams flows between technological and educational specialists. To be successful, we had to become specialists in both.

Open Mentor is becoming successful, both within our institutions and beyond. However, the key factor is still institutional integration, and the key to this is the open frameworks that are enabled by the use of open source. In today's educational climate, with the continued pressure on staff resources, making individual learning work is always going to be a challenge. But it is achievable, so long as we manage to maintain our empathy with the learner. Tools can help us achieve this by giving us frameworks where we can reflect on our social interaction, and ensure that it provides the emotional support as well as the conceptual guidance that our learners need.

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