Guidelines for the Use of Lightwork

Introduction

Successful assessment of student work draws on many factors, including assessment design in relation to targeted learning outcomes, marking guidelines and procedures, study context and student characteristics, workload pressures affecting teachers and students. Lightwork has been designed to assist with these challenges. It aims to support teachers and their marking teams to conceptualize and conduct assessment of students with assignment type work to high educational standards while being efficient at the same time.

This document provides background from the literature on assessment with assignments. It further draws on experiences from Lightwork users to show how to use Lightwork for setting up and conducting assignment assessment. This document focuses on conceptual issues. Other documents, concentrating on the use of Lightwork in a technical sense, are available from http://lightworkmarking.org/.

This document uses the term *teacher* to refer to the person who is academically responsible for the assignment. In Lightwork a teacher takes on the role of the *Marking Manager*. The term *marker* is used to refer to a person who assesses student work yet works under the guidance of a teacher. In Lightwork such person takes on the role of *Marker*. Multiple teachers and markers can form a marking team. The phrase *Lightwork user* is applied when referring in general terms to either teachers or markers using Lightwork to support their work.

Background from Literature

In 2006/7 a project funded by the Tertiary Education Commission of New Zealand investigated the status and potential of e-learning supported assignment assessment (see http://etools/index.htm). Findings of this project have contributed to the conceptualization of Lightwork. A review of the literature on assessment, compiled as part of the project, is available at http://etools/documents/LitReview101006.pdf. The following sections are closely based on extracts of this literature review.

Assessment in Relationship to Teaching and Learning

Education in general and specifically higher education should prepare students for life-long and autonomous learning. Assessment plays a central role in higher education and should facilitate this goal. Assessment must be designed in context of the teaching and learning strategy of a course (Kendle & Northcote, 2000; Macdonald, 2003; Muirhead, 2002). There must be a commitment to a pedagogical rationale for adoption of assessment design (O'Reilly, 2005). Assessment should be student-centred to enable meaningful and relevant learning experiences (Muirhead, 2002). Meaningful and constructive assessments need to challenge students to think critically and should encourage students' interest in learning (Leathwood, 2005). As it is widely acknowledged that assessment drives student learning and directs student effort, assessment design must be planned accordingly and must be an integral part of course design (Kendle & Northcote, 2000). Assessment tasks influence the direction and quality of student learning (Maclellan, 2004). To move forward students need to be given more responsibility for assessment processes (Nicol & Macfarlane-Dick, 2006) and must be encouraged to participate (Taras, 2002).

Formative and Summative Assessment

Assessment of student work serves a lot of different purposes in the learning and teaching activities of tertiary institutions. These purposes can be classified under two main groupings: formative purposes and summative purposes. The formative purposes involve structuring, guiding, and enhancing student learning. The summative purposes involve certifying and reporting student achievement and admitting students to subsequent learning opportunities. The prime issue to be addressed in planning, implementing and reviewing assessment procedures is their validity: the extent to which they fulfil their intended purpose. Validity is an overarching issue and encompasses narrower issues such as the reliability and fairness of the procedures.

There are different validity requirements for the formative and summative purposes of assessment. Validity is high for formative purposes when the assessment procedures help the student considerably towards achieving the real goals of teaching and learning. Validity is high for summative purposes when the assessment gives an accurate account of the student's capabilities at the time the assessment occurs, a final grade is awarded, or a selection decision is made.

Assessments at the end of a course, such as a final examination, may be seen as largely or entirely summative. This is not entirely true. Even if the students receive no comments from the teacher, and perhaps even do not get their marked work back, the final examination has a formative effect. Students' motivation, study habits and specific learning activities are affected by the existence, expected nature and content of the impending examination, while the experience of sitting the examination and the result obtained can have a major impact on student perceptions of their ability or self-efficacy in the subject, and on their future study options and choices (Crooks, 1988).

Assessments during the course may have a dual purpose: to count toward the final grade, but also to be used as a source of guidance, direction or re-direction of the students' learning. These usually have all of the formative effects mentioned for final examinations. In addition, however, the students usually get their work back accompanied by comments designed to indicate strengths and weaknesses, and there may be feedback to the whole class based on issues common to several or many students. These are more explicitly intended to be formative.

Another category is assessments during a course that are intended solely for formative purposes, and do not count at all in the final grade for the course. These are now comparatively rare, given the heavy workload of both staff and students in most institutions, but have the clear potential advantage that students know that these assessments are non-threatening and designed to be helpful.

There is an inherent tension between formative and summative assessment purposes, especially if the same assessments are to be used for both purposes (Crooks, 2004). For instance, assessment relatively early in a learning experience may be particularly valuable for formative (learning) purposes but distinctly inappropriate to be counted later for end-of-course grading (summative) purposes. If the early assessment makes a substantial difference to the student's learning, perhaps as a consequence of the feedback resulting from it, that learning gain arising from the assessment means that the summative information from the assessment has become out of date and inaccurate by the end of the course, and therefore inappropriate to be counted in the final grade. The early

assessment may have given an accurate picture of the student's performance level at the time of the assessment, but that picture no longer is relevant.

Another aspect of the tension between the formative and summative use of the same work involves the nature of the feedback on the work that the students receive. The feedback may focus on justifying marks or grades awarded, on helping the students do better in the future, or both. Feedback focused on justifying marks strengthens the summative focus, and is less useful for improving students' work than feedback that makes suggestions about how the work could have been improved. For instance, a comment that paragraphs are poorly structured helps a student less than some examples of how the paragraphs could have been structured more effectively.

A third aspect of the tension arises from preliminary evidence that the mere presence of summative information on student work (such as a grade or a mark) diverts student attention away from the more detailed comments provided. There are numerous reports, from teachers and students, that students often pay little attention to specific feedback if a mark or grade is also provided. These reports are accompanied by a few tantalising pieces of research. Black and Wiliam (1998a) cite the research of Butler (Butler, 1988), who found little learning benefit from feedback that consisted of marks alone or marks together with written comments, but substantial learning benefit where the feedback consisted solely of written comments.

Certain approaches to combining assessment of learning and assessment for learning in the same tasks seem promising. Crooks (2004, pp. 6-7) summarised these:

> If students are allowed multiple chances to perform well in a particular area, for instance by being reassessed if they do not meet the desired standard initially, they are very likely to pay careful attention to specific feedback resulting from their initial unsuccessful attempts. Perhaps less strongly, if they are expected to perform several tasks that are similar in nature and demands, the feedback on the earlier tasks is more likely to be attended to than similar feedback on the first of quite unrelated tasks.

> Another option promoting attention to feedback is subdivision of a relatively large task into a series of smaller stages, with feedback available at each stage but the grade based principally or entirely on the final product. This often involves a tension for the teacher in deciding how detailed and extensive feedback can be before it raises doubt about whether the final product is more the work of the teacher or the student – rather akin to a tightrope walking act, with dangers in both directions. In these examples of approaches that involve both feedback and assessment for credit, I think students can see a close association between attending to and trying to respond to the early feedback and the possibility of greater success on later or more important tasks.

The Importance of Formative Assessment

A number of research and policy papers over the past 20 years have indicated the important impact that assessment practices can have on student learning and motivation (Assessment Reform Group, 1999, 2002; Black & Wiliam, 1998a, 1998b; Crooks, 1988; Harlen & Crick, 2003; Hattie, 1999; Madaus, 1988; Shepard, 2000). For instance, assessment can have the following affects on students:

- Focus their attention on important aspects of the subject;

- Communicate and reinforce (or undermine) teaching goals, including key performance criteria and desired standards of performance;

- Give them opportunities to practice skills and consolidate learning;

- Influence their motivation as learners and their perceptions of their capabilities (self-efficacy);

- Guide their choice and development of learning strategies, skills and study patterns.

The substantial effects identified have suggested that it is important to plan assessment carefully so it can be used most effectively to support and improve students' learning and motivation – in other words, used well for formative purposes.

A very influential paper that focused attention on formative assessment is the literature review by Black and Wiliam (1998a), summarized in Black and Wiliam (1998b). Their main conclusion from reviewing ten years of wide-ranging research was that providing high quality feedback on student work is a very powerful way of raising the standard of student work. They stated that "We know of no other way of raising standards for which such a prima facie case can be made." New Zealand professor John Hattie conducted an extensive synthesis of a wide range of educational research, which he summarized in his inaugural professorial lecture at the University of Auckland (Hattie, 1999). He concluded this review of "what works" in educational practice with the comment that "the most powerful single moderator that enhances achievement is feedback."

What is Needed for Effective Formative Assessment

Royce Sadler (1989), in the most influential early paper on the requirements for good formative assessment, identified three elements that are crucial to the effectiveness of formative assessment:

- Helping students to recognise clearly the desired goal (understand what is required), and to appreciate what high quality work looks like;

- Providing students with evidence about how well their work matches that goal, and helping them to develop the evaluative skill to compare with some objectivity the work they are producing in relation to the desired goal;

- Explaining ways to close the gap between the goal and their current performance, and helping them to develop the skills required.

While a major strategy for meeting these requirements is teacher feedback to students, as Black and Wiliam, Hattie and others have identified, such feedback can be made less time consuming and more effective if the nature of the work to be done and the criteria for evaluating how well it has been done are well understood by the students before the work is begun. This requires good explanations by the teacher, and preferably time for the students to explore and discuss the criteria. It is particularly helpful if the teacher can make available examples of similar work at different levels of quality, to illustrate the qualities that are being sought (Sadler, 1987). With these conditions in place, the feedback can be much more focused, aimed at fine-tuning the students' understanding of the desired qualities and how to adjust their work to better exemplify those qualities.

Sadler (1989) argued that self-assessment is a vital component in learning. He said that if students were to be able to improve, they must have the capacity to monitor the quality of their own work during its production. Feedback on assessment cannot be effective unless students accept that their work can be improved and identify important aspects of their work that they wish to improve. If students are asked and encouraged to critically examine and comment on their own work, assessment can become more dialogue than monologue, and can contribute powerfully to the educational development of students. As Wynne Harlen and Mary James (1996) put it, students have to be active in their own learning (teachers cannot learn for them) and unless they come to understand their own strengths and weaknesses, and how they might deal with them, they will not make progress.

Student motivation is crucial to learning. Assessment is one of the major influences on student motivation (Crooks, 1988; Harlen & Crick, 2003). It is important, therefore, to anticipate and try to optimise the motivational effects of feedback on assessment. The research evidence available suggests that the greatest motivational benefits will come from focusing feedback on:

- The qualities of the student's work, and not on comparisons with other students;

- Specific ways in which the student's work could be improved;

- Improvements that the student has made compared to his or her earlier work.

The formative functions of assessment will be seriously undermined if the feedback on assessment does not consistently and strongly emphasise the most important aspects of student learning and development, or if it gives undue emphasis to less important aspects (Black & Wiliam, 1998a; Crooks, 1988). Consequences of such failure are poorly directed student effort, and hence lower validity for formative purposes. For instance, if attention to assignment content is neglected in favour of a strong focus on surface features such as presentation, spelling, punctuation and grammar, the latter may improve but the original purpose of the assignment is not encouraged and supported through appropriate guidance.

Most writers on formative assessment or feedback on student work indicate that a good balance between criticism and positive comments is most effective. Students pay attention to comments that they perceive to be useful and constructive. Comments on strengths make them more receptive to other feedback, while the most effective comments on weaknesses not only identify them but also suggest how they might be addressed.

Nicol and Macfarlane-Dick (2006) emphasise the importance of learner self-regulation.

They suggest seven principles of good feedback practice:

1. Helps clarify what good performance is (goals, criteria, standards);

2. Facilitates the development of self-assessment and reflection in learning;

3. Delivers high quality information to students about their learning;

4. Encourages teacher and peer dialogue around learning;

5. Encourages positive motivational beliefs and self esteem;

6. Provides opportunities to close the gap between current and desired performance;

7. Provides information to teachers that can be used to help shape teaching.

Higgins et al. (2002) report that students, despite paying lots of attention to grades, have an intrinsic motivation to learn from feedback. The potential of influencing student learning with formative feedback is large. To achieve this, timely feedback is vital, must explain misconceptions and must suggest pathways to improvement.

Marking of Assignments

One of the practical challenges around assignment marking is its the time consuming nature of the marking (Linn & Miller, 2005) that has to be performed by a human expert (Hanna & Dettmer, 2004). The individual nature of most assignments and the types of learning outcomes targeted make it largely impossible to define one correct answer.

The nature of assignment assessment poses a range of challenges for the marking process. Knowledgeable human markers are required for judging the quality of responses (Hanna & Dettmer, 2004). The marking of essays is very time consuming and the reliability of the marking can be very low (Linn & Miller, 2005; Nitko, 2004). To address these challenges the literature presents a very coherent picture of suggested techniques and procedures (Gronlund, 2006; Hanna & Dettmer, 2004; Lambert & Lines, 2000; Linn & Miller, 2005; Nitko, 2004).

Successful marking starts with the definition of the assignment questions. These questions need to be clearly linked to learning outcomes. It has to be assured that the most suitable form of assessment is chosen for the learning outcomes targeted. Next, the marking has to be guided by a marking rubric. There are two main forms of such rubrics that support analytic and holistic marking. An analytic marking rubric requires an outline of an ideal answer or a list of major elements that should be included in an answer. It specifies the number of points that can be achieved for an answer or part of an answer. Restricted response items are commonly judged with the help of analytic marking rubrics. Based on the nature of extended response questions and the inherent degree of freedom it is not possible to provide a single model answer. Holistic marking rubrics are suggested to assist in the marking of such questions. This involves the definition of quality criteria by which answers are judged and the provision of scores for each quality level. The availability of a marking rubric allows the marker to focus on the learning outcomes to be assessed. Without guidance from a rubric the marker can be influenced by matters of presentation over content.

Ideally an appropriate marking rubric should be developed before administering the essay questions. Planning of the scoring will help to refine the questions. Making holistic marking rubrics available to students before they write their work will allow them to focus their efforts into the right direction.

A number of procedures are suggested for the marking process. If an assessment consists of multiple questions each question should be marked separately. This will prevent the so called 'halo' effect, where a marker judges the merit of an answer not only based on its merit but influenced by good answers in the same assignment to other questions. Focusing on each question separately implies that the marker has to work through the student work multiply times. If this is done it is best to vary the sequence in which the work is assessed. It has been shown that the judgement of markers can

evolve over the course of marking work of a whole class. A marker might assess the same work differently, depending on when the work is looked at. This is called 'marker drift'. To counteract marker drift student work that has been marked early on should be marked again by the same marker later in the process. If possible, the assignments should be marked anonymously, that is the marker should not know the identity of the student who has submitted the assignment. Ideally, an assignment would be marked by more than one knowledgeable marker. Following these procedures and using an appropriate marking rubric will greatly enhance the reliability of marking and will further save time in making.

Returning to the formative aspects of assignment assessment, the importance of feedback needs to be emphasised. The marker should provide feedback to each student, outlining strengths and weaknesses in their work and guiding towards further learning (Linn & Miller, 2005; Nitko, 2004; Torrance & Pryor, 1998; Tynjala, Mason, & Lonka, 2001). Individualised feedback that provides detailed information on the quality of an answer is mostly given in conjunction with an analytic marking rubric. Even when using a holistic rubric individual feedback should be supplied (Nitko, 2004). While facilitating student learning is the most important aspect of feedback a further advantage are the conclusions that can be drawn for teaching.

Collecting all feedback the marker can identify strengths and weaknesses of answers across the whole class. This information can be used as a guide for further teaching (Nitko, 2004). Assessment of essays and especially the provision of individual feedback are very time consuming. The development of a statement bank of frequently used comments can make this process more efficient (McLachlan-Smith & Irons, 1998).

Working with Lightwork

The following recommendations come from experiences of teachers and markers with using Lightwork. Appendix B shows how teachers have designed their marking rubrics for their specific marking contexts.

Recommendations around Marking Rubrics

Designing a marking rubric is a challenging task. The change experienced when using Lightwork is that many aspects around rubric become more explicit. The principles of working with rubrics do not change. Lightwork users make the following recommendations.

- One should design the rubric together with the assignment task. This helps to sharpen the focus of the assignment, to clarify what exactly is required from the students and what marks will be given for. The students should be given the rubric together with the assignment specification. This helps students to know what to focus on.

  Having designed the marking rubric helps to respond to student inquiries about the assignment task leading up to the submission deadline.

- For some assignments the structure of the marking rubric follows straight from the way the assignment tasks are setup. This is the case if there are fairly discrete and separate tasks to be done by the students. For other assignments the structure of the marking rubric is less obvious.

- If there are several teachers involved in a course it is good to consult when developing the marking rubric. Discussing the marking rubric bring underlying assumptions forward. Discussing these helps to arrive at marking rubric and ultimately marking that is consistent and in line with the learning outcomes.

- It is challenging to know how fine-grained the criteria should be. If there are only a few criteria worth many marks there is more scope for the marker to apply judgment and more flexibility but at the same time less guidance and control. If there are many criteria worth only a few marks each it can be simpler for the marker who can decide on sub-marks quickly without too much challenge of keeping everything in their head. The downside can be that student work which does not fit the standard template expected is harder to mark. What best to do seems to depend largely on the type of assignment. The more prescriptive an assignment task is the more detailed will the rubric be.

- A further challenge when designing a marking rubric is to avoid covering the same feature of student work in different categories. This links as well to the decisions around how to weight a category in relationship to others. To solve these challenges it is important to go back and re-examine the learning outcomes set for the course and the assignment. This helps to evaluate what is most important and as well what should be signaled to students as being important, e.g., by appearing as separate criterion in the marking rubric. Issues like layout and presentation, and sometimes referencing, are mostly dealt with in their own marking criteria. These issues affect the whole assignments and are usually regarded as less important than content, but are nevertheless assigned marks to emphasize their importance for complete work.

- The frequently used comments that can be defined as part of a marking rubric are very useful for providing good quality feedback in efficient ways. It does take a while to develop these comments and teachers report that they have to re-work these comments as marking progresses. Writing these comments helps the teacher to again think through what is important for the assignment and how it relates to the learning outcomes.

  The first instinct of many teachers is to write frequently used comments that explain shortcomings in student work. It is also important to write comments that confirm to the students if something has been achieved and done as expected. This allows the markers to put these comments to show the students that the marker acknowledges this feature of their work.

  The frequently used comments provide a good way for guiding markers and assisting them in presenting valuable feedback to students.

- Lightwork allows that instructions to markers can be integrated into the criteria of a marking rubric. Again this is a very good way to guide markers. It allows the teacher to pass on guidelines for making judgments to the markers. Markers like having this information available to them in Lightwork directly in their marking context. Markers commented on this being better than being given separate sheets they then have to find again. Writing the detailed marking instructions out is also useful if the teacher marks themselves. It lowers the cognitive load of remembering the details and helps with consistency if there are interruptions in marking.

- In many areas assignments in subsequent semesters will be assessing the same principles using different examples or application areas. It can be possible to design the marking rubric, the instructions to markers and the frequently used comments in a way they can be re-used. Looking at this possibility encourages distinguishing between the more fundamental aspects and their specific applications, which can be useful for the quality of feedback to current students.

Recommendations around the Marking Process

- To facilitate a fast turn-around of assignments it pays to get started with developing a marking rubric early. Designing a comprehensive rubric that includes instructions to markers and frequently used comments takes time. Proper marking can only start once the rubric is fully designed.

  Ideally the rubric should be developed when the assignment task is designed. If this is not (or not fully) achieved at that time the next deadline is around the assignment submission due date. It would be good it the rubric was fully designed by the time of the assignment due date so marking can commence immediately.

- The teacher in charge of the assignment should mark some assignments by themselves before advising markers to commence their work. Marking these assignments will show up potential issues with the marking rubric, the detailed instructions to markers or the frequently used comments. All these elements can be edited.

- The teacher should ask markers to pass some marking on for review immediately. This allows the teacher to check the quality of the marking and to compare the work of the different markers. Doing this early allows the marker to adjust the way they mark before they have marked many assignments.

  Once this initial checking has happened it can be an advantage if the markers hold on to their marking (keeping it in 'Marking completed' status) as this allows the markers to revisit their work as they go along and make changes if required.

- It is good to monitor progress (via the overview tables). This allows seeing how much work markers have already done and allows intervening early should a marker fall behind.

- Before releasing marking to students teachers should do some final checking of marking. Teachers follow different approaches, some picking randomly, some focusing on very high or low marks.

- Teachers have reported that students get upset if marking is release in stages. The teachers recommend releasing all marking at one point in time.

Coping with Reading on Screen

Using Lightwork requires that student work is submitted in electronic form to Moodle. The typical process of using Lightwork implies that the student work is read on screen and that marks and comments are captured by typing on the keyboard. Lightwork users often refer to this process as 'marking on screen'. Some users report finding it difficult to mark on screen. Closer investigation

shows that these users refer to reading on screen, with no-one finding it difficult to enter their marking via the keyboard.

Users are divided about their preference in reading student work on screen or on paper. Some users prefer reading on screen. There does not seem to be any relationship to the age of the user. Issues around reading documents on screen instead on paper are not restricted to the use of Lightwork. Some users who have found reading on screen difficult have provided recommendations that relate to the ergonomically correct setup of their working environment and their movements.

When working with Lightwork it is of advantage to have two monitors setup. One monitor is used to display the marking sheet, the other to display the student's work. Users have reported that it is important to follow advice for ergonomically correct workplace setup and movements. For example, a user reported difficulties in the neck area, pointing out that the problems had been caused by keeping the body still and turning just the head sideways to shift focus between the two monitors. The solution to the problem seems to be to rotate the whole body sideways, supported by the rotating motion of an office chair. The other issue was related to the height of the monitor, with problems arising from the lower edge of the monitor sitting too low.

Appendix A: References for the Background from the Literature Section

Assessment Reform Group. (1999). *Assessment for learning: beyond the black box*. Cambridge, U.K: University of Cambridge School of Education.

Assessment Reform Group. (2002). *Testing, motivation and learning*. Cambridge, U.K: University of Cambridge School of Education.

Black, P., & Wiliam, D. (1998a). Assessment and classroom learning. *Assessment in Education, 5*, 7-74.

Black, P., & Wiliam, D. (1998b). Inside the black box: Raising standards through classroom assessment. *Phi Delta Kappan, 80*, 139-149.

Butler, R. (1988). Enhancing and undermining intrinsic motivation; the effects of task-involving and ego-involving evaluation on interest and performance. *British Journal of Educational Psychology, 79*, 474-482.

Crooks, T. J. (1988). The impact of classroom evaluation practices on students. Review of Educational Research, 58, 438-481.

Crooks, T. J. (2004). Tensions between assessment for learning and assessment for qualifications, Paper presented at the third conference of the Association of Commonwealth Examinations and Accreditation Bodies. Nadi, Fiji.

Gronlund, N. E. (2006). Assessment of Student Achievement. Boston: Pearson.

Hanna, G. S., & Dettmer, P. A. (2004). Assessment for Effective Teaching Using Context-Adaptive Planning. New York: Pearson.

Harlen, W., & Crick, R. D. (2003). Testing and motivation for learning. Assessment in Education, 10, 169-207.

Harlen, W., & James, M. (1996). Creating a positive impact of assessment on learning, Paper presented at the annual meeting of the American Educational Research Association. New York.

Hattie, J. (1999). Influences on student learning, Inaugural professorial lecture. University of Auckland, New Zealand.

Higgins, R., Hartley, P., & Skelton, A. (2002). The Conscientious Consumer: reconsidering the role of assessment feedback in student learning. Studies in Higher Education, 27(1), 53-64.

Kendle, A., & Northcote, M. (2000). The Struggle for Balance in the Use of Quantitative and Qualitative Online Assessment Tasks. Paper presented at the The 17th conference of the Australasian Society for Computers in Learning in Tertiary Education (ASCILITE). Coffs Harbour, NSW.

Lambert, D., & Lines, D. (2000). Understanding Assessment: Purposes, Perceptions, Practice. Padstow: TJ International.

Leathwood, C. (2005). Assessment policy and practice in higher education: purpose, standards and equity. Assessment & Evaluation in Higher Education, 30(3), 307-324.

Linn, R. L., & Miller, M. D. (2005). Measurement and Assessment in Teaching. Columbus: Pearson Merrill Prentice Hall.

Macdonald, J. (2003). Assessing online collaborative learning: process and product. Computers & Education, 40(4), 377-391.

Maclellan, E. (2004). How convincing is alternative assessment for use in higher education? Assessment & Evaluation in Higher Education, 29(3), 311-321.

McLachlan-Smith, C., & Irons, B. (1998). Ideas to Share: Examples of Succesful Extramural Study Guide Design. Palmerston North: Massey University.

Madaus, G. F. (1988). The influence of testing on the curriculum. In L. F. Tanner (Ed.), Critical issues in curriculum, Eighty-seventh yearbook of the National Society for the Study of Education, Part 1 (pp. 83-121). Chicago, IL: University of Chicago Press.

Muirhead, B. (Artist). (2002). Effective Online Assessment Strategies for Today's Colleges & Universities

Nicol, D. J., & Macfarlane-Dick, D. (2006). Formative assessment and self-regulated learning: a model and seven principles of good feedback practice. Studies in Higher Education, 31(2), 199-218.

Nitko, A. J. (2004). Educational Assessment of Students (4th ed.). Upper Saddle River, New Jersey: Pearson Education.

O'Reilly, M. (2005). Hallmarks of Excellence in Online Assessment. Paper presented at The First International Conference on Enhancing Teaching and Learning Through Assessment, Hong Kong Polytechnic University.

Sadler, D. R. (1987). The specification and promulgation of achievement standards. Oxford Review of Education.

Sadler, D. R. (1989). Formative assessment and the design of instructional systems. Instructional Science, 18, 119-144.

Shepard, L. A. (2000). The role of assessment in a learning culture. Educational Researcher, 29(7), 4-14.

Taras, M. (2002). Using Assessment for Learning and Learning from Assessment. Assessment & Evaluation in Higher Education, 27(6), 501-510.

Torrance, H., & Pryor, J. (1998). Investigating Formative Assessment: Teaching, Learning and Assessment in the Classroom. Buckingham: Open University Press.

Tynjala, P., Mason, L., & Lonka, K. (2001). Writing as a learning tool: an introduction. In L. M. Paivi Tynjala, Kirsti Lonka (Ed.), Writing as a Learning Tool: Integrating Theory and Practice (Vol. 7, pp. 7-22). Dordrecht, Boston, London: Kluwer Academic Publishers.

Appendix B: Sample Marking Rubrics

The following pages give example of marking rubrics that have been designed and used by Lightwork users. The idea behind making these rubrics available is to give others ideas that might help with the design of their own rubrics. There is no suggestion that the rubrics presented are perfect. Like any marking rubric they probably should be more seen as work in progress that will evolve with changing assignment contexts and increased experience.

The authors of these rubrics have kindly given their permission for their rubrics and marking contexts to be displayed and explained.

The examples are presented in the following ways:

- Context: This outlines the context of the assignment such as the level of the course, the number of students, the subject area, and the assignment task. It describes the composition of the marking team.
- Comments: Information if available from the teacher on thoughts and reasons for the design of the marking rubric. Comments on what worked well or could be improved.
- The marking rubric: If available the description of criteria directed at students, the instructions to markers and the frequently used comments are displayed.

Sample Marking Rubric for a First Year University Computer Science Programming Paper

This rubric was designed by Dr Eva Heinrich, SEAT, Massey University.

Context

The subject area of the assignment is object-oriented programming with C#. The assignment belongs to a first year university course that has about 240 enrollments, split about equally into internal and distance students.

The teacher had a team of four markers available. The markers were senior students.

Comments

The following thoughts have gone into designing this marking rubric (and the assignment task):

- The programs the students submit should be properly constructed (in this case following good object-oriented design). Because the programming task is relatively simple (being only the second programming assignment the students are doing) it is possible to produce a program that has the required functionality but is poorly designed. The rubric tries to strike a balance between design and functionality (considering the extremes of a poorly constructed program with full functionality or a well constructed program with lack of functionality).

- Aspects like user interface design and structuring of the code are important for setting the right standards for future work, but not as important as for example the correct object-oriented design. One challenge here is that a program with a nice user interface but little functionality should not get an overall good mark.

- Ten marks (half the marks available overall) for one criterion is a lot. It was done to allow for some flexibility when marking, specifically should there be programs that do not fit well with what was expected. Hopefully the description of the criterion has given students enough guidance on what was required.

- The descriptions for the markers were quite detailed (done to one or even half a mark). The idea was to give markers a high level of guidance to ensure that their marking will be to the same level. The markers were also instructed to use their own judgment (because it is not possible to foresee all situations).

- The frequently used comments are there to help markers in giving appropriate feedback fast. For each criterion there is a positive comment describing what features had been achieved, to be used when a student had done well. This was to avoid that students would either get no comments or just a 'well done'.

This rubric has worked well, based on the marking the teacher has done herself and judged from the lack of issues raised by markers or students.

Criterion - Summary	
Maximum Mark	N.a.

Description for Students	Please study your individual feedback and check Stream for any class-wide feedback and a sample solution.
	Make sure to adhere to our coding styles.
Descriptions for Markers	Take the marks I have indicated in the details for each criterion as a guide - use your judgement, as sometimes you get work for which this doesn't quite fit.
	You can give half marks (but don't go down lower).
	Provide an overall comment to each student. Point out both a strength and a weakness of the assignment.
Frequently Used Comments	Done well in this assignment:
	Area(s) to focus on for improvement:
Criterion - Functionality	
Maximum Mark	10
Description for Students	List of students is displayed
	List of papers is displayed
	Details for selected students are displayed
	Details for selected paper are displayed
	The credit value of a paper can be changed
	A student can be enrolled in a paper (up to the maximum number allowed, only once per paper)
Descriptions for Markers	List of students is displayed and List of papers is displayed [1 mark; (the values for students and papers were supposed to be hardcoded; if they are read from file this is ok as well]
	Details for selected students are displayed [2 marks - name, papers enrolled in, total credit value (give these marks if this is correct before changing the paper values)]
	Details for selected paper are displayed [1 mark - I have not asked showing all students enrolled, just paper name and credit value; if the students are displayed as well, use that as a bonus mark that can make up for other issues within this criterion (give this mark if this is correct before changing the paper values)]
	The credit value of a paper can be changed [3 marks - can enter and change a the credit value (1); listing of paper details shows correct new credit value (2); listing of student enrolled in this paper shows correct new total enrolled in (1)]
	A student can be enrolled in a paper (up to the maximum number allowed, only once per paper) [3 marks - student can be enrolled (1); only up to maximum number of papers (does not matter what number they have chosen) (1); only once per paper (1)]
Frequently Used Comments	Your program needs to create and display students and papers.
	When selecting a student the correct details (name, all papers enrolled in and the added-up credit value of these papers) should be displayed.
	When selecting a paper name and credit value of a paper should be

	displayed.
	You are displaying the students enrolled in the paper - this was not asked for but is a good feature.
	In your solution the user cannot change a credit value.
	After the credit value for a paper has been changed, the new credit value must be shown when listing the paper details. This does not work in your solution.
	After the credit value for a paper has been changed, the new credit total must be shown when listing student details. This does not work in your solution. In your solution a student can be enrolled in more than the maximum papers allowed.
	In your solution a student can be enrolled in the same paper more than once. Your solution has all functionality required.
	Your solution has most of the functionality required, just ... is missing.
Criterion - Object Oriented Design	
Maximum Mark	6
Description for Students	'Student' class is defined and used
	There is a class, it is defined in a separate file, it stores the right information and provides the right functionality, it is used in other parts of the program, objects are created.
	'Paper' class is defined and used
	There is a class, it is defined in a separate file, it stores the right information and provides the right functionality, it is used in other parts of the program, objects are created.
	Proper class design
	Scope definitions are appropriate, classes provide appropriate public interfaces, classes protect
	internal values and methods with 'private', properties are used where appropriate
Descriptions for Markers	Classes Student and Paper are defined in separate files [take 0.5 off if this is not the case]
	Class Paper should have:
	Private instance variables for paper name and value [1 mark]
	Public methods or properties to get/set name and value [1 mark]
	(There can be a constructor to pass arguments in or not - it needs to make sense overall)
	(If the paper can hold references to student objects (correctly) you can use that as 1 mark to balance out missing items in this criteria)
	Class Student should have:
	Private instance variables for student name and papers enrolled in (can be array or arrayList) [1 mark]
	Needs to have public methods for enrolling a student [1 mark], for working out the total paper value and listing the papers for

	the student [1mark] (the point is the work is done by the most suitable class; it is possible to have a solution where the Student object returns the list of papers to the Form and the Form works out the credit values of the papers)
	In the Form class there are ArrayLists to hold the student and paper objects [1 mark] (if they have done this with arrays and it works let it go through but comment that ArrayLists would have been better)
Frequently Used Comments	Your classes should be defined in separate files.
	The class Paper should have private instance variables for paper name and paper value. The class Paper needs to have a public interface (methods or properties) for name and value.
	Your Paper objects can hold references to the student objects enrolled in the paper. This was not required but is a good feature.
	Your class Student should have private instance variables for student name and papers enrolled.
	Papers enrolled can be held in an array or an ArrayList. It is not appropriate to have separate variables with each variable just holding one paper. Such solution is not scalable.
	You should have a public method for enrolling a student in a paper in the class Student. This method takes the paper as argument and adds the paper to the array or ArrayList you have in the class Student.
	You should have a public method for working out the total paper value for a student in the class Student. This method will go through the papers the student is enrolled in (be looping through the array or ArrayList containing the papers), ask each paper for its credit value, and add up the values. The method returns the total credit value to the Form which displays it.
	You should use ArrayLists to hold Student and Paper objects.
	You have used arrays to hold Student and Paper objects instead of ArrayLists. (We have not taken marks off but) ArrayLists would be better because you do not know how many objects there will be and because ArrayLists link better with ListBoxes.
	Your classes are well-structured and have the correct functionality.
	You have the classes correct in principle, but you need to focus on ...
Criterion - User interaction and style guidelines	
Maximum Mark	4
Description for Students	Suitable user interface components used; layout is appropriate
	User interface can be simple but must be clear, user needs to know what to do, components must be named properly
	Interaction of user with program is controlled
	It is checked if all/correct data are available before carrying out an action; the user is given appropriate messages
	The C# style guidelines as given in the textbook/in the course material have to be followed

Descriptions for Markers	Listboxes are used to display both student and paper lists (not text boxes).
	There has to be a try-catch around converting the text string paper value into a number (worth 1 mark).
	The user interface need to be reasonably clear (don't be too strict, only if it is really bad take something off).
	There need to be messages to the user, e.g., if a student is already enrolled in a paper and cannot be enrolled again.
	The code needs to be written reasonably clear, e.g., proper spacing/indents, suitable names.
	Approach by giving marks by taking something off the 4 marks available.
Frequently Used Comments	You should use ListBoxes to display students and papers.
	You should have a try-catch around converting the text string paper value into a number.
	Your user interface is not clearly structured.
	You should have messages to the user, e.g., if a student is already enrolled in a paper and cannot be enrolled again.
	Your code needs to be formatted better, e.g., proper spacing/indents. It is too hard to read.
	You should use suitable names for the components in your program. This would make it easier to understand for another programmer.
	Your user interface is appropriate.
	The interaction with the user is appropriate.
	Your code is formatted appropriately.