INTRODUCTION

Setting assignments, marking student work and filling out reports are among the most time consuming and yet least rewarding of a teacher’s activities. One solution to this problem which has emerged in the 1990s is student self-assessment, whereby students set, mark and review their own work. This paper first briefly reviews what motivates teachers to introduce student self-assessment. It then describes three methods for implementing student self-assessment and the likely benefits. Finally some of the common obstacles to implementation are discussed. The focus of this article is on self-assessment in mathematics because the literature is quite well developed in that area. Nevertheless, the same principles apply equally well to any subject, and studies have been carried out in many other areas (Boud & Falchikov, 1989).

INITIAL MOTIVATIONS

The most commonly expressed argument in favour of attempting student self-assessment is the desire to promote greater learner autonomy, that is when students begin to take responsibility for their own learning. Csongor (1992) and Stallings & Tascione (1996) argue that when students engage in self-assessment they learn more about themselves, this improves their self-confidence and hence encourages them to become independent learners. Conversely, as argued by Swan (1993) and Adams & King (1995), rising student teacher ratios imply that teachers no longer have the time to mark every student’s work in detail, and involving the students directly in the assessment process helps to make good the deficit.

The second argument in favour of student self-assessment is that it improves metacognition, which is the ability of students to reflect critically on their own thought processes. This argument features in Curriculum and Evaluation Standards for School Mathematics (NCTM, 1989) which advocates a shift away from the rote application of algorithms to standard problems and towards mathematical power, a term which encompasses among other things the ability of students to apply their mathematical knowledge to solve non-standard problems. It is known (Schoenfeld, 1985, Campione, Brown & Connell, 1989) that metacognitive ability is essential to mathematical power, but that traditional assessment practices fail to encourage metacognitive skills. Kenney & Silver (1993) and Swan (1993) argue that self-assessment aids students in developing metacognitive skills and hence improves mathematical power and problem solving ability.

The third motivating factor is what might be termed the cycle of improvement, the process through which students review their own work, analyse their mistakes, and hence improve their subsequent performance. This use of self-assessment is highlighted in Assessment Standards...
for School Mathematics (NCTM, 1995) in the section on monitoring of student progress. Although in principle we know that it does not matter who makes the assessment of our work, in practice we do not like to be told that we are wrong, especially by someone in authority over us. For the same reason, teacher assessment is frequently regarded by students as summative rather than formative (Swan, 1993) and this acts as a disincentive to improvement. Student self-assessment, on the other hand, allows students to detect their mistakes by themselves in a non-judgmental and non-threatening way, and this encourages improvement (Anderson, 1993).

METHODS AND BENEFITS

Grading

The most commonly employed approach to student self-assessment is simply to ask students to grade their own work. This immediately raises the obvious question of how students are to be able to tell right from wrong. After all, if they were able to mark their own work accurately surely they should be able to score full marks in the first place!

The standard answer to this question is to adopt subjective grading by means of a scoring rubric (Stallings, 1992, Petit & Zawojewski, 1997). Scoring rubrics generally consist of a list of qualities which are characteristic of each grade or score. One very simple example might run as follows: “A = completely correct, B = only careless errors, C = some conceptual errors, D = many conceptual errors.” By comparing their work with the rubric, and finding the characteristics which provide the best fit, students are able to assign their work a mark or grade. This kind of grading is clearly more akin to that used to mark essays than to the traditional point count marking usually employed in mathematics, hence the name subjective. Such rubrics, which are usually much more sophisticated than the simple example given above, must nevertheless be written in a way which is comprehensible to the students.

Some examples of how subjective grading has been implemented in practice are as follows. Csongor (1992) instructs her students to spend the last five minutes of every test applying the rubric to their answers in order to assign themselves an overall mark. The students are encouraged to make any corrections which suggest themselves. They then hand up their work for the teacher to mark using the same rubric and a comparison is later made between the two marks. Stallings & Tascione (1996), on the other hand, ask their students to grade their work using a rubric only after the teacher has looked at their work and highlighted the places where they have gone wrong. They are also required to explain the reasons behind their errors and to write out full corrections. Again comparison is made with the grade which the teacher would have assigned. More advanced approaches (Petit & Zawojewski, 1997, Assessment Standards for School Mathematics NCTM, 1995) use a separate rubric for different aspects of a student’s answer, such as initial approach, correctness of analysis, ability to interpret the answer, etc. Such multidimensional grading carries more useful information than a single grade but can be cumbersome to use in practice.

Some of the benefits which have been obtained using subjective grading...
(Csongor, 1992, Stallings & Tascione, 1996) are as follows.

1) After an initial learning period, students generally become quite capable of grading their work reliably, i.e. the student grade is very close to that which the teacher would have assigned.

2) There is a substantial reduction in test anxiety and consequent improvement in self-confidence, especially among less able students. Taken together these imply that the goal of increasing learner autonomy can be achieved.

3) Student performance improves for exactly the reasons given under the cycle of improvement motivation. Students simply get into the habit of checking their own work and correcting it before it gets to the teacher even when self-assessment is not formally required.

4) The dialogue which takes place between the students and the teacher over which is the correct grade to assign has been found to provide considerably better insights into what students find difficult than is the case when only the teacher marks the work. This is especially true when it comes to deciding whether an error is merely careless or in fact conceptual, something which is quite difficult to discern based on the written work alone. This certainly helps the teacher to judge metacognitive ability better, but whether or not it results in an improvement in that ability has yet to be shown.

Student Constructed Tests

Another approach to student self-assessment is to invite students to create their own test questions or assignments. Clarke (1992) divides his class into small groups, each of which produces a few test items. The teacher edits these to create a complete test which the whole class then attempts. This results in a much greater sense of participation among the students and a higher level of interest in the answers and the subsequent discussion. This is consistent with the aim of improving learner autonomy. Swan (1993), on the other hand, encourages every student to create an entire test of their own, complete with model answers and a grading scheme. This does have the effect of improving overall performance in that it encourages the students to review the syllabus and structure in their own minds the relationships between the various topics. The disadvantage here is that there may be too much material for every student to contribute something to the class test.

Progress Review

The final approach to student self-assessment is for students to use a checklist, rather like a scoring rubric, to review their progress. This can be performed in-task, immediately post-task or periodically through the year. Although akin to journal writing, it is usually more structured and assessment oriented. Kenney & Silver (1993) encourage the use of metacognitive self-monitoring questions in-task, and significant improvements in performance can result. Clarke (1992) suggests a monthly review in which students highlight their specific technical strengths and weaknesses with a view to improvement in the medium term. This can provide significant insights into the students’ learning problems. Finally Csongor (1992) uses a quarterly journal in which students rate the quality of various aspects of their work without recourse to technical details. This has been found to be a remarkably reliable indicator of a student’s overall performance, as well as helping students.
take greater responsibility for their own learning. It is interesting to note that short term progress reviews contribute most to the cycle of improvement, medium term reviews contribute most to the improvement of metacognitive skills, while long term progress reviews primarily assist in promoting greater learner autonomy.

OBSTACLES TO IMPLEMENTATION

There are a number of obstacles which may have to be overcome to ensure a successful implementation of student self-assessment. The first is that self-assessment is a skill and, like any other skill, sufficient time must be allowed for students to acquire it. Csongor (1992) and Kenney & Silver (1993) point out that while some students possess this skill naturally, most do not. By providing the right experiences, however, they show that all students can develop a significant capacity to assess themselves. This goes against the common belief that self-assessment is possible only for more mature students, which would explain why the bulk of the research into self-assessment appears to have been carried out at the tertiary level (Boud & Falchikov, 1989). In fact, as Lester (1989) points out, metacognitive skills develop hand in hand with cognitive learning, which implies that the acquisition of self-assessment skills appropriate to primary and secondary levels is both possible and desirable.

The second obstacle is that a conducive environment is essential to the development of self-assessment skills. According to Csongor (1992) and Anderson (1993), it is only by creating an environment of respect, understanding and tolerance that students can be helped to overcome their natural fear of being wrong. Despite the considerable long term benefits discussed above, self-assessment can initially be quite a painful experience, especially in success-oriented cultures.

The third obstacle is the problem of student motivation. Even if the right environment exists, students may still fail to persevere with self-assessment in the short term if they do not experience immediate benefits. Wilson (1994) gives an attractive cautionary tale which describes one teacher’s attempts to introduce journal writing. The attempt failed simply because the journals earned the students no explicit credit towards their overall grade, and so they refused to participate. As an antidote to this, Csongor (1992) offers bonus points for those students whose self-assessed mark comes sufficiently close to that of the teacher. Stallings & Tascione (1996), on the other hand, re-grade the students’ work after they have made their corrections and give the revised grade a significant weightage in the overall assessment. They also allow the original grade to improve if the student can make a convincing case for reassessment.

The final obstacle to be overcome is that students may simply regard self-assessment as yet another activity which the teacher will assess, a sort of meta-assessment. As Anderson (1993) points out, students may be so used to seeing the teacher as the sole judge that, even with regard to self-assessment, they will still look to the teacher to tell them if they have done it correctly or not. The teacher may have to tolerate uncritically work which would otherwise be marked wrong simply in order to get the message across to the students that the rules have changed.
CONCLUSION

Although a teacher may initially be attracted towards student self-assessment as a reaction against the tedium of marking student work, there are three positive reasons for attempting it: improving students’ self-confidence and hence encouraging them to become independent learners; improving students’ metacognitive skills in order to increase their mathematical power and problem solving ability; and encouraging students to critically evaluate their own work and hence engage in a cycle of improvement. Despite the obvious objections, it is in fact perfectly possible to develop techniques whereby students are able not only to mark their own work reliably but also to set their own tests and assignments and to report on their own progress. The kind of benefits which result, and which more or less justify the reasons for attempting it, include: reduction in student test anxiety; improved self-confidence and participation; greater insights into students’ problems and metacognitive development; and improved overall student performance.

IMPLICATIONS

In view of the research cited in this article, teachers who intend to involve their students in self-assessment may like to consider the following.

1. Invite students to grade their own work, to explain the reasons for their mistakes and to write out corrections.

2. Allow students to contribute their own questions for class tests and to create their own tasks for assignments.

3. Encourage students to report periodically on their own progress, highlighting their strengths and weaknesses.

4. Teach self-assessment skills explicitly as these do not come naturally to most students.

5. Create a tolerant environment to overcome students’ natural fear of being wrong.

6. Give explicit credit for self-assessment in order to encourage students to persevere with it in the short term.

7. Lead students to understand that self-assessment is not simply another activity which will be assessed.
SOURCES


