

## DOING IT THEMSELVES – EXPERIENCES ACROSS THE CURRICULUM

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**Abstract** *¾ We describe a range of problems presented by the contemporary student population, and suggest that the mode of assessment used while teaching can be important in solving them.*

*A particular assessment regime designed to achieve this is described which might be tailored to many topics in many disciplines.*

*Experiences with its use are given, together with a discussion of its successes and shortcomings. Suggestions for its improvement are then made.*

**Index Terms** *¾ assessment, independent working, strategic students.*

### MOTIVATION

Many of the problems of modern Higher Education (HE) that are common gossip in staff rooms can be summarized as;

- They don't research: students are slow to read around the subject or follow up references given in lectures. They are much too inclined to regard the lecture as the sole source of information.
- They don't absorb outside formal delivery: related to the first problem, student skills at learning outside lectures are often underdeveloped - they have insufficient practice at learning things for the first time from, for example, books.
- They don't present: student experience at retailing information, either to staff or each other, is limited. When they do so, the lack of experience means they are often less than successful.
- They don't assess: the ability to assess the work of others is increasingly seen as useful. Student experience in this area is often limited at best.

The reasons for the existence of these problems are many. It may be the case that they have always existed and we either didn't notice or didn't care - for example, presentation and assessment skills were not seen as particularly important in the curricula of 10 or 20 years ago. On the other hand, student motivation to learn is certainly evolving in the climate of increased intake and "results focus" that characterize the higher education of the mid-90's onwards [8]. It was once possible to expect a good proportion of a class to pick up and study a reference

mentioned in passing during a lecture, but few staff would expect this to happen in the modern university without explicit attachment of credit.

There are many ways to try to change student behaviour, but assessment – simultaneously a threat and an opportunity – remains the academic's primary weapon. The "blunt instrument" approach to assessment is simply to increase its weight, causing the students to respond strategically by giving it more attention. Such strategic behaviour is increasingly widely observed and documented [8]. This often does not, however, result in the improved learning we seek, and can instead easily result in "competitive course-work setting" among staff, and over-assessment of students. Many departments across all disciplines observe this. A better approach is to change the assessment as a tool to change the learning.

The use of assessment as a device for strategic change in student behaviour has been considered [6]. It is noted that changes may be made to what is assessed, or how it is assessed, and that either approach, if well chosen, can have radical effects on learning and learning habits. The functions of assessment are recorded as

1. To capture student time and attention.
2. To generate appropriate learning activity.
3. To provide timely feedback, to which students pay attention.
4. To help students internalise the discipline's standards.
5. To generate marks which enable pass/fail decisions to be made.
6. To provide evidence to external agencies that permit them to judge the standards of the course.

The first four of these are formative in nature, and the last two summative. The drivers for the issues raised in this paper are primarily the first three with an element of the fourth, although we also address the last two.

We present experiences with a novel form of assessment that aimed at the four problems itemized above. It is interesting inasmuch as it is applicable as a mechanism across the originating discipline and, we conjecture, across many disciplines. Without being completely successful, we present evidence that it worked in two different domains, satisfying most of Gibbs' criteria. We conclude by briefly discussing amendments that may be made to overcome the shortcomings evident in evaluation.

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## PROCEDURES

Full details of the mechanism have been presented elsewhere [3], and a sample full specification is available [4].

In summary, within a given module some topics are identified that are free standing (yet at the appropriate intellectual level for the course), and so which can be studied independently of lecture material and its scheduling. The topics are allocated to students in teams, who then research them without the benefit of lecture support. Their findings are publicly reported in a prescribed form: a wall-mounted hard-copy poster, perhaps; or verbal presentation; or WWW page. These presentations are viewed and judged (assessed) by the other teams. The specification of the work involves a number of intermediate deliverables (in particular, a bibliography), representing sub-tasks, meaning that the job is not “all-or-nothing”.

A significant driver for success in this is that an assessed test is held on the material of *all* the presentations - thus, students should be able to answer questions on their own allocated topic with ease, but will have to work to be able to answer questions on other topics.

An interesting twist is to require the students to set test questions on their own topic - a subset of these questions may then be used for the test sat by all. It is good to make these questions fully public, thereby actively encouraging the students to do the comprehension work necessary to score well in the test assessment.

This idea hits many targets at once

- Students are required to do their own research - they have to find their own references, digest them and then feed them back.
- Presentation skills are practiced in the chosen mode. In one deployment, the author chose to have A0 posters (841x1149mm) submitted, the first time the classes had been required to do this.
- Comprehension of the presentation of others is practiced. This can be very challenging in some cases since some presentations are not top quality!
- Assessment skills are practiced, since groups are asked to assess each other for content, presentation and style.
- A different form of assessment skill is practiced by asking students to set their own test questions.
- Team skills are rehearsed in segmenting the tasks of research, understanding, presentation and assessment.

## EXPERIENCES

This idea has been deployed in two different modules

- A second year computer networks module - this is a standard “communications” introduction, discussing protocols, layering and standard applications. The self-contained topics set to the students included knapsack encryption, DNS and MPEG, and students were asked to produce a wall-mounted poster.

- A first year professional issues module; this is often seen by students as unpopular and irrelevant. It covered legal and social issues, in addition to rehearsal of reporting techniques and teamwork. Topics set to the students included Ada, Computer Assisted Learning, and the Free Software Foundation (FSF), and students were asked to produce a suite of WWW pages.

In both instances, the students took to the work and delivered a lot of effort - there were no reported cries of “unfair”, which is interesting since most of the remainder of their assessment (in contemporaneous modules) was very traditional in form. The problem of “passengers”, or “drop-outs”, commonly experienced in undergraduate group-work, was scarcely reported at all, suggesting that the overwhelming majority of the class did indeed get their teeth into it.

They were offered significant opportunities for consultancy, both in the technical and detailed aspects of what they were researching, and in the practice of poster presentation in which they had little or no experience. There was negligible take-up of this offer, which certainly impacted on the quality of output. The reasons for this are interesting to consider; other authors have examined issues surrounding students' attitudes to asking for help and identify a number of obstacles based on preconceptions and expectations [5,7]. The skill of seeking help where it can best be provided is certainly one that students ought to develop, and this exercise has pointed out that development in this area is clearly needed.

The actual content of the presentations was good - at least as good as might be expected for the level of the class. This was encouraging as it represented evidence that the students (or at least some of them) were able to come to grips with material without staff support. In coming to this judgement, some care was taken to examine the presentations for plagiarism. While one can never be sure that work has not been copied straight from a book or the Web, stylistic clues usually make this obvious, and brief conversations with the presenters usually reveal any problems of this kind.

Conversely, the presentations were highly variable in layout quality. At the top end, enormous care was taken on choice of materials and considerable expense was incurred, but weaker submissions indicated students had little or no idea about this form of presentation, and had done nothing to find out. Common faults were poor choice of layout and cramping of text, which was often poorly chosen. The average was passable but not outstanding.

The questions students chose to set on their own material betrayed interesting variations in academic maturity. Sample questions were provided, and guidance given that the test was to be challenging for students of the appropriate level - therefore, simple “fact based” questions were probably poor tests of understanding. Nevertheless, the majority of questions (but not all) were at this elementary sort of level. Those set by first year students

were much simpler in form and content than those set by second years, often concentrating on isolated facts of little meaning outside their context. This is interesting since there had been no practice among the class in this skill, suggesting that the more senior students had acquired by accident (as much as anything else) some understanding of how to assess.

The final test results are the best index into what was learned. They were adequate for the first years, but lower than might normally be expected for the second years. All students reported the test as “hard”; this is thought to be because, even though the students had prior access to all the questions set by each other,

- They did not know which precise ones would be used, and this selection was (from their point of view) from the difficult end of the spectrum,
- The questions selected were often amended or manipulated to defeat those simply memorising answers,
- Those who had set “easy” questions may well have come undone when faced with harder tests of understanding.

Figures 1 and 2 illustrate histograms for the two modules of the test results; we see in both cases a respectable spread of results. For the first years, the range is also as we might expect - some students have done well on a challenging test and a small number have failed, while the mode and mean are entirely reasonable. The second years have done less well on average, and while few have failed, scarcely any have excelled.

possible that the second years performed relatively poorly because they failed to understand the material presented by others (which would be disappointing). It is equally likely, though, to be attributable to a relatively low amount of credit being attached to the test, and a multiple choice assessment scheme that penalized wrong answers, thereby depressing the results of those who either guessed or misjudged. (Multiple-choice tests have the advantage of very rapid assessment, but require careful selection of marking scheme).

The overall result for the exercise was synthesized from the presentation and its content, question setting, peer assessment, test, and organizational ability. The final mark distribution for the whole class reflected their ability as a whole and was seen by most as a fair and reasonable activity to undertake - certainly, there were no appeals.

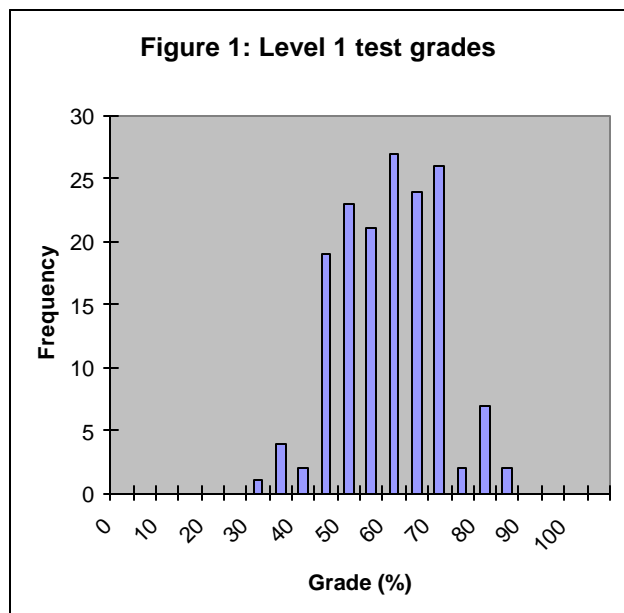


FIGURE 1  
DISTRIBUTION OF TEST GRADES FOR THE LEVEL 1 CLASS.

These raw numbers do not tell us enough, and it is dangerous to draw conclusions from one cohort. It is

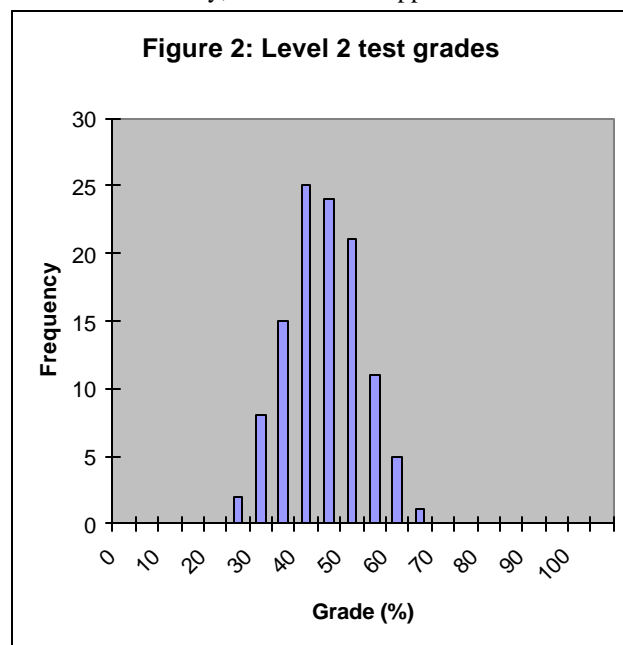


FIGURE 2  
DISTRIBUTION OF TEST GRADES FOR THE LEVEL 2 CLASS.

### OBSERVATIONS

We have presented a novel and widely applicable assessment mechanism that, while open to improvement, has been seen to work. It is parameterised in many ways and can be tailored to material, duration and local circumstances, but has the merit of coupling purely technical material with other skills that are increasingly demanded by consumers of modern HE. This is particularly attractive if it is believed that “Personal Transferable Skills” are best integrated into the curriculum rather than isolated in a module of their own [2], an approach often thought to devalue them in the eyes of students.

The weaker points of the mechanism, and proposed improvements, are

- The reluctance of the students to seek help with material they were researching,
- The reluctance of the students to seek help with the design of presentation.

There are deep issues here surrounding student attitudes to self-motivated learning, and these are key areas for improvement. Subsequent years will permit the display of good quality work from earlier years which will provide clear targets, but work will also be put into facilitating staff consultancy and support that the students do not see as an admission of their own ignorance or shortcomings.

Other areas for improvement are:

- The inexperience of students in setting assessment questions suited to the material they were presenting: Again, targets from earlier years will assist in this area, but the experience suggests that some class time will need to be set aside to illustrate what makes a "good" question on a particular topic. Of course, this skill, when acquired, is transferable.
- The difficulties students faced in sitting a test based on material presented by others: From the small sample of two classes (albeit big ones), it is not possible to gauge exactly how much the students learned from each others' work, but it seems clear that, while there was some success, there is room for improvement. Various devices exist: a crude one is to increase the weight of the test, but subtler ideas such as clearer publication and rehearsal of the test questions may well also help.

It is unusual for students to volunteer positive opinions on assessment, and one gauges reaction by the degree of negative reaction. On this metric, the mechanism was a success since predominant feedback views were, at least, non-negative. Some very positive remarks about pleasure being taken in self-directed work were also seen.

### CONCLUSIONS

The balance of opinion is that this mechanism not only works, but works well, with the drawbacks being minor and rectifiable. Effort will be directed at encouraging and assisting students in the important skills of seeking help.

The criteria for assessment [6] have been met successfully since;

1. Student time was evidently spent.
2. Self-directed and organised learning of necessity occurred in order for material to be presented.
3. Feedback was provided by a staging of the exercise; those who were struggling or otherwise inactive could direct their efforts to success before all was lost.
4. There was exposure to academic activity characteristic of the discipline: the production of technical display material.
5. Graded assessment of value was forthcoming.

6. External examiners and external agencies have looked on the idea with approval and interest.

Further conclusions are;

- "Idlers" are flushed out by their groups via the requirement of many staged deliverables, ensuring that work can't be left to the last minute.
- A successful test performance requires that it be understood by all of the group, along with the material of others. Students are assisted in this by foreknowledge of the test questions, encouraging research of the answers.
- Experience suggests that it really doesn't matter if more than one group covers the same material, as they rarely duplicate and often the topics are (quite reasonably) broader than the presentation.

The mechanism employed engages students actively in their own learning. When they succeed, it is possible to observe them interacting with the concepts we wish them to discover, thereby constructing their own understanding [1].

The pre-requisites for the exercise are few - it is difficult to think of a subject area that does not permit the identification of some isolated topics that students can usefully research, and all other implementation details can be tailored to the class, local custom and need. The outcomes include a class with some self-gathered knowledge and understanding, and a shrewder assessment of the value of the work of others. It is conjectured that their approach to self-directed learning has evolved.

### ACKNOWLEDGMENT

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