WHAT DO YOU KNOW? ASSESSMENT BEYOND THE TRADITIONAL ROLES

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The main emphasis of this paper is to look at non-traditional ways of assessing students work. Assessment is often described as having two purposes: one is for measuring student's performance to indicate how well a student is progressing and to allocate a grade or mark on that performance; the other is in helping a student to learn. The National Union of Students (NUS) in the UK and other educators who study assessment often argue that there is too much emphasis on performance at the expense of aiding students learning. The NUS has stressed that assessment should be 'for' learning and not simply 'of' learning and calls for more formative assessment. The aim of this paper is threefold namely: (i) to briefly look at traditional methods; (ii) to identify other assessment methods and (iii) to elucidate the advantages and disadvantages of the assessment methods and their usefulness in statistics education.

THE ROLE OF ASSESSMENTS

Assessment is at the heart of learning, whether it be formative or summative. Through assessment feedback the student is able to measure their own progress and the teacher is able to offer guidance and help. The mark a student receives, for their assessed work, often determines their future studying and potential job opportunities. For example degree classifications are important for a student's job opportunity as many employers ask for specific classifications and for further acceptance to study a particular course or subject discipline is dependent on their assessment results. So assessing students is probably the most important work we do for them so it is vital that we get the process and the marking correct. A considerable amount of time, regarding assessment, is spent in trying to get the students to put their best effort into getting the right things into the assessment.

What type of assessment will be used is often debated by academics and practicing teachers alike. The National Student Survey (NSS), for all students in Higher Education (HE) in the England, was launch in 2005 and is carried out every academic year [See NSS, HEFCE 2009 & 2010]. Ever since the NSS was launched, students have consistently given the lowest scores to the assessment and feedback they have been given. Students, from the most recent National Union of Students (NUS) NSS (2009), have sent a clear message that to them the current assessment practises in education are often out of date. The NUS have stated that this means there is a considerable way to go before the HE sector does 'get it right' and are encouraging all university heads of teaching and learning to identify areas for improvement. What do they mean by this and what type of assessment do they think is right is a difficult question to answer, however there are new ways of assessing students that encompasses what the students think is a correct method of assessment and uses some of the tried and tested ways that academics and teachers are familiar with. The NUS have identified and sent to universities ten principles of what they think are the 'Principles of Effective Assessment'. Results from the past few years, from this survey, have only seen a three per cent increase in the satisfaction in the area of assessment. There is a least a small percentage rise but the NUS and HE government bodies say this is not good enough and so more should be done in this area to improve the scores. HE institutions have a great deal of autonomy when it comes to deciding what type of assessment to use and how they use this type of assessment. Thus HE should be in a position to be able to incorporate newer assessment techniques. Unfortunately, the external examination system at the secondary level in the UK rarely provides this opportunity and little diagnostic use is made of the tests for teachers.

THE NUS PRINCIPLES OF EFFECTIVE ASSESSMENT

Some of the principles that the NUS have outlined will come as no surprise to those who are experience educators and will be adhering to in their forms of assessments. I would like to add to their list that it is the assessment procedure that is used should reflect the way students learn today and will potentially be working with the subject area in the real world. This is implied in the

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ten criteria but does need to be fully explored. The principles that the NUS [See NUS 2009] have sent out for discussion regarding effective assessment is as follows and assessment should:

- Be for learning, not simply of learning. This positions assessment at the heart of learning rather than it serving as a simple add-on at the end of the process.
- Be reliable, valid, fair and consistent. It is crucial for staff, student and employers to have confidence in the assessment process and their outcomes.
- Consist of effective and constructive feedback. Effective feedback is a crucial aspect of assessment process and a key feature of enhancing the leaning process. Furedi (2009) reported that "undergraduates crave high-quality feedback is a misleading one. When students complain about poor feedback, what they often express is their confusion about the purpose of a university education." Perhaps we need to educate the student in this aspect.
- Be innovative and have the capacity to inspire and motivate. Formative assessment practise have the potential to inspire and motivate, and this aspect can be captured by innovative approaches, including those making use of new technology.
- Measure understanding and application, rather than technique and memory.
- Be conducted throughout the course, rather than being positioned as a final event. Positioning assessment as an integral part of the course helps facilitate continuous leaning.
- Develop key skills such as peer and reflective assessment. Not only do such mechanisms allow students to receive extra feedback on work beyond that of their tutor, they also help develop the key skill of reflection.
- Be central to staff development and teaching strategies, and frequently reviewed. Assessment processes must be innovative and responsive to learners' needs, and as such they need to be central to staff development and teaching strategies.
- Be of manageable amount for both tutors and students. While assessment should be placed in a central role in learning, for it to be effective neither tutor not student should be overburdened. For today's student time is often of the essence since many students are working to support themselves at university.
- Encourage dialogue between students and their tutors and students and their peers. It is important that students and staff share the same definitions and ideas around standards. This can be fostered by increased dialogue and engagement.

The assessments described in the next section have been used at London South Bank University (LSBU) for various courses. Each has its own particular advantages and disadvantages and if they are to be used then the user needs to be aware of these. It should be noted that a considerable number of the students at LSBU come from a lower socio economic background, often have caring responsibilities and need to be employed for economic reasons. These factors need to be taken into account when deciding what assessment strategy is to be employed to meet the needs of the students and maintain academic rigor and standards.

METHODS OF ASSESSMENT
The assessment processes are changing in HE and below are examples of looking at assessment using a mixture of tried and tested assessment processes and using new technology where appropriate. The aim of the assessment process is to engage the students and reduce the burden on both the academic staff and students alike. It is essential that all assessments are carefully constructed on the basis of clearly defined objectives and are an aid to studying thus adhering to the first point raised by the NUS above. With any form of assessment the following needs to be taken into account:

- Does the assessment measure what it is supposed to do?
- Is the assessment reliable?
- Is the marking and results obtained accurate and consistent?

The following are examples used at LSBU with their students but could be adapted to meet the needs of pupils in schools or colleges.

Multiple Choice Testing

This type of testing has been around in education for some considerable amount of time and often called Objective Testing. The traditional ways of using this type of test had its own advantages, disadvantages and limitations. By using a variation of this style of questioning some of the issues regarding this type of assessment can be overcome. In the computing course at LSBU we have about 100 students and they have four multiple choice tests each covering 25percent of the material. The best three test results are counted for the assessed coursework. Since this is a major part of the assessment, the course team employ negative marking. Students can tick more than one answer so for example if there are four answers to choose from, see Table 1, then the score obtained for this question is 3-1 = 2 marks.

Responses	Score	Students Answer
A	+3	√
B	-1	
C	-1	√
D	-1	

Table 1. Score for each response

The reason for this style of marking is that it discourages guessing but allows some flexibility. The tests are completed on-line and hence the marking is done electronically. The academic staff, teaching on this unit, randomises the test questions so that each student gets different questions, has only one attempt and is given automatic feedback of their score.

Now a variation on this is by using electronic voting sets. At LSBU we have purchased electronic voting buttons, at present we have 125 of these that can be used at any one time, which can be pre assigned to students before any assessment takes place. The test can be done in the lecture theatre (that is the test is projected onto the screen) so each student has the same test and the test can be time controlled by the academic staff. The academic staff can see at a glance who has answered the question at any one time. The voting sets are all numbered and given to the respective students so that when the student votes, using the set the computer picks up their choice. This is on trial at LSBU but has proved popular with the students. One thing that we at LSBU have also included is a confidence option where the student rates how confident they are at getting the question correct. This has not yet been used for formal assessment but we are trialing it.

The major strength of this type of testing is that the marking is done electronically for up to 125 students at a time so saves time for the academic member of staff. There needs to be major investment in the writing of the questions and you need to have the computer system fully reliable. For statistics this type of assessment would be suitable in some circumstances but in most courses or programmes that have a dissertation or project that students do within their final year of study it would not. This type of assessment does address the issues of being an integral part of the course and uses new technology. Students can also download feedback on their results.

Objective Structured Clinical Examination (OSCE)

OSCE is an assessment process that is used by the health profession in assessing their students' practical skills. The assessment tests a range of competencies carried out at work stations. Each work station has an examiner who has well defined tasks or questions that the student will be asked. This can be adapted to be used with non medical students and statistics being a practical subject could well use this technique. The OSCE assessment use what they term as Specialise Patient (SP), who are at each work station and who are trained not to give the students any information unless specifically asked. The object of the exercise is to ascertain the relevant information from the SP to help the student assess the situation and come up with a potential answer/solution. Typical answers [See, for example, OSCE home page 2010] that the SP will give are as follows:

- What do you mean?
- Is this relevant to my problem?
- Do I have to answer that?

The typical length of an OSCE station is 5-20 minutes. The OSCE examination is recorded for future use. This can be omitted if desired but is often useful for it to be used to re-run the activity within a classroom for discussion purposes. The word examination does not in this case have to be a formal examination but the techniques can be used for learning. This type of scenario could be used, with modifications, to simulate consultancy for example a meeting with a potential client who needs some data analysis or statistics carried out for them. The questions above can be tailored to the situation. Alternatively suppose you wish a group of students in a school to do some data analysis perhaps using the Royal Statistical Society Centre for Statistical Education CensusAtSchool Project [See CensusAtSchool website 2010]. The CensusAtSchool is an online survey that started in 2001 in conjunction with the UK population census. Since then, a new phase of questionnaire has been launched each year and they have a database of around a million lines of data from the UK and overseas for you to use in your classroom. The CensusAtSchool is an excellent international resource which can be used for collecting and disseminating real data for use by teachers and pupils in data-handling, Information Communication Technology and across the curriculum for teaching and learning. The teacher with their pupils can use this resource to do various activities using real data in class. The work station(s) can then be used to test/ascertain what the pupils have learned from the exercise by using the OSCE examiner who will ask relevant questions and maybe using a SP who is the one who does not understand the answers given or the questions they are asked. The range of skills assessed are interpersonal and communications skills and problem solving. The role of the OSCE examiner is to assess the competence of the pupil at answering the question. The criteria being assessed must clearly be stated. An OSCE examiners check list may include some or all of the following:

- Knowledge of the scenario
- Data Gathering Skills
- Documentation
- Initiative of the interviewer
- Questioning skills
- Information sharing skills
- Listening skills
- Professional manner and rapport
- Organisation of interview
- Closing
- Ethical conduct
- Spoken English proficiency.

The list above can be modified and adapted to your own particular assessment. In a teaching situation to aid learning you may run say the CensusAtSchool project with a group of students and then use yourself as the examiner with or without at SP to ask questions of a group of students. This type of assessment does not have to be summative but can be used to be for learning as identified by the NUS in their criteria and can be used in schools as identified above.

Owning Leaning: Learners with e-Portfolios

Virtual Learning Environments (VLEs) are increasingly becoming a standard feature of university education across the UK, widely adopted to support traditional and distance learning. At LSBU we use Blackboard as a VLE. A VLE is a course management system that takes a number of web-based services and places them together on a single site, with a single interface, accessed through a web browser. One of the latest editions to be used at LSBU is the e-Portfolios. The e-portfolio can be found under student tools and a member of staff first must create a link and set up

what they require, with respective time deadlines. Students then submit their work into the respective area electronically which is date and time stamped. The student can also print out their own receipt if they require.

Why use e-Portfolios? These can be used to encourage deeper learning rather than a formal examination, develops IT literacy for students and allows assessment for many learning outcomes. What we did at LSBU was to embed this in the unit being studied from day one in the first year. It was used for the students to demonstrate what they have learnt. Over 10 weeks the students have to submit 10 assignments of approximately 500 words or equivalent in an academic style with references as appropriate. The students have a lecture on the relevant topic at one session and then the students have a tutorial on this topic at another session when the students bring back their answers to the assignment given out at the lecture. The students then discuss with a fellow student what they have done to get feedback from their peers (student worked in pairs with a different pair each week). The students then have time to alter/update their assignment. The following week the student submits their work (e-activities as we call it) to their e-portfolio. The marking scheme was as follows:

- 7% for attendance and discussion of the assignment e-activities,
- 13% for placing the e-activities answers in the e-Portfolio,
- 80% for two e-activities that were chosen by the academic staff to mark (this was to reduce the marking work load but the students did not know which ones were being marked).

The benefits, that LSBU found, are that the students were much more active through the e-activities and peer review and they viewed each topic equally. The pass rate remained relatively unchanged and the staff had less marking to do but were confident that the students had completed the work. Problems arose whereby a student had not submitted the e-activities that were chosen but this only occurred once. A statistical example could be a large topic broken down into various aspects. For example describing how to go about sampling, do some sampling, calculations and graphs produced as required, analyse the results and state conclusions with any limitations. The 10 e-activities do not have to be the norm it can be more or less than this number and the teaching structure accordingly.

Peer and Self Assessment

This method was used in LSBU engineering faculty with just under 100 day release students/part time students who were doing the course as part of their paid employment. The lecturer found it took approximately two years to get the students used to this style of assessment so hence it was formally used as a summative assessment in year three with years one and two as a formative assessment for learning. This method reduced the academic marking work load and empowered the students.

The method starts with a simple list of what is to be assessed and the 15-20 items are then given 5-10 marks each. These are then peer marked first and then self assessed by the student. The marks are entered on-line and the student does not see the peer mark until they have entered their own mark. The academic member of staff then samples the student work from time to time to mark and compares their mark with the peer and self assessed mark. Generally the academic member of staff has found that the self assessed mark is lower than theirs and the peer assessed mark is very similar. The peer mark is what is recorded unless some complaint is made or major deviation from the academic member of staffs marking. Peers are rotated round the students so that the same peer does not mark the same student each time. Since this was an employment based course the students stated 'that it was more like how they operate in their work place' so they were happy with this form of assessment.

CONCLUSION

From the examples of assessment given above it can be seen that LSBU has been trying out newer ways of assessing students. Some of these methods can be adapted to be used for students in secondary schools and colleges to aid learning for formal/informal assessments. The examples make use of IT which is a must for employment and for future studies that a student may

take. These examples are not the only ones that could be used in HE, schools or colleges but it is important that both (a) academic/teaching staff are familiar with the assessments and (b) students feel comfortable with what may be seen as a departure from the 'normal' way of assessing them. At LSBU we have found the techniques described in this paper does go some way to meet the requirements of the NUS Principles of Effective Assessment.

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