

Portfolios and self-assessment of common skills in a Higher National Diploma program in Electrical and Electronic Engineering

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Abstract. The system used for teaching and assessing common skills within the Electrical & Electronic Engineering HND at the University of Northumbria requires the student to submit a portfolio of evidence of their ability for each of 18 common skill competences. Staff assessment of these portfolios with a large class proved excessively demanding on staff time, and self-assessment was investigated as an alternative. Studies are cited which support the authors view that self-assessment can be both valuable and reliable. These were borne out by practical experience as an appropriate methodology was developed. Results showed that there was no longer any need to examine every competence claim, but simply to provide quality assurance through sampling and moderation.

1. Introduction

During the years since the issue of BTEC's "Policies and Priorities into the 1990's"¹ BTEC programmes have seen many changes in the way common skills have been taught and assessed^{2,3}. In general it is now accepted that within programmes of higher education there is a need to ensure that students develop not only knowledge in their own chosen field, but also more generalised and transferable skills, which will fit them for employment, and support their continued growth as individuals and professionals. This interest is reflected in a series of surveys that have been carried out in recent years to determine exactly what employers expect and desire of newly qualified employees.

The University of Northumbria at Newcastle started the process of redesigning courses as unitised 'routes' in 1993. In November 1993 a letter to staff⁴ required that all routes should provide a unit in the first semester which would give an introduction to the route as a whole, and also help the students to develop the general skills they would need to be successful on the route. At this stage it was decided by the course management team for the HND in Electrical and Electronic Engineering that the Common Skills teaching and assessment required by BTEC should form the major part of this unit. This meant that the amount of time available specifically for common skills was now considerably less than the 90 hours required by BTEC, so a separate half unit was introduced to focus on teaching information technology, which was seen as being especially important in this area of expertise.

2. The aims of the Common Skills unit

The underlying aim of Common Skills teaching is to promote the development of the student as an individual, and to improve their ability to fulfil their role firstly as a student, and later as a skilled employee.

The stated aims for the unit are ⁵

- "To provide an understanding of the course as a whole, within the framework of unitised courses."
- "To assist the student in the development of skills for effective study."
- "To review and improve the students common skills, such as interpersonal communication, problem solving, etc.."
- "To develop skills relevant to the future employment of the diplomate."

3. Teaching Common Skills

Several strategies have been suggested for improving and assessing common skills, one being BTEC's Programme of Integrative Assignments (PIA's). Almost invariably the techniques for teaching and assessment of competences have proved destructive to the academic cohesion of the course, and involved huge amounts of effort for very little return. For example the author has seen one program in which **every** piece of work produced by the student has also been assessed for **multiple** common skill competences.

A model which has received some support recently is the vertical integration of common skills into all units of a route. I attempted to apply this model in various forms over a period of four years, and found the following limitations which in my opinion outweigh its advantages within this particular route.

- Every specific competence must be assigned to one or more particular unit. There will always be some units where the link between competences and unit content is at best tenuous, and at worst non-existent.
- There is a tension between the academic and skills content in units. Unit tutors are faced with a requirement to teach and assess these competences in addition to the academic content of their unit. A tutor teaching a 'difficult' subject could not be criticised for a 'token' treatment of a competence. They would also be unlikely to show great enthusiasm for it, a feeling that the students would share.
- It imposes an artificial and unrealistically even balance between competences. An engineer or scientist in training would be expected to have more opportunity to exercise their skill in numeracy than would a nurse or a chef.
- It links the opportunity to show competence to the content of the unit. The unit may not provide much opportunity to display such competence. Further, a student who is having difficulty with the academic content of the unit is unlikely to show the full extent of their competence at the related skill.
- If the skills assessment is a completely integral part of the unit, then a student may fail that academic unit because of a skills problem, or pass despite their lack of understanding of the unit, but with a well developed skill.
- The low relative value of competence assessment distributed throughout the course means that a student who fails to show any skill whatsoever (other than passing exams) may still achieve a good pass. It also gives the student the impression that the skills are not considered to be of any great value.
- My principal reason for rejecting this model is that it hides skills performances within the content of the course, so that effective quality monitoring of this aspect of the course becomes difficult.

The model used within the Electrical & Electronic Engineering HND at the University of Northumbria is based on the Kolb⁶ experiential learning cycle. The Common Skills unit can be seen as supporting the training, monitoring and assessment for these skills, whilst the demand for most occurs within the other units of the route. Where there is little opportunity to exercise or seek evidence for a particular competence within the other units of the route (e.g. oral & non-verbal communication) it is provided within the Common Skills unit.

The system presently in operation requires the student to submit a grade claim for each of the 18 BTEC common skill competences. They submit evidence in a portfolio to support these claims, and a statement for each competence justifying their claim in relation to the evidence provided. The evidence may be collected from any or all of the course units, and also from their experience in the outside world, provided that it is current, valid, and identifiably their own. As evidence may be drawn from any source the student is free to select the evidence of their best performances of each competence, rather than the performance that happens to occur within a particular unit. Through the unit students gain experience in both self- and peer-assessment by examining their own work and comparing it with others, often with tutor support.

A program of lectures takes place during the first semester which aims to extend their common skill and study skill competences; inform their understanding of the assessment strategy; develop a common appreciation of marking standards, and provide opportunities for practice in collecting evidence into a portfolio and evaluating its worth. Throughout a grading scale of 0 to 5 is used, with 0 = not shown and 5 = excellent.

4. Self assessment: its value and validity as a tool for student grading

Studies by myself⁷ and others^{8,9} have shown that self-assessment can be both valid and reliable. My experience, supported by that of others at this institution¹⁰ shows that if the students are familiar with the nature of the subject, and the criteria and scales for assessment, they will be able to make reasonable, accurate and fair judgements of their evidence. Their ability to make fine discriminations between grade marks is initially very limited, but improves with practice and familiarity with the application of the grading criteria; and it is therefore important to use grading scales which provide sufficient but not excessive resolution. The six point scale already mentioned allows students to form a clear understanding of the significance of each of the grade points.

Students will not mark reliably unless they know that the value they ascribe to their work will be accepted. If they do not believe that the mark they give their work is going to be taken seriously they will not mark seriously. Assessment schemes which attempt to incorporate self-assessment as a minority component (e.g. 4%¹¹) display in so doing a lack of trust in the students ability or honesty. The scheme described herein places the responsibility for the whole of the assessment on the student; the function of tutor moderation is principally to allay students fears that others will judge their own performances too highly, or that they will themselves under-rate their ability. Students are aware that our assessment of their work is subject to moderation, so do not regard this as an implied criticism of their honesty or judgement.

The reduction in the load on lecturing staff brought about by this reliance on students judgements is not the only benefit to be gained from self and peer assessment. According to Boud¹² “The development of skills in self-assessment lies at the heart of higher education, and we as teachers should be finding whatever opportunities we can to promote self assessment in the courses we teach.” The development of skill in assessing ones own work and that of others is of major importance to students in Higher Education in that it plays a vital role in helping the student to become an autonomous learner. Without this skill the student will always be reliant on another to ascertain the value of their work.

Another benefit of self-assessment is that in reducing the marking burden on staff it allows a wider range of assessment vehicles. Many of the academically respectable methods for testing, such as tutor-marked examinations or assignments lack validity in that they do not reflect the demands which will be made on the graduate in their employment. Further, they make unnecessary demands, and place unnecessary stress on the student. According to Rogers¹³ students don't learn under threat. At the very least this sort of assessment encourages an instrumental and surface approach to learning¹⁴. Since the development of common skills is a student-centred activity, it is only reasonable that their assessment should recognise the different ways students have learnt, and allow them to demonstrate and assess the full extent of their abilities.

5. The portfolio and final assessment

As the first semester proceeds students gather evidence of their various common skill competences for inclusion in their portfolio. The restriction placed on evidence is that it must be able to be examined without any equipment other than the senses of the assessor; i.e. no tape or video recordings etc. are allowed. The principal reasons for this restriction are to ensure that all students are assessed on equal terms; and also to facilitate quality assurance through sampling and moderation. One of the issues addressed in the taught part of the unit is strategies for gathering hard evidence for the quality of evanescent performances. Students are encouraged to bring evidence into class for discussion with the tutor or their classmates.

Near the end of the first semester portfolios are submitted for appraisal. As this is usually the first portfolio presentation with which they have been involved they often make mistakes, and feedback from this first submission provides an opportunity to correct any misunderstandings, particularly in terms of the expected standards. The appraisal may involve peers as well as the unit tutor, and provides a written critique of their portfolio. The student then has the opportunity to discuss this feedback with the unit tutor or their personal tutor.

Before the final submission for moderation the students may revise their portfolios, adding extra evidence, changing their claimed grades, or improving their justification of their given marks.

Moderation involves scanning the portfolios, amending any marks which are inappropriate, and combining marks for competences to give a grade for each common skill area. Following the moderation students are informed of their grades, and their portfolios are returned with written feedback. This is positive in nature, emphasising the student's successes, noting areas which need improvement, or making suggestions about sources of evidence. In order to receive an overall pass in their HND students must pass all common skill areas; however the assessment for the Common Skills unit requires only a 40% pass mark. This is made up of their common skill competence marks, with other assessed components such as the student-led seminars. The result is that students can pass the common skills unit despite lacking evidence for several of the common skill competences. These can be addressed during the remainder of the course.

In accordance with BTEC policy, all students are encouraged to repeat the portfolio submission at the end of the course, which allows them to make good any failures, to improve on any weak areas, and to gain credit for their improvement through the whole duration of the course. This also provides an opportunity to assign grades to students who have entered the course at any time after the first semester.

6. Results

This is the third year that the Common Skills assessment has taken this form. The period has been a valuable learning experience, and I feel that the unit is now largely successful in achieving its aims for most students. However this has not been achieved without problems. During the first year of operation students were asked to bring evidence in for discussion, but only one did so, and when the portfolios were submitted none met the required standard. It was clear that the students did not really understand what was required. This problem was addressed by returning the portfolios and providing additional feedback and guidance. The following year saw this problem resolved by adding a requirement for a preliminary submission, followed by a feedback session, and the standard was much improved.

A further problem which has been addressed during the period of operation is the competence of the students to evaluate a performance, as they do not have a common 'gold standard'. Various strategies have been used to enhance their understanding of the marking criteria, and I am still experimenting and reviewing different methods. The students first exposure to self-marking occurs at the beginning of the programme, when they are asked to produce a profile of their competences. This provides an opportunity to discuss the relevance of common skills, and the criteria for the different mark levels. Open peer marking of student-led seminars gives frequent opportunities for them to practice this skill, and this seems to help the students develop a common understanding of the marking criteria. I also use the same system on a weekly basis to gain useful feedback about specific aspects of my lectures, and to give them additional experience in marking.

7. Conclusion

The use of portfolio based assessment allows students to present evidence of their best work, rather than restricting them to assessment of a particular performance which may not reflect their real ability. Self-assessment is one way of reducing the marking load on staff which often prevents this vehicle for assessment being adopted. Several other benefits accrue from this methodology, including enhanced learner autonomy, the development of a valuable skill in evaluating ones own work, and an enhanced awareness of the role of the assessor. The process of selecting material for their portfolio also encourages the student to reflect on their performance, as a 'reflective practitioner'.

Experience of early limitations of this strategy has shown factors which are important to its success. The system is based on trust between both parties, and this must be developed throughout the program. The students must be aware from the start that their marking will count; and their early fears that they will over- or under-rate their abilities, or that their classmates will 'cheat' must be addressed to their satisfaction, both early in the unit, and also near the time for submission. A clear and common understanding of the marking criteria must be developed, with opportunities for peer marking, so that students develop faith in each others judgements.

Recent changes at BTEC make the future of common skills uncertain, but a recent document from EDEXCEL¹⁵ indicates that BTEC accreditation of (NVQ) Key skills may take its place. This may result in changes to the assessment required, but it is hoped that sufficient flexibility will still exist in the system to allow self-assessment to play a significant part in key skill certification.

If this proves to be the case I intend to continue developing the system, and to attempt to carry out a more rigorous examination of the correspondence between student, peer, and tutor grading as evidence of the system's reliability. I also hope to survey the students to determine their feelings about its validity, as compared to more traditional assessment. However I remain convinced of the relevance of this approach particularly for the assessment of skills. As Angela Brew says¹⁶ "Without self assessment a competency-based education is barren".

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