Problems of Integrating Core Skills Development with Vocational Learning: a case study in engineering

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JENNY TIZARD
University of Huddersfield, United Kingdom

ABSTRACT This paper describes an institutionally based research project examining the problems encountered in introducing curriculum change to an engineering programme in a further education college. The project required tutors to integrate assessment of core skills with their engineering assessment. Evaluation of the impact of these changes was made using both interviews and questionnaires. Tutors experienced some problems in taking on this new responsibility. Students, particularly adult students, welcomed a move to more active learning, but required more guidance from lecturers on what was required of them. The project explored the practical problems experienced by lecturers and students when change was introduced. The findings of this study highlight the extent of change in attitude and in teaching style that may be required by many lecturers implementing General National Vocational Qualifications programmes.

Introduction

Full-time further education courses at technician level in the United Kingdom are in transition, with consequences for both teachers and learners. In order to prepare young people to be flexible workers, capable of coping with changing technologies, there has been a move to focus more on student's skill development. Certain skills have been identified by the National Council for Vocational Qualifications as core skills which all people undergoing full-time vocational education must develop. The new qualifications, General National Vocational qualifications (GNVQs), are outcome-based. In order to achieve a GNVQ students will have to demonstrate competence in core skills, such as communication and information technology, as well as in vocational modules.

This curricular approach had been developed by courses validated by the Business and Technology Education Council (BTEC), see Table I. However, in the BTEC courses, the delivery and assessment of common skills tended to be left to communication lecturers rather than vocational staff. From 1995 GNVQs will replace Business and Technology Education Council (BTEC) National Diplomas. Vocational lecturers will then be required to deliver and assess core skills within their teaching (National Council for Vocational Qualifications, 1993).

BTEC common skills	GNVQ core skills
Communicating	Communication
Applying numeracy	Numeracy
Applying technology	Information technology
Managing tasks and solving problems	Problem solving
Work with and relating to others	Working with others
Managing and developing self	Improving own learning and performance
Applying design and creativity	

TABLE I. Comparison of transferable skills required to be assessed.

Many engineering tutors have been used to delivering a teacher-centred, knowledge-based curriculum as described in this report from Her Majesty's Inspectorate (Her Majesty's Stationery Office, 1988):

> Although much of the teaching was sound and conscientious, it was often unimaginative; students were required to copy notes, either from the blackboard or through the sterile process of dictation, and they were fed information they could better have discovered for themselves.

Lecturers in engineering have traditionally worked individually, rather than in teams, and have concentrated on working through the syllabus, rather than developing students' skills. Skills development has been seen as something that was done by a communications lecturer as a bolt-on to the 'real work' of the engineering course.

The Further Education Unit has carried out project work in Further Education colleges in England and Wales, identifying and recommending good practice in the integration of core skills into 16-19 provision (Further Education Unit, 1993). They found that:

> the major changes involve the use of the teachers' time in more teamwork and the use of different skills compared with those they have been using or trained to use.

This paper describes a research project involving collaboration between the School of Education at the University of Huddersfield and the

Engineering Department of Bradford and Ilkley Community College. The project sought to examine the problems that arose when a group of engineering lecturers took responsibility for developing and assessing students' core skills.

Methodology

This research project set out to explore the problems encountered in skills assessment in engineering through working with a lecturing team and students on the first year of a BTEC National Diploma in Engineering. In total, 15 tutors and over 50 students were contacted during the course of the study. By focusing on one college it was possible to examine in detail practice that was taking place, and to explore attitudes and opinions in some depth through extensive interviewing as well as using questionnaires.

Participant observation was used as a major part of the methodology and during part of the study the researcher herself taught on the course. The project steering committee was chaired by the Head of Department and included three members of the course team. To some extent the fact that the research was being carried out may have influenced the findings. Changes in attitude may have been partly as a result of the research project prompting reflection on student learning. Nonetheless, many of the findings confirm research carried out by the Further Education Unit Core Skills project (Further Education Unit, 1993).

Raising Staff Awareness of the Significance of Skill Development

At the beginning of the academic year 1992-1993 a presentation was made on core skills, emphasising their importance to learners for transition to higher education and also for employment in a fast-changing engineering industry. Lecturing staff present at this meeting agreed to carry out a curriculum audit on core skills, identifying where skill development was taking place on the course.

At this time BTEC policy on reporting and grading of common skills was changing. Common skills development was now required to be integrated into subject delivery and carried out by the whole course team. It was decided to use the BTEC common skills competencies as the focus for evaluating skills development in the research project, since this would carry weight with both lecturers and students. The research steering committee decided to implement a plan that would require all specialist teachers to take responsibility for developing common skills, by requiring them to assess skills as well as 'subject work'.

Tutors for each of the units on the programme were allocated between 3 and 5 of the 18 BTEC common skill competencies and asked to provide a grade for each student on the skills that had been allocated to

that unit, in addition to the subject/unit grade. Where skills had been identified by tutors through the curriculum audit as being covered in their units then these were the skills allocated to them. In other cases the course leader made the allocation.

Tutors were advised of someone they could contact for advice on how to assess skills, though in fact this offer was never taken up. A standard cover sheet for assignments was designed which identified which skills were being assessed through the assignment. At the same time a leaflet was drawn up for students informing them how skills assessment was to be carried out.

Evaluating an Increased Focus on Skills

At the end of the academic year an evaluation was carried out on the effectiveness of involving vocational lecturers in delivery of common skills. Did engineering lecturers actually carry out skills assessment? What problems did they encounter? Did students feel that assignments helped them to develop skills? What further support was needed? Evaluation was carried out through interviews and through questionnaires.

Looking at Changes Made by Tutors to Assignment Work

Three of the 15 tutors teaching on the first year of the National Diploma course were interviewed individually about assignments that they had set. They were all assessing common skills through assignments for the first time. Methods used for assessing skills were observation, self-reporting by students, looking for evidence in technical reports and log books.

The three tutors interviewed reported that they had put more thought into setting the assignments because they were looking for common skills outcomes. There had been three main effects of this, for each tutor interviewed.

1. They had allowed the students more independence in their work than in previous assignments. For example, one of the assignments was to do with laboratory exercises. Assessment of common skills had made the lecturer change the style of the laboratory sheets used and of the teaching, so that students were making decisions and judgements and not simply following instructions and recording results. The assignment they were setting involved "putting more responsibility onto the student. Because you can't teach common skills, they have to be developed by the student and the only way that you can allow a student to develop the skills is to teach in a different way".

2. Tutors had been more explicit to the students about how the assignment was to be presented. "I spent half an hour going through how the work should be presented, what the correct format was. Before I

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wouldn't have spent time on that, but it has improved their work". Guidance on presentation was seen by two of the tutors as an area that they needed to develop. "They had to do a log of how they'd used their time. Perhaps I needed to spell out more clearly what was needed here. I went through it verbally but some just didn't take it in." One tutor commented that it would be useful if there were a common approach across the course on standards of assignment presentation.

3. They had had to consider more carefully how the student was going to do the assignment, since some common skills grading required assessment of the process of producing the assignment as well as of the final report. "I had to consider at what point could we check the task and how."

None of the tutors interviewed felt that they had had major problems with taking on the assessment of common skills. They felt that the skills that they were assessing were important ones for the students to develop, both for life and for study.

Nevertheless, the tutors felt that there were some problems in taking on this new area of assessment. Many of these would be addressed if the staff working on the course met together as a team and worked together on developing greater expertise in this area.

1. Grading was felt to be subject. "What is acceptable and what isn't? It's a value judgement and all tutors could have a different value". It was suggested that the course team needed to meet together and discuss a common approach to the common skills. Both tutors and students needed more guidance on what was expected to demonstrate common skills outcomes.

2. It was difficult finding time to develop materials that could be used for assessment purposes. It was suggested that it would be useful for the team to meet together and share ideas and materials e.g. observation sheets, guidance on presentation for students, self-assessment forms for students.

3. Tutors said that they didn't need anyone to explain to them what the common skills were, but that it would be useful to share ideas on how other people were assessing them.

Questionnaire Responses from the Staff Team

To what extent had requiring the assessment of common skills changed the attitudes and the teaching of vocational lecturers? Questionnaires were distributed to the course team and ten of these were completed and returned, a response rate of 67%.

Only three tutors said that they felt that assessing common skills had changed the way in which they taught the group. One of these said that it

had made him allow students more room for manoeuvre, another that it had made him reflect more on student capabilities and the third that it had made him stress common skills more in his teaching.

Some changes had been made to assignments in order to assess common skills. Six of the tutors had changed the assignments, three to allow for group work, two to make them more open-ended and four to specify common skill requirements. Three tutors said that they had not needed to, since the assignment requirements used previously allowed for common skill assessment. Six of the 10 tutors stated that they had explained to the students how they could achieve maximum grades on the common skills area of the assignment. Two of the rest felt that it was implicit within the assignment.

Half the tutors felt that they had had problems in taking on the assessment of common skills. The problems described were: the subjectivity of the grading, the extra time involved, and the problem of identifying individual contributions to group work.

Six of the tutors felt that they had benefited from taking on the assessment of common skills. The benefits mentioned included: students taking on more responsibility for the assignments, use of more interesting projects, identifying more closely the skills involved in the subject area, and the introduction of more flexibility in the work.

Assessing common skills in engineering work was felt to make students more conscious of how they were approaching their work, mostly by improving presentation, by six of the tutors. Most of the tutors (eight) felt that students benefited from common skills being assessed within engineering subjects. This was seen as important because many students were seen as being deficient in these skills and because the skills work could be tailored to engineering.

Most of the staff also felt that the course benefited from assessing skills work in the engineering subjects. The reason for this were: because skills work could be related to core work, because students learn to be more self reliant in their engineering work, because there was an increase in the quality of practical teaching, and because it made for a more rounded course.

Tutors were asked to recommend improvements in the way in which the course was developing and assessing common skills. Most of the tutors had suggestions, which included:

- programming the assignments for the whole year in advance;
- providing an introduction to common skills for the students with some guidance on how assessment would be carried out;
- involving the communication studies lecturers more in the work;
- allowing time for the course team to meet in small groups to discuss methodology;
- introducing assessment through outcomes;
- staff development on how to assess common skills;

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- simplifying the number of skill areas to be assessed;
- introducing more role play.

Summary of Lecturer Responses to Change

Problems Experienced by Lecturers

- Need for common course/department approach on standards that are expected of students, e.g. in report writing, presentations, logbooks.
- Difficulties in grading – feeling that it is very subjective.

Perceived Development Needs

- Need to raise awareness of common skills within course team.
- Need to raise awareness of common skills with students.
- Need to provide common guidelines to students on what is expected.
- Need for better communication within the team (circulate minutes? build a core team?).
- Need to share what individuals are developing with the rest of the team.
- Need to plan assignments ahead and schedule them.

Student Responses to Assignments

Eighteen students were interviewed, individually or in small groups, about the work that they had done on two particular assignments. Nearly all the students said that they had understood what they were expected to do for these assignments, and knew how they were being assessed on them.

Almost all the students had found the first assignment difficult. There had been problems with the equipment that they had used. They said that they needed more preparation for the assignment, and would have liked to have been shown something similar before tackling the assignment. Despite these problems they said that they felt that they thoroughly understood that area of work by the end of the assignment. They recognised the development in their own self reliance as a result of doing assignment. "Because at 8.30 at night there are no technicians around and you've just got to do it on your own. You've got to be able to start learning on your own and really not relying on other people."

The second assignment required people to work in groups on a design problem. This assignment was popular with all of the students interviewed. "I'm thinking for myself, coming out with my own ideas." They talked about enjoying the chance to use their imagination, and to work in teams.

The students interviewed said that both assignments had helped them to develop confidence in solving problems, to learn more about their own strengths and weaknesses and to apply their learning.

Students were asked if they wanted to make any general comments on assignment work on the programme. Two points were raised by a significant number of the students:

Assignments were not evenly spread throughout the year, "they all come at once, and there's too many".

There was inadequate feedback on their work.

Common skills aren't explained. Mostly lecturers don't give you feedback so you don't know where you are. You just get a mark and that's it.

Obviously you learn by your mistakes, but if you don't know what mistakes you're making you can't do anything.

Student Questionnaires on Assignment Work

Questionnaires were handed out during class time to students on the first year of the course. The questionnaires asked students to reflect on their work on assignments over the year. Responses were anonymous. Twenty-eight completed questionnaires were received from the student group of 35, a response rate of 80%.

The overseas students (mostly from Gulf States), had a more negative attitude towards assignments than the British students. This is reflected in their responses on the questionnaire, and also in the interviews. They said that they sometimes had problems understanding what was required, that there was too much writing involved, and that they did not understand the purpose of assessing common skills. It took them a long time to do the assignments and they felt that it was mostly a waste of time. In the following discussion of questionnaire findings the figures for the British students are used, since there are a number of separate issues raised by the experience of assignment work for overseas students.

The first question asked students whether assignments had helped them to learn on the course. Most of the students (83%) answered that they felt that assignments had helped them to learn. The older students were more positive about the value of the assignment work than the younger students.

Students were asked whether assignments had helped them to develop in different ways. The seven areas asked about had been identified earlier in the research as being significant areas of skill development required by students on the course. All of the statements drew more positive than negative responses. In every case the responses

of the older students were more positive than those of the younger students.

Students identified assignment work as having been most useful, i.e. fairly helpful or very helpful, in helping them to read through, reflect on and apply their learning (87%) and to develop confidence in knowing how to set about solving problems (78%). Assignments were identified as being *very helpful* in helping to identify your own strengths and weaknesses by 39% of students (including half of the young students), and helping to practise and improve report writing by 35%.

Students were then asked to report whether they had experienced any of the five listed problems during their assignment work, and if so whether it had been on some assignments or on most assignments. Most students (83%) said that they always knew where to go for help, and none identified this as a problem on most assignments.

Characteristics of a 'good' assignment	Characteristics of a 'difficult' assignment
Clarity	Not clearly explained
Challenging	Boring
New and interesting	Complicated
Design work	Too much writing
Consolidating class work	Lack of support material
Bringing theory and practical together	Relevant books not available
Reading about a new subject and writing a report on it	Not enough background teaching
Working in groups	
Giving a talk	
Project work	

TABLE II. Student views on assignments.

Just over half the students (57%) said that they always understood how the assignment would be marked, and the same proportion said that there was always enough time to complete the work.

Problems that significant numbers of students had had with assignments were not understanding what to do on some assignments (61%) and not getting enough feedback on where mistakes had been made on some or all assignments (78%). Just over half the students described this as being a problem on most of their assignments.

Next, students were then asked to identify an assignment that they had found useful and which had helped them to learn, and to describe why they had felt it to be good. They were also asked to identify an

assignment that they had found difficult and describe what had made it difficult. Their views are summarised in Table II.

Finally the questionnaire asked students if they wanted to make any further comments about assignment work or the course in general. The main points made were:

- the need to schedule assignments so that they were more spread out;
- the need for more practical work on the course;
- and the amount of time required outside of timetabled hours.

Summary of Student Responses

Students felt that their assignment work during the first year of the programme had:

- helped them to develop self-reliance;
- helped them to learn more about their own strengths and weaknesses;
- helped them to develop confidence in solving problems.

Problems that they experienced with assignments were:

- being set problems that they had not been properly prepared for;
- needing more examples of what was expected, how to do things;
- needing more feedback on how to improve their work.

Conclusions

Most of the common skills (BTEC) and core skills (GNVQ) were recognised by staff and students as important skills for students to have mastered in order to succeed on a full-time technician level engineering course. At the beginning of the study nearly all the engineering tutors felt that students should enter the course already equipped with these skills. They did not see it as their responsibility to develop these skills in a systematic way. However, many of the students were not competent in these areas and this was one reason why they had problems on the course.

Requiring engineering tutors to assess common skills did effect a change in attitude in most tutors towards taking responsibility for their students' skill development. Staff experienced a number of problems in meeting the demand, most of which could be addressed by working as a course team on the issues.

Students, particularly adult students, welcomed a more active approach to learning. They felt that the assignment work integrating common skills assessment did help them to develop skills that were necessary for the course. Students felt that they needed more information and examples of what they were supposed to do, and more feedback on how to improve their performance.

Changes in programme requirements being introduced by GNVQs will lead to all engineering assessment being competency-based. The reductions in contact hours for full-time courses taking place at most Further Education Colleges will necessitate more independent learning in these programmes. The work carried out during this research project suggests that this may have some benefits for the learners. However, changes in engineering programme delivery are unlikely to be effective unless lecturers work in teams that meet regularly and communicate clearly with their students.

Correspondence

Jenny Tizard, School of Education, University of Huddersfield, Holly Bank, Huddersfield HB3 3BP, United Kingdom.

References

Further Education Unit (1993) Core Skills Action Pack: principles for development of core skills across the curriculum. London: FEU.

Her Majesty's Stationery Office (1988) *Non Advanced Further Education in Practice 8. Engineering. An HMI survey* para.41. London: HMSO.

National Council for Vocational Qualifications (1993) *Assessing Core Skills in GNVQs*, p.9. London: NCVQ.