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# USING VIDEO REPORTS TO PROMOTE ACTIVE ENGAGEMENT IN LEARNING

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**Abstract:** The expectation of today's paying customers is of 'teaching' not 'learning' and sadly, even a mild spell of disengagement can quickly lead to an unwelcome request for a course transfer. This paper describes how rising wastage rates encouraged a large engineering department to review the first year curriculum and this resulted in the introduction of an innovative new problem-based module sitting alongside traditional engineering units. The new module features several team project assignments and a series of skills workshops. All the learning scenarios were designed to improve study competences, to add interest and enjoyment and to address the gulf in attitude to learning that exists between staff and students. This paper concentrates on just one of the assignments, which was designed to encourage teamwork and improve fundamental knowledge of machines and systems. It shows, through survey data, how a novel video reporting approach that has proved both exciting for the students and efficient for staff was used to stimulate, present and assess the learning.

*Keywords; PBL, Assessment, Video, Engagement, Teamwork*

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## 1. INTRODUCTION

### *1.1 Realisation*

The gulf between the educational methods in UK secondary and tertiary education has never been wider. Students arrive at university, increasingly driven by marks and with the expectation of 'teaching' not 'learning'. A survey of first year students' expectations by Cook and Lackey (1999) found that freshers generally expected their learning experience would not differ greatly from secondary school. Today's students demand more than ever before: they expect courses to be fun to take part in and allow plenty of time for social interaction and revelry; they are increasingly driven by marks and reading appears to be a dying art. Furthermore, even a mild spell of disengagement can quickly lead to an unwelcome request for a course transfer.

Clearly, this does not sit well with the academic's need to convey large quantities of basic engineering science as the early building blocks of an engineering degree. Nor does it match the rose-tinted recollections of academics who cheerfully recall a mythical time when lecturers introduced a topic, students would copy large quantities of notes from the blackboard and work diligently through examples, then go home to read around the subject. When students don't respond and depart or fail, traditionalists are tempted to blame the students' lack of dedication or ability. This was the approach taken by Ozga and Sukhnandan (1997) in their model of non-

completion using qualitative data from studies of UK institutions. They criticised many earlier attempts at explanatory models for focusing too much on the student; seeking faults in the students' behaviour to explain their withdrawal.

Loughborough's intake is predominantly traditional, typically three high grade GCE-A (Advanced) levels including Mathematics and physics and the vast majority are young school leavers. And despite many attempts to encourage women into engineering, most are male.

Since 2000, the A-level examination has been divided into a succession of six sequential modules causing the fragmentation of knowledge (Haywood and McNicholl, 2007), students describe an instrumental approach to learning where they gather marks from a collection of short term intensive assignments within the modules and the marks are all important to them. To achieve the best mark, students become very good at following instructions to the letter but there is little or no time given to any learning outside that directly associated with the instructions. Their teachers, who are very conscious of school league tables, naturally do little to discourage the mark culture and its knock-on effects. Furthermore, contemporary students arrive at university with the widespread belief that "the first year doesn't matter" which is the apparently logical but over-simplistic conclusion they draw because few UK universities carry first year marks into the final degree classification.

### *1.1 Practical Skills*

Many have also observed that university intake is also massively short of practical skills and has little perception of how things work or what a career in engineering actually entails. As the world around us has changed, budding engineers no longer make their first associations with engineering at a young age by building models or repairing bicycles; processes that can help to sow the seeds of an enquiring mind and enable students to better understand the engineering world they have entered. Shobrook (2004) provided an extensive summary of the reasons for withdrawal from engineering programmes. The list was a long one but focused largely on the fact that student's pre-perceptions of engineering and engineering studies were not matched by the reality. She also pointed out that most entered university having studied maths and physics but had little real knowledge of what engineering is. At Loughborough, it was thought that this lack of the fundamental building blocks and the associated lack of an engineering vocabulary had also begun to inhibit the acquisition of higher level knowledge.

It was the realisation that young people are no longer the same and that universities need to adapt that drove the need for change. Surely, it is time to stop blaming the young people for the society we created and they live in.

## **2. ENGAGEMENT AND MOTIVATION**

### *2.1 Engineering Principles and Professional Skills.*

It is known that "...the adoption of teaching approaches that actively engage students from the outset" can enhance the student experience in transition (Yorke and Longden, 2008). These ideas are founded in constructivist learning theory where learners are invited to construct knowledge

for themselves, become actively involved and learn how to learn while they are learning. This paper describes one successful experiment to address these issues.

A curriculum review panel, chaired by the lead author, decided to introduce a new year-long module alongside existing traditional engineering modules. The new module sought to exemplify fundamental engineering principles in a practical environment and help freshers acquire the necessary skills to become autonomous learners. Hence, it took the title Engineering Principles and Professional Skills (EPPS). High on the priority list was the need to actively engage the students: taking responsibility for their own learning, working creatively in complex situations and critical reflection are all characteristics of an autonomous learner. So, it was decided, the new module would be built around a variety of student-centred assignments of unequal length and complexity. The students would work together in teams formed around existing personal tutors.

Working with student feedback data collected over a number of years, the new module would replace existing material that was tired or outdated but retain and repackage elements that were proven to be working well alongside new problem-based material. While the new experiences were designed to improve fundamental knowledge and study competences they also provided the means to add considerable interest and enjoyment; furthermore, the informal staff-student interaction appears to be helping address the gulf in attitude to learning that previously existed between staff and students.

The new module includes 4 team projects and 6 skills workshops integrated together and supported by a short lecture programme. The team projects cover a wide range of topics and themes: competitive design, build and test, industry sponsored mechanical handling project, vehicle systems investigation and a start-up business game. The skills workshops include teambuilding, library skills, understanding learning styles, metrology and measurement, problem solving (robotics) and workshop skills. While this paper describes and reflects on only one of the team projects, PBL3 – ‘vehicle systems investigation’, it was always anticipated that success would depend on successful integration of all the elements alongside traditional study and the quest to establish a learning community with greater motivation and more autonomy.

## *2.2 The assignment.*

The (PBL3) vehicle systems assignment starts immediately after the Christmas Vacation and lasts three weeks; that is, the student teams have three weeks to complete the work even though there are few timetabled events. This is the third scheduled group assignment of the year and by this time, the students are well rehearsed in working as a team and reporting to their ‘personal tutor’. This project was created in academic year 2008/9 and ran a second time this year with a little refinement.

The intended learning outcomes for this assignment were:

- The ability to apply engineering principles in a practical situation through examples.
- Improved learner autonomy.
- Enhanced research, communication and team-working skills.

We needed a group of topics that were potentially interesting to mechanical engineers, complex enough to require significant understanding and with examples in abundant supply: the decision to focus on cars was, therefore, a simple one. A list of distinct 'systems' such as emission control, power brakes and active suspension were easily identified.

Such a research project would normally warrant students to submit a substantial written report and possibly an oral presentation. However, there was no requirement here to test these particular skills as they are already adequately assessed in other parts of the programme. The assessment process looked daunting: twenty four teams of freshers would tackle the project, some 150 students and the assessment task would inevitably fall on the module leader. Furthermore, compiling a written report was hardly going to motivate students. The present authors are indebted to Mike Brammall and his colleagues in Sheffield for providing the inspiration to try a new reporting and assessment method that was to become an integral and vital part of the assignment. Brammall et al (2008) demonstrated that video reporting provides an attractive medium for his final year materials students. They claimed that the video report added realism and aids communication and analysis skill; that students were motivated by this methodology and that it enhanced achievement. They also claimed that students developed a deeper understanding of the technical content of the exercise and that learner autonomy was developed although this was largely unproven.

During the introduction to the task, students were told that they must plan and schedule their own work. They should aim to become self reliant and that innovation and ingenuity is rewarded. Nevertheless they could ask for assistance through their personal tutors, the project leaders or the laboratory staff by making advance appointments. Several other help mechanisms were put in place, a web-based discussion forum, delivered by the university's VLE, a Question and answer session timed one week from the start, the services of an Audio Visual Technician and some self teach materials appropriate for the project also mounted on the VLE. To ensure the teams headed off in the right direction at the outset, they were required to complete a pre-prepared 'objectives' form setting out their chosen topic, planned methodology and intended deliverables and discuss their plans with their team tutor.

### *2.3 Filming and Reporting.*

Would first year engineers be able to direct, act, shoot and edit a watchable video documentary? – you bet they are. Students today have an expectation of using communication technologies. They "take them for granted and integrate them seamlessly into their daily lives. These technologies also represent an opportunity for making changes in higher education instruction. How can higher education fully embrace the possibilities they present?" (Caruso & Salaway, 2007) Easy creation, distribution and instantaneous uploading and downloading of digital media is the norm. 'MySpace' and 'YouTube' are just two examples of free user-generated online video sharing that are predominantly the preserve of the young. Over two years we have received 48 video reports and the baseline requirement of a filmed 10 minute presentation to camera has been exceeded in every case with some ingenious and relatively complicated screenplay.

Clearly, there is a requirement for equipment and this had to be supplied with a limited budget. Six kits were bought specifically for the job, each kit comprised a hard drive video camera, an inexpensive tripod, a hand held microphone for narration and a carry bag and the total cost was

under £2000. Teams loan camera kits for 48 hour periods against a returnable deposit. It would be helpful to add a couple more kits when finance permits. The inexpensive equipment is easy to use and adequate for the task; the only real deficiency is the lack of provision to connect an external microphone to the camera, a feature that is only available on more expensive cameras. For video editing, we use Windows Movie Maker, which is included on all Windows lab computers at no cost.

No formal training in filming or video editing was either provided or necessary save for a short list of 'dos and don'ts' and some general advice during the introduction. Revealing sample clips this year appeared to promote extra enthusiasm for what, at first appears to be a considerable challenge. I need not have feared that the students would rise to the challenge. Some teams were keen to integrate humour into their serious research and this was encouraged, as it would help to promote engagement. Nevertheless, the assessment criteria, published in advance were weighted towards the demonstration of knowledge and understanding of the vehicle system.

Filming took place in a variety of locations of the students choosing; in labs and workshops, in halls and student houses, in group study rooms and on location in their own and sometimes their tutors' cars. Some students headed for the local scrap yard in search of relevant artefacts to dissect while others headed off to interview the local dealership and found them surprisingly accommodating.

Of course, a lot of research involved the library and the internet and this enabled us to convey, in sharp focus, the rules of copyright. All teams were required to submit, with their video, a release form allowing the module leader to make use of the media together with a declaration of the copyright status of all materials used. Teams were encouraged to use copyright free or Creative Commons licensed materials although copyright protected material can legally be used for personal research and educational purposes. It should be noted that videos containing copyright media, sound or pictures, cannot be publicly shown.

An added bonus of video reports is the opportunity to use them as a future learning media resource. Selective use of a 10-minute student made documentary video or edited highlights of it can add spice and interest to the lecture programme and disseminates research on the wide variety of topics throughout the whole group.

#### *2.4 Assessment.*

The assessment and feedback task was straightforward and, for once, quite enjoyable. Two staff members watched each documentary at the same time and independently rated it against fixed criteria. *Structure. Evidence of teamwork, technical content; breadth depth and accuracy, audience engagement; clarity & impact, and innovation.* Grades associated with the School's generic grade descriptor assessment policy using terms like 'outstanding, good and weak' were used to assign grades against each criteria, and these were later computed into an overall numeric score. Feedback was provided in the form of a table of comments against each criterion. Assessing 24- 10 minute videos equated to one day's work for two people.

### 3. STUDENT SURVEY

Students in 2009/10 were asked to complete an online questionnaire following the Vehicle Systems project. A broad range of questions covered team working practices, experience of working with their personal tutor, how they interacted to complete the task, and their reflections on the experience. Data was collected from individual students with a response rate of 51%. The questionnaires gathered both quantitative and qualitative data. A thematic analysis was used to analyse the qualitative data. There were 24 teams each with 5 or 6 students.

#### 3.1 Quantitative results.

Summarising the quantitative data; several questions investigated the level of engagement and motivation brought about by the activity. 84% of respondents stated that the topic, chosen by the team was their first choice and 76% reported that they had **enjoyed** the task. Enquiring about community spirit, students were asked to rate how helpful they'd found their personal tutor in the PBL3 Video project. 72% responded positively to this question with nearly 10% describing their personal tutor as being 'enthusiastically helpful'. Prior to the initiative the longstanding personal tutoring scheme had been patchy, at best. 84% claimed to have met together as a team more than once each week of the task.

Using a 5-point Likert scale, students were asked whether they thought this assignment was an effective learning tool: 87% felt that they had **learnt or consolidated knowledge** of engineering principles by completing the task. 80% felt that the project was effective for improving **transferable skills** such as researching, communication or IT skills. Figure 1 illustrates these results graphically.

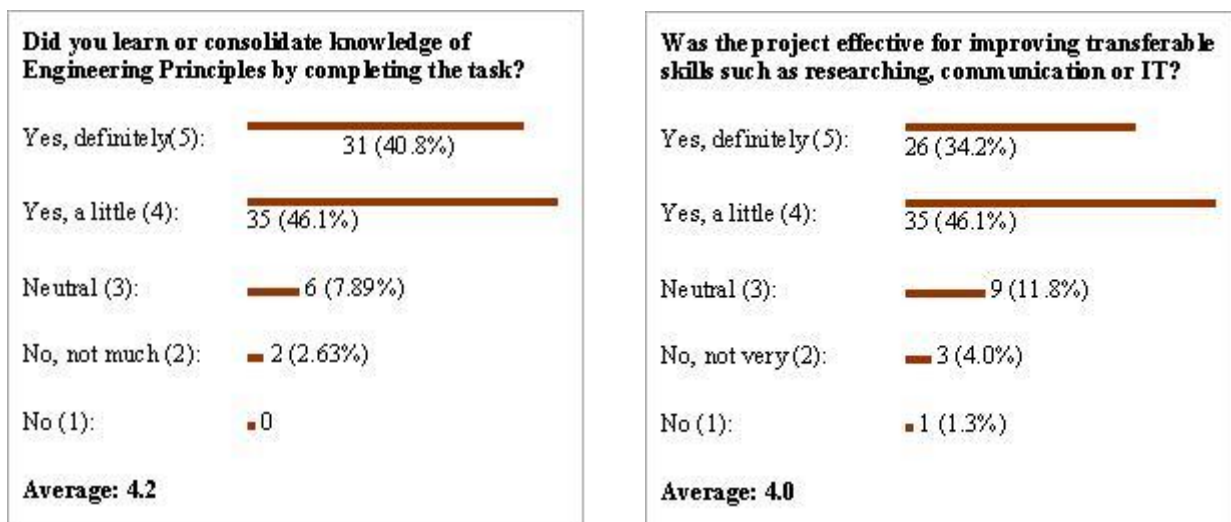


Figure 1: Perceived effectiveness, (a) acquisition of knowledge and (b) skills development

#### 3.2 Thematic analysis.

Students were asked to comment freely about what was best about this project. Responses tended to relate to one or more of seven themes.

- The learning experience
- Doing something different



- The team aspect
- Technical knowledge
- Freedom
- Fun
- Filming the video

In particular, twenty students made positive comments relating to the **video reporting** aspect of the learning experience, for example; “Written reports can easily be ‘blagged’ by finding information on the internet and compiling it into a neat and tidy work document, but the video report forces you to take a deeper look into the subject”. They welcomed “the opportunity to talk to experts...and the need to find our own props” [*for the film*]. “Being creative in showing a subject of engineering”; “It made me think in different ways due to the new format of presenting information”.

A common theme amongst comments on the learning experience was their appreciation of being able to do something ‘**different**’. For example; eight students made a specific comment on this aspect. “The self satisfaction of doing something different other than writing a report or doing an exam”. “It was a nice change from the norm”. “It was very different”. “Doing something different to labs and lectures”. “It was just nice to do something different for a change”.

Thirteen students referred positively to the **team aspect** of the project. Students appreciated being able to “work as a team” and comments suggest that they felt that the project had enabled them to “bond as a team”. One elaborated; “It [*the assignment*] allowed team dynamics to really flourish, highlighting everybody’s role in the team well, which should prepare us better for the major project PBL4”. Another respondent commented, “teaching you to work better as a team and become better friends as a result.”

Thirteen students valued the **technical knowledge** developed through the project. Comments included: “Learning about the engineering behind a system and how our study relates”. “Discovering new information about the working of each component to add to my previous knowledge”. “Actually learning about how a hybrid vehicle works, it was very interesting.” “We get to know how safety systems work in a car and the importance of it! How through equations of physics and creativity we can improve the mechanisms!”

Twelve students highlighted ‘**freedom**’ as one of the best aspects of the project. Comments either referred to the fact that they could choose their topic or freedom in how they tackled the project. Typical comments included: “Freedom to plan and put together the video by ourselves when and how we want”. “The fact that the topic could be chosen”.

Eight students made comments on the **fun element** of the project. The typical comment on this was that “it was fun”. More expansive responses included. “A very enjoyable task”, “it was more entertaining than sitting down for an exam”.

Seven positive comments were made relating to the **filming of the video**. Two comments in particular attributed learning new skills and improved team relations to the filming process itself.

#### 4. DISCUSSION AND CONCLUSIONS

There was a good feeling about this assignment; as though we had something right with the vast majority of students appearing 'on-side'. Informal reports from personal tutors who were 'roped in' by their tutees were also enthusiastic in the main. Furthermore the evidence from the online survey is encouraging. We speculate that few conventional coursework assignments would prompt a response from 3 in 4 students that they had enjoyed completing it.

Although the questionnaire did not explore changes in attitude to learning, respondents positive perceptions of the video project in terms of engaging with their personal tutor and tutor group, valuing the opportunity to choose their topic of study, and engaging in an assessment method that they perceived to be both fun and a means of broadening their skills. One particular telling comment hints at a positive change in attitude. "The project was educative and fun at the same time – which is rare and I believe my lab partners and I seized the opportunity to work together better." The survey data also demonstrated considerable success in achieving the outcomes of improved knowledge and transferable skills; at least, this was the students' perception.

This adventure has proved interesting and instructive for both staff and students. An assignment like this will not, in itself remedy all the problems of engagement and transition to university but as part of a planned programme of activities it just might. The survey suggests that for this assignment at least and by implication, the ethos of the new EPPS module have been successful in meeting their objectives. Whether this translates into reduced wastage rates remains to be seen.

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