

# The Role of Pre Entry Practices and Induction Strategies in relation to Student Retention



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*Induction Processes at The University of Hull by Dr G.B. Neighbour*

*Induction Activities at the University of Plymouth by Mr Ian Barlow*

# Introduction



This workbook should be thought of as a practical guide that will help staff interested in, or involved in, issues and activities relating to pre entry, induction and student retention.

A range of concepts are identified that connect pre entry practice, induction strategies and student retention. Information relating to each of the above has been collected from primary and secondary sources. The primary information has been derived from a series of interviews with staff at departments/schools identified as having good practice in pre entry practices, induction strategies and achieving and maintaining low attrition rates. The secondary information has been collected from other FDTL projects, conference papers and journal articles.

In section one a discussion is put forward that contextualises contemporary thinking on student retention and progression. Within this debate the argument highlights how contemporary government policies on higher education are inextricably linked to pre entry issues, induction policies and student retention. It is argued that poor pre entry practices and undefined induction strategies can contribute to higher attrition rates. However, as this is a highly subjective area and no definite correlation has been identified the advice in this workbook should be considered as recommended good practice, not hard scientific proof.

Section two discusses the practical difficulties that staff face when they attempt to introduce new practices in areas such as pre entry. Suggestions are put forward that draw on the experience of departments who have changed

their practices and as a consequence have achieved positive results. An example looked at in detail comes from the School of Electronics at the University of Glamorgan (Hammoudeh 2002).

Section three looks at induction strategies and argues that induction should not be thought of simply as a weeklong activity. Induction strategies need careful thinking through so that they form a buffer zone between preparation for university and immersion into HE culture. Pre entry, induction and first year teaching are not separate categories they are all part of a set of continuous processes that when linked together help students to progress successfully through their undergraduate course.

Section four outlines a range of case studies. Most are from engineering departments but some are from other disciplines which have been identified as having good practice in the area of student induction. It is suggested that the conceptual ideas linked to induction are transferable between and across different disciplines.

Section five outlines suggestions for good practice in the area of pre entry and induction. This good practice guide is aimed at the busy academic who wants to identify quickly how, where and when to make changes.

The final section offers a brief conclusion and makes suggestions on how staff might take forward some of the ideas and issues presented in this workbook.



## I. Contextualising the problems; identifying themes that link pre entry, induction and student retention

This section identifies how pre entry activities and induction practices play an important role in student retention and progression. Although each of the activities could be viewed as separate issues the argument put forward suggests that good practice in both areas will help reduce attrition rates (Hammoudeh and Barrett 2002). This sentiment is reiterated in a HEFCE document on widening participation where it is suggested that, "... outreach activities and student progression [are] mutually dependent, because raising aspirations, better preparation of students, and good practice in admissions underpin successful retention in higher education" (HEFCE last updated 24 April 2003). The following discussion will attempt to unfold a series of themes that straddle pre entry and induction and explore the commonalities between the two in a broader context.

The conceptual basis for understanding transition and progression into higher education is often taken from the model of Tinto (1987). This emphasises that successful transition depends on the integration of the student into both the academic and social framework of an institution. A number of factors contribute to this process including prior experience, matching expectations with experience; social factors within a new institution and an ability to understand one's own academic performance. Banning (1989) takes a slightly different approach arguing that it is the identifiable differences between the sending and receiving

academic environments that cause problems for students. More recently Mantz Yorke's (1999) research on why students withdraw from university identified that there was no one reason why students left. The following reasons were given by students who had withdrawn from courses: unable to cope with the demands of an HE programme, in some instances it was suggested this happened due to a lack of academic support, unable to settle to university life, selected the wrong course, felt isolated and lonely, struggled financially, didn't make friends easily and were apprehensive about asking for help (Yorke 1999). As can be seen from the above list there is no one reason, no single issue that can be identified as a cause for high attrition rates. With this in mind it is important to conceptualise student progression as a series of interrelated processes.

Whilst high drop out rates have been identified as a problem within a broad HE context, engineering has been singled out as one of the worse case scenarios (Cutler 2002). Research into why engineering has been particularly hard hit has identified a number of factors. For example, mathematics has been noted as a problem area and a lot of work has gone into providing extra support for students (Wilkinson, Mathew & Earnshaw 2001). The gender bias in engineering and the masculine culture of the subject does not sit easily with the changing cohort of students and can leave the more vulnerable student feeling isolated or lonely (Frame 2002). This vulnerability was an area identified by Mantz Yorke (1999) as a reason students gave for early withdrawal from university. In engineering there is also a problem with students selecting the wrong course



and Hammoudeh (2002) suggests one reason for this could be linked to the new 'sexy' titles attached to engineering courses, for example 'Music Technology'. Another contributing factor links to schools and the students prior experience of engineering. In most cases this will be limited to A Level maths and/or physics. Very few young students entering university will have actual experience of engineering (Ash 2002). This could result in a misalignment of expectation with experience.

Hammoudeh and Barrett (2002) argue that all potential students need to be given clear information about courses and course content prior to being accepted on, or offered a place on degree course. However, this is not a one-way process, as students also need to know what is expected of them and what job opportunities might arise from their chosen degree. If students have a clear idea of what they will be doing and where they are going this could help with motivation. Pre entry processes should then feed into induction activities to provide a platform where students can be introduced to their courses and get a clear picture of what to expect.

In addition to the practical and academic aspects of induction there is also a social aspect that needs careful attention. This is not just social, as in the activities arranged by the student union; receiving departments should take responsibility for setting-up some kind of social/academic activity where students meet with other students and with relevant staff. Getting to know other students on a course, finding a person to relate to, talk to, or have academic debates with is important (Frame

2002). One way of generating interaction between students is to have some form of group/social/academic activity in the first week. Encourage students to work together, to talk to each other, to get used to using laboratories etc (see section on case studies for practical examples).

Induction practices can or should be thought of as a buffer zone between pre entry activities and immersion into university life. None of the activities should happen in isolation rather they should all be informed by an underlying rationale linked to providing good learning and teaching support for students (Barton 2002). Research has shown that it is very difficult to demonstrate a direct correlation between attrition rates, pre entry activities and induction practices. However, student feedback and research on why students drop out of university has identified that preparation for university and good induction practices do help students settle quickly and more effectively, thereby reducing the number of 'at risk' students (York 1999, Hammoudeh and Barrett 2002).

The above discussion has tried to conceptualise the importance of pre entry activities and induction practices in relation to issues about student progression and retention. It is clear from the above debate that there is no simple answer, no one activity that could cure all problems. Thus, what is now needed is a set of joined up thinking where academic staff, support staff and existing students work closely together to provide a good range of resources and activities for students progressing into and through university.



## 2. Pre-Entry Practices

This section discusses the importance of good pre entry practices in relation to induction and student retention. Questions are raised about who should be responsible for pre entry practices and when and where they should take place. The work of Hammoudeh and Barrett (2002) will feature strongly in the recommendations. Pre entry in the context of this discussion addresses the time prior to entering university when students are thinking about the choices open to them and about which degree course to take. As has been noted by Ash (2002) and by Yorke (1999) making the right choice of course is a really important decision. Pre entry practices should link with local schools and colleges and with UCAS to provide clear information about courses. This same information should be available on open days or applicant days at the university.

As was noted in the previous section good pre entry practices can be used to help students match their expectations of university to their experiences. Clear guidance and information on what a course entails is important to a student as it helps them to make up their mind about what they want to do and where they want to go. Recent research has shown that dissatisfaction with a course because it does not correspond to what was expected by the student is a major contributing factor to student withdrawal (Hammoudeh 2001). This is particularly the case in engineering, as the subject is not taught at schools. Students arriving on an engineering degree do not always understand what will be expected of them or what to expect from it (Ash 2002). Thus it is impor-

tant that course publicity is accurate and not aimed at selling a product but reflecting the true nature of the course. Information from admissions needs to be relevant and students should receive guidance on anything they are unsure of. In this context information on module content, assignments, learning outcomes and employability prospects could form an important resource to help students make the right choice.

There is a marketing argument that runs contrary to the above debate. Many universities are reluctant to let student numbers fall and will focus publicity in such a way that it attracts the student to the area and the university and not a specific course. Now while in some cases this might work in others it creates an inherent tension by bringing into play the competing needs of the university, the student and the department. With this in mind it becomes important to ensure the right publicity and information are handed to prospective students.

It is argued that pre entry practices should be guided by and closely linked to the receiving department and where possible staff from the receiving department should be the ones to talk to potential students to explain what will be expected of them on the course and what to expect from university.



### 3. Induction Strategies

Induction, the process of helping students become familiar with their surroundings, is generally standard practice for new students arriving at university, however the type of induction students receive varies greatly between faculties, schools and across universities (Crystal 1993, Billing 1997, Carter & McNeill 1998). Given these differences it is difficult to identify any direct correlation between induction strategies and attrition rates, however, recent research has shown that induction is an important time for students (Bradbeer 2000) and there are clear indicators that good practice at induction can help reduce the number of 'at risk' students.

Most students come to university with some experience of higher education courses and certain expectations. This does not mean that they have a clear idea of what to expect, research has shown that school leavers and students from FE colleges experience a culture shock on arriving at university (Shobrook 2001). Now while some students deal well with the differences others will likely need help and support. The main cultural differences relate to how the student learns, at school and FE colleges they are taught and given close tutor support, whilst at university they are expected to become an autonomous learner (Frame 2002). The first year of an honours degree course is a settling in time for students, a time to adjust to new surroundings, new ways of working and meeting new friends. As a way of helping students settle quickly it is advisable to introduce group activities in induction week and in the early stages of the first year

(Bradbeer 2000). Group activities will help students form social groups within their academic discipline and these social groups can act as support networks for those students too shy or too self-conscious to talk to lecturers.

Induction can be viewed as having two strands. The first links to registration week and the second to the first year. During registration week students learn about their course, the practical aspects of adjusting to a new location and meet other students. Effectively students are immersed into the system (Carter and McNeill 1998). While a straightforward approach as described above promotes integration into the system it often does little for student retention. Carter & McNeill (1998) suggest that induction activities spread over a longer period are more beneficial to students and help them adjust to university life, and by implication will help with student retention. An example of this type of programme is used at the School of Hospitality, Tourism and Consumer Studies, University of Ulster (Cook & Lowe 2000).

Most universities provide a generic induction to library facilities, student support services and computers. While this is always useful for students there are debates that suggest that these activities would be most usefully delivered as part of an early group work activity at departmental level (Bradbeer 2000). The timing and delivery of such activities is important as it has been identified that during the first week at university students are often overloaded with information and would prefer to meet departmental staff rather than general support staff. There are two strands here that need to be thought through. Firstly, how much information



should students be given in the first week? and secondly who should deliver the information? Answers to each of these questions could help in forming an over arching strategy for pre entry and induction.

It would appear that if induction is to be a tool for helping with retention then clearly the strategies employed will need careful thought and planning to account of pre entry issues and first year teaching.

## 4. Case studies



This section outlines a range of different case studies collected from a series of interviews with staff. Most of the studies are from engineering departments but some are from other disciplines which have been identified as having good practice in the area of student induction.

### University of Glamorgan

At the University of Glamorgan in the School of Electronics a number of initiatives have been put in place that relate to increasing student numbers, reducing attrition rates, and ensuring incoming students select the right course. Akram Hammoudeh (2001, 2002) has been responsible for implementing a number of these changes. He has worked with a small team of like-minded staff to help reduce attrition rates. In 1999/2000 16.8% of students withdrew from courses in the School of electronics but by 2000/2001 this had dropped to 9.3% and was still in decline.

So what did the School of Electronics at the University of Glamorgan do? They decided to have an active policy of interviewing all students who applied to them via UCAS. This was extremely time consuming as it took up most Wednesday afternoons from October through to May. However, this activity had a number of advantages, firstly it ensured that students knew what to expect from the course, secondly it gave staff the opportunity to meet new students, thirdly the uptake from UCAS increased due to the interview process and 36.1% of UCAS applicants took up the their offer of place. This hands on approach

paid dividends for the department.

On arrival at the University students were taken under the wing of the first year programme manager, who showed them around the campus and department, helped them with registration at induction, helped them logon to the computer system and generally supported them while they settled in.

First year teaching was also seen as an important area for consideration. Hammoudeh and Barrett noted that "Staff teaching first year are hand picked to be empathetic, approachable, available and inspiring and as far as possible first year modules adopt a 'hands on' workshop approach to learning" (2002: 1).

The above actions have been captured in a formula to address student attrition

$$RET = EID + (E + IN + C)IV$$

RET = Retention

EID = Early Identification

E = Early

IN = Intensive

C = Continuous

IV = Intervention

Over the last three years the strategies put in place by the school of Electronics at the University of Glamorgan has paid dividends, attrition rates have fallen from over 16% to about 8% and in addition applications for courses have increased.



## University of Plymouth (Business School)

Drop-out rates at the Business School at the University of Plymouth went to over 20% in the mid 1990s. Staff recognised that something needed to be done, but as with many university departments or schools resources (as in staff time) were limited. One way in which the staff tried to address the high drop out rate was by providing a better induction programme for first year students. Part of this induction programme included a social/academic activity that vaguely related to their subject area. The students were gathered together as a complete cohort in one of the lecture theatres and put into groups of four. Each group was then given a game of monopoly and invited to play. Interspersed with playing monopoly lecturers gave light-hearted talks on accounting and economics. Consequently students got to know other students and began to recognise lecturers in a social as well as an academic context.

The game served a number of purposes; it allowed students to begin to get to know others on their course, to form friendship groups and support networks and to recognise staff not as ivory tower academics but as a human face that would be teaching them. Evaluative feedback showed that this was a popular activity and one that helped students settle into university life.

## University of Plymouth Department of Technology

The department of technology encompasses, students from electrical engineering and from computing. A shift in emphasis on entry requirements has meant that some students have found some courses extremely difficult; it has been noted that as with many other engineering departments large numbers of students have problems with maths. Now while this is addressed through a drop in maths support situated in the library and by other teaching initiatives it was recognised that if students form support groups early on this might help them work through some of the problems.

Ian Barlow a lecturer in electrical engineering at the University of Plymouth worked with colleagues to design an induction activity called the buggy game. The idea behind the game was to encourage students to think about electronics in an informal manner, form friendship groups and become familiar with the departments laboratories and equipment early on.

In the buggy game students were put into groups of four and given the task of building an electrical buggy in their first week. As part of the task students were given a set of rules and regulations (these have needed to change each year). They were given the appropriate parts such as a motor, a battery, a switch and a remote sensor. Students were given open access to the laboratory during the first week to build the buggy. Academic staff and technical support staff were available at various times during the week to help students. At the end of the week all groups were invited back to the



main lecture theatre where each group had to demonstrate their buggy's proficiency in a competition (as set out in the rules). The winning group receive a prize of some sort (this is usually dependent upon departmental funds). If a group decides not to build a buggy they still have to attend and take part in the competition. It was felt important that all the students should be involved. The game proved to be hugely popular with the students (see pictures below).

As with the monopoly game at the Business School the buggy game serves a number of purposes linked to a good induction programme, namely it integrates students into university life, gets them talking and working together and in general helps them settle into the subject and get to know staff at an early stage.

### University of Hull "The orange tree game"

The University of Hull introduced an induction activity called the 'Orange Tree Game' (OTG). As with the two case studies discussed above the OTG was seen as much as a team-building, social activity as an academic one. Students took part in the OTG on the Friday of induction week. They were divided into groups of four and given a sheet of A3 paper, one broadsheet newspaper, a roll of sellotape and an orange.

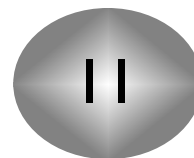
The OTG was divided into two parts. In part one, students had to design and draw a structure that would support the orange using the materials supplied, as high as possible from the laboratory floor. In part two, students had to

make the structure. Groups were marked on the design conformance of the structure and the height of the final model. The OTG took place in the engineering labs and before the game students were introduced to the rules and safety regulations of the labs. Lecturing staff were at hand to talk to, although students had to do the work themselves. The winning group were given book vouchers.

Feedback from the students showed that most (90%) felt this to be a positive activity, which they really enjoyed. In fact at the end of the first year when they were asked what they had enjoyed about university many still went back to the OTG as something memorable and fun. Some students even asked for more, similar activities to be arranged. On the whole the OTG proved popular with students and even the staff involved really enjoyed the experience. (also see Appendix).

### University of Teeside

The Business School at the University of Teeside run an extended induction that stretches well into the first semester. They identified that at induction week students were overloaded with information and probably forget more than they learnt. With this in mind the University of Teeside decided to extend some induction practices over a longer period and offer optional drop in sessions to students throughout the first semester. These sessions were linked to skills and using the university facilities such as the library and computing. While in the initial weeks this approach was quite successful it was not long before student



numbers diminished. It was found that the students left attending the optional induction classes were often the most enthusiastic ones and not necessarily those in need of help. Feedback from students suggested that if the activities were not part of the course, nor assessed then they saw no reason to continue attending.

This case study is not a success story but does offer an opportunity to consider how sometimes the best intentions are not always the most successful. Hence it is important when considering an induction strategy to include students in the process as well as staff.

## 5. Good practice guide on pre-entry and induction



This section outlines suggestions for good practice and is aimed at providing easy to use ideas for the busy academic.

### Pre entry

- o Ensure that the appropriate academic staff are involved in university open days (use staff who are enthusiastic about students)
- o If possible interview potential students prior to entry
- o Ensure that students know what will be required of them on the course they are interested in
- o Use existing students to talk to potential students about university life and courses
- o Ask students to consider why they are interested in a particular course and what is their motivation for doing the course? Good paid job, academic interest, just fancied the course; someone said it was a good course to do etc.

### Pre-entry/induction

- o Send out a personalised invitation to the make student feel welcome
- o Include a timetable of induction events. Ask the SU if they would like to include something

### Induction

- o Find a time for the students to meet with their programme leader
- o Organise an appropriate social/academic activity that helps students integrate not only into the university but also with each other. Group activities work well in this context
- o Run an orientation activity where the student has to find their way around the university and the existing area. Often fun prizes are given as an incentive to achieve this. Treasure hunts can be fun
- o Spread some induction activities over the first weeks of the term/semester; in this way students would not necessarily be overloaded with information
- o Make self assessment tests available to students and link to appropriate teaching support
- o Put information and a draft timetable of induction events on the university web pages
- o Provide a timetable with details of classes and courses as early as possible
- o Include students in the evaluation of the induction programme and pre entry practice

## 6. Concluding remarks



The above workbook is not a definitive recipe to pre entry and induction practices; rather it is more a prompt, a guidebook that offers suggestions for practical activities to help support students. This book does offer some practical advice and actual examples of activities that could be used by busy academic staff.

Cater & McNeill (1998) put forward the idea that listening to what students ask for and responding to student feedback is the key to successful transition into HE. Including qualitative evaluation and feedback from students is a sure way to identify good pre entry practice and induction strategies and attention to both these areas will help alleviate some of the problems relating to high attrition.

There is little doubt that changes to the higher education system are bringing with them new challenges for staff and students alike. By way of responding to these challenges it will be necessary for staff to make changes and adjust according to the needs of students. The above suggestions on good practice apply to this moment in time, but to keep apace of the changes that are happening it will be important for staff to develop a continual evaluation process with students and respond to the findings. This process in itself will ensure that student progression never becomes a static topic.

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## Appendix



### Induction Case Study I

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It is perhaps ironic that the one of the most crucial times in the HE career of a student is within the first few weeks at University. It is during this time that the behaviour and activity of the student sets the tone for the remaining three or four years the student spends at University. Factors that influence the integration of the student within the HE can be wide ranging and include anything from the formation of the immediate peer group through to understanding the environmental in which they find themselves to familiarisation with the formal study pattern (i.e. ranges from soft to hard issues).

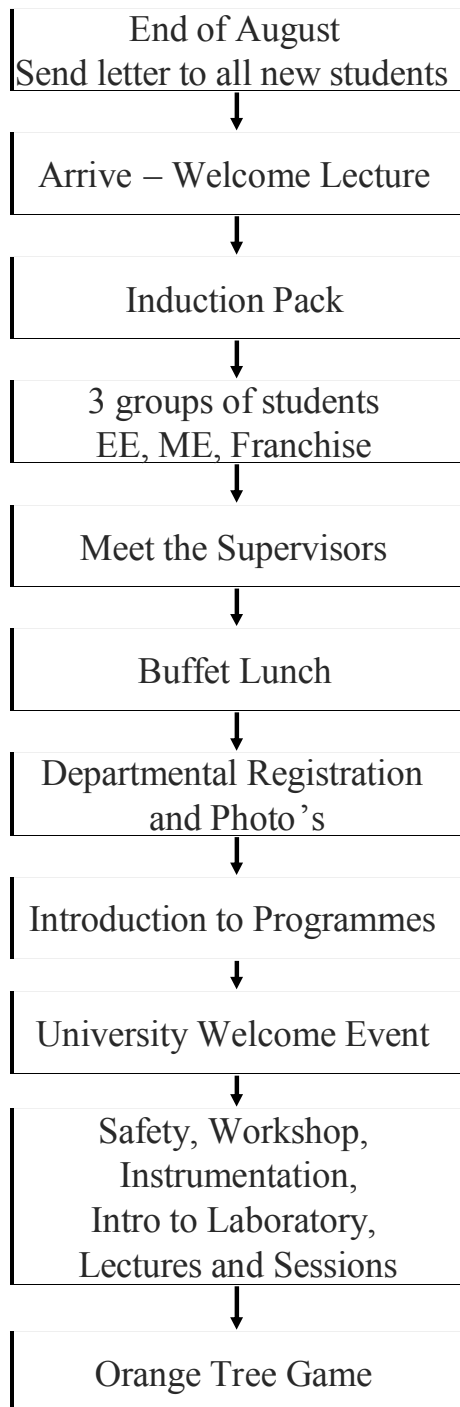
The Induction process is also continuously changing to reflect the needs of the student population in the 14-19 education system and also (and sometimes ignored) HE Institution (for example mathematics diagnostic testing). It is easy to forget that perhaps twenty years ago, the induction process consisted of standing in-line to register as a student and collect a grant cheque with perhaps the softer issues being delegated to the Student's Union. Therefore, albeit lately, there is a clear need to implement induction strategies to ensure effective student integration within the HE system which has a major effect on student progression and retention.

The Department of Engineering at the University of Hull has embarked on a path to develop evolving induction schemes over the

next few years. After an extensive review for entry in 2002, the department implemented the following induction scheme, illustrated by a simple flowchart in Figure 1, which attracted the attention of the University as showing best practice.

Once the student intake is finalised in late August, a personalised letter from the Admissions Tutor giving "joining instructions" and other additional information is sent to the new student. The first task of the student is to attend the "Welcome Lecture" given by the Admissions Tutor on the morning of the first day of semester. During the lecture the students are given an induction pack. The welcome lecture covers a wide range of issues as outlined below.

1. Welcome to the Department by Head of Department
2. Short safety talk
3. Introduction to the staff-student committee / student representatives.
4. Overview of Week 1 and what to expect.
5. Organisation of teaching in Week 2 onwards
6. Explanation of the teaching timetable and the modules, semester and credit system.
7. Contents of the Induction pack what to do with the various items.
8. University registration.
9. The benefits of the university student card, including access to library and computing facilities.
10. Booklist.
11. Question and Answer session
12. Allocation of Personal Tutors



**FIGURE 1**

Achieving the right balance in the welcome lecture is extremely difficult. On one hand, the students have already received a wealth of information and are reaching saturation level. On the other, the department clearly has a duty to impart some information at the very beginning such as the basic safety notices. The remaining activities in Week 1 are organised such that the students should flow from one activity to another and are aimed at counterbalancing the information overload with reinforcing some of the softer issues such as peer group formation. For organisational convenience, the student intake is organised in to three groups based on subject grouping in mechanical engineering, electronic engineering and those students on 4 year BEng programmes. Immediately after the welcome lecture, the students spend at least one to two hours with their allocated personal supervisor in tutor groups. These meetings have no formal agenda except from tackling immediate issues raised by the students and taking the students through the completion of any forms required by the University or Department as part of the registration process. The remaining time is given over to developing social relationships between the students or the students and the personal supervisor. The morning of the first day is then completed with all students and staff gathering for a buffet lunch and to take some time to chat and relax after the stress of meeting new people and exploring new surroundings.



### Typical Items within the Induction Pack

- Letter from HOD
- Student Registration Checklist
- Induction Week Timetable
- Uni. Induction Welcome Session
- Student Induction Checklist
- Useful Web Links
- Copy of Assessment Sheet
- New Student Record
- Student Medical Form
- Entrance Qualifications
- Photograph Form
- Room Numbers Leaflet
- University Registration Pack
- Student Handbook
- Maths Skills Practice
- Maths 4 Engineers CD-ROM
- Seminar 1 Timetable

The afternoon of the first day is devoted to the completion of the Departmental registration process where students are digitally photographed before they exchange a series of completed forms for a University registration document. At the same time, the students are given additional materials such as a student handbook, "Maths for Engineers" CD-ROM and also a Maths Skills Practice booklet. It should perhaps be mentioned here that as part of the Study Skills module, student undertake an on-line mathematics diagnostics test and so the Maths Skills Practice booklet is aimed at helping the students prepare for that test.

The second day of the new semester is given to a detail overview of the various degree programmes in subject groups by the Programme Directors. The department feels this is a very important part of the process as quite quickly the student can lose sight of the overall programme by focussing too much attention on individual modules, essential the emergent properties of the programme are brought out from the collection of modules that make up the programme. In addition, the second day of the semester also includes the University's welcome event which encompasses items such as a talk by the Vice-Chancellor; registration with doctors and dentists and an overview of the various student services available within the University.

The third and fourth day of Week 1 encompasses a range of activities to help students embrace the demands of an engineering course. For example there are sessions on workshop experience, instrumentation and laboratory safety which are evenly spread over the two days.

The final day of week 1 is given over to two equal sessions; one in the morning and one in the afternoon. The first session is a laboratory session where students aim to improve their skills such as soldering a cube or the operation of elementary items of equipment whilst not having the normal rigours of a full experimental session. Two of the main objectives of the department in this session are to orientate the students to practical demands of their course whilst developing the student's group work and social interaction with other new students. The second session aims to reinforce the latter



in an extended group exercise / team building game which we called the Orange Tree Game. The students are requested to design and then build a tower to freely suspend an orange as high off the ground as possible using only a newspaper and one roll of sellotape. During this session, academic staff are required to be on hand to offer advice and present a friendly face to the students. The exercise is competitive between teams with the winners receiving a £10 book token each. The exercise is very well received by the students most of whom in their feedback forms requested additional events along the same lines. The students felt that the exercise broke down quite a few barriers and helped them consolidate their experiences over the previous week.

The author does not present this induction model as the ideal; it is very much a work in progress. There are also many subtleties that go on in the background that make the process of induction and indeed the progression of the student smooth such as the matching up of right personal supervisor with the right tutor group (this is by no means random), the creation of the student records, the briefing of staff to the arrangements and gaining their support to be involved. The message is here is really with a little extra effort the rewards can be significant. The retention rate has improved and some of this improvement can be attributed to the increased effectiveness of induction. However, it clear has to be emphasised that there is a need to adopt and change with time. For example, in the longer term, the aim is for the induction scheme to evolve to meet the needs of the various participants (students, HE institution, parents, employers, etc.). For

example, one key aim of the induction process above the normal requirements is to provide the students with a full range of resources such a suite of software such as CAD, mathematical support and various computer-aided learning packages). To illustrate the point about other participants, we also run a Family Open Day in November for first years which has been very well received by students and their families and has the result of creating a more relaxed environment for all concerned. One last point that perhaps should also be mentioned is the additional needs of overseas students. To accommodate their concerns we run a special session over lunch where issues particular to the UK educational system can be discussed or any particular needs for the current cohort identified.





## Induction Case Study 2

Mr Ian Barlow  
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### *“Head banging buggies preferable to head banging students”*

My department (Electronic, Communication and Electrical Engineering at the University of Plymouth) offers a wide variety of undergraduate programmes from 'traditional' BEng engineering courses to 'new' BSc programmes in media and internet technologies. It goes to considerable pains, as do many others, to attract new students onto them. In summer 2000 I made a critical appraisal of what we had done in recent years, having persuaded students to join our courses, to welcome them when they first arrive.

New students were instructed to arrive up to a week in advance of the start of the academic term, given a brief introductory talk and then enrolled - essentially a form filling and fee paying session. They were then given an induction week timetable detailing them to arrive at particular locations at scattered times during the induction week to receive various talks: Students' Union, library, welcome from Head of Department, administration, student services. The week was largely empty and the students left to their own devices. In some years an evening 'meet the staff' social event had

been laid on but these seemed to have been abandoned after one small group of students had enjoyed themselves rather too much on a boat trip (booze cruise) up the river Tamar.

It was clear to me that for many students our induction week efforts were counter productive; far worse than having no induction period at all. Those students who were local students, or who had arrived with friends, or who were unusually outgoing simply spent the week partying. Many others tended to 'hide' for a week and felt at a loss, bored and homesick. In both cases it was a poor preparation for the following week when we expected students to settle enthusiastically into good work habits.

What exactly was wrong with what we were offering?

1. There was no opportunity for students to get to know each other or staff for although they were meeting together for specific talks, these were occasions when they were expected to listen.

2. Although useful (in some cases essential) information was conveyed in the introductory talks they give students little opportunity to participate or to think for themselves and must have seemed to many to be a sad foretaste of their university experience.

3. There was simply too much 'white space' in the timetable. Students who arrive, enthusiastic and raring to go (we cynical academics probably underestimate the number of freshers in this category) cannot fail to be disappointed by being told to amuse themselves for a week.



Our hard won new students needed to be given something interesting and challenging to do during induction week. I had in mind something along the lines of 'build a crane/bridge with matchsticks' but with an electrical/electronic connection. Designing a suitable task proved to be in itself a challenge for staff. Informal discussions with academic colleagues produced a large number of suggestions most of which were pitched at the knowledge and resource level of a final year undergraduate project. I drew up a check list of requirements for a suitable task, it must:

1. Be achievable without prior knowledge in about three days by groups of four students.
2. Have a competitive element to provide motivation.
3. The competition must be decideable on the basis of a simple measure (ie a count or a time) and must not require 'judging' by staff.
4. Ideally have an 'electrical' theme.

Discussions with technical staff proved more fruitful than those with academics. Consideration of simple electrical/electronic components led to the idea that it might be reasonable to expect our new students to build a switch which led to a search for a suitable application for the switch and the idea that it could be used to reverse the polarity of connections to an electric motor and that if the motor and switch were mounted on wheels, the switch itself could be activated by hitting something. The name 'head banging buggy' quickly followed and the competition

would be won by the team whose buggy 'banged' - reversed direction - the greatest number of times in 30 seconds when placed between two 'walls' about one metre apart.

A prototype was built to confirm that the task was feasible given the time and knowledge constraints and to check the costing. Items bought in were a variety of wheels, cogs, axles, pulleys, a simple dc motor and battery. Glue and sticky tape and 'junk' items were also needed. The estimated cost was about £3 per buggy - less that £1 per student.

A table consisting of a board surrounded by low walls was constructed. A set of rules was drawn up. We considered the possibility that some innovative students might realise that a long buggy, just short of the 'pitch' length would have an advantage and we debated whether to phrase the rules so as to forbid this. Our decision then was to phrase the rules in as open a fashion as possible with the aim of encouraging innovation. This proved to be startlingly a fruitful.

At the start of induction week when students arrive and enrol I construct a list of student names and place of origin and then divide them into groups of 4 mixing them up as much as possible, one of the main aims of the exercise being to break down barriers and encourage them to get to know each other. They are then given the rules and a briefing on the competition including a demonstration of the prototype but little or no information about how to proceed. It is made clear during the briefing that the main aims of the exercise are to enable the new students to get to know each



other and the staff and to have some fun.

The rules for the first buggy competition:

#### DEPARTMENT OF COMMUNICATION AND ELECTRONIC ENGINEERING

INDUCTION WEEK SEPTEMBER 2000

#### HEAD BANGING BUGGIES - THE CHALLENGE

To design an autonomous buggy from basic components provided or scrounged, which will travel continuously between two, fixed parallel walls.

The buggy is to be self contained without external connection of any kind for power or control.

#### BUGGY SPECIFICATION

The buggy is to use the single HI-Torque miniature DC motor provided.

The buggy is to be powered by a single AA battery.

The buggy is to be completely autonomous and free from human intervention after release.

#### COMPETITION PLATFORM SPECIFICATION

The competition area will be a raised table with a distance of approximately 1200mm between walls each approximately 70mm high.

#### COMPETITION RULES

Each team will designate a buggy handler.

Only the buggy handler may place the buggy on the competition table or touch the buggy once the timed run has started.

Each touch by the handler after the start of the run will count as a penalty point to be subtracted from the total point's score.

The buggies will be placed in the centre of the competition area facing either of the walls.

When ready the handler will start the buggy at the starters signal.

The timed run will last for 30 seconds with one point awarded for each touch of a valid wall, including the first wall.

Competitors are expected to come to the table ready to commence the timed run.

The judge will impose a time limit if set-up appears to be taking too long. The teams will be allowed a repeat attempt at the judge's discretion.



The induction week timetable now looks much as it has always done with the various introductions and talks scattered through the week but now all the gaps are filled with 'Buggy build.' Students are given free access to a laboratory during the week where they have space to work and where materials and simple tools are available. They are told that at the end of the week there will be a competition and that each group must demonstrate its buggy - even if all that exists is a 'pile of bits.' There is no formal staff supervision but staff are on hand to ask helpful questions ("What happens if you connect the battery to the motor the other way around?") when groups appear stuck.

In the event the majority of groups of students managed to produce a functional machine but with a wide range in performance. The majority opted for a design based on a switch along the lines of our original conception. What was very surprising and gratifying was the originality displayed by several groups. Some buggies were very long as we anticipated that they might be. We had not anticipated however, that two such groups would dispense completely with a

switch and instead mount the motor with its axis vertical and mount a weight eccentrically on it causing the buggy to vibrate back and forth once for each rotation of the motor spindle. One of these was operational and won the competition with in excess of 200 hits (the nearest rival being around 30 hits.) for a design based on a switch along the lines of our original conception.

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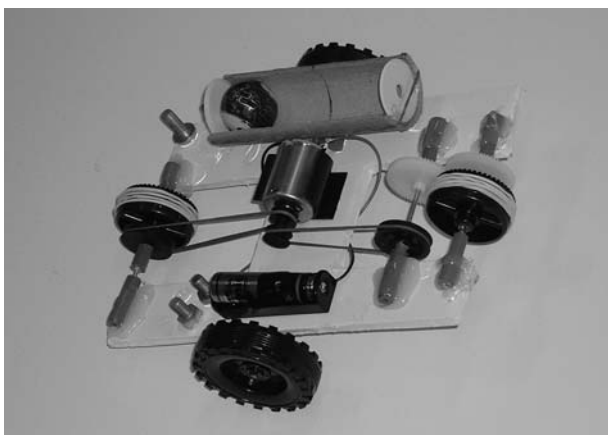


They're off!

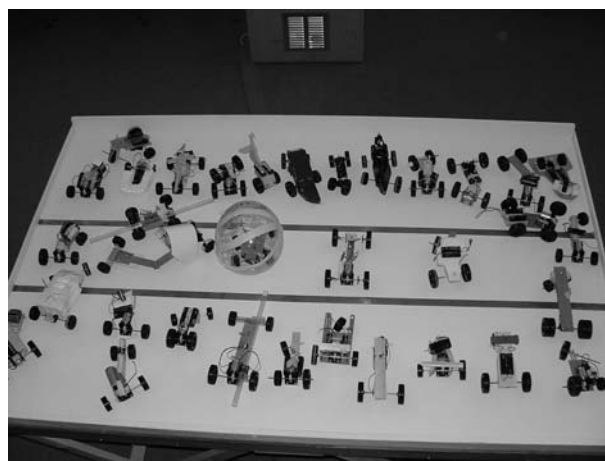


The long buggy with vertically mounted motor (not visible) achieving &gt; 200 hits

Another group had two drive wheels permanently rotating in opposite directions but with only one of them in contact with the ground at any time. When the buggy hits the wall a marble rolls along a tube under its residual momentum thus tilting the buggy onto the



other drive wheel and so reversing its direction of travel.



A table of buggies from 2002

It was heartening to see such innovative thinking coming from our new students and was such a pleasing aspect of the exercise that we decided to try to foster it in subsequent years. This, of course, requires a new task each year otherwise the best ideas would simply propagate down the grapevine and be recycled from year to year. Creating a new task each year is proving to be a challenge for staff.

Any appraisal of the success of such a venture as this must of necessity be subjective and anecdotal but any visitor to the laboratory during induction week or to the final competition event cannot fail to be impressed by the enthusiasm and good humour of the students working on this task. It is difficult to quantify what effect it may have on our progression rates but we feel it can only be beneficial.