



# Outduction: Enhancing the Final Year Experience

## Who are the final year in EDT?

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### Abstract

This mini-project is concerned with the statistical analysis of the final year within the School of Engineering, Design & Technology (EDT) at the University of Bradford. It firstly aims to answer the question posed in the title as due to the different degree courses (BEng, MEng, BSc, sandwich courses) and the way EDT works there is not a simple answer to this question. It then extends the analysis to look at the performance of the identified cohorts within the school to see if the perceived perceptions of academics are true:

- Industrial placements enhance student performance
- Direct entry students perform comparatively worse than students who do their entire degree course at Bradford
  - In particular students who are direct entry to stage 3 perform poorly
- Foundation year students perform as well as the students who came into Stage 1.

The results showed that students who undertake an Industrial Placement are more likely to get a 1<sup>st</sup> or 2.1 than those who do not. This is consistent across the accredited and non-accredited courses. The direct entry students on accredited courses perform as well as those entering at Stage 1 contrary to the perceived opinion in EDT. However for non-accredited courses the direct entry students tend to perform worse as is the perceived opinion. Again for students from the foundation year, those on accredited courses perform as well as students who enter at other stages of the course, but those on non-accredited courses tend to perform worse.

Overall the results show that the perceptions of academics in EDT are borne out for industrial placements across all courses, for foundation year entrants on accredited courses and for direct entrants on non-accredited courses.

## Introduction

This mini-project is about what makes up the final year within the School of Engineering, Design & Technology (EDT) at the University of Bradford. Within the school we have a number of qualifications across various disciplines as well as a number of entry points to our undergraduate degrees. This means we have a diverse set of students who can be classed as final years. This includes the split between accredited and non-accredited courses, as well as between entry points (Foundation, Stage 1, Stage 2 & Stage 3) and students who do a placement year in industry.

The aim of this project was to analyse the performance of the various cohorts who make up the EDT final year. In order to meet this aim a number of objectives were defined:

1. Classify the final year into different cohorts:
  - a. By programme team
  - b. By degree programme
  - c. By entry point to course
  - d. Students who did an industrial placement
2. Analyse performance of the identified cohorts
3. Compare the effect on performance of:
  - a. Industrial placements
  - b. Direct entry at stage 2 and stage 3
  - c. Foundation year entry

The ultimate aim of this project is to investigate statistically a number of perceptions that academics within EDT hold:

1. Industrial placements enhance student performance
2. Direct entry students perform comparatively worse than students who do their entire degree course at Bradford
  - ◇ In particular students who are direct entry to stage 3 perform poorly
3. Foundation year students perform as well as the students who came into Stage 1.

The mechanism for meeting these aims was to analyse the Board of Examiner spreadsheets for the past two academic years (2009/10 & 2008/9) identifying students who fall into the various categories.

## Background

The School of Engineering, Design & Technology at the University of Bradford was formed in August 2002 when the various departments of engineering across the university were amalgamated into one school. There is a 'flat' management structure with separation of courses from modules by the way of a matrix approach with eight programme teams (roughly corresponding to the various branches of engineering, with technology & design) and seven subject groups (for modules). For the majority of courses, students take modules from across a number of subject groups and from other schools within the university, including the School of Management and the School of Computing, Informatics and Media. This enables the school to use the synergies between the various disciplines. In addition to provision at Bradford, there is a longstanding collaborative provision at INTI International University in Nilai, Malaysia and INTI College in Penang Malaysia in the field of electronic and electrical engineering as well as more recently mechanical and civil engineering. There are a number of direct entry second (& increasingly third) year students from these institutions.

For this project it is the programme teams that are important as these are the bodies that hold Boards of Examiners and define what degree a student is awarded. The eight programme teams within the school are:

- Foundation Programmes: for students on foundation year – no degrees awarded.
- Civil Engineering: one BEng/MEng course.
- Chemical Engineering: one BEng/MEng course – re-started in 2010/11 so as yet no students in final year.

- Design: two BSc courses.
- Electronics & Telecommunications: two BEng/MEng courses.
- Mechanical & Automotive Engineering: two BEng/MEng course and one BSc course (now withdrawn).
- Medical & Healthcare Technology: one BEng/MEng course and one BSc course.
- Technology Management: two BEng courses and two BSc courses.

For the purposes of this project only six programme teams were considered as the Foundation Programmes offers no degree award and Chemical Engineering has only recently re-started. As can be seen from the data above, this means that students in their final year from 8 BEng, 6 MEng and 6 BSc courses were considered. It is also worth mentioning that all BEng and MEng programmes within the school are accredited via the relevant professional institutions as either part of full credit for the academic portion of the chartered engineer qualification.

It was considered important to try to quantify what makes up a 'final' year within EDT as due to the existence of undergraduate Masters courses, it is actually difficult to actually define what the 'final' year is. Typically within the sector the final year is considered to be Stage 3 of the degree – or the stage in which the major project is undertaken. However the MEng students within EDT do the same Stage 3 as the BEng students but then go onto a Stage 4 which consists of a mixture of inter-disciplinary modules and subject-specific modules which are normally part of one or MSc courses as well.

## Methodology

The method used to get the results for this mini-project was simply a pure analysis of the pass lists produced from the board of examiners in June 2009, September 2009, June 2010 and September 2010 – with additional information from relevant Chairs Actions. The students were all checked individually via the e-vision system to determine at what point they entered the course (foundation, stage 1, stage 2 or stage 3) and whether they did an industrial placement or not. It was also determined what students were doing a top-up year. These are students who entered stage 3 at ordinary level and opt to do a further year's study to top-up their ordinary degree to honours by clearing any outstanding credits at stage 1 and stage 2, and doing a further 40 credits worth of modules at stage 3.

**The results were analysed using Microsoft Excel – each programme team has its own spreadsheet that breaks the cohort down by grade and by the various groups: entry stage, industrial placement and MEng. It is worth noting that for Stage 3 MEng students a fall-back award of a classified BEng is identified and for stage 4 MEng students within the scope of this project were awarded a dual award of a classified BEng and a MEng either at distinction, merit or pass level. A screenshot of the spreadsheet for the**

**Mechanical & Automotive Engineering Programme Team for the board in June 2010 is shown in**

	A	B	C	D	E	F	G	H	I
1	Jun-10		F	IP	MEng	MSc	DE2	DE3	TOPUP
2	BENG								
3	1	14	2	1		5	2	5	
4	2.1	17		3		1	3	1	
5	2.2	7		1		2	1	1	
6	3	1							
7	Took Ord	2	1				1		
8	RES H	11	2	3			3		
9	DD	2							
10	ORD	8					4		1
11	RES O	5					1		
12	MENG D	2		1				1	
13	DW	1							
14	W	1					1		
15	<i>Total</i>	<i>70</i>	<i>5</i>	<i>9</i>	<i>0</i>	<i>8</i>	<i>15</i>	<i>8</i>	<i>1</i>
16	<i>Total P</i>	<i>51</i>	<i>3</i>	<i>6</i>	<i>0</i>	<i>8</i>	<i>11</i>	<i>8</i>	<i>1</i>
17	<i>Total B H</i>	<i>39</i>	<i>2</i>	<i>5</i>	<i>0</i>	<i>8</i>	<i>6</i>	<i>7</i>	<i>0</i>
18	<i>Total ME</i>	<i>2</i>	<i>0</i>	<i>1</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>1</i>	<i>0</i>
19	<i>Total Ord</i>	<i>10</i>	<i>1</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>5</i>	<i>0</i>	<i>1</i>
20									
21	BSC								
22	1	2					1		
23	2.1	1							
24	2.2								
25	3								
26	RES H	1		1					
27	DHE	1							
28	<i>Total</i>	<i>5</i>	<i>0</i>	<i>1</i>	<i>0</i>	<i>0</i>	<i>1</i>	<i>0</i>	<i>0</i>
29	<i>Total P</i>	<i>3</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>1</i>	<i>0</i>	<i>0</i>
30	<i>Total B H</i>	<i>3</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>1</i>	<i>0</i>	<i>0</i>

Figure 1.

The various columns are as follows:

- A: results where Took Ord indicates students who were on Honours but elected to leave with ordinary degree; RES H is results for Honours; DD is decision deferred; ORD is ordinary degree; RES O is results for Ordinary; MENG D is MEng with distinction; DW is deemed withdrawn; W is Withdrawn and DHE is Diploma of Higher Education (failed stage 3).
- B: Total number of students in each category in column A.
- C: Number of students from Foundation year.
- D: Number of students who did industrial placement.
- E: Number of Stage 3 students who are going onto MEng Stage 4 in academic year 2010/11.
- F: Number of students who proceeded to an MSc course within EDT in academic year 2010/11.
- G: Number of students who entered at Stage 2.
- H: Number of students who entered at Stage 3.
- I: Number of students doing a top-up year.

It is worth noting that the data in column F is for the mini project EDT Project 2: Transition to Postgraduate Studies.

Once all six programme teams had been analysed the results were combined to give some overall statistics as reported in the next section.

	A	B	C	D	E	F	G	H	I
1	Jun-10		F	IP	MEng	MSc	DE2	DE3	TOPUP
2	BENG								
3	1	14	2	1		5	2	5	
4	2.1	17		3		1	3	1	
5	2.2	7		1		2	1	1	
6	3	1							
7	Took Ord	2	1				1		
8	RES H	11	2	3			3		
9	DD	2							
10	ORD	8					4		1
11	RES O	5					1		
12	MENG D	2		1				1	
13	DW	1							
14	W	1					1		
15	<i>Total</i>	70	5	9	0	8	15	8	1
16	<i>Total P</i>	51	3	6	0	8	11	8	1
17	<i>Total B H</i>	39	2	5	0	8	6	7	0
18	<i>Total ME</i>	2	0	1	0	0	0	1	0
19	<i>Total Ord</i>	10	1	0	0	0	5	0	1
20									
21	BSC								
22	1	2					1		
23	2.1	1							
24	2.2								
25	3								
26	RES H	1		1					
27	DHE	1							
28	<i>Total</i>	5	0	1	0	0	1	0	0
29	<i>Total P</i>	3	0	0	0	0	1	0	0
30	<i>Total B H</i>	3	0	0	0	0	1	0	0

Figure 1: Example Spreadsheet from Excel

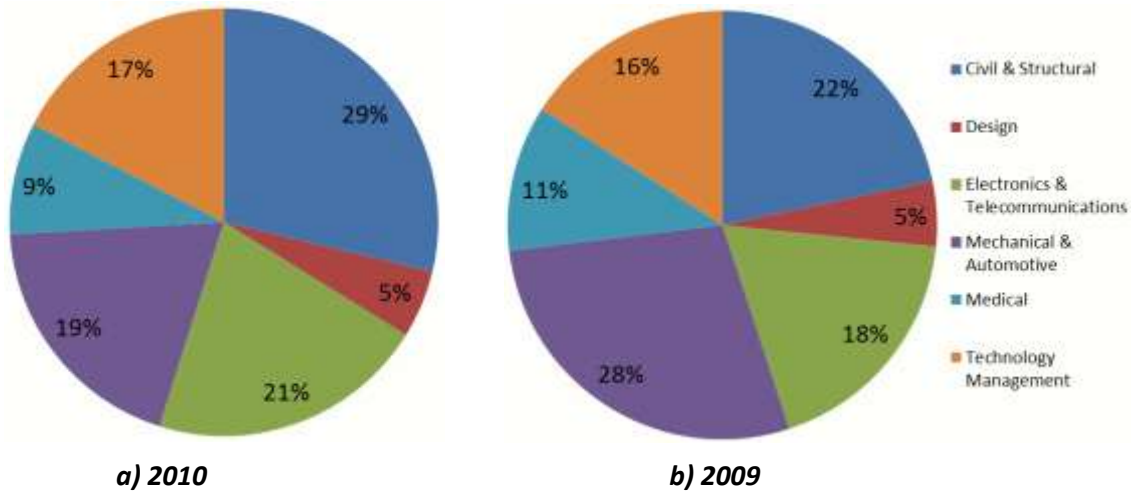
## Results

The results are presented in terms of the objectives laid out in the Introduction to this report. So the first section looks at the actual make-up of the final year in terms programme team, course, entry point and industrial placements. The second section presents the performance of the various cohorts and compares the performance of the cohorts.

### Make-up of the 'Final' Year in EDT

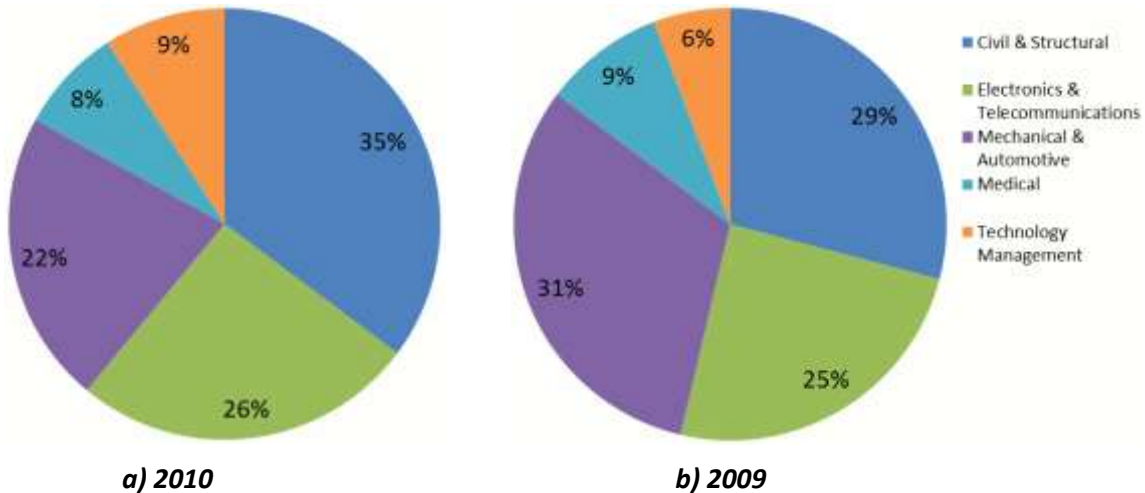
#### *By Programme Team*

The first method of analysing the make-up of the final year is by the six programme teams considered for this study. It is useful to do this to see where the majority of students are studying, both on the accredited (engineering) programmes and the non-accredited BSc programmes.



**Figure 2: Students by Programme Team**

Figure 2 shows the breakdown of the pass lists for all stage 3 & 4 students (whether the student passed or not) by programme team. As can be seen the major variations between the years is that in 2009 the greatest number of students were on Mechanical & Automotive courses, whereas in 2010 the largest number of students were on Civil & Structural Engineering courses.



**Figure 3: Accredited Students by Programme Team**

Looking at Figure 3 which shows the breakdown of students on accredited (BEng or MEng) courses it can be seen that students from the Civil & Structural, Mechanical & Automotive and Electronics & Telecommunications programme teams make up the vast majority of students on accredited courses. It is worth noting that for both Civil & Structural, and Electronics & Telecommunications programme teams only accredited courses are offered.

Figure 4 shows that on the BSc courses, it is the courses within the Technology Management programme team that make up the vast majority of the students. The students from the Mechanical & Automotive courses make up a decreasing proportion of these students and indeed now there is no BSc within this programme team. The total number of non-accredited courses within EDT has fallen from around ten at its peak to only five courses recruiting today, compared to nine BEng and seven MEng accredited courses plus the Foundation Year.

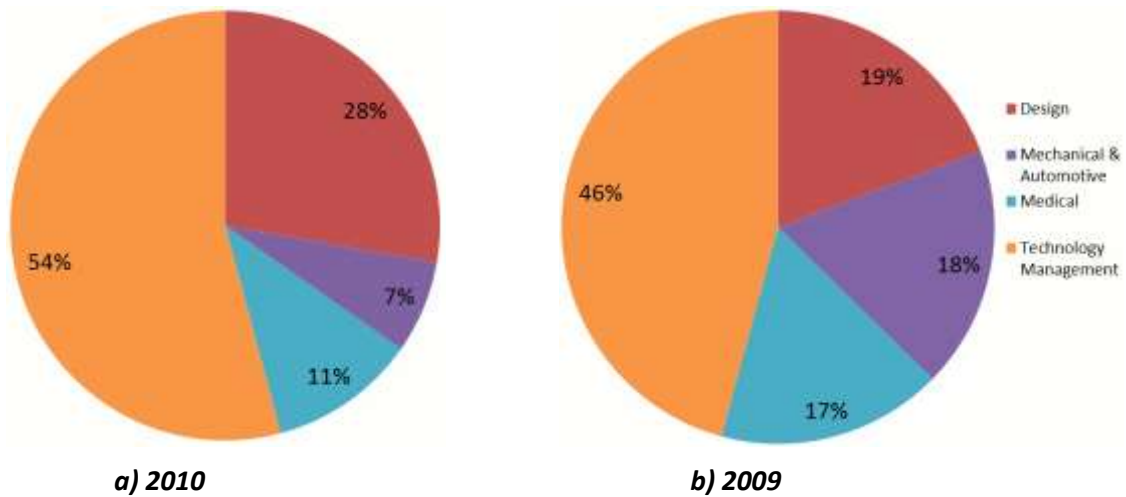


Figure 4: Non-Accredited Students by Programme Team

### By Course

The second way of analysing the EDT 'final' year is by the type of course the students are on. This basically separates the students into category by course: BEng, MEng Stage 3, MEng Stage 4, Top-up and BSc. Figure 5 shows that the proportion of the 'final' year on accredited courses (BEng, BEng Top-up & MEng) increased between 2008/9 and 2009/10. This is in line with the fact that the school is generally moving to a situation where all degree courses will be accredited in the future. It is interesting to note that over 90% of the students in 'final' year are on Bachelors courses. However on the basis of the small sample an increasing number appear to be doing the MEng course which completely fulfils the academic requirement for chartered engineer (CEng) status.

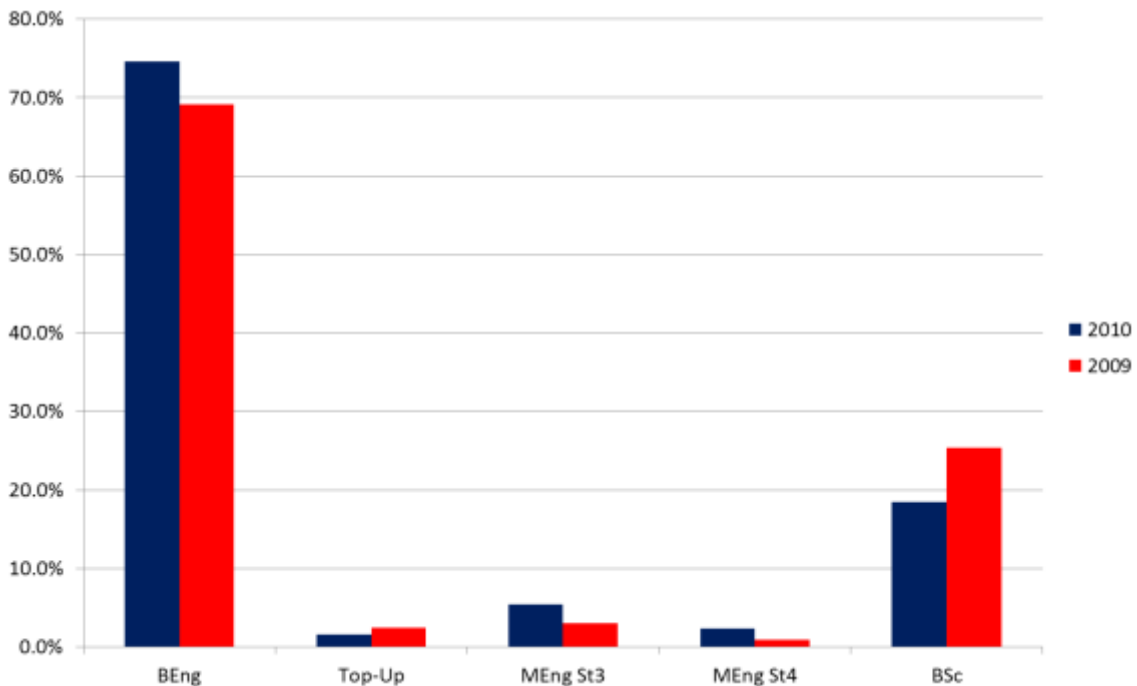
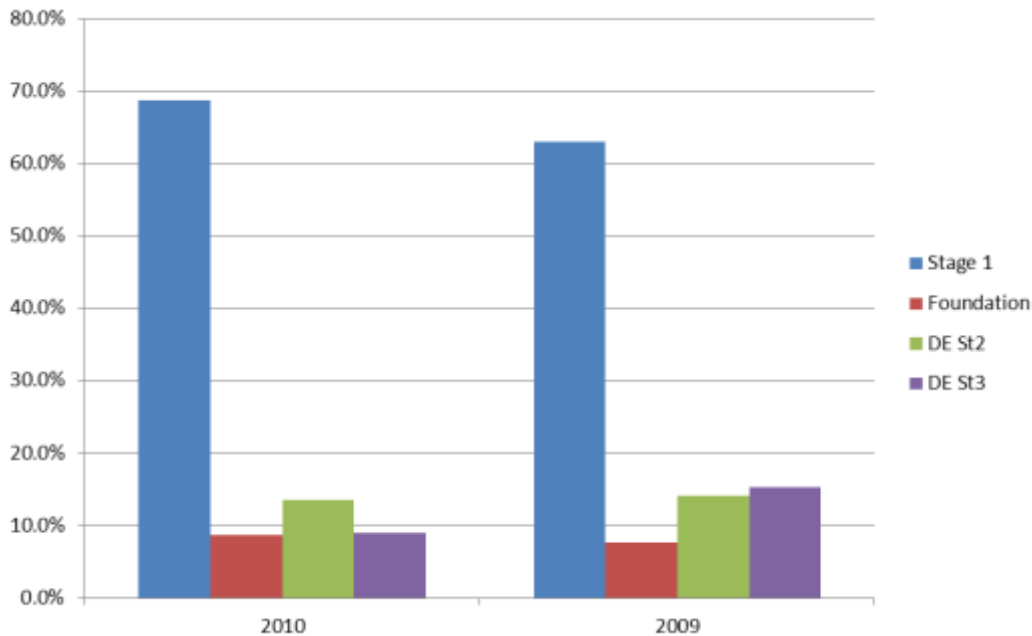


Figure 5: Breakdown by Type of Course

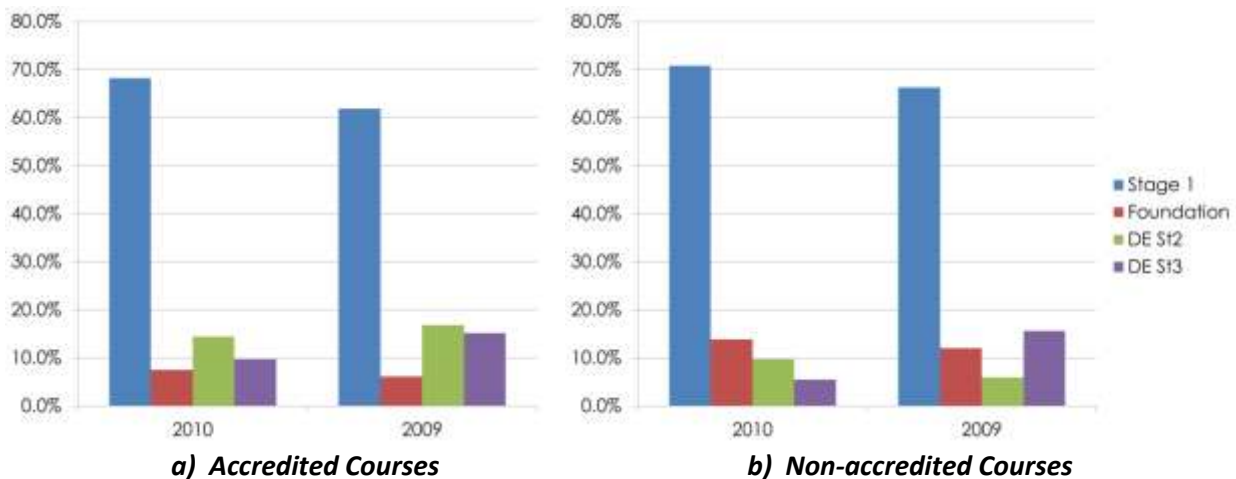
### By Entry Point to Course

The third way of analysing the 'final' year is by entry point to the course; that is did the student enter via the foundation year, at stage 1, stage 2 or stage 3 of the course. Typically the sector norm is for most students to enter at Stage 1. Figure 6 shows that although most students on the stage 3 & 4 pass lists do enter the course at Stage 1, a significant portion do enter either via the foundation year or at a later point in the course. Comparing the accredited to non-accredited courses as shown in Figure 7 it can be seen that there tends to be a similar proportion of students that enter at Stage 1, but on the whole more direct

entrants to the accredited as opposed to the non-accredited courses. A greater proportion of entrants to the non-accredited courses appear to have at least attempted foundation year, but will have not achieved the enhanced pass (55%) required for entry to an accredited programme.



**Figure 6: Breakdown by Entry Point**



**Figure 7: Breakdown by Entry Point**

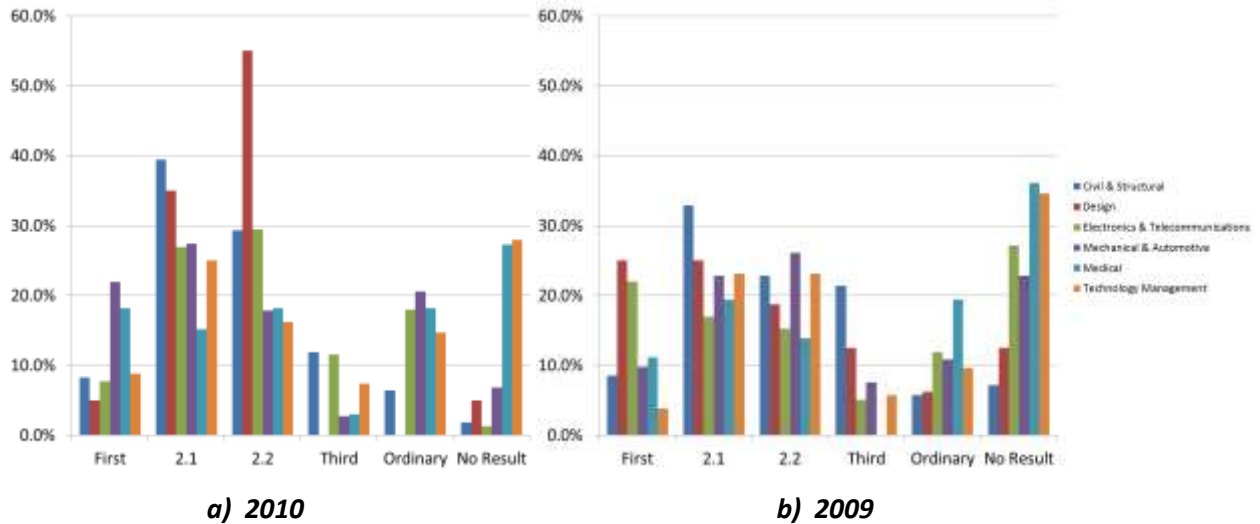
**Industrial Placements**

The statistics for the proportion of students within ‘final’ year who did a placement are that in 2010 12.6% of students undertook a placement and in 2009 12.8% of students did a placement. It is interesting to note that if you exclude ineligible students (direct entry stage 3), then in 2010 13.8% of students had done a placement, whereas in 2009 15.2% had done one. This difference will be down to the larger proportion of stage 3 direct entrants in 2009.

**Analysis of Cohort Performance**

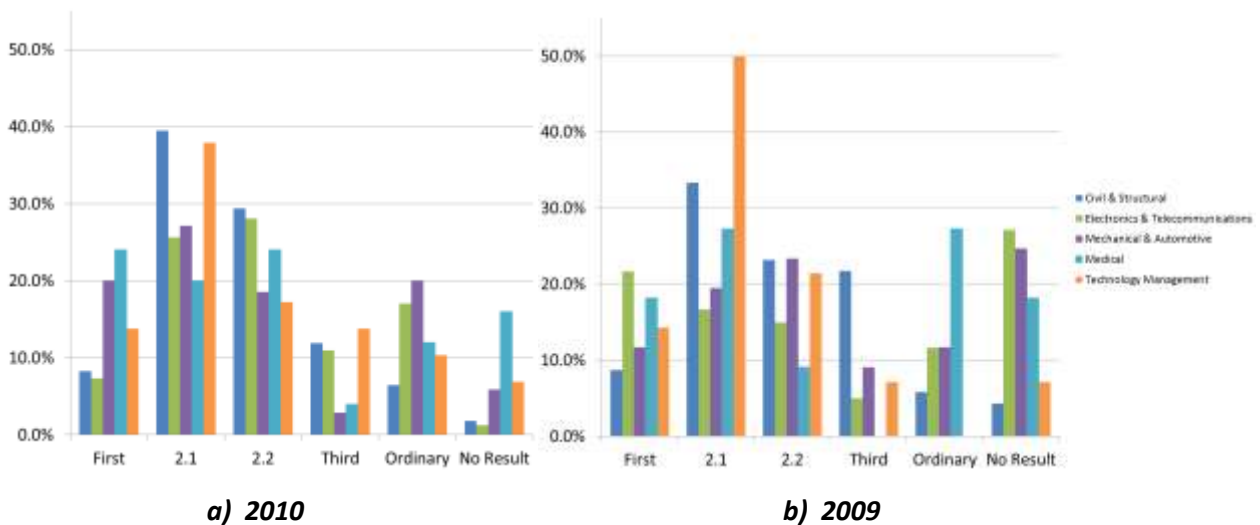
This section takes the students as broken down in previous section and looks at their performance in terms of the degree awarded (First, 2.1, 2.2, Third, Ordinary). No Result indicates student either left with lower qualification (DHE, CHE) or was given further resits to do. The MEng stage 4 results are mentioned in the text as the cohort is too small to display on the graphs.

**By Programme Team**



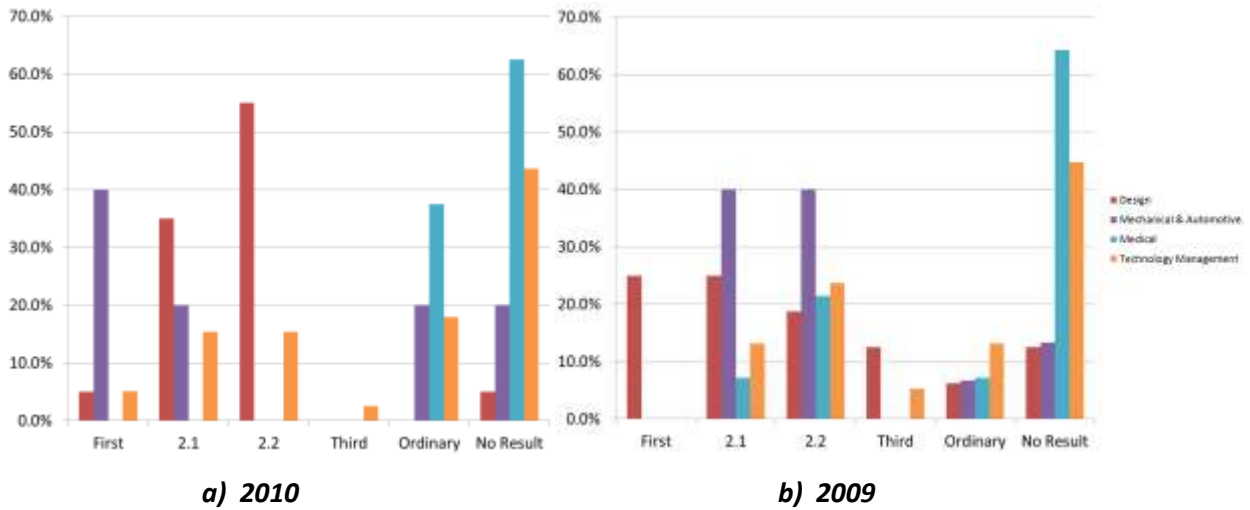
**Figure 8: Breakdown of Bachelors Results by Programme Team**

From Figure 8 it can be seen that the performance across programme teams varies from year to year as would be expected and there is no significant impact of having done a degree in one programme team as opposed to another. This is what would be expected. Noticeably in the Design Programme Team it is rare to get an ordinary degree. Indeed in 2009 only one student did and no-one did in 2010. This is probably in part due to the small cohort size (smallest) and the fact that sixty credits of their final year mark comes from project work as opposed to the 30 credits for all other courses. Anecdotal evidence tells us that students tend to do well in their project work as they engage with it and enjoy the independence of the projects.



**Figure 9: Breakdown of Accredited Course Results by Programme Team**

It is interesting to break these results down further into accredited (Figure 9) & non-accredited courses (Figure 10). It can be seen that with the exception of students in the Design Programme Team students on accredited courses tend to perform better overall than students on non-accredited courses. This could be as a result of a number of factors, including entry qualifications, motivation, suitability of course etc which require further investigation



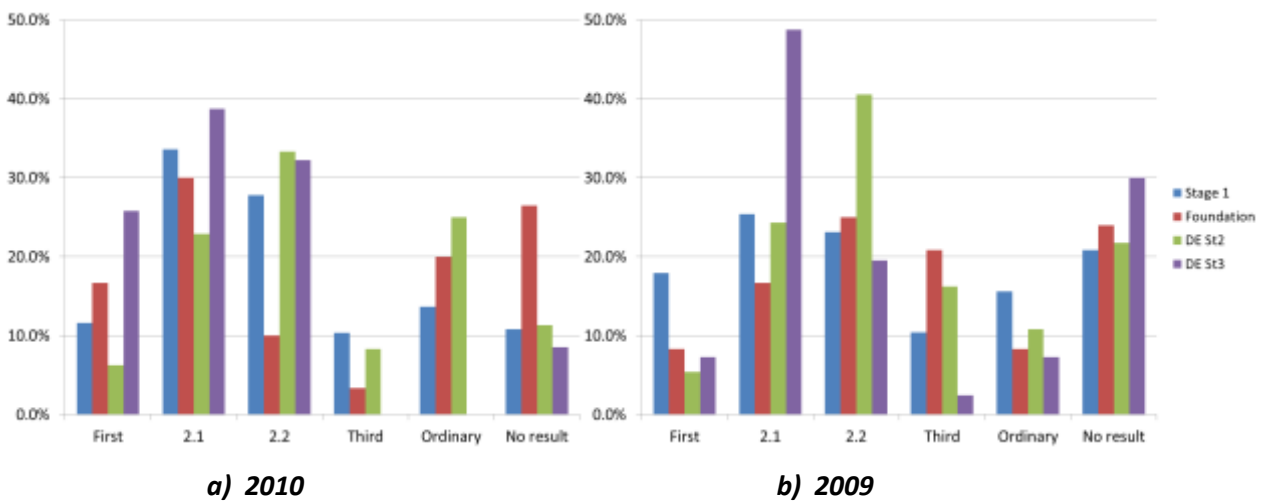
**Figure 10: Breakdown of Non-accredited Course Results by Programme Team**

In two years analysed, there were only 9 students in 2010 and 3 students in 2009 on the MEng Stage 4. These were spread across Civil & Structural (3 in 2010 and 2 in 2009), Electronics & Telecommunications (4 in 2010 and 1 in 2009) and Mechanical & Automotive (2 in 2010) Programme Teams. The breakdown of the results for these students (MEng with Distinction, MEng with merit, MEng) can be seen in Table 1. In 2010, over half the students got a distinction, a third got a merit and 1 obtained a basic MEng, whereas in 2009 (much smaller cohort) only 1 student gained a merit and the others all got plain MEngs. No really useful information can be gained from this small sample of students who study alongside postgraduate taught students on all of their modules.

**Table 1: MEng Results by Programme Team**

	2010			2009		
	MEng D	MEng M	MEng	MEng D	MEng M	MEng
Civil & Structural	1	2			1	1
Electronics & Telecommunications	2	1	1			1
Mechanical & Automotive	2					

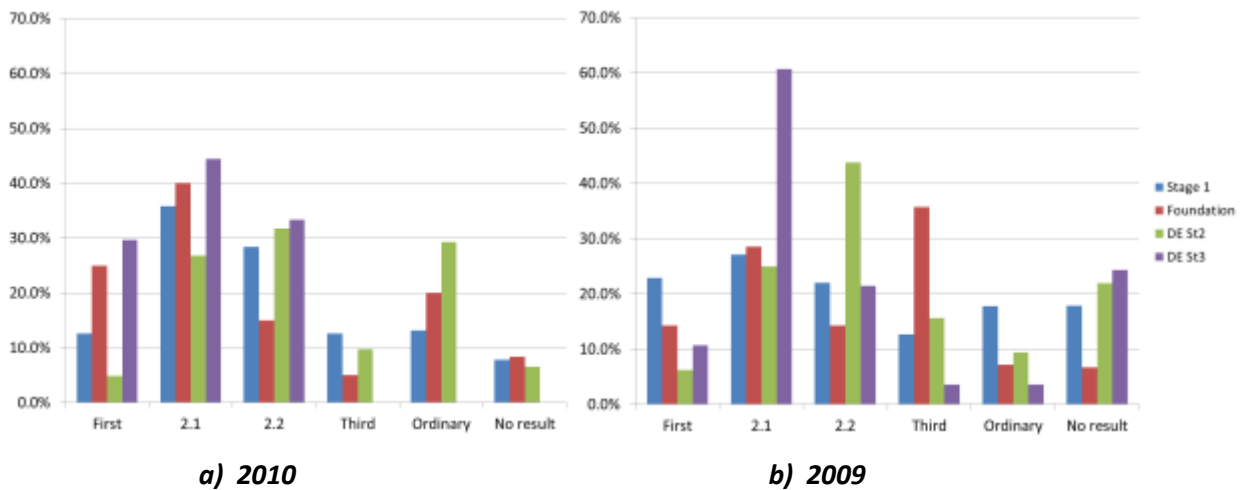
**By Entry Point to Course**



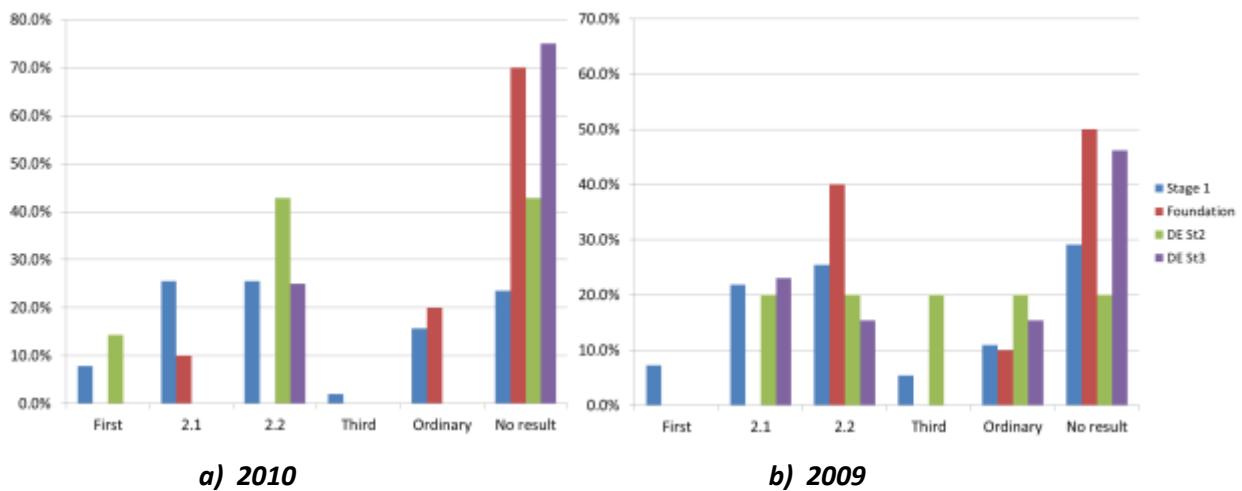
**Figure 11: Breakdown of Bachelors Results by Entry Point**

Figure 11 shows the results analysis for all students in the school. You can clearly see that entry point has very little effect on what result a student enters on as the variation between the years is significant. Of

more interest is the data shown in Figure 12 and **Error! Reference source not found.** which show the result analysis by entry point for accredited and non-accredited courses.



**Figure 12: Breakdown of Accredited Results by Entry Point**



**Figure 13: Breakdown of Non-accredited Results by Entry Point**

It is easy to see that for the accredited courses the performance of the students who entered from the foundation year with an enhanced pass is similar, if not slightly better in terms of proportion of student who get the higher classified degrees (First & 2.1) to that of the students who enter at Stage 1. This is not the case for the non-accredited courses where students could well have come into a BSc course without passing the foundation year as they may well have been doing the foundation year to try to gain entry to an accredited course but may already meet requirements for entry to a non-accredited course.

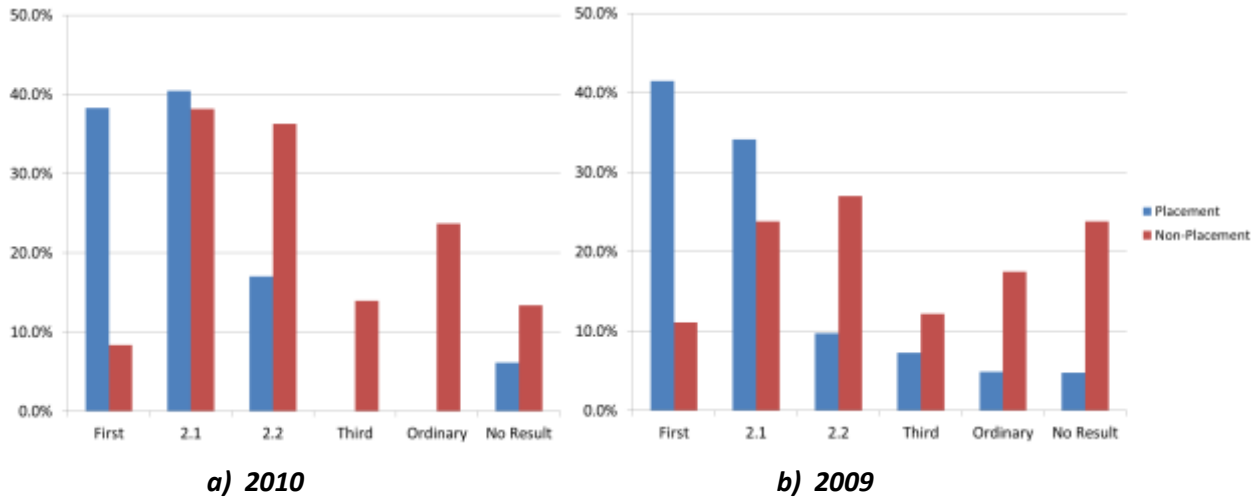
Of particular interest is that, contrary to the general perception of academics within EDT, direct entry students do not perform considerably worse to other students. Indeed the students who came into an accredited course at Stage 3 in 2010 actually performed better than the rest of their cohort, although once again the opposite is true for students on non-accredited courses. The effect of direct entry within the school is explored further in another EDT mini-project.

In two years analysed, there were only 9 students in 2010 and 3 students in 2009 on the MEng Stage 4. Table 2 shows the breakdown of the results by entry point to the course. Again there is no significant difference between results for each entry point, but as stated earlier it is difficult to draw any statistical significance from such a small sample. It is encouraging to see that in 2010 students from every point of entry to the course continued on to do the MEng which normally requires a average of a 2.1 grade in Stage 3.

**Table 2: MEng Results by Entry Point**

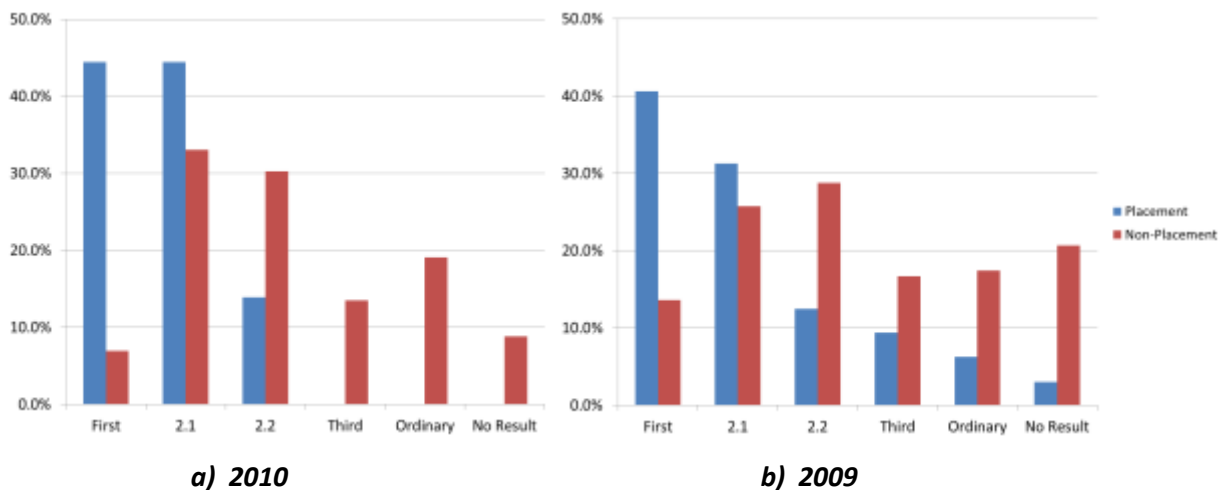
	2010			2009		
	MEng D	MEng M	MEng	MEng D	MEng M	MEng
<b>Stage 1</b>	3	1	1		1	2
<b>Foundation</b>	1					
<b>Direct Entry Stage 2</b>		1				
<b>Direct Entry Stage 3</b>	1	1				

**Industrial Placements**



**Figure 14: Overall Bachelors Degrees & Placements**

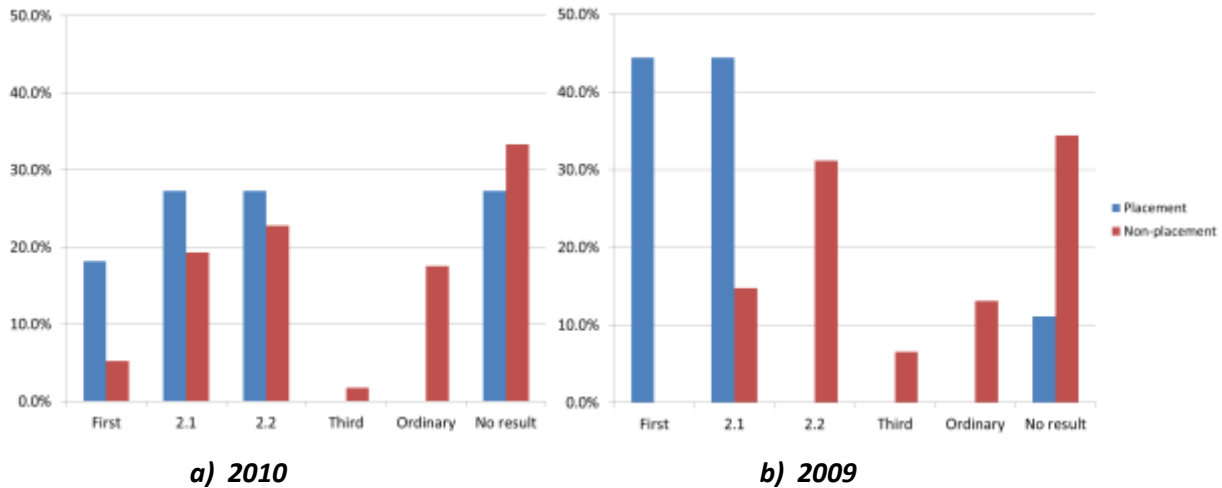
The data in this section excludes all data for students who are direct entrants to Stage 3 as these students are not eligible for a placement. The sandwich courses within EDT have the placement between Stages 2 and 3. Figure 14 shows the comparison of results for Bachelor degrees between students who did an industrial placement and those who did not. It is clear to see that those who did a placement tend to have on average higher results than those who did not.



**Figure 15: Accredited Courses & Placements**

Looking at Figure 15 for accredited and Figure 16 for non-accredited courses it can be seen that this trend is consistent through both types of course. It is however worth noting that the general trend in EDT is on the whole for the more able students to elect to do a placement which may be one reason for the higher results demonstrated. Even taking this into account, these results show that an industrial placement appears to make a student more motivated and more likely to understand how their degree course related

to work in the real world. This is as reported by academics within the school who supervise projects which at times are provided by the company where the student did their industrial placement.



**Figure 16: Non-accredited Courses & Placements**

Table 3 summarise the MEng results as divided between the eligible students (one direct entrant stage 3 student gained MEng with distinction in 2010) who did an industrial placement and those who did not. As can be seen the trend is for students to either do a placement or undertake the MEng degree. This could in part be due to the fact that to do both takes five years, but could also be for other reasons.

**Table 3: MEng Results & Placements**

	2010			2009		
	MEng D	MEng M	MEng	MEng D	MEng M	MEng
<b>Industrial placement</b>	1					
<b>No industrial placement</b>	3	2	1		1	2

## Conclusions

This project has demonstrated that the 'final' year within EDT is mainly made up of students on accredited engineering courses (more than 70%) with over 60% of the students entering at the traditional Stage 1. However, a significant proportion of students do come in by less traditional routes which does not significantly affect performance on engineering courses, but this does have an impact on performance on BSc courses. Most students are also on Bachelors degree courses, although there are small, but increasing number on the integrated Masters courses. Looking at the results for the 2010/11 academic year, the increase in numbers is distinct with 21 students graduating with a MEng degree. Sixteen of these students were on the Civil & Structural Engineering course. In part this is due to the encouragement of academics, particularly within the Civil & Structural Engineering Programme Team, for students who qualify to go onto the MEng route as this is completely fulfils the academic requirement for chartered engineer status defined in Engineering Council (2003):

- *“An accredited Bachelors degree with honours in engineering or technology, plus either an appropriate Masters degree accredited by a professional engineering institution, or appropriate further learning to Masters level.*
- ***Or an accredited integrated MEng degree.”***

In the introduction, the perceived perceptions of academics within EDT concerning the performance of students were introduced:

1. Industrial placements enhance student performance.
2. Direct entry students perform comparatively worse than students who do their entire degree course at Bradford true.

- ◇ In particular students who are direct entry to stage 3 perform poorly.
- 3. Students from the Foundation year perform as well as the students who came into Stage 1.

Looking at the statistical analysis of the 2008/9 and 2009/10 Stage 3 and 4 results, it is clear that industrial placements have a positive effect of student performance. Thus perception 1 has been proved true.

In the case of perception 2 this has actually been proved false for accredited courses where direct entrants perform in a comparable manner to students who have done their entire course at Bradford. Indeed in 2009/10 it can be said that the Stage 3 entrants in that year actually performed better than students who had been at Bradford for their entire degree. However for non-accredited courses the perception can be probably assessed as true as there is a large 'tail' of Stage 3 direct entry students who gain no result at all in both the analysed years. However, the overall performance of all direct entry students to non-accredited courses is probably only slightly worse than that of students who have been at Bradford from at least Stage 1.

In the case of students who attempted the foundation year it can be seen that again there is a definite split between those with the required enhanced pass (55%+) to do accredited courses, and those on the non-accredited courses who either completely failed (but have required entry requirements for non-accredited courses) or gained a non-enhanced pass (40%+). With the students on the accredited courses there is little noticeable difference in performance with the other entry points as is perceived to be the case. This is not true for the students on the non-accredited courses where there is a definite trend for foundation year students to perform worse than other students.

Overall this project has been a useful exercise to give actual statistical backing the has either proved or disproved an number of pre-conceptions held by EDT Projects. It is intended to continue the analysis to cover both the results from 2010/11 following the September supplementary Board of Examiners, as well as go back to the results from 2007/8 and 2006/7 academic years to give a greater depth of data to really explore the trends. Extending the analysis will give greater confidence in the results, and was originally envisaged but time constraints on the author prevented analysis of more years being undertaken.

## References

Engineering Council (2002), *UK Standard for Professional Engineering Competence*, updated June 2011, Available from: <http://www.engc.org.uk/ecukdocuments/internet/document%20library/UK-SPEC.pdf>, accessed 17/08/2011.