Second Level Education and the Decline in Popularity of Engineering within an Irish Context

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Abstract: This paper examines the obligatory but often contentious relationship that exists between contemporary second level education and undergraduate student course choice within an Irish context. A survey of 1,723 students from across four second level schools and all year groups was conducted asking students to elect a future career they would most like to pursue. The results of this survey served to highlight the declining allure of engineering as a future career for students as they progress through second level. Focus groups were held in all four schools in order to identify current motivations behind student course choice, as well as students' perceptions regarding the decline in undergraduate engineering numbers. Students frequently highlighted future career prospects, as well as current matriculation requirements as mitigating factors in the uptake of undergraduate engineering degree programmes. Finally this paper also compares and contrasts the perceptions and motivations of current second level students with those of existing undergraduate engineers.

Keywords; course choice, engineering, education, student perceptions,

1. INTRODUCTION

This paper is divided into three sections. The first is intended to provide context by outlining recent trends in student course choice and predicted future undergraduate numbers based on population statistics. The second outlines the quantitative element of this study based on students' results from a laconic but pertinent survey on future course choice. This section also compares students' course choice to their dominant interest types through the use of an extensive interest inventory known as Holland's Self Directed Search. Finally, the qualitative data resulting from focus groups in all four schools involved in this study is delineated and subsequently compared to the results of a survey on existing undergraduate engineers. Accordingly this paper aims to provide context, as well as an insight into the contemporary motivations behind student course choice and the recent decline in the uptake of undergraduate engineering programmes. This research was predicated on the belief that past trends in student course choice and recent shifts in perceived course value can provide a

reliable barometer for future course uptake. Consequently this study becomes more Janus like, looking to the past and the future simultaneously.

What is important to note at this stage is the inevitable role that existentialism will play in what is inexorably a subjective choice that students make each year. One cannot ignore the individual and personal nature of undergraduate course choice often driven by passionate and sincere beliefs, interests and desires [1]. However, by studying the macro motivations and trends in course choice an accurate account of current second level student perceptions can be formulated and if necessary addressed accordingly. Second level education in Ireland is comprised of two distinct but interconnected 'cycles'. Students enter second level education at the age of 12 or 13 years and immediately enter the Junior Cycle. This programme spans three years building on the education received at primary level and culminates in the Junior Certificate Examination. Following the completion of the Junior Cycle, students at the age of 15-17 years enter the Senior Cycle. The Senior Cycle culminates with a summative examination entitled the Leaving Certificate Examination. Eligibility for university placement in Ireland is primarily governed by points attained by students in this Leaving Certificate examination. Thus, the Leaving Certificate years form a distinctly pressurised time for student [2, 3]. For a comprehensive delineation of the Irish matriculation process and third-level system of education please see McLaughlin 1999 [4].

2. RECENT TRENDS

Recent trends in students' first choice preferences through the Central Applications Office (CAO) show a significant shift in numbers over the past ten years. This change in student course choice has resulted in a significant decline in the number of students choosing Engineering/Technology courses and a comparable increase in the numbers choosing Art and Design courses. As highlighted in Table 1, a sizeable decline of 4,344 students placing engineering as their first preference on the CAO was witnessed between the years 2000 and 2010. Since 2000 Engineering has seen a significant fall in popularity amongst students despite an overall increase in CAO applicants of 10,701 students during the same period. As a percentage of the total applicants through the CAO for level 8 degree courses, engineering has experienced a period that saw the amount of candidates fall from 19% of the total cohort to less than 9%. By comparison, the same period saw a significant increase in the number of students choosing design courses through the CAO application system. Between 2000 and 2010 the percentage of total applicants placing design courses as their first preference has risen from 0.7% to 4.3%, corresponding to an increase of 2,275 applicants. This recent decline in undergraduate engineering numbers was not alone experienced nationally, with both the United States and Australia reporting a decline in enrolment numbers during the same period [5]. Although the decline was less acute in the United States, similar problems regarding the ability to attract and retain high quality undergraduate students have been reported in recent studies [6]. This has become more prevalent within an Irish context in recent years as the numbers of students applying for engineering courses have continued to decline, imposing a related decline in the entry points for engineering programmes (a principal component of the matriculation system).

Table 1 Students' Level 8 CAO Course Choice Data

Faculty	2010	2009	2008	2007	2006	2005	2004	2003	2002	2001	2000	Between 2000 & 2010
Engineering	29045	27688	34985	33233	43231	45709	51702	49549	46636	60370	63874	**-34829**
1st Pref	5399	5072	6161	5860	7406	8041	8142	8375	7815	9460	9743	**-4344**
% of Total	8.7%	8.6%	10.9%	10.6%	13.8%	15.0%	15.0%	15.2%	15.3%	18.5%	19.0%	**-10.3%**
Design	10193	9933	8380	8475	4831	3819	3887	3062	958	1047	1103	**9090**
1st Pref	2652	2634	2249	2227	1458	1078	1007	828	364	378	377	**2275**
% of Total	4.3%	4.5%	4.0%	4.0%	2.7%	2.0%	1.9%	1.5%	0.7%	0.7%	0.7%	**3.5%**
Total Applicants	**62082**	**58799**	**56315**	**55172**	**53488**	**53784**	**54263**	**55239**	**50996**	**51115**	**51381**	**10701**

(Note: Statistics sourced from the CAO Board of Directors Report for the respective years [7])

The number of students applying for third level courses through the CAO has effectively demonstrated a steady increase since 2000, despite a significant decrease in student numbers sitting the Leaving Certificate exam during the same period (as shown in Figure 1). From 2007 onwards the number of applications through the CAO has exceeded the number of students sitting the Leaving Certificate, with more and more students returning to education. However, since 2007 the number of students sitting the Leaving Certificate examination has started to rise and is expected to continue to rise into the near future. This prediction is predicated on birth rates in Ireland which have seen a steady increase since 1994 (see Appendix A). Recent birth rates would strongly suggest that the numbers entering higher education in Ireland will continue to rise for the foreseeable future. This inevitably raises questions about how best to facilitate these students, what skills will they require going into the future and how can these skills be developed and nurtured within higher education? To address this it would necessitate the formation of a type of prolepsis, where student numbers have already risen and the future requirements of industry are already here. Therefore this study will focus only on current requirements based on the most up to date statistics available.

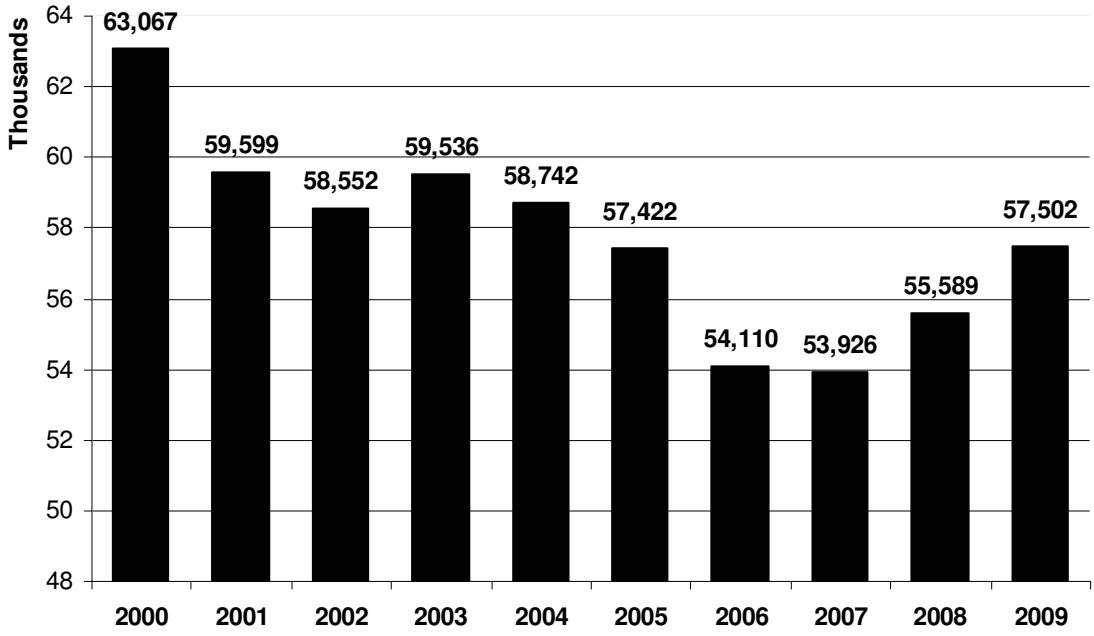

Figure 1 Leaving Certificate Numbers from 2000 to 2009 [8]

A recent study conducted by Graduate Careers Ireland between January and March 2009 highlighted the significant role that engineering and technology industries continue to play in Irish business activities [9]. This survey focused on private sector enterprises and found that 16.2% of the jobs offered by employers in this sector were in the engineering and technology industries. The survey also highlighted an average starting salary for engineers of €29,500, up from €28,218 in 2007. This was comparable to an average starting salary within the Public and Voluntary sectors of €30,733, also reported in this study.

When compared with other OECD countries the percentage of level 8 engineering and technology graduates from Irish higher education is notably lower. By comparison the percentage of Irish graduates from Humanities, Arts and Education courses is significantly higher than most other OECD countries (see Figure 2). The statistics presented in Figure 2 are based on 2006 graduate numbers [10]. Since then engineering and technology courses have continued to decrease in popularity and in 2009 only 8.62% of CAO first preference applications were for courses in these fields.

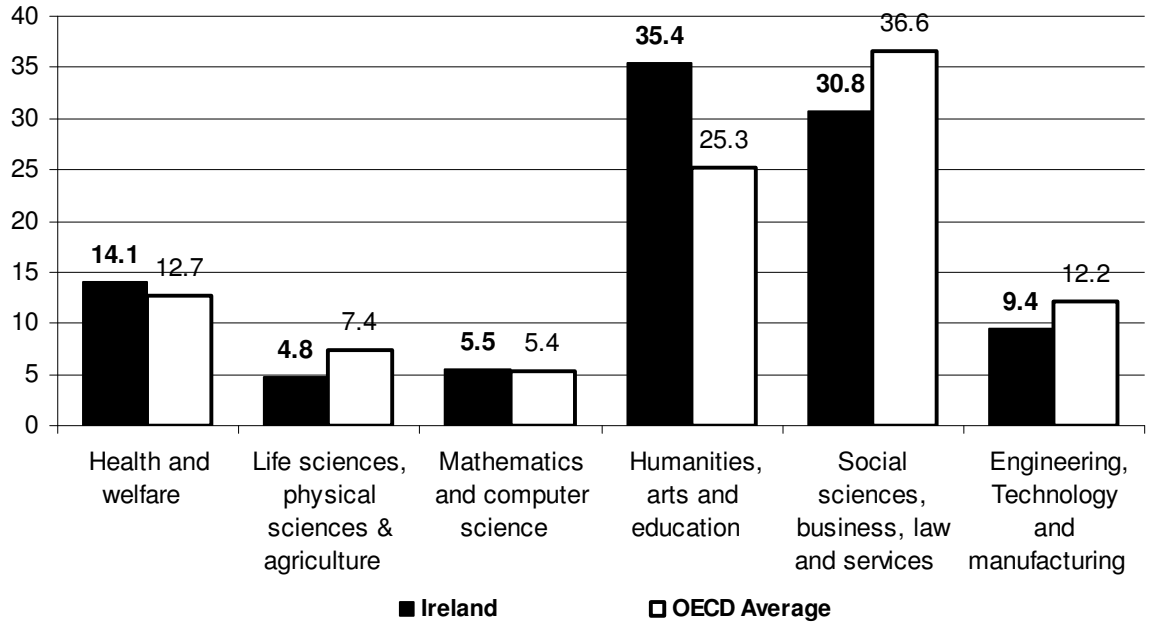

Figure 2 Percentage of 2006 Level 8 graduates per field of education [11]

The above statistics serve to provide context, highlighting the continued decline in popularity for engineering courses despite a recent increase in overall undergraduate enrolment numbers and a continued relative demand for high quality engineering graduates. The following section outlines a study conducted by the authors between January and April 2010 to identify trends in students' future career choice preferences as they progress through second level education.

3. FUTURE CAREER CHOICE SURVEY

The following elements of this study were designed to identify the cause and motivations behind this decline in engineering student uptake, as well as the developmental stage at which this decline in popularity transpires. The study benefited from a "pragmatic research approach" [12], employing both the use of qualitative and quantitative paradigms. While the

initial stages of this study concentrates on the positivist approach and the analysis of quantitative data, it was also supported by interpretative research methods through exploiting focus groups post completion of a survey. Quantitative data was collected through the use of a concise printed survey which was disseminated to students and focused primarily on what future career students would most like to pursue. This study and the subsequent design of the survey draws from a research framework employed by Pink [13] in his review of students' attitudes towards Art as a possible future career as they progressed through high school.

Second level students from across four different schools were requested to complete the survey which asked them to select one of sixteen different sectors/areas in which they would like to pursue a future career (see appendix B for survey). These sixteen sectors were chosen for comparison purposes as the same disciplines are utilised each year in the CAO Board of Director Report [7] to illustrate the growth or decline of courses in these areas. The four participating schools in this study consisted of two urban and two rural schools of comparative equal size. These schools can be further stratified into two comprehensive schools, one vocational school and one community college. All four schools offered transition year to their students and students from across all six years completed the survey. In total 1,723 students completed the survey which represented a participation rate of approximately 67%. Career guidance counsellors and participating teachers within the four schools assisted in the dissemination of the surveys and in explaining and clarifying the sixteen different sectors and possible future careers for students. The results of the survey demonstrated a significant shift away from careers in the engineering/technology sectors as students progressed through second level. The percentage of students wishing to pursue a career in these sectors fell steadily from 23.2% in first year to 8.8% in sixth year (see Figure 3). By the time students reach fifth year (senior cycle) interest in engineering/technology begins to stabilise with a diminutive difference witnessed between the percentage of fifth year and sixth year students wishing to pursue a career in this sector. The results from the survey for the sixth year students are directly in line with the percentage of students choosing engineering/technology courses through the CAO in 2010, with 8.7% of students electing courses in these sectors as their first preference. A full breakdown of the survey results can be seen in appendix C.

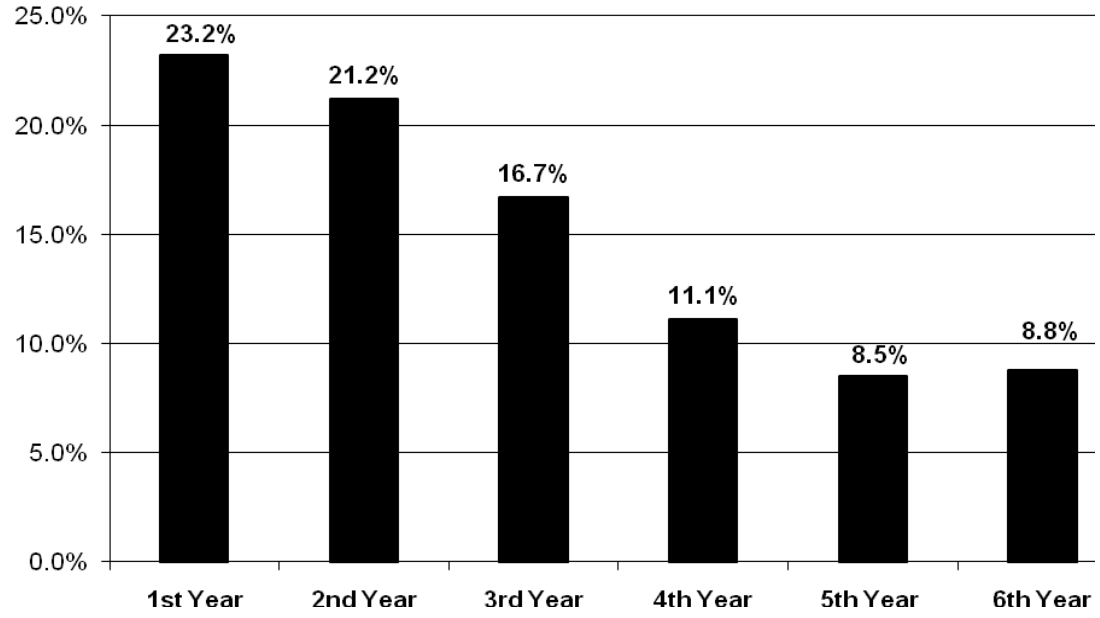

Figure 3 Percentage of students selecting engineering/technology throughout second level

Of the sixteen sectors assessed in this survey the engineering/technology sector was the only area to witness such a significant and progressive decline in popularity throughout students' second level development. The following phase of this study was aimed at measuring the degree of alignment between student interests and course choice resulting from the aforementioned survey.

4. STUDENT INTERESTS AND RESULTING APPOSITE CAREERS

The nature and strength of one's interests represents an important aspect of an individual's personality, with this characteristic materially affecting educational and occupational achievement [14]. Although interests affect major aspects of one's life, tests that assess and identify these interests (known as *Interest Inventories*) have predominantly been used as a career guidance tool in the past. This is due to the strong and long established link that exists between interests and future career choice [15]. Studies have shown that interests can be used to predict future vocational performance and satisfaction [16, 17]. As a result career guidance counsellors often use interest inventories as a guidance tool when advising students on future careers and courses [1]. Given the significant influence that interests have on future career performance and satisfaction; this study examined a sample of Leaving Certificate students to determine their dominant interest types. This phase of the research was aimed at determining whether or not students are choosing courses that best suit their interests.

A cohort of Leaving Certificate students from each of the four schools was asked to complete an extensive interest inventory called Holland's Self Directed Search (SDS) which was made available to students online. This interest inventory comprises 228 items and takes a Leaving Certificate student approximately 25 minutes to complete [18]. This interest inventory was chosen as it is extensive in the vocations it incorporates and can also be self-administered and even self-assessed to a large extent. This is very important when administering the test with relatively large cohorts. Holland's Self Directed Search has also proven to be very reliable with a reported median reliability coefficient of 0.82 for high-school students and 0.92 for college students [15].

A total of 127 Leaving Certificate students completed the inventory, of whom 19 presented results directly in line with that of a successful engineer. This would suggest that based on their dominant interest types 15% of the students who completed the inventory would be suited to pursuing a future career in the engineering/technology sector. However of these 19 students only 10 (or 7.9%) elected this sector as an area in which they wished to pursue a future career. By comparison 14 students (or 11%) presented interests directly related to administration/business careers. However 18 (or 14.2% of students) had chosen to pursue an administration/ business course. By the time this phase of the study was completed most of the students had already completed their CAO application for 2010.

Although involving a smaller sample cohort of 127 students, the results of the interest inventory suggest that a number of students are choosing courses that are not directly related to their dominant interest types. While the majority of students continue to choose courses directly related to their interests, a significant number of students are choosing alternative courses. With research highlighting the importance of alignment between interests and vocational choice for future career performance and satisfaction [16], these results suggest that certain students may be making choices that could be detrimental to their future career

performance. With several students choosing courses not related to their dominant interests, other variables are clearly having significant influence on their future career choice. The next phase of the study focused on interpretative research methods in an attempt to determine the motivations and perceptions behind contemporary student course choices.

5. FOCUS GROUPS WITH LEAVING CERTIFICATE STUDENTS

In order to determine the motive for this notable shift away from engineering/technology as students progress through second level, focus groups were held with four groups, one from each of the aforementioned schools. Discussions were held with Leaving Certificate groups that varied in size from 20 to 24 students, regarding the courses and careers they wish to pursue and the motivations behind that course/career choice. Three principal exacerbating factors regarding the decline in popularity of engineering emerged from these discussions. The first was an increased emphasis placed on perceived future career prospects. The second related to the significant gender imbalance present in the number of students choosing engineering and the perceptions and motives behind this disparity. The final dynamic emerging from these discussions pertained to the impact current matriculation requirements have on student course choice.

5.1 Perceived Course Value and Career Prospects

Traditionally students' interests, their past academic performance and apparent self-efficacy for different subjects in school have been highlighted as principal influences in future course choice [19, 20]. However in all four schools students stressed the importance of future employment prospects as one of the foremost influences on their future course choice at present. It is clear that student course choice has become consumerist driven, where value for money, time and effort are central to the decision process [21]. These are influences that were formerly only associated with university preferences [16]. Job prospects and academic reputation are variables that previously were strongly linked to a students' choice of university after the formation of a course/career choice [22, 23]. In all four schools students expressed acute concern over future career prospects and highlighted how this has inevitably lead to a change in preferred course choice for many students. This was evident in one student's comments regarding the courses he finally applied for through the CAO;

> Originally I had wanted to do architecture but there are no jobs in that now...
> I applied for courses in environmental science and environmental engineering instead.

As highlighted in the above student's comments the decision process has become significantly influenced by perceived career prospects, so much so that this student chose courses that would previously not have been his first preference. This decision was based on his perception of current market requirements even though the course in architecture that the student originally wished to pursue was a five year course. This is not to suggest that students' course choice is now entirely capricious. The above student went on to explain that he felt the courses he had applied for were in areas that were of intrinsic interest to him but which also had better career prospects for the future. Therefore the decision process continues to focus on areas that are of interest to students but has become more purposely directed toward specific vocations within that area/discipline where students perceive better career prospects exist. This was reflected in another student's decision to pursue a course in Physical Education teaching. This student originally expressed his interest in sport and a

love of training and being active as the main motive for choosing this course. However, when asked why he chose teaching over alternative courses such as exercise management, personal training, sport science etc., the student replied;

> I suppose teaching just appeals to me. (Why?) It has good benefits. You'll always need teachers and it's a good stable job.

While originally the above student expressed an interest in sport and exercise he chose a course in teaching as a result of perceived job prospects and career benefits. This augmented emphasis placed on perceived career prospects has proven to be an aggravating factor in the decline in engineering popularity. Some students indicated that they decided not to pursue a career in engineering based on a perception that there are insufficient job opportunities in the current market.

> I would have possibly liked to do mechanical engineering or civil engineering but with the way thing are now I'm thinking of doing energy science instead.

The perceptions of this student regarding job prospects resulted in a decision not to pursue a career in engineering. It is clear that this widespread and often erroneous assumption regarding current career opportunities is having an increased influence on student course choice [24, 25].

5.2 Sex Differences in Course Choice

The present study serves to support previous findings regarding the influence self-efficacy expectations have on students' future course choice [26, 27]. The beliefs of students concerning their ability to pursue various careers were consistent with existing patterns of occupational sex typing [28, 29]. The self-efficacy expectations of female students with regard to engineering were highlighted by many as directly influencing their decision not to pursue a course or career in this sector. This was also reflected in the number of female students selecting engineering in the previously highlighted survey. Of the 260 students that elected engineering/technology as an area in which they wished to pursue a career only 12 (or 4.6%) were female. With self-efficacy directly related to interests [30], it is clear that perception of low self-efficacy is an important factor in female students eliminating possible career options in engineering.

> I wouldn't like to do engineering. It's not something that appeals to me at all. I'd actually be scared of all the machines they use… I tried metal work in first year and wasn't very good at it.

For the above student her perceived self-efficacy resulted in the disregard of engineering as a future career. However the student's comments also highlight the strong association made between second level subjects and university courses. This student directly related the skills required for success in a second level technology subject with those required for completing an engineering course. This relationship between students' experience of technology subjects and the desire to pursue engineering was evident in the results of the future career choice survey. Of the 260 students that selected engineering/technology (see Appendix C), 228 students studied one or more of the technology subjects at second level. These subjects include Engineering, Construction Studies and Technical Graphics. However as highlighted by Hammond and Palmer [31] the technology subjects (including one entitled Engineering) offered at second level are not an accurate reflection of Engineering at third level. It is clear

that perceptions pertaining to these second level subjects are carrying through to third level and are reflected in student's course choice. For example the perceptions and concerns of female students regarding second level Technology subjects have previously been associated with the poor uptake of female students in undergraduate engineering programmes [31].

A distinct difference emerged from these focus groups between female and male motives for future course choice. While male students appeared pragmatic in their course choice decision, choosing courses where they perceived better career prospects, female students highlighted personal interests and occupational status as the principal influences on course preference. For example one female student consciously elected to pursue a course in Biomedical Engineering. According to the student this decision was primarily motivated by the enjoyment she experienced working with patients that had undergone hip replacements during her transition year work placement, two years earlier. It was clear from this student's demeanour that this experience had left her with an innate desire to help similar patients by pursuing a course that would facilitate the development of the requisite skills and knowledge. This student was not concerned about future career prospect but instead was conatively guided by a previous positive experience. This emerging disparity between male and female students and the motives behind course choice is further supported by previous research studies. Lightbody et al. [32] found that women purposely choose courses which lead to careers that contribute to playing a useful social role. Eccles [26] also found that women favour courses with high levels of social involvement and that lead to careers with meaningful social roles.

5.3 Matriculation Requirements and Student Course Choice

By the time most students in Ireland have completed the Junior Certificate at approximately age 15 more than half have already made sufficient academic choices to inevitably prevent them from pursuing most level 8 engineering degree courses. For example, in 2008 the percentage of students sitting the higher level mathematics paper in the Junior Certificate exam increased to 43% (23,634 students), of whom 97% received a grade D or higher. In the same year 15.3% of Leaving Certificate students (8,510 students) sat the higher level mathematics exam paper for the Leaving Certificate. Despite an increase of almost 2,000 students sitting the Leaving Certificate in 2009, the number taking higher level mathematics fell to 8,420. The associated difficultly with mathematics and the resulting decline in numbers sitting the higher level paper in the Leaving Certificate was highlighted as an additional factor in the diminished uptake of engineering courses by students during the focus groups. This is as a direct result of the matriculation requirement of a minimum grade C3 or greater in higher level mathematics for entry into most level 8 engineering degree courses in Ireland. The implication of this requirement for engineering student uptake is evident in the following student's comments;

> I would have liked to do mechanical engineering but I find maths very difficult. I dropped down to pass maths after the Christmas exams last year and I'm still finding some topics very hard. I have applied for a software development course.

It is clear from this student's experience that current matriculation requirements are resulting in a number of students choosing alternative courses. However, the implementation of Project Maths in all second level schools from September 2010 is aimed at contributing to an increase in the number of students completing higher level Leaving Certificate mathematics [33].

6. UNDERGRADUATE ENGINEERING STUDENTS AND COURSE CHOICE

For the purpose of comparison 168 existing first year engineering students completed a survey between February and April 2010 on the subject of influencing factors in their current course choice. The results of this survey served to support many of the findings emerging from the aforementioned focus groups. When asked what were the main factors that appealed to them about the course they chose, 70.8% (or 119 students) highlighted the strength of the course itself and its perceived future value as the most appealing feature. In addition the majority of students (68%) highlighted an interest in the subject area as the most influential factor in their decision to pursue a career in engineering. This included an interest and aptitude for mathematics and the science subjects. When asked what information they required when choosing a course of study 74.9% of the first year undergraduate engineering students stressed the importance of career opportunities on marketing material, again highlighting the importance of future career prospects as an influential factor in their course choice. The results of this survey stress the importance of course appeal and interest in the subject area as a driving factor in the selection of engineering courses. The increased emphasis placed on career prospects as a prevalent influence on course choice (as highlighted in the focus groups) is in stark contrast to the relatively low prominence this received in the first year engineering student survey. This would strongly suggest that there currently exists a negative perception amongst students regarding future career prospects for engineering graduates. This suggestion was further supported through interviews with current first year students, with one female student stating that at present "they will find it very difficult to find a job". In parallel with findings from the focus groups this female student chose to pursue a degree in Biomedical Engineering because of the associated social benefits and the opportunity to help others through her potential future career.

7. DISCUSSION

It is clear from the results of this study that a series of multifaceted and regrettably complimentary factors are contributing to a continued decline in uptake of engineering/ technology courses. It is also apparent that student course choice cannot be deterministic with course preferences significantly evolving according to perceived career opportunities and course worth as demonstrated by the recent shift in undergraduate course numbers. An increased emphasis placed on future career prospects, combined with a perceived dearth in engineering positions, is resulting in potential students choosing alternative occupations and therefore courses. Findings suggest that course choice has become more consumerist driven and students highlighted enhanced "benefits" associated with alternative careers as an exacerbating factor in the decline in engineering popularity. This combined with the low uptake of female students and current matriculation requirements continue to discourage students away from engineering as a career. Nonetheless there are positive findings from this study. Upon entry into second level a high percentage of students are interested in pursuing a career in engineering. While changes in future career choice are expected to occur throughout the second level development of students, such a drastic decline in interest in a particular career was isolated only to this sector. However, when Leaving Certificate students' dominant interests were assessed using an interest inventory, it was established that a significantly higher percentage of students remain interested in engineering than those selecting courses in this area through the CAO. This would suggest that certain students are choosing future courses based on contemporary perceptions in relation to career prospects

over personal interests (as well as preventive matriculation requirements). This in turn provides an opportunity to attract more students into engineering by addressing such perceptions. The declining allure of engineering as a future career proved progressive throughout the junior cycle development of students, stabilising by the time they reached fifth year. It is therefore pertinent that any intervention be targeted at junior cycle students at an early stage before certain academic choices are made which will inevitably prevent students from pursuing an engineering degree course.

The abating ability to attract students and in particular female students continues to impede the influx of applicants for engineering courses. The results from focus groups conducted as part of this present study support previous findings regarding differences in motives behind course choice for both sexes. Female students emphasised the importance of a strong future occupational role, as well as the corresponding social responsibility attached to that career in this decision process. This decision reflects a more altruistic perspective of the function of employment when compared to their male peers. Recent years have witnessed an increased emphasis placed on the development of socially responsible engineers within Irish engineering education programmes [34]. This has resulted in greater focus placed on ethical standards, responsibilities towards people and the environment, teamwork and communication skills [35]. Results from the present study would strongly suggest that this contemporary movement towards engineers providing a greater social role could indirectly prove advantageous in the campaign to attract more female students.

Also emerging from the focus groups was the direct relationship between students' experience of certain subjects at second level and their perception of engineering courses. Of the students that elected engineering/technology as an area in which they wished to pursue a career in the Future Career Choice Survey, 87.7% studied one or more of the technology subjects and 83.5% of the senior cycle students studied a science option. A negative perception of the technology subjects, especially among many female students, lead to an associated negative perception of engineering courses. Similarly self-efficacy perceptions associated with the sciences and especially the physical sciences at second level left many students concerned about their ability to complete an engineering course if they were to pursue a career in this sector. In a comparable study Woolnough, Guo et al. [36] established a similar connection between high-school subject experience and university course choice. Findings from the survey of existing first year engineering students serve to support the importance of second level subject experience in the decision to pursue an engineering course. Therefore this present study highlights the continued role that second level education plays in students' future course choice and notes that this is independent of any career guidance received. It is also clear that the influence of second level education in student course choice begins at a very early stage in the student's development.

8. CONCLUSION

This paper serves to highlight the continued decline in popularity for engineering amongst second level students. Findings suggest that second level student experiences are contributing to the development of a series of perceptual schemata that serve as an exacerbating factor in the fall in engineering student numbers. It is also clear from this study that student course choice is becoming more consumerist driven, with students demanding more value from third level courses in respect to future career prospects. They continue to choose areas and disciplines that interest them but are becoming more deliberately selective

in the vocations they pursue within those disciplines. Negative perceptions regarding future engineering occupational prospects exist within a second level school context. Current matriculation requirements as well as perceived disparity between the levels of difficulty and therefore academic effort associated with second level subjects, is resulting in academic choices that are unsupportive and contrary to the pursuit of an engineering degree. These factors begin to influence student career choice at an early developmental stage and as a result any intervention must be aimed at a Junior Cycle level before such academic decisions become established.

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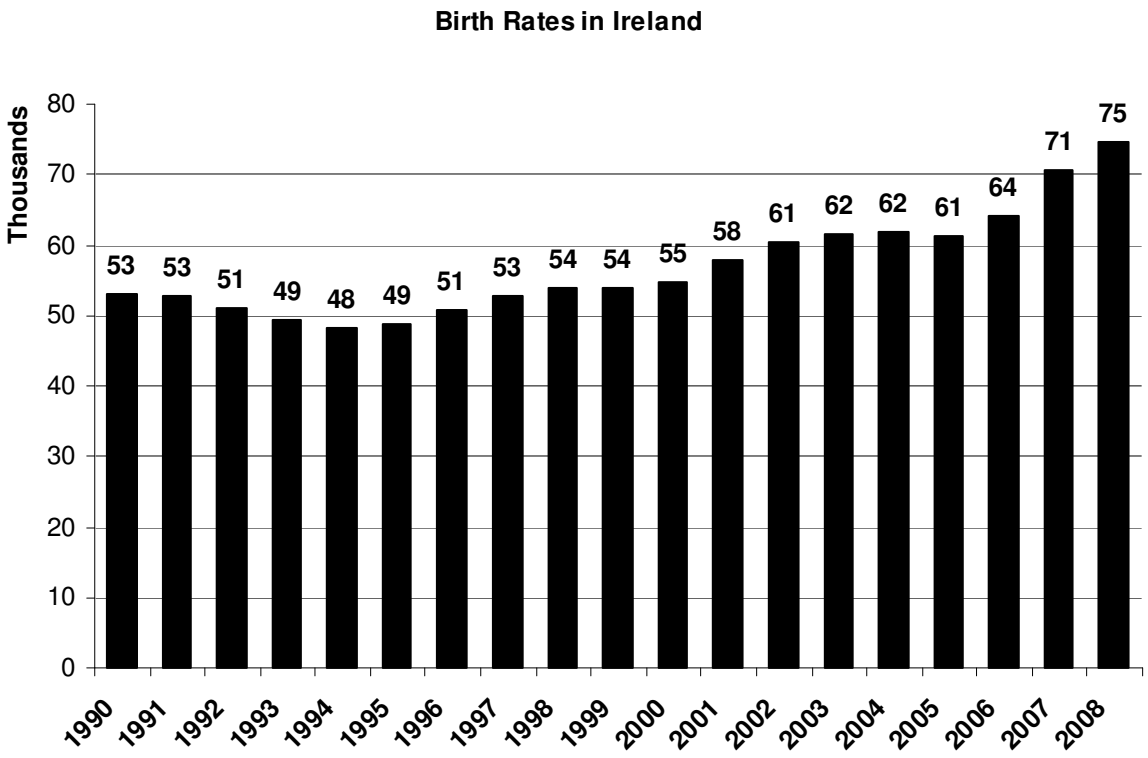
Appendix A – Birth Rates in Ireland from 1990 to 2008



Appendix B – Future Career Choice Survey

Please note that this is an anonymous survey

Please circle:

Gender: Male Female

Year: 1st 2nd 3rd 4th 5th 6th

Please list your option subjects

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____

Listed below are 15 occupational areas. Please indicate **one** area in which you would like to pursue a future career from the following list;

Place an **X** in your preferred occupational area.

1. Arts/ Social Sciences ( )
2. Science/ Applied Science ( )
3. Agriculture/Horticulture ( )
4. Education ( )
5. Administration/Business ( )
6. Engineering/Technology ( )
7. Architecture ( )
8. Art And Design ( )
9. Law ( )
10. Human medicine ( )
11. Veterinary Medicine ( )
12. Dentistry ( )
13. Pharmacy ( )
14. Physiotherapy ( )
15. Nursing ( )
16. Other ( )

Appendix C – Results of the Future Career Choice Survey

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Future Career Choice * Year of Study	1723	100.0%	0	.0%	1723	100.0%

Future Career Choice * Year of Study Crosstabulation

			Year of Study						
			1st Year	2nd Year	3rd Year	4th Year	5th Year	6th Year	Total
Future Career Choice	Arts/Social Sciences	Count	7	8	21	6	35	44	121
		% within Year of Study	2.3%	3.0%	5.9%	4.2%	11.4%	12.9%	7.0%
	Science/Applied Sciences	Count	5	9	19	2	17	13	65
		% within Year of Study	1.6%	3.3%	5.4%	1.4%	5.6%	3.8%	3.8%
	Agriculture/Horticulture	Count	5	2	19	0	12	7	45
		% within Year of Study	1.6%	.7%	5.4%	.0%	3.9%	2.1%	2.6%
	Education	Count	41	41	41	34	51	62	270
		% within Year of Study	13.2%	15.2%	11.6%	23.6%	16.7%	18.2%	15.7%
	Administration/Business	Count	25	13	33	14	29	54	168
		% within Year of Study	8.0%	4.8%	9.3%	9.7%	9.5%	15.9%	9.8%
	Engineering/Technology	Count	72	57	59	16	26	30	260
		% within Year of Study	23.2%	21.2%	16.7%	11.1%	8.5%	8.8%	15.1%
	Architecture	Count	11	7	19	4	7	5	53
		% within Year of Study	3.5%	2.6%	5.4%	2.8%	2.3%	1.5%	3.1%
	Art & Design	Count	44	30	32	18	35	12	171
		% within Year of Study	14.1%	11.2%	9.1%	12.5%	11.4%	3.5%	9.9%
	Law	Count	14	14	20	4	15	19	86
		% within Year of Study	4.5%	5.2%	5.7%	2.8%	4.9%	5.6%	5.0%
	Human Medicine	Count	5	11	16	14	11	12	69
		% within Year of Study	1.6%	4.1%	4.5%	9.7%	3.6%	3.5%	4.0%
	Veterinary Medicine	Count	22	14	9	4	3	5	57
		% within Year of Study	7.1%	5.2%	2.5%	2.8%	1.0%	1.5%	3.3%
	Dentistry	Count	0	1	0	0	0	0	1
		% within Year of Study	.0%	.4%	.0%	.0%	.0%	.0%	.1%
	Pharmacy	Count	1	2	2	6	7	3	21
		% within Year of Study	.3%	.7%	.6%	4.2%	2.3%	.9%	1.2%
	Physiotherapy	Count	7	7	9	2	20	3	48
		% within Year of Study	2.3%	2.6%	2.5%	1.4%	6.5%	.9%	2.8%
	Nursing	Count	2	9	13	2	6	25	57
		% within Year of Study	.6%	3.3%	3.7%	1.4%	2.0%	7.4%	3.3%
	Other	Count	50	44	41	18	32	46	231
		% within Year of Study	16.1%	16.4%	11.6%	12.5%	10.5%	13.5%	13.4%
	Total	Count	311	269	353	144	306	340	1723
		% within Year of Study	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%