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2010 School of Computing Undergraduate Student Survey.

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Abstract

This paper summaries the findings from a voluntary online survey distributed to all Computer Science undergraduates (part time and full time) of a large Irish third level institute in 2010. The objective of the survey was to investigate, identify and report the cohorts' personal circumstances, computing interests, preferred learning methods and reasons for selecting Computer Science as a profession. The survey had a good response rate from most student groups. Identified from the two cohorts of part and full time Computer Science undergraduates are typical students, their personal computing interests, learning motivation and the methods of learning they indicate as most significant.

1. Background

The Dublin Institute of Technology (DIT) is one of Ireland's largest third-level institutions, with undergraduate and postgraduate degree programmes offered from its four colleges Science and Health, Engineering and the Built environment, Business and Arts and Tourism.

The DIT was established as an autonomous institution under the DIT Act in 1992 and was created from the amalgamation of six colleges of higher technical education. Kevin Street College the home of the DITs School of Computing (SC) was started in 1887 to provide technical education and training in specialist fields. This continues to be the goal of the SC with an emphasis on research and industry links. The DIT college of Science and Health has been offering courses in computing since 1971.

2. Introduction

There are limited resources available to Schools in relation to Computer Science undergraduate students. Basic information with regard postal address, age etc. provided on registration and modules taken are available through college systems but this does not elucidate trends nor inform actionable items for schools. There is limited published literature in relation to Computer Science students as an undergraduate group. Internationally studies tend to be done on specific groups such as Women [1] and often Computer Science is not a large enough cohort to warrant individual study. Within the US Computer Science is amalgamated with unrelated studies such as Agricultural Science in the 'Others' section of undergraduates [2].

The survey of the student's experience on the programmes of the SC was produced to inform and indicate actionable items for consideration within a school review process. The UnderGraduate (UG) programmes surveyed were:

- DT211 (BSc Computing)
- DT248 (BSc Computer Science)
- DT249 (BSc: Information Systems and Information Technology: Part time).

The students surveyed were those studying at the Dublin location. None of the franchised programmes were included in the survey.

3. Method

The students' survey was designed in collaboration with the programme chairs and the head of school. Within the literature there are examples significant negative to negligible impact on response rate identified when selecting online over hardcopy surveys [3] [4]. Online surveys were selected as the students were technically able and a student trusted delivery route was

available through the SC email. Additional benefits were a reduction in time and costs through the use of surveymonkey.com to administer the survey.

The survey was a voluntary anonymous online survey. The question design was primarily selection of options, rank agreement and open ended questions. Students were able to skip questions and select more than one option in some questions. This was to reduce frustration with participation in the survey and ensure that the survey was completed. It is also known that such open ended questions delivery high quality information due to 'lengthier inputs' from respondents [5]. The survey was open for a total of three weeks, launched week 8 before Easter break and closed week 9 of semester 2 in 2010.

4. Response Rates

The total student population of the UnderGraduate (UG) programmes is 558 the survey sample for UGs was 136. This relates a response rate of 25%. The Full Time (FT) UG population is 338. The FT UG response rate was 30.5%. The Part Time (PT) UG population is 220. The PT UG response rate was 15%. The difference between FT and PT response rates may relate to the voluntary nature of the survey.

The survey was launched at the start of the Easter break, students were absent from college for the two thirds of the 'life' of the survey and this related directly with was the final year project submission deadlines. The timing was expected to have a negative impact on response rate. The response rate for students in final stages of their programmes was 13%. This is the lowest response rate yet is not significantly less than the average expected response rate of 17% for online surveys [6]. Overall the response rates for the survey are very good with the exception of FT UG seniors.

Females have far greater response rates than male respondents [7]. One third of all PT and 7% of FT respondents were female. UG female response rates were 34%. The female student SC population is relatively very low as is the trend in Computer Science the response rate for female participation was high and the survey should reflect well their views.

Table 1. Undergraduate response rates

Programme	Year	Population	Survey Sample	Response rate (%)
DT211	1	46	7	15%
	2	32	13	41%
	3	27	6	27%
	4	12	8	67%
DT228	1	60	33	55%
	2	60	16	27%
	3	56	4	7%
	4	45	4	9%
DT249	1	72	8	11%
	2	44	11	25%
	3	44	7	16%
	4	60	7	12%

5. Findings

The average age of UG students surveyed is 22.5 years. FT UG and PT UG are 19 and 26 years old respectively.

5.1 Sex.

As is the national trend in Science the majority of students were male; 79.5% of UG Of the survey sample 92% of FT UG are male in contrast to only two thirds of the PT survey sample. This is a reflection of the overall increased female participation on part time CS programmes.

5.2 Nationality.

Of the respondents on the UG programmes 74% were Irish, 7% were Polish and 5% were Chinese. The remaining 14% constituted students from 14 other countries (Brazil, Denmark, France, Iran, Italy, Latvia, Lithuania, Moldova, Nepal, Nigeria, Pakistan, (the) Philippines, Slovakia and Britain). 8 of the 14 countries are European countries. 83% of the FT students are Irish. China is the next

nationality represented with 4.5%. On the PT UG programme 52% are Irish. Or conversely 17% of FT and 48% of the PT students are international students. Due to the international franchises of the School it might have been expected that there were more FT International students than PT. This was not evident in the survey sample. The country most representative in the UG survey (other than Ireland) was Poland. This is a reflection of the 2006 population demographic of Polish people aged 25-35 representing 6% of the total population [8]. Of the international students surveyed 59% of PT and 67% of FT had a certificate of proficiency in English or equivalent.

5.3 Previous Education.

The highest educational awards received by students to- date was requested. 56% of the UG students have proceeded from second level education. This is 30% less than the 87% reported by Euro student 2006 survey [9]. The majority of the others (23%) have proceeded from other places of education. 4% have come from the live register to education this is expected to increase significantly in 2010-11 onward.

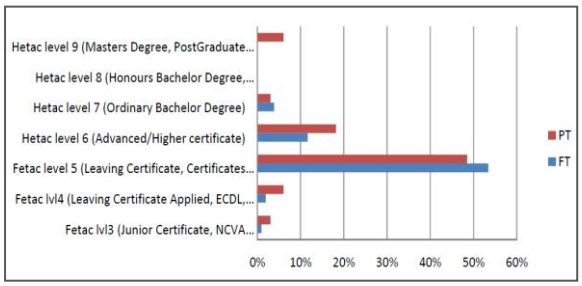

Figure 1. Highest educational award achieved by undergraduates.

5.4. Why Computer Science?

All students were asked to answer why they have chosen computing as a career. Surprisingly for FT UG students media attention is the most influencing factor (43%). This is a very significant and new finding. PT students have chosen on the basis of personal interest (85%) and skills (35%). These are rated for FT as personal interest (30%) and personal interest (26%).

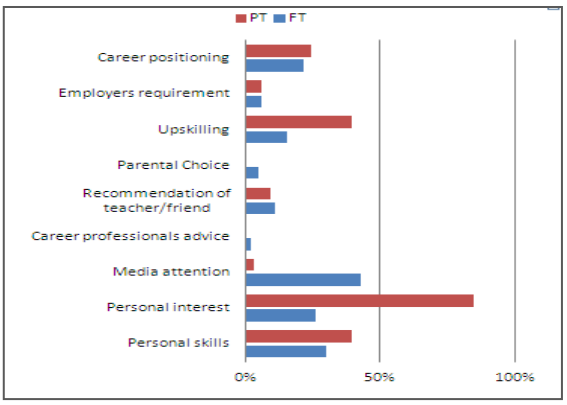

Figure 2. Why undergraduates have chosen Computer Science.

5.5. Why have you selected your current programme?

Students were asked why they have chosen to study with the SC in preference to other computer science programme providers. FT UG students are making their decision based on the course (programme) content (27%) and the reputation of the DIT (23 %). From the survey students identified internship and the exit options of DT211 as particularly influential in their choice of the FT UG programme. PT UG students are more strongly influenced by the reputation of the DIT (58 %) and by the course content (42%). The location of the college is also very important to this cohort (39%).

The students surveyed identified that there is limited choice in the provision of part degree programmes and that the relatively low fees was very influential in their decision of selection. The students were asked if the course was in their top three CAO/personal preferences. 63% of FT UG and 45% of PT UG students had placed their programme in the top three.

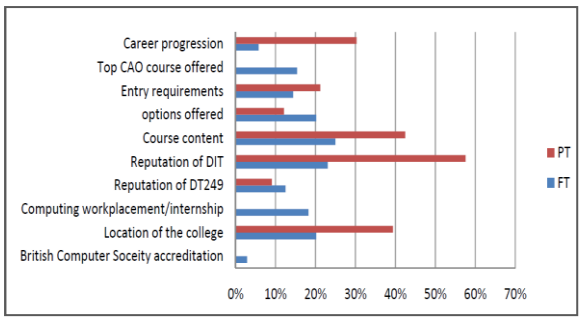

Figure 3. Why have you selecting this programme?

5.6. Current computing interests.

The students were offered a list of existing and current computing areas to select those that they wished to have included on their programme. The students were also asked to submit their dream computing job. The choices of FT UG appear to focus on the emerging technologies such as cloud computing. However website design has the highest vote (32%). The choices of the PT UG respondents appear to focus on fundamental subjects (such as website design) which are core to our programmes however cloud computing has the highest vote (39%).

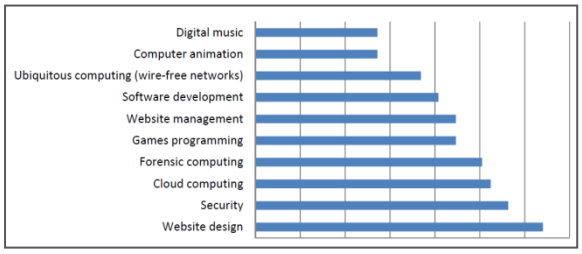

Figure 4. Full time undergraduates' computing interests.

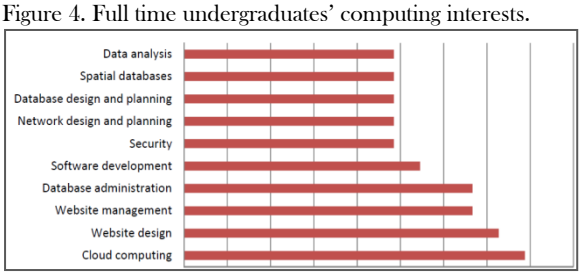

Figure 5. Part time undergraduates' computing interests.

Figure 6. Full time Computing undergraduates' career aspirations.

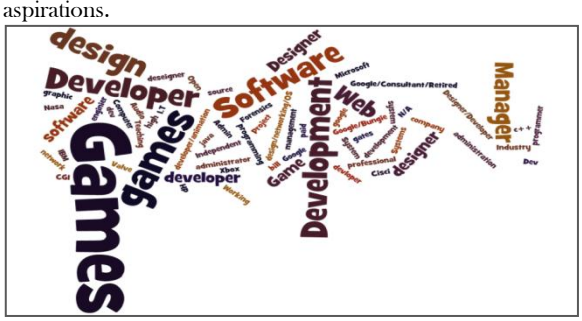

Figure 7. Full time Computer Science undergraduates' career aspirations.

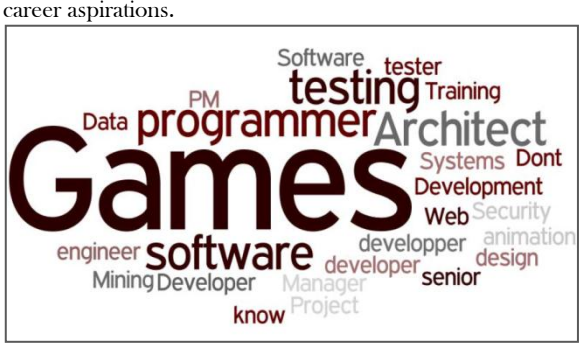

Figure 8. Part time undergraduates' career aspirations.

5.7. Approach to learning

FT UG students were asked to assess the importance of a wide range of criteria important to them as individuals. The aim was for the student to loosely define their character. They chose the following as the most important

- Order (organization, stability) – important (47%) Achievement (complete tasks, results) – important (45%)
- Advancement (moving ahead, growth) – important (44%)
- Learning (commitment to understanding) – important (42%)

The students were asked to identify the teaching methods they learn best from. The methods identified by UG FT students were assignments (43%), practical (37%) and

lectures (31%) see figure 10. These were all traditional methods of teaching. The methods identified by the PT UG respondents were lectures (55%), labs, teaching labs and problem based learning (all valued at 42%). This group has identified their learning with more student centered learning approaches than traditional teaching and learning methods.

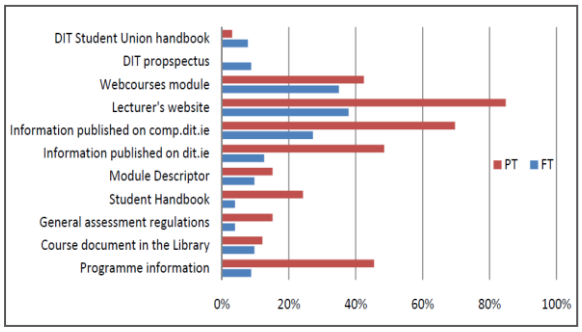

Figure 9. What material do you use for programme reference?

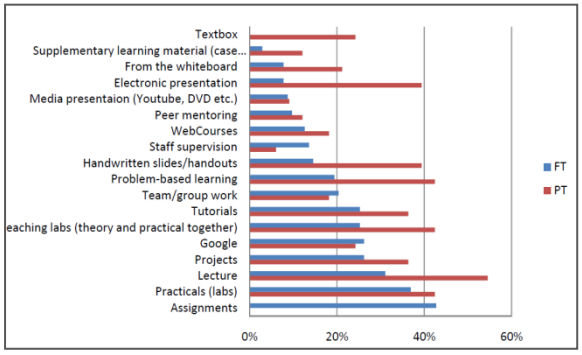

Figure10. How do undergraduate CS students learn best?

6. Discussions

Similarities seen within the two groups are dream jobs and current interest. Game Design is the dream job (see figures 6, 7 & 8) and two of the top three current computing interests: Cloud computing and Website design. The author suggests that this is due to the predominant population of the SC and sample size being dominated by Men.

The two most important factors when selecting their programme was course content and the reputation of the DIT (see figure 3). This is an important point to note in relation to promotion of CS in general to promote itself better within parent organisations mediums of communication.

The PT cohort are primarily mature students who are returning to education and obtaining Computer Science degree three evenings a week to open gateways to new careers or gain qualifications in their chosen career [7]. FT students have come from a range of educational paths to the SC but are primarily students who have come directly from second level through the Irish Central Admissions Office. The differences between the PT and FT students' attitudes to effective methods of learning may be explained by the FT continuation in education and relative preference to traditional learning and PT students importance placed on hardcopy published documents for informing their studies.

7. Conclusions

Online survey by college email was ideal. Response rates were very good with the exception of final year FT UG (13%). Female response rate were excellent (30%).

The mean information gathered indicated that a FT UG was a first year male student aged 19 from Dublin, who had progressed from second level education. His dream job was in the games industry. He had chosen computing due to media attention (43%) and personal skills (30%). He has identified the course he attends through the course content (25%) and the reputation of DIT (23%). He learns best from assignments (43%), practical (labs) (37%), lectures (31%), Google (26%) and projects (26%). His current computing interests are website design (32%), security (28%), cloud computing (26%), forensic computing (25%) and games programming (22%).

PT UG is a second year 24-28yr old male student from Dublin employed in an area other than computing. His dream job is also in the games industry. He has chosen to

study computing due to personal interest (85%) and personal skills (35%) and has chosen his programme based on the reputation of DIT (58%) and course content (42%). He learns best from lectures (55%), practical (labs) (42%), teaching labs (theory and practical together) (42%), problem-based learning (42%) and handwritten slides/handouts (39%). His current computing interests are cloud computing (39%), website design (36%), website management (33%), database administration (24%) and software development (24%).

8. References

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