Performance of Non-traditional Students in an Irish HEI

A Comparative Analysis of the Performance of Non-traditional Students in an IT Program in an Irish Higher Education Institute (HEI)

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Introduction

• This study examines the performance of non-traditional students when they enter a Higher Education Institution (HEI) in Dublin

• Each year Dublin Institute of Technology (DIT) grants ca. 20 students from Colleges of Further Education (CFE) advanced entry into the second year of a three-year ordinary degree program in Networking Technologies

• The final year results of this program, examined over a three-year period, provide the basis for this analysis
Background to Study

• The slowdown in economic growth in the years following the financial crisis in Ireland of 2008-2011 saw unemployment levels climb rapidly from 6% in June 2008 to 14.8% in June 2012[1]

Background to Study

• Irish government encourages the unemployed to upskill and return to education and supports institutes of higher education in delivering STEM programs

• This brought back into formal education many people who had been away from it for several years

• Reflected by the older age profile of students from CFE programs compared to the traditional-entry student body over the period of this study
Framework of Qualifications

- Irish National Framework of Qualifications (NFQ)[2] categorizes levels of educational qualifications in Ireland
- Differs from the European Qualifications Framework for Lifelong Learning (EQF)[3], which offers a common reference for national qualifications across Europe
- The NFQ uses 10 levels to cover the span of possible learning achievements, while the EQF does the same with 8 levels

[3] https://ec.europa.eu/ploteus/content/descriptors-page
Framework of Qualifications

Framework of Qualifications

- Upper NFQ levels of education in Ireland:
  - Level 6 (Higher Certificate)
  - Level 7 (Ordinary Bachelor Degree) – aligned with EQF Level 6\[4\]
  - Level 8 (Honours Bachelor Degree)
  - Level 9 Masters Degree
  - Level 10 (Doctoral Degree)

- Students in this study have been engaged in a NFQ Level 7 Bachelor of Technology Degree (Ordinary) in **Networking Technologies**

Background to the IT Program of Studies

- DIT SEEE\(^5\) operated a popular 2-year NFQ Level-6 program called *Higher Certificate in Electronics* until numbers dropped following the economic downturn.
- A market analysis determined that demand for newer programs in IT disciplines.
- The 2007 report by the National Expert Group on Future Skills Needs identified:
  - “IT employment is projected to grow strongly as highlighted both in the latest reports by Forfás and FÁS/ESRI”\(^6\)

\(^{5}\) [http://www.dit.ie/electricalelectronicengineering/](http://www.dit.ie/electricalelectronicengineering/)
Success of the Program

• Team devised a new IT program to operate as a 3-year Level-7 Ordinary Degree, titled the Bachelor of Technology (BTech) in Networking Technologies[7]

• This has been enormously successful, mainly due to a confluence of two factors:
  1. The financial crisis in Ireland of 2008-2011
  2. The availability of an attractive course in the centre of a large cosmopolitan area

Success of the Program

• This IT program is not part of an engineering stream
• It was designed to incorporate any necessary mathematical content into the modules requiring it, rather than any separate dedicated mathematics modules
• The HEA is the statutory planning and policy development body for higher education and research in Ireland

• HEA *National Plan for Equity of Access to Higher Education 2015-2019*[^8], has set the target of having 10% of new entrants to higher education (HE) coming from further education (FE) by 2019

• DIT aligns its activities with a key goal for delivery over the period of the National Access Plan:
  • “to build coherent pathways from further education and to foster other entry routes to higher education”

[^8]: [http://www.hea.ie/node/1622](http://www.hea.ie/node/1622)
Future of the Program

• HEA investment makes the performance of FE students in HE a subject worthy of study
• A sustained relationship between DIT and the Colleges of Further Education has developed
• DIT benefits from a boost in student numbers following Year 1 retention losses
• CFEs gain standing from students who aim to progress to higher education programs
Entry to the Program

• Ireland’s Central Applications Office (CAO)\cite{9} allocates places to applicants to undergraduate courses based all or in part on results from the Irish Leaving Certificate.

• Over 90% of direct entry to Year 1 of this program is via CAO.

• DIT recruits ca. 60 students into the first year of the Networking Technologies program.

• Approximately 75% progress to Year 2, where their numbers are augmented by ca. 20 advanced entry students.

\cite{9} https://www.cao.ie/
Entry to the Program

• For clarity, *Colleges of Further Education* in Ireland (and the United Kingdom) are broadly similar to *continuing education* in the United States.

• In Germany, *Weiterbildung* (further education) is very broad in meaning, and is used differently in each state / Bundesland[^10]. An equivalent might be the "*Dritter Bildungsweg*"[^11], or the "*third course of education*"

[^10]: http://ausbildung.info/weiterbildungslandschaft
[^11]: https://www.boeckler.de/6299.htm?produkt=HBS-006316&chunk=1
Entry to the Program

- From a HEI perspective, the advanced entry students are considered non-traditional entrants having bypassed the mainstream entry route.
- Further, the particular group in this study have gained advanced entry into Year 2 of a Level-7 program, which can be a considerable leap for some students.
- However, this study has shown that many of these students adapt to their new environment to outperform their mainstream colleagues.
Age Profile of Students

- Due to delayed entry into HE, the average age of former CFE students is noticeably higher than that of non-CFE students.
Age Profile of Students

• The drop in age differences over recent years probably reflects the pick-up in employment opportunities.
• For 2013-14 and 2014-15, the average age difference was 9 years, but by 2015-16 it had dropped to a 5-year difference.
• The consequent different expectations and work-ethic may be contributing factors to the performance differences between these two groups in the student population.
Grades v. Student Age

- Low correlation between individual student ages and their final result
Grades v. Award Classification

• CFE students earning a Distinction (32%) is much higher than that of non-CFE students (12%)

• Dist: Distinction
• MU: Merit Upper
• ML: Merit Lower
• Pass (lowest passing grade)
Results

• Over the three year study, CFE students made up ca. 39% of the final year cohort
• Former CFE students have represented at least half of the top ten ranked places
• Specifically, within the Top 10, CFE students generally score above the median in this category, including occupying the number one spot
Results

• However, the positive findings at the top end are contrasted with the observation that former-CFE students also rank among those that dropout
Results

• Probability Density Function (PDF) of CFE student results indicates a better performance over non-CFE students
Results

• Complementary Cumulative Distribution Function (CCDF), or tail distribution, demonstrates this slight difference more clearly
Results

• **Null Hypothesis:** Mean of 59.99%
• **Alternative Hypothesis:** CFE score is higher than 59.99%
• **Sample statistics:**
  • Mean of CFE group: 63.59%
  • Sample size: 41
  • Standard Deviation: 6.99
  • Calculated $p$-value: 0.00023
Results

- The analysis indicates that if the null hypothesis were true, the likelihood of the CFE group obtaining a mean score of 63.59% or higher is only 0.023%.
- This is a highly significant result and strong supporting evidence that the CFE student group outperforms the non-CFE group.
Discussion

• A point of note: for this particular Technology program students without strong mathematical skills are thriving, in contrast with students in STEM areas taking modules underpinned by significant mathematical components[12]

• From the 3-year total of 108 students, 41 students (39%) are former-CFE students compared with the other 67

Discussion

• Evidence to-date shows the former-CFE students have an average 3.8% higher performance, which was shown to be statistically highly significant

• Furthermore, it would appear safe to infer that the former-CFE students performed at least as well as their counterparts
Discussion

• Students graduating from the CFE sector and electing to study at DIT are a self-selecting group

• They make a more serious commitment to their studies at DIT compared with their younger counterparts, and this selection bias may account for some of the improvement seen

• Former CFE students tend to be somewhat older, and certainly more mature, than traditional students, with varying life experiences that prepares them to adjust to the transition to higher education
Discussion

• Former-CFE students are deeply invested in their time, personal resources and in acquiring as many ancillary skills as possible

• In discussions, some former CFE students have stated that they will be in competition with younger graduates, and seek to achieve the advantages that higher grades may bring
Discussion

• They are acutely conscious of how market competitiveness bestows value on a good qualification and are anxious to graduate with the highest marks

• Staged learning via the ladder system enables students that lack confidence to re-access pathways to more advanced qualifications
Future Work

• This is the start of a longer term study and the next set of final year results will be available shortly

• It is hoped to expand on the information collected to:
  • Analyse the background of students entering the program in Year 1, since not all students join through the CAO system
  • Create a student questionnaire, for early in the academic year, that might reveal why some students do not subsequently complete the program