

Changing the Introductory IS Course to Improve Future Enrollments: An Irish Perspective

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ABSTRACT

A significant challenge facing the IS discipline worldwide is the reversal of the low numbers of students currently enrolling in IS courses. While there is a growing body of literature which offers various insights into the IS enrollment crisis, almost all of this work is either from U.S. scholars or based on findings from U.S. universities. This paper seeks to bring a much needed international perspective to this issue. The setting for this paper is the Kemmy Business School at the University of Limerick in Ireland where enrollments on the IS program have grown from a low of 12 in 2007 to 70 in 2011, a five fold increase. Using a set of steps laid out by Firth et al. (2008) we detail how this success was achieved. Supported by focus group and survey data, we provide new ideas on how to engage business school students in the IS discipline in a way that encourages them to specialize in the discipline. This paper presents a useful and immediately applicable plan for all IS programs that are seeking to grow or strengthen their offerings.

Keywords: Enrollment, Large classes, Instructional pedagogy, Introductory course

1. INTRODUCTION

There has been a shift in attention over the last several years toward a more focused consideration of the role and impact of undergraduates within the IS field. Much of this is as a result of the challenges facing the IS discipline, a key factor of which is low enrollments (Choudoury 2010; Gill and Bhattacharjee, 2009; Granger et al. 2007; Koch and Kayworth 2009). The effect of low enrollments has been to imperil the viability of IS programs. Around the world IS programs have been folded into other business school programs or shut down entirely (e.g. University of Central Florida, see Weber and Zaragoza 2009). Recognizing the seriousness of this issue, the ICIS 2011 panel session “Are we on the wrong track and so do IS curricula need to be reengineered?” (Gefen et al. 2011), culminated with a call for a better understanding of the practical steps IS academia need to undertake in order to counter the enrollment crisis. This paper is a response to that call.

In looking at the role of undergraduates in the IS field, scholars have addressed issues from a variety of levels of

analysis. At a high level of abstraction Firth et al. (2011) look at the credibility of the IS field as a whole, and the role graduate and undergraduate students play. At a more detailed level there has been coverage of more specific issues such as how to recruit students into the major (Downey 2011; Koch et al., 2010; Looney and Akbulut, 2007), pedagogy issues dealing with students (Firth et al., 2008), and the relevance of IS research for undergraduate students (Davidson, 2011). Looking across this growing body of published work, one comes to the conclusion that scholars of all stripes within our field are realizing that undergraduates are a foundational resource for the IS field. Yet, while low IS enrollments is a global issue, almost all of our knowledge on how to address this concern is either from U.S. scholars, or based on findings from U.S. universities even when the publishing journal is not U.S. centric (e.g. Davidson, 2011). To exemplify this regional imbalance, the aforementioned ICIS 2011 panel session consisted of four North Americans and one European. Studies that examine this critical issue in regions beyond the U.S are paramount to addressing the IS enrollment crisis as undergraduate motives may be region-

specific (Downey 2011). Thus, our paper seeks to expand this important scholarly work out of the U.S. by providing a perspective from an Irish University.

The primary setting for this paper is the Kemmy Business School at the University of Limerick (UL) in Ireland. While the IS community has offered various strategies for improving IS enrollments, such as revising the curriculum (Apigian and Gambill, 2010; George, Valacich and Valor, 2005; Looney and Akbulut, 2007), and marketing IS careers (Granger et al., 2007; Koch and Hayworth 2009; Kuechler et al. 2009), the focus of this paper is on the introductory IS course. At the Kemmy Business School, as at many schools, the objective of the introductory IS course is to provide students with a broad understanding of the fundamentals and strategic importance of information systems in contemporary organizations. It is also a mandatory course for all students studying business. As such, it provides the first opportunity to influence business students as to the major, or course of study, they are considering (George, Valacich and Valor, 2005; Looney and Akbulut, 2007). Using a set of steps laid out by Firth et al. (2008 "Addressing the IS Enrollment Crisis: A 12-step Program to Bring about Change through the Introductory IS Course") we present evidence of strategies and the successful results thereof at the Kemmy Business School. We compare, contrast and elaborate on the work Firth et al. (2008) produced from a U.S. institution, bringing an international perspective to the issue of changes with the introductory IS course and its impact on student enrollment in future IS courses. As a result of the strategies pursued and the positive results emerging, we provide advice for other IS educators wishing to grow their IS major and minor options.

2. BACKGROUND: THE KEMMY BUSINESS SCHOOL IS ELECTIVE

The option to major in IS was first offered to UL's undergraduate business students in the mid 1990's. The timing coincided with the dot.com boom and as with many IS courses at the time, the student uptake was quite high, between 70 and 80 students each year. Following the bursting of the dot.com bubble however, enrollments declined dramatically, so much so that by 2003 the IS elective was downgraded from a major to a minor option. The minor option now consisted of three modules that students took in the 3rd and 4th year of their degree program. *Data and Decision Making* (year 3, semester 1) provided students with database development skills and an appreciation of decision-making theories and the role of IS within them. *Social and Economic Perspectives of IS* (year 4, semester 1) focused on the IT challenges that companies and their CIO's face today. Students also acquired skills in business process modeling through the computer labs that complemented this course. Finally, *Knowledge Management* (year 4, semester 2) combined an in-depth critique of the role of IT in creating, sharing, storing, and exploiting a firm's knowledge assets, with technical skills in the social network analysis package UCINET.

As a minor option, IS continued to struggle. In 2009, only 12 out of a possible 358 students chose the IS minor. The IS option was now viewed by the School's Management Board as being unviable and the IS group was given one

more year to address the enrollment crisis. Failing a significant turnaround, the option would be withdrawn from the undergraduate business program.

The following sections detail out how we went about resurrecting the IS option with supporting evidence from student focus groups and end of course evaluation survey.

3. RESEARCH METHODS

The initiatives, results and lessons learned in this paper come from an action research approach (Baskerville and Wood-Harper, 1996). Action research differs from other methodologies in that the researcher is directly involved in the phenomenon being studied (Galliers, 1992). In this research, the first author gathered data from his own students and implemented initiatives designed to increase IS enrollment. Student focus groups were initially conducted to determine why business students were not selecting the IS elective. After selecting and implementing a variety of initiatives to reverse the trend, an end of course student evaluation survey was used to determine the effect of each initiative.

Focus group participants were sought from the 2nd year business class who had just selected their major and minor options. A €10 gift voucher for the university bookstore was offered as an incentive to encourage volunteers. In all, 26 students participated. None of the focus group participants had selected IS as their minor option. A review of their grades revealed that there was no sample bias in terms of performance. These students were divided into five separate groups with each session lasting 50 minutes. The focus groups were moderated by the first author who kept the sessions very open and informal. With the permission of the students, each session was recorded and transcribed. Qualitative data analysis was performed using the NVivo software package and followed established inductive qualitative methods: coding, data categorization and pattern identification (Miles & Huberman, 1984).

In addition to these focus groups, a course evaluation was administered at the end of the 2011 term by an independent teaching improvement unit within the university. 188 students out of 362 business students who took the course completed the questionnaire, giving a response rate of 52%. The questionnaire incorporated both likert scale and open qualitative responses. A copy of this questionnaire is provided in Appendix A.

4. FOCUS GROUP FINDINGS

Consistent with Downey's study of U.S undergraduates (Downey 2011), the focus group sessions quickly identified that the low enrollment problems rested with the Introductory IS course which all 1st year business students were required to take. The students explained that after taking the introductory course they failed to see the relevance of IS. Comments equivalent to this from one focus group participant were frequent:

I came to UL to study business. I know why a businessperson needs to understand accountancy, strategy, or marketing. But I don't know why I need IS...I don't want to be a programmer or someone who fixes hardware.

In addition to the relevancy issue, a number of other problems students were experiencing arose during the focus groups. The IS introductory course placed a heavy emphasis on the technical aspects of IS. Topics such as ‘system analysis and design’ and ‘database development’ were covered in lectures with weekly computer labs on MS Excel and Access. Students found these topics quite unpalatable and the word ‘boring’ arose regularly when the focus group discussion switched to this issue. The quality of teaching on the 1st year introductory course was also an issue. The course was delivered by one lecturer whose knowledge of IS was unquestioned, but whose delivery was not at a level that truly engaged the students. Additionally, students believed that the introductory course did not challenge them. This was primarily because 80% of their final grade was determined by an end of term multiple choice question (MCQ) exam. According to students, this encouraged rote learning and deep reflective thinking was not seen as necessary.

To address these problems, we implemented the steps laid out in the “12-step Program to Bring about Change through the Introductory IS Course” developed by Firth et al. (2008). This program is designed to address the “how” aspect of teaching the introductory IS course, not detailing the actual content to be covered. A summary of the 12-steps is provided in Figure 1. Only the ‘Identify and market to top students’ step was not implemented and a discussion about

this particular step is provided in our concluding remarks. Of the eleven steps that were implemented in the introductory IS course at the Kemmy Business School, we found that seven of these had the biggest impact in addressing our enrollment crisis. These seven are (1) Assign the most effective teachers, (2) Teach IS, not IT or computer science (CS), (3) Use writings from non-IS authors to tell the IS story, (4) Force the students to write and write and write, (5) Expose the students to innovative and interesting technology (6) Recruit peers and alumni as guest speakers, and (7) Expose students to career and internship counseling. While the remaining four steps were implemented, these are not discussed in this paper. Two of these steps (i.e. ‘be nimble’ and ‘focus on local strengths’) are designed to support the other steps and we uncovered no direct evidence that these particular initiatives had either a positive or negative impact on future enrollments. The remaining two steps (i.e. ‘provide opportunities for reflective growth’ and ‘provide sufficient levels of assistance to students’) were always implemented in the introductory IS course over the years. When the change to the course was made in 2009, we did not do anything different on these fronts that were not done in previous years. Thus, any increases in enrollments were more likely due to the new steps we did implement.

As a result of these interventions, new life was brought back into the introductory course and enrollments to the IS minor option grew from a low of 12 in 2009, to 70 in 2011

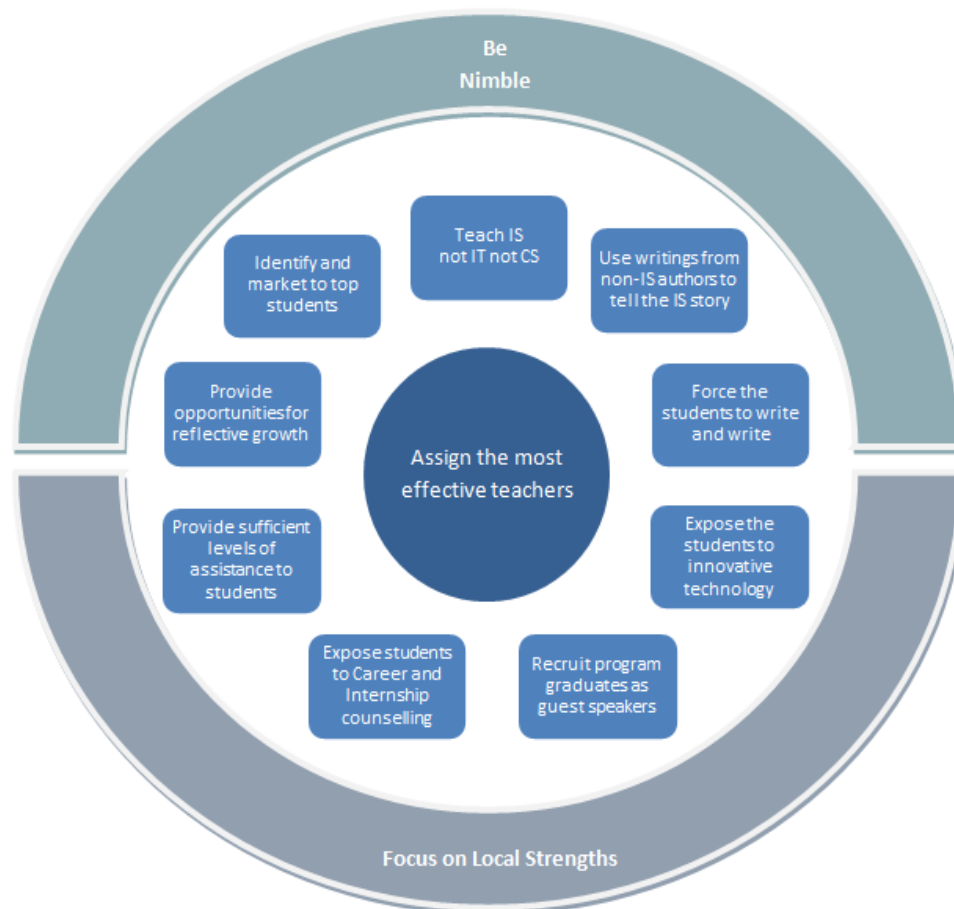


Figure 1. The 12-step Program to Bring about Change through the Introductory IS Course from Firth et al. 2008

(see figure 2). Since the year 2000, the number of students who could take a minor option stayed relatively constant at between 355-365 each year. Of the 12 minor options available to business students, the IS elective is now the 2nd most popular (Law being most popular with 72). The following section describes how this success was achieved.

2008). The IS group at the Kemmy Business School adopted this approach but we add an important improvement that others seeking to improve there is programs should consider. An analysis of the student evaluations revealed that some teachers were rated as “very effective” when they taught small classes (<25) but scored poorly when they taught

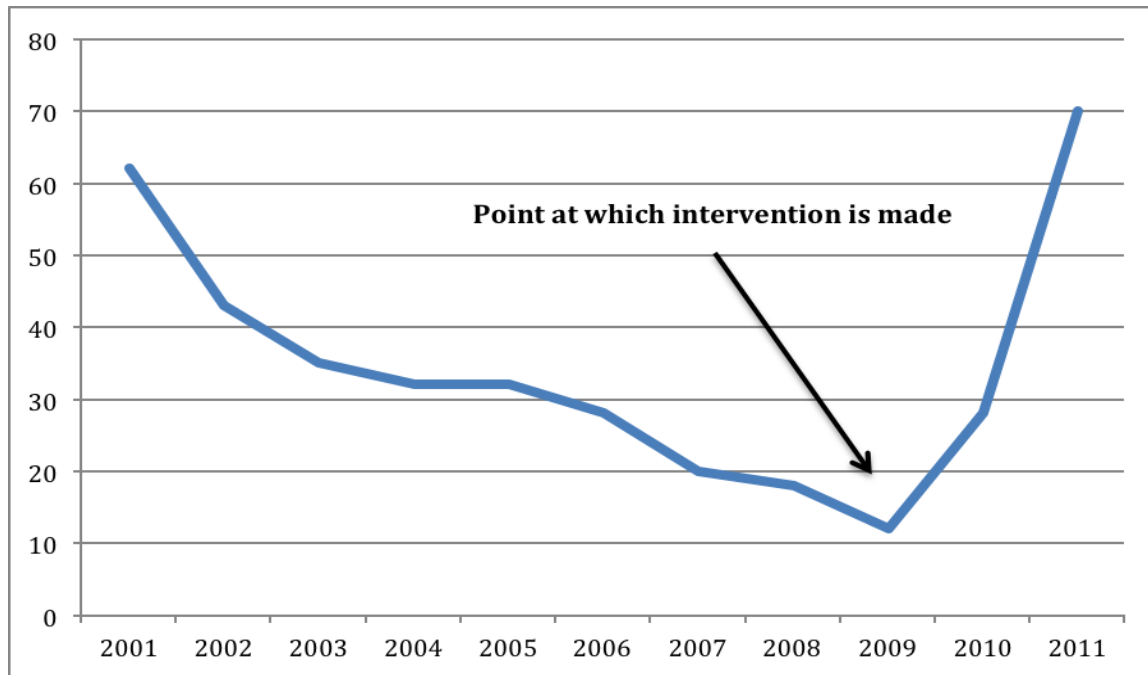


Figure 2. Enrollment numbers for the IS minor at the Kemmy Business School

4. IMPLEMENTING THE CHANGE PROGRAM

This section details the specifics of how each of these 7 steps were implemented from an Irish business school perspective. We also provide evidence from an end of term course evaluation which encapsulates the impact each intervention had on students’ perception of IS.

The quotations we include below are taken from the student responses to the open-ended question on the course evaluation survey “Please highlight any further details relating to your learning experience on this module.” The quotes we include are those we believe to be most representative of the overall student sentiment.

4.1 Assign the Most Effective Teachers

Effective teachers are hugely influential in shaping the ultimate career choice of the students they educate. Such teachers are able to diffuse their passion for the discipline and motivate students to want to learn more. Recent studies of students enrolled in an introductory IS course empirically demonstrates that students are more likely to be attracted to the IS discipline when they are taught by effective instructors (Downey 2011; Looney and Akbulut 2007). The 12-step program advocates that student rated course evaluations be used to identify the most effective teachers and based on these results, teaching assignments should be adjusted to place these teachers in the introductory IS course (Firth et al

classes with 50 or more students. Pedagogical theory has long recognized that the dynamics of large and small classes are quite different and that educators need to be trained in appropriate teaching methods for both (Ebert-May et al., 1997). For example, maintaining student engagement in a small class can be easier as students are likely to feel more comfortable in interacting with the instructor. In a large lecture hall, students may not be as confident and interaction is unlikely to happen unless specific techniques are incorporated e.g. frequent breaks, buzz group discussions, interactive handouts etc. At the Kemmy Business School, the IS teacher with the best evaluations for large classes was selected to teach the introductory IS course. This teacher also participated in a teaching workshop offered by the University entitled “Teaching and Learning in Large Groups.” This led to a change in teaching style and the introduction of various teaching innovations to the IS introductory course. As a result of these initiatives, the overall effectiveness of the IS introductory module was rated as one of the highest among all large classes taught in the university (see figure 3).

The open-ended response section of the survey allowed students to offer their opinions on the course. Almost all comments were positive in relation to the teacher’s effectiveness and a sample of these which mention the IS minor option are listed below;

- *This was an extremely useful module and I thoroughly enjoyed it. I am seriously contemplating choosing it as my minor option next year!*
- *I have enjoyed this subject immensely [and] as a mature student, I had very little knowledge or experience in this area prior to commencing college. I am now considering doing my minor in this area.*
- *I find this module the most interesting and [instructor's name] is a very effective lecturer, very knowledgeable on the subject matter and manages to create an interest in the subject which encourages me to find out more.*

of the nuts and bolts of the racing car and how they fit together. The pit crew is analogous to IT as they ensure that a well-designed race car is properly maintained. IS is then the driver of the car, making critical, real-time decisions, and the person who takes all the glory. The driver utilizes the well-designed and well-maintained software to its maximum, ensuring that the highest possible business value is extracted. A similar analogy was given to the Kemmy Business School students in their very first lecture. However, instead of using NASCAR, the most popular spectator sport in the U.S., the analogy used Formula 1, a more popular sport in Europe and

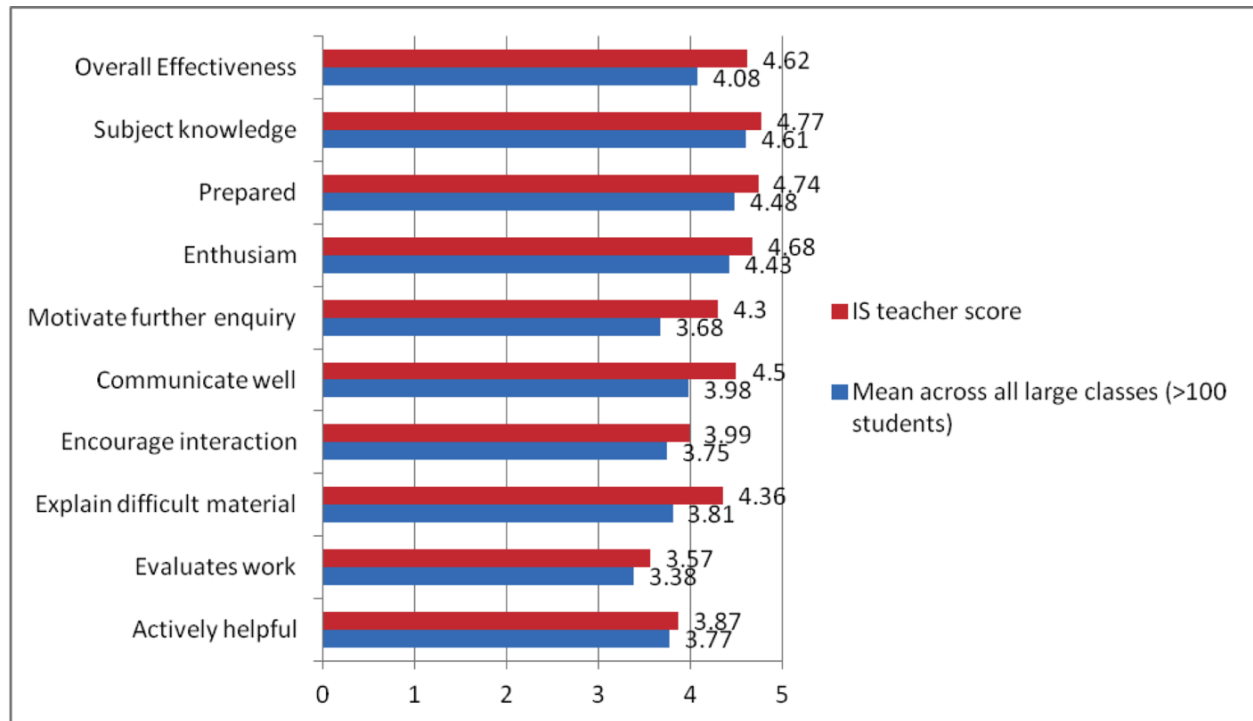


Figure 3. Student evaluation of introductory IS course (Semester 1, 2011) at the Kemmy Business School

4.2 Teach IS, not IT or CS

The initial student focus groups used to diagnose the specific problems with the IS elective clearly pointed to the fact that students continued to view IS as hardware, software, and programming, even after taking the introductory IS course. This 'hard' view of IS can lead to students accepting the myth of the IS worker as a cubicle-bound low-level technician (Koch et al. 2009). Likewise, our students had a clear understanding of why they had to take other mandatory business courses, such as accountancy, economics, marketing, and strategy, but could not reconcile why they, as business students, needed to know about IS. To combat this myopic perception of IS, two specific strategies were pursued.

Firstly, Firth et al. (2008) provide an analogy of NASCAR (National Association for Stock Car Racing, a US-centric car racing sport) which can be given to students very early in the course in order to explain the differences between IS, IT, and CS. The analogy explains that CS can be viewed as the engineers who need an intimate knowledge

one that most students would have some understanding of. The students found this analogy quite useful in helping them to identify exactly what IS is about. As one student commented in his/her course evaluation;

I didn't really know what IS was about coming into the course. The Formula 1 example [instructor's name] gave at the very start really helped me [to] understand what it was all about. I was a little confused at times when doing my assignments but I just kept thinking about Formula 1...[that] helped to pull it out of the clouds for me.

Secondly, to demonstrate the relevancy of IS to business students, each topic covered in the course was linked to the core business disciplines which students could major in – Accountancy, Economics, Marketing, and Human Resource Management. For example, Web 2.0 technology was one topic covered in the course. After explaining what these technologies were and how they differ to Web 1.0, the attention then switched to the organizational impact of these technologies on functions such as Human Resource Management. The instructor guided students through

discussions about how social networking sites might be used to recruit staff, how employees can use blogs and wikis to connect and share ideas, or how virtual worlds could be used to deliver employee training. This strategy of tightly coupling IS to each major option also had a positive impact on enrollment to the IS minor option. Many students who choose the IS minor indicated they did so because they understood how IS compliments their major option and how a better knowledge of IS would be of benefit in their careers as accountants, economists, marketers, or HR managers.

4.3 Use Writings from non-IS Authors to tell the IS Story

A core objective of the introductory IS course should be the articulation of the transformative power of IS. This goal is necessary to convince students of the importance of IS and the impact it will have on their future careers. The Firth et al. (2008) 12-step program advocates the use of non-IS writings, such as Thomas Friedman's *The World Is Flat* (2005), Clayton Christensen's *The Rules of Innovation* (2002), and Nicolas Carr's *The End of Corporate Computing* (2005) to emphasize the importance of IS to the business world. The early lectures in the introductory IS course at the Kemmy Business School focused on the question "Why is information systems important?" and Friedman's observations on "The ten forces that flattened the world" were particularly effective in aiding this pursuit. Friedman discusses how phenomenon's such as Netscape going public, the advent of workflow software, and the rise of online communities have leveled the industrial playing field, and why organizations of all sizes need to pay attention. In addition, the Kemmy Business School course also incorporated more European writings from magazines such as *The Economist* (the February 27th 2010 edition on "The data deluge and how to handle it" was especially useful when discussing the negative aspects of IS). Likewise, students were also encouraged to read an IT newspaper supplement called *eThursday*, published each Thursday in the business section of the *Irish Independent*. The instructor would then take 5 minutes from one weekly class to discuss a noteworthy article from this supplement, usually about how a new technology was transforming an organization or an entire industry. The use of non-IS writings in the course received positive feedback from students, the following quote being an exemplar of such opinions;

This course was my favorite of all my classes this semester...I liked the fact that we didn't really use a standard textbook, all my other classes did. It was obvious that [instructor's name] put a lot of thought into the material we cover[ed] and it felt like we were getting a really unique course.

4.4 Force the Students to Write and Write and Write

There are many reports available which highlight what skills and abilities industry require from graduates about to enter the labor force today. In addition to specific technical skills, what these reports consistently show is that the higher level abilities sought by industry are; critical thinking and deep thought, creativity, and being skilled in problem solving, and knowing how to critically analyze information to inform decision making (see Nelson et al 2011). The best way the introductory IS course can develop these skills is through writing (Firth et al. 2008). The IS course at the Kemmy Business School was failing in this regard as students were

assessed almost exclusively through an end of term MCQ exam.

As part of the turnaround strategy, the assessment procedures were changed to focus on writing and to reward students for critical thinking, analysis, creativity, and problem solving ability. Students were assessed in a number of ways. Firstly, a number of discussion topics were posted up by the instructor on the class online discussion forum throughout the semester. One discussion topic posed the question "Do social media technologies make us more or less social?" Students were required to consider this statement and to reply with their own opinions using supporting evidence where appropriate, and to debate their view with their classmates. Each discussion topic was worth 3% of the final grade and students were explicitly informed that they would be rewarded for original thought, and not just a regurgitation of what others have said. Secondly, students had to complete two written assignments, each worth 15%, as part of their continuous assessment. Each assignment presented a unique organizational problem which required the student to write a report to that company which (a) framed exactly what the problem was and its causes, and (b) suggests how IT can be used in an innovative way to solve that problem. Students were then given some feedback on how the quality of their report could have been improved. Finally, students sat a two hour end of term exam. The questions posed were a mixture of case study and essay style questions that required students to think analytically and creatively.

A number of students complained that the work they were required to complete for the IS course was significantly more than some of their other courses, many of which still assessed the class with a final MCQ exam. Therefore, to secure buy-in from the students it was necessary to spend some time explaining to them why they were being assessed in this fashion. This discussion focused on the skills that industry require, and how the assignments they complete in the IS course were developing these very skills. This message was repeated throughout the course and the end of term course evaluation showed that students broadly accepted this approach, as evidenced by this student comment;

I found all the assignments quite difficult and they took up a lot of my time. I didn't get the grade I hoped for in these but I guess I can see that there is a learning curve. I have a good idea of what I need to improve on and hopefully I will be able to demonstrate to potential employers that I have the skills they want.

4.5 Expose the Students to Innovative and Interesting Technology

In our experiences, the most effective way to get students interested in IS is to give them hands on experience using real applications. The introductory IS course at the Kemmy Business School always had a computer lab component where students learned MS Excel and Access to a relatively high knowledge level. However, students were failing to engage with these applications as they viewed them as being antiquated. The data analyses skills that students get from using MS Excel and Access are quite important so the decision was taken to cover these applications at a very basic level in the introductory IS course, and at an advanced level

in the later IS electives. Moving more of the advanced spreadsheet and database sessions to the elective courses enabled the introductory course to incorporate emerging technologies that students would find interesting. For example, one computer session focused on using wiki platforms. To understand the advantages that such platforms offer in terms of distributed collaboration, a wiki was created for the class where they could collaborate together to answer a sample exam question. The students benefited from this in two ways. Firstly, they got hands on experience using the technology. Secondly, the result of the experiment was a sample exam answer produced by the whole class that turned out to be of very high quality (it would have received an A1 grade in a real exam setting). The computer labs also incorporated other emerging and interesting technologies such as;

- Social networking sites - with an exercise on Facebook related to identify theft and how much information people reveal about themselves online.
- Open source software – with an exercise using the open source application, SugarCRM, to manage the customer relationship.
- Scratch – a visual programming language that makes it easy to create games, animations, and interactive stories (www.scratch.ie). A prize was awarded to the student who created the best application using Scratch.

Overall, the feedback from students on the redesigned computer labs sessions was highly complementary;

- *The [computer] labs were great and really interactive, more so than any of the other modules I have studied! The Facebook lab really woke me up to how much personal info I was giving away. Really enjoyed this module. We don't really get any hands-on experience in our other modules.*
- *The labs were my favorite part of the course. Working on the wiki sample question was an excellent exercise. I'm really curious now about how companies are using these systems.*
- *I never really had an interest in IT before doing the computer sessions. I developed this interest in IT as a result of the labs and the lecturer's skills in teaching it. I would have liked to have done more with Scratch...I'm not sure if programming is done in the minor but I'd be keen to learn other programming languages.*

4.6 Recruit Peers and Alumni as Guest Speakers

In addition to demonstrating how IS can contribute to all business disciplines, a dual strategy pursued in Kemmy was to promote the career of the CIO as one that business students could aspire to. We explicitly used the title 'CIO' and not 'IT Manager' to ensure that students did not confuse IS with IT. Emphasis was placed on the prominent position of the CIO in top management teams, and how this role has been critical to the success of well-known European companies such as Ryanair. A CIO of a leading Irish logistics company was invited to give a guest lecture to explain the role of the CIO, the skills they need, and the challenges they face. This particular CIO was chosen because we were aware of his undergraduate degree in Business Studies, and the fact that IT is increasingly critical to the success of the logistics industry.

The advice of Firth et al (2008) was heeded and the content of the lecture was discussed and agreed upon with the speaker in advance of the class. We discussed what we wanted to achieve; (1) to emphasize that the goal of the CIO is to deliver business value through the effective management of IT and to achieve this, the modern CIO needs a strong knowledge of business fundamentals (i.e. strategy, marketing, finance etc.) in addition to a deep understanding of IT, (2) to provide interesting examples of how his company used IT in innovative ways to achieve competitive advantage, and (3) to describe the rewards that are available to students who choose an IS career, and to focus the talk on why taking the IS elective is relevant, useful, and fun. The speaker agreed to structure his talk to these objectives and provided his slide deck in advance to ensure his talk was aligned to our goals.

Essentially, the core goal of the guest speaker is to act as an ambassador for the IS elective. Based on the feedback received from students, we believe the guest CIO speaker contributed to the upturn in IS elective enrollment. Below is a comment from one student to this effect;

The guest lecture from the CIO was really insightful. He was really passionate about his company and how IT is making a big difference. I liked that he talked about his own time studying business. He convinced me that this is a career I should be thinking about. Will definitely do the minor for this course.

4.7 Expose Students to Career and Internship Counseling

Empirical evidence suggests that the perceived availability of jobs and good salaries promotes student interest in the IS elective (Akbulut and Looney 2007). However, students in the introductory IS course are unlikely to be aware of the types of careers and rewards that are available as a result of pursuing the IS elective. The distribution to students of such information is central to the growth of enrollments on future IS courses. To execute this strategy, the instructor continuously scouted for positive news stories relating to the demand for IS graduates, and posted these up on the online platform for the course. These news stories were frequently brought up by the instructor in class as well. In addition, our guest CIO speaker devoted part of his class to talking about the current opportunities for IS graduates and how 'ambidextrous' students (i.e. those with a combination of deep technical skills and a broad understand of business) are in high industry demand. Likewise, all Kemmy Business School undergraduates are required to undertake a 6-9 month work placement program in the 3rd year of their degree. The instructor worked with the work placement office to identify companies offering IS roles and made 1st year students aware of these posts through both the online platform and class discussions.

5. DISCUSSION

A significant challenge facing the IS discipline worldwide is to bring about a reversal of the low numbers of students currently electing to take IS courses. Already we are aware of IS courses being abandoned with the result being no new recruits to the department, less research resources available, and IS instructors assigned to teach non-IS courses. The IS program which is the subject of this paper is one such

program which came perilously close to being cut due to low enrollments. In this paper we described how this IS program at the Kemmy Business School was successfully transformed as a result of implementing the Firth et al. (2008) "12-step Program to Bring about Change through the Introductory IS Course". Supported by data from a student course evaluation survey, we found that 7 of the 11 steps implemented were most effective in influencing students to select future IS courses. Importantly, the change program needed to be tailored to an Irish context as it was initially developed from experiences in a U.S institution. This paper details how each of the 7 steps were implemented to specifically cater for the needs of the European IS student.

5.1 Comparison with U.S Experiences

While aspects of the 12-step program have to be customized for the local region, the impact of the changes made at the Kemmy Business School in Ireland are broadly similar to those found by Firth et al. (2008) at the University of Montana in the U.S. This was surprising to the authors as we expected the differences in the educational systems both pre-university (generalist in the U.S vs. specific in Ireland) and during university (University of Montana is a liberal arts college which means the students are required to take a good third of their classes outside the business school), would have resulted in larger differences in student reactions to the intervention strategies. It is an interesting finding in itself that the reactions of Irish students are broadly similar to their North American counterparts. One could interpret this to mean that the educational system does not have a strong bearing on student major/minor enrollment decisions. Instead, our results support that students are more focused on the outcome i.e. who will hire them. In our increasingly globalized world, U.S and European employers are looking for the same skillsets and all introductory IS courses need speak to these, regardless of the regional location.

We did find some differences when comparing the implementation of the 12-step program at the Kemmy Business School with that of the University of Montana. Firstly, one of the steps – identify and market to top students – was not implemented at Kemmy. Other business disciplines could construe such a strategy as an attempt to 'poach' high performing students away from their electives. As discussed in the following section, IS electives have more to gain by complementing and partnering with other business disciplines than by fighting tooth and nail with them for the best students. Also, such strategies could easily be countered by other units which could present a non-collegial perception of the business school to the student. This is certainly not desirable. Secondly, both Firth et al. (2008) and Koch and Kayworth (2009) report that their change initiatives not only increased IS enrollments but also attracted higher performing students. An analysis of student grades over the past 5 year years revealed that there was no significant change in the quality of students enrolling on the IS program at the Kemmy Business School. This could be a result of our decision not to specifically target the highest performing students, a strategy that both Firth et al. (2008) and Koch & Kayworth (2009) did implement.

5.2. Issues for IS Educators

While the redesign of the introductory IS course at the Kemmy Business School certainly had a positive impact on future IS enrollments, it also raised a number of other issues which IS educators need to be aware of. Firstly, the decision to remove advanced MS Excel and Access from the introductory IS course in favor of focusing on emerging technologies was a point of controversy with the School's Management Board. Focusing on emerging and interesting technologies allowed us to better sell the IS program but the downside was that business students who do not elect to take the IS minor option would graduate with no real database or data analysis skills. Unless this scenario could be resolved, the changes to the IS program would not have been approved.

Regarding database skills, the argument we put forward was that business students need only know how to extract information and not necessarily run the database. Developing and maintaining databases, in our view, is not an essential skill of the business graduate. Extracting information and making decisions based upon that information, is. All students of the introductory IS course would have basic skills in how to extract information from a database with the later IS elective covering more advanced database skills. Regarding data analysis with MS Excel, the IS group partnered with their accountancy colleagues to ensure that the introductory accountancy course not only covered the basic uses of Excel for financial data (e.g. cashflow analysis, breakeven points etc.) but also incorporated business intelligence skills ('what if' analysis, data presentation etc.). IS educators need to be aware that any changes to the learning outcomes of the introductory IS course are going to be controversial and they need to consider how to partner with other disciplines to ensure that core business skills traditionally aligned with IS, are covered elsewhere.

This notion of partnering with other areas of the business school is a powerful driver in promoting increased enrollments into the IS program, and a major contributing insight from this paper. Many students come to the business school with a particular outcome in mind, and they are not willing to change their major course of study. However, a persuasive and valid argument can still be made that IS is a strong compliment with their chosen major course of study. We have found that the accounting department is a natural first starting point for this. In many organizations, the accounting area is a focal point of where IS is applied, so having student's dual-major or major/minor with accounting and IS is a natural fit. Many of our accounting colleagues find that having IS students in their accounting classes enhances class discussions by bringing a varied and unique perspective to class. Likewise, Downey (2011) argues that promoting the creative aspects of IS, such as Web development, will attract students who are interested in marketing. Indeed, the MIS program at the University of Montana has now begun to partner with the Marketing department to focus on this, as well as other issues highly relevant to market such as business intelligence and social media marketing.

5.3 Limitations and Areas for Future Research

As with any empirical study, ours is subject to limitations. Firstly, this study was conducted at only one European university, an Irish university at that. The vast majority of students observed in this study were of Irish nationality. Thus, we echo Downey's sentiments (Downey 2011) and call for further studies which examine undergraduate interests in IS, and how this can be used to address our enrollment crisis in other countries. It would be quite interesting to see if the success of our intervention strategies could be replicated in another European business school. Yet, we do acknowledge that the intervention strategies we adopted may not be suitable to other IS courses due to their curriculum structure. In the Kemmy Business School, the introductory IS course is taken in the first semester of year 1, thus providing a perfect platform to influence incoming business students. However, in other schools, the introductory IS course can be scheduled for the 2nd year of study. In such cases, it is likely that students already have a good idea of their elective decisions and a different set of intervention strategies may be needed to persuade them towards IS.

Secondly, the student course evaluation survey that we draw upon to support our interventions, only received a response rate of 52%. We have to be open to the possibility that the students who completed the survey had a personal motivation for doing so i.e. that they really enjoyed the introductory IS course. The non-respondents could have been those students who just did not engage with the course because the intervention strategies did not work for them. While there was a 'healthy' number of negative student ratings, suggesting that our concerns maybe unwarranted, we nonetheless advise that future studies in this vein consider more holistic approaches to assessing the impact of interventions in the introductory IS module.

To conclude, this paper presents a useful and immediately applicable plan for all IS programs that are seeking to grow or strengthen their offerings. The authors are of the opinion that the IS discipline should be the center of every business school, primarily because ICT is increasingly infiltrating all other business disciplines. However, unless we can address the IS enrollment crisis, IS educators will not be able to avail of this considerable opportunity to become the business discipline core to all others.

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APPENDICES

Appendix 1 – End of Course Student Evaluation Questionnaire



Student Evaluation of Teaching - Centre for Teaching and Learning Round 20 – Semester 1 2010/11

Section 1: Course and student details:

1. Gender M _____ F _____
2. Programme level: Certificate Diploma Bachelor Grad. Diploma Master PhD
3. Year of study: 1 2 3 4
4. Name of your overall programme of study _____
5. Your age _____

Thank you for providing valuable feedback on your learning experiences. This form is used on a voluntary basis by lecturers/tutors and will be treated with the utmost confidentiality.

Section 2: The Lecturer	1 = Strongly disagree, 5 = strongly agree
1. Overall, this lecturer is effective in teaching this module.	
2. The lecturer is knowledgeable about the topics covered in this module.	
3. The lecturer is well prepared for class.	
4. The lecturer is interested in and enthusiastic about the subject.	
5. The lecturer encourages me to find out more about the subjects in this module.	
6. The lecturer communicates effectively in class.	
7. The lecturer makes me feel free to ask questions, disagree or express my ideas	
8. The lecturer is good at explaining difficult material	
9. The lecturer evaluates my work in a way that helps me to perform better	
10. The lecturer is actively helpful when I have encountered difficulties.	

Section 3: The student	1 = Strongly disagree, 5 = strongly agree
1. I felt sufficiently prepared for this module.	
2. I find this academic subject quite easy	
3. I attended most or all of the required contact hours for this module	
4. I find this subject interesting	
5. I handed in all necessary coursework on time	
6. I did all I could to contribute to my learning and understanding of this module.	
7. I have worked hard to succeed in this module.	

Section 4: The module	1 = Strongly disagree, 5 = strongly agree
1. The module objectives are clear.	
2. The classroom facilities are appropriate.	
3. The texts and course materials are valuable learning aids	
4. The course is organised and sequenced well.	
5. The module has significantly increased my knowledge in the subject areas.	
6. The module has significantly increased my skills in the subject areas.	
7. The subject matter is relevant to my educational goals	
8. Overall, this is an effective module.	

Section 5:

Please highlight any further details relating to your learning experience on this module. Thank you for your feedback



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