

MORE WAYS TO HEAVEN THAN ONE: IMPROVING STATISTICAL LITERACY IN IRELAND

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In 2007, with the aim of improving statistical literacy and effective use of statistics, the Central Statistics Office in Ireland launched an Education Outreach Programme. To achieve these objectives, the CSO has fostered key academic partnerships at a national and international level. Seminar Series, Statistical Liaison groups, Oireachtas briefings, CensusAtSchool, the John Hooper Medal for Statistics, the Apps4Gaps competition, the Professional Diploma in Official Statistics for Policy Evaluation, the International Statistical Literacy Poster Competition are some of the key projects developed under the umbrella of the Education Outreach Programme. This paper outlines the rationale behind the development and implementation of the Irish Education Outreach Programme with illustrations drawn from the Irish experience to date.

INTRODUCTION

‘There are more ways to Heaven than one’

(John Needham)

‘Change is almost impossible without industry-wide collaboration’

(Simon Mainwaring)

In 2007, when the Central Statistics Office (CSO) in Ireland launched the outreach programme *‘Investing in the Future’*ⁱ it was recognised that CSO staff did not have the necessary skill-sets or networks to design and implement a successful outreach programme. Hence CSO would need to identify and collaborate with professionals in the education space. It was also recognised that CSO could not address all of the educational ‘gaps’, and that each ‘gap’ might require a bespoke approach, so the outreach programme targeted three limited or specific cohorts:

- Primary and Post-Primary Education;
- Third level and Continued Professional Development; and
- Media and Oireachtasⁱⁱ.

This paper outlines the steps taken by the CSO since 2007 to improve statistical literacy with regard to cohorts 1 and 2 (above). Initiatives taken to improve statistical literacy in the Media and the Oireachtas are outside the scope of this paper as they do not involve academic partnerships.

GENESIS

In 2007, the Senior Management Board of CSO found itself deliberating the role of a statistics office in improving statistical literacy. One of the five CSO corporate goals *‘Increased awareness and effective use of our statistics’* (2004) inferred that statistical education would be prudent. A proposal, before the Board, argued that CSO should develop an ‘Education Outreach Programme’ that collaborated with the Department of Education and other recognised national and international experts to improve statistical literacy. The concept of statistical literacy used in the proposal leaned heavily on Smith’s definition (2002), which stated that statistical literacy should compromise the following:

- Understand and interpret statistical data;
- critically evaluate statistical information and data-related arguments;
- use the information in context of daily life; and
- discuss or communicate one's reactions.

The proposal also argued that the programme should be designed to promote the statistical outputs of the office. This would be done by *‘Creating real life projects that enhance the learning*

process and nurture the life skills needed in our knowledge based society, while supporting the Irish education system in developing its youth as future policy makers, entrepreneurs and statisticians' (CSO, 2007). The Board endorsed the proposal to establish an education outreach programme, viewing it as a long term investment.

Cohort 1: Primary and Post primary Education

The '*Investing in the Future*' programme initially focused on reaching out to the student population. In Ireland, Primary School students are typically aged 12 and under and Post Primary School students are normally aged 19 or lessⁱⁱⁱ. This section of the paper will outline the two main initiatives that have been designed for primary and post primary education:

- CensusAtSchool; and
- John Hooper Medal.

The CSO had a very limited budget that could be dedicated to outreach. Furthermore, CSO had no particular teaching skills or knowledge of the education curricula. Thus, it was recognised that targeted projects and collaboration would be essential if the programmes were to have any impact. A review of activities in national statistical organisations and educational institutes both in Ireland and abroad identified some promising designs and ultimately led to the creation of a number of key partnerships.

CensusAtSchool

CensusAtSchool is an international project that started by the Royal Statistical Society Centre for Statistical Education (RSSCSE) the UK in 2008. The project encourages students to collect data about themselves and improve their understanding of data collection, analysis and presentation.

The CensusAtSchool website^{iv} was launched in the academic year 2008/2009 following a successful partnership with the RSSCSE. With their active and enthusiastic support, and assistance from the Irish National Council for Curriculum Assessment (NCCA), 'Project Maths' (the institute established to provide support to Irish mathematics teachers) the CensusAtSchool was tailored to Irish circumstances and successfully promoted throughout schools. The National Centre for Technology in Education (NCTE) also championed CensusAtSchool as it supported their mandate to '*Promote and support the integration of ICT in learning and teaching*'. The NCTE through HEAnet (Ireland's National Education and Research Network) offered to host CensusAtSchool and manage the teacher interface with CensusAtSchool. All these links were formally agreed in a Memorandum of Understanding between CSO, the NCCA and the NCTE.

Both the NCCA and Project Maths have been keen to develop and use CensusAtSchool. Since its launch, CensusAtSchool in Ireland has been used by Project Maths as part of a pilot to trial a new mathematics curriculum. CensusAtSchool data were also featured in the Irish Junior Certificate Higher Mathematics paper in 2013 (State Examinations Commission, 2013, Q.5). Most importantly, since the launch in 2008, 120,000 students in Ireland have completed CensusAtSchool questionnaires as part of their mathematics and statistics education and have downloaded datasets or accessed results over 250,000 times.

John Hooper Medal

On World Statistics Day, October 10, 2010 the CSO launched the annual John Hooper Medal^v for Statistics; a national poster competition for post primary students. This poster competition is run every year and combines with the International Statistical Literacy Project (ISLP) Poster Competition, on the alternate years where the ISLP^{vi} run a competition. The poster competition reaches out to post-primary school students, encouraging them to explore an issue and present their findings in a poster format, working as a team and using their mathematics and statistics skills. In the current 2014 competition 1,931 students are registered for the competition from schools across the island of Ireland.

The John Hooper Medal is now in its fourth year and going from strength to strength. In 2013, the winners of the medal, and runners-up, represented Ireland in the ISLP Poster Competition (Senior and Junior sections) where they placed 2nd and 3rd respectively. This success has many

parents; the CSO runs this competition in cooperation with the Department of Education & Skills, the NCCA, the NCTE and Project Maths.

Cohort 2: Third level and Continued Professional Development

The second phase of the ‘*Investing in the Future*’ programme was more complex, targeting tertiary education and the working population. This section of the paper will outline the three main initiatives that have been launched:

- Professional Diploma in Official Statistics for Policy Evaluation;
- Seminar Series; and
- Apps4Gaps.

Again, working with a limited budget and limited lecturing experience, it was once again recognised that targeted projects and collaboration would be essential if the programmes were to be successful.

The Professional Diploma in Official Statistics for Policy Evaluation^{vii}

The *Professional Diploma of Official Statistics for Policy Evaluation* was launched in 2012 by the CSO in cooperation with the Institute of Public Administration (IPA) and University College Dublin (UCD) to address the real need for improved statistical literacy and analytical skills to support evidence informed policy making. The diploma is a one-year, part-time programme and is targeted at the public service, specifically those who use (or should use) data to formulate or assess policy. The award is a level 8 National Framework Qualification special purpose diploma worth 20 credits^{viii}.

The diploma is intended to introduce participants to important Irish and international official statistics that will help them better understand the structure and trends of Irish and international economies, societies and environments and their respective inter-dependencies. The course is designed as a practical ‘hands-on’ course where students are shown how to access and interpret official statistics. Considerable emphasis is also placed on presenting and visualising statistics so that useful policy relevant information can be derived.

A primary aim of this diploma is to take the fear and mystery out of official statistics. The diploma is not designed as a quantitative methods or technical statistics course but rather to teach an appreciation of statistics and how they can be used to find and present key messages. The first class sat their exams on April 19th, 2013 and graduated on December 13, 2013.

Seminar Series^{ix}

The CSO currently runs two seminar series: A Business Statistics Seminar series and an Administrative Data Seminar series along with occasional ad-hoc seminars. The philosophy underpinning these series has four central pillars:

- to make users and potential users aware of all the data already available;
- to demonstrate how these data could be used by providing case studies or illustrations of analyses;
- to improve our relationships and develop a network of researchers, policy makers, academics and other stakeholders; and
- to market new products or datasets.

The Seminar series were launched in 2008 with the specific aim of promoting awareness and use of statistics and advocating for the development of a National Data Infrastructure (NSB, 2012a, 2012b; MacFeely & Dunne, 2014). This series provides a forum to showcase new and innovative work developed by CSO and provides an informal space where users, respondents and CSO staff can meet face-to-face to discuss matters of mutual interest. The seminars are explicitly designed to make the link between statistics and policy relevant information. Consequently speakers include not only statisticians from CSO but also data users, such as academics, researchers or policy experts, who are encouraged to raise issues about the data and demonstrate the uses to which statistics can be put.

Apps4Gaps

In October, 2013, to mark the international Year of Statistics and publication of the 2011 Census of Population as ‘linked, open data’ the CSO in partnership with Science Foundation Ireland (SFI) through their Smart Futures initiative and the INSIGHT Centre for Data Analytics launched a new app (software application) competition during the 2013 ‘Maths Week’^x. ‘Apps4Gaps’^{xi} is an all island competition designed to encourage young people to develop ideas and create applications that will provide innovative and fresh ways of exploiting the open data available from the 2011 Census. Participating teams are challenged to explore and utilise the opportunities offered by open data and create an app. In the process, participants will develop or improve their team-working, statistical, analytical, programming and design skills.

Unlike the John Hooper Medal, this competition is open to everyone. There are two categories of participant: (1) Student, which is open to teams of two or three students from Irish primary, secondary or third level institutions and (2) Open, which is open to teams of two or three people where some or all of the team are not students. There are also two types of entry: (1) Concept App, where a proposal for a theoretical App is submitted and (2) Working App, where a fully functioning App is designed and built. The App can be designed to run on any platform: mobile device (Mobile App); on a social platform or media (Social App); or on a web browser (Web App). The primary requirement is that the App must use at least one dataset from the 2011 Census of Population linked, open dataset hosted on www.apps4gaps.ie/data (data.cso.ie).

Although there are three core partners in this venture (CSO, SFI and the INSIGHT Centre for Data Analytics), a number of other academic institutes are closely associated. The Professional Development Service of Ireland (PDST), the Department of Education and Skills (DES), Project Maths, the Department of Education Northern Ireland (DENI) and the Digital Repository of Ireland (DRI) have all contributed enthusiastic support and advice and have helped to extend the reach of this competition. Another key partner has been ‘CoderDojo’, the open source volunteer led movement that teaches young children how to code and program. As an open source movement, CoderDojo is keen to support and promote the use of Open Data in general and Apps4Gaps in particular.

This is the first year the Apps4Gaps competition has been run. At the close of registration on 31st January 2014, 636 students had been registered for the Student category and 103 people registered for the Open category.

CONCLUSION

The outreach programme ‘*Investing for the Future*’ has two broad aims: (1) to promote the availability and appropriate use of official statistics and (2) to improve the general standard of statistical literacy among all cohorts of our users. This programme is viewed as a long term investment, but an investment worth making, if it encourages the rationale and sensible use of information to formulate and assess public policy and life decisions.

There are two key conclusions from the CSO outreach programme. Firstly, collaboration is critical to success. Secondly, different people and age-groups learn in different ways – no single solution will reach everyone.

Collaboration: CSO did not have the skills-sets, the budget, or broader contextual understanding to unilaterally launch the projects described above. Not only has collaboration improved the service we are delivering but it has allowed us to do so in a very cost effective manner.

Programme versus project: *Investing in the Future* is a multifaceted programme or suite of projects, not a single targeted intervention. While this adds complexity, it has widened the catchment of our programme.

Cooperation and collaboration across a number of different projects has introduced CSO to new networks of talented, enthusiastic and committed professionals with aims that overlap with our own. By building on this enthusiasm and harnessing these diverse skills, we are confident that *Investing in the Future* will pay dividends.

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ⁱ www.cso.ie/en/media/csoie/studentcorner/documents/Investing_in_the_future

ⁱⁱ The National Parliament or Oireachtas in Ireland consists of the President and two Houses: Dáil Éireann (House of Representatives) and Seanad Éireann (the Senate).

ⁱⁱⁱ Department of Education and Science (2004), ‘A brief description of the Irish Education System’, Dublin. <http://www.education.ie/en/Publications/Education-Reports/A-Brief-Description-of-the-Irish-Education-System.pdf>

^{iv} www.censusatschool.ie

^v <http://www.cso.ie/en/studentcorner/johnhoopermedalforstatisticscompetition/>

^{vi} <http://iase-web.org/islp/>

^{vii} www.ipa.ie/index.php?lang=en&p=page&id=363

^{viii} www.nfq.ie/nfq/en/

^{ix} www.cso.ie/en/newsandevents/conferencesseminars/

^x www.mathsweek.ie

^{xi} www.apps4gaps.ie