AN ROINN OIDEACHAIS AGUS SCILEANNA | DEPARTMENT OF EDUCATION AND SKILLS

ICT Action Plan

Meeting the high-level skills needs of enterprise in Ireland

ICT IRELAND
Leadership in Information and Communications Technology

Irish Software Association

American Chamber of Commerce Ireland

HEA
Higher Education Authority
An tÚdarás um Ard-Oideachas

Expert Group on Future Skills Needs

ICT Action Plan

Foreword

As a country we face many challenges in bringing about a return to economic prosperity. In building that recovery, we also have huge resources to draw from, in terms of the strength of our ICT enterprise base, the quality of our education system and the talent and flexibility of our workforce. This Plan represents the output of the process of research and engagement which was initiated in early 2011 to address concerns about the supply of high level ICT skills being experienced by companies in Ireland. Given the global demand for ICT skills this is not an issue that is unique to Ireland. However, while inward migration will always play a key role in meeting the demand for ICT professionals, we need to take action to develop a sustainable domestic supply of high level ICT skills to drive the further expansion and development of the ICT sector and to support innovation and growth across other sectors of the economy. This Plan represents a collaborative response across Government Departments, State agencies, the education sector, and enterprise to work together to build that supply. A coherent system level approach is provided for in the Plan. The process of engagement will continue and the Action Plan will continue to be developed and new responses, actions and timelines will be added.

Ruairí Quinn T.D.
Minister for Education & Skills

Introduction

The technology sector in Ireland is thriving. Employment, through indigenous and multinational technology firms continues to grow strongly year on year. All of the top 10 multinational technology companies have a significant presence in Ireland and the indigenous software sector's exports are worth well in excess of €1 billion annually. Five of the top 10 exporters in Ireland are technology companies, and the sector is responsible for approximately one-third of Ireland's total turnover.

Since January 2011, over 80 jobs a week have been announced in the sector. This is on foot of 6% employment growth in 2009 and 4% in 2010. A recent global competitiveness report ranks Ireland as the top destination in the world by quality and value of investments. With a growing multinational technology presence in Ireland and a vibrant and innovative indigenous software sector, the future prospects for Ireland's technology sector are bright.

Highly skilled individuals are needed to maintain Ireland's competitive advantage and meet the demands of a rapidly expanding sector. Action is required from both government and industry. This education action plan is a direct and positive response to the skills needs of the technology sector. Through a variety of initiatives, the action plan places Ireland at the forefront of the global technology industry, ensuring Ireland will continue to produce the quality and quantity of skilled graduates needed for the technology sector.

Regina Moran
CEO Fujitsu and Chair of ICT Ireland

1. High-Level ICT Skills Needs of Enterprise in Ireland

ICT is a broad and dynamic sector encompassing software (applications, systems, middleware), IT services (data processing, outsourced IT services, and IT consulting), electronics and hardware, and communications services. It also has a pervasive impact on all sectors, enabling innovation, productivity enhancements and greater customer and market reach. Following a slowdown between 2008 and 2009, the global market for ICT is expected to regain momentum, with an overall growth rate of 5 percent between 2009 and 2014/15[1]. Internet communications (including cloud computing) is set to be one of the fastest growing sub-markets within ICT – with potential growth rate as high as 20 percent per annum over the next decade. The manufacture of both semiconductors and computer hardware continue to exhibit moderate to strong growth prospects globally (6 percent per annum to 2015)[2].

The emergence of next generation internet, mobile ICT, location based services and the exponential growth of social networking have driven innovation and new revenue streams for firms of all sizes. Information security has emerged as a key issue for activities reliant on ICT communications; it also represents a growth opportunity within the ICT sector.

Key to the successful exploitation of these opportunities is to ensure that one of Ireland's most important resources, its labour force, is appropriately skilled and that Ireland's education system remains responsive to the needs of this expanding and evolving sector and the ICT needs of enterprises across other sectors as they arise.

2. Context and Background

In 2008, the Expert Group on Future Skills Needs (EGFSN) published a report[3] detailing the future demand requirements for high-level ICT skills in the ICT sector- and from other sectors such as banking, finance, business services etc. The report found that the ICT industry had largely recovered from the global downturn experienced in 2001 and that there had been a substantial shift in the skills mix and levels required by the industry. It also found that the demand for these skills was set to exceed domestic supply, due in part to the lower numbers of high performing school leavers choosing to study in computing and electronic engineering disciplines. The decrease in interest was steeper for females. ICT companies were utilising inward migration to address this gap. While inward migration will continue to be an important source of skilled professionals into the near future, it was recognised that boosting the domestic supply of high-level ICT skills would be the most sustainable way forward.

Following a significant decline in graduate numbers in computing and engineering from a peak in 2002, intake onto science and technology courses has continued to expand. There has been a 29% increase in student acceptances onto computing courses; 33% increase onto electronic engineering courses and 28% increase onto other engineering courses[4] between 2007 and 2010[5]. However, it will take time for increased enrolments on ICT courses to feed through into increased graduate supply.

1 Datamonitor, 2011, Software Global Industry Guide; Ovum (Datamonitor), 2011, Global Market Trends 2010: IT Services Forecasts; Datamonitor, 2011, Telecommunication Services: Global Industry Guide 2011; Datamonitor, 2010, Computer Hardware: Global Industry Guide; Datamonitor, 2011, Semiconductors: Global Industry Guide

2 Datamonitor, 2010, Computer Hardware: Global Industry Guide; Datamonitor, 2011, Semiconductors: Global Industry Guide

3 Future Requirements for High-Level ICT Skills in the ICT Sector, EGFSN, 2008

4 Excluding electronic and civil engineering

5 Source HEA 2011

3. Development of the ICT Action Plan

In early 2011, a range of high-level ICT skills recruitment difficulties were raised through the work of the EGFSN. Forfás-EGFSN, with the support of IDA Ireland and Enterprise Ireland, directly consulted with a selected range of foreign affiliate and indigenous companies. Discussions also took place with, ICT Ireland, American Chamber of Commerce Ireland, the Irish Software Association, IT@Cork, Dublin Chamber of Commerce, and Engineers Ireland.[6]

Companies indicated that current and medium-term recruitment difficulties mainly related to ICT honours degree (NFQ Level 8) and above – both for graduate-entry level positions and particularly for ICT professionals with experience. Also, they signalled that a greater skills supply would have the potential to create more jobs, as foreign firms can bid for and win more mobile investment within their group and Irish companies can keep more of the work here rather than contracting it out abroad. At the same time, companies continue to fill a substantial number of professional, administrative, sales and marketing positions without too much difficulty. These recruitment difficulties also need to be set against a background of a high world-wide demand for high-level ICT Skills. In response to these findings a working group, led by Department of Education and Skills and including HEA and Forfás set in train a process to identify more precisely what the high-level skills needs were and to develop short, medium and longer term responses to meeting those needs.[7]

In May 2011, the HEA hosted an ICT Skills Summit bringing together representatives from higher education institutions to consider the analysis undertaken by the EGFSN - Forfás and to discuss practical ways to address skills gaps and realise the significant emerging employment growth opportunities. They identified challenges and opportunities pertaining to the attraction and retention of students, programme development, proliferation of courses, conversion and up-skilling and other longer term and underlying competence issues were considered and possible responses identified.

In June 2011 the Minister of Education and Skills, Ruairi Quinn, TD and the Minister for Jobs, Enterprise and Innovation, Richard Bruton, TD jointly met with the ICT Ireland Clearing House Group. Proposals for the development of a coherent plan of action with cross government and industry collaboration and a multi-level approach across the education system received strong support. Since then there has been further consultation on the development of the Plan with the education sector, the enterprise development agencies, ICT Ireland and American Chamber of Commerce. This has taken place in tandem with the roll out of a number of the key actions in the Plan.

4. The Action Plan

As previously stated a mobile workforce is a particular feature of the ICT sector, and at a time when there is such high global demand for ICT professionals this poses inevitable recruitment challenges. Inward migration, valuable for the cross -fertilisation of ideas and practices which underpin innovation, will always have a key role to play in meeting the demand for high level ICT skills in Ireland, including the demand for native foreign language fluency. However, it is estimated that approximately 55% of the high level ICT skills needs are currently being met through inward migration. A continued reliance on inward migration of this scale is not sustainable if Ireland is to fully realise the expansion and development opportunities that exist for the evolving ICT sector while also meeting the high-level ICT skills needs of other enterprise sectors.

The domestic skills supply needs to be built up over time by boosting graduate level output and by companies upskilling existing staff to fill positions for experienced professionals. State supported measures to assist companies to provide training for employees include the Skillnets ICT training networks which also provide opportunities for jobseekers to acquire ICT skills. The key focus of this Plan, however, is on what can be done to ensure an adequate and sustained supply of high-quality graduates from the education system.

6 Addressing high level ICT recruitment needs-Research findings, EGFSN 2011

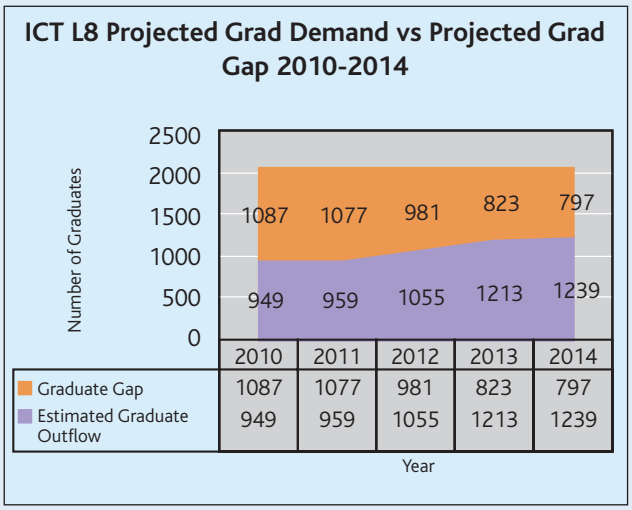
7 Skills Recruitment difficulties identified were for **Software Engineers; Network Specialists & Engineers; Security Experts:** Internet security and Network security; **Telecomms:** Mobile telephony, s/w applications dev. & programming; **ICT Project managers** with technical background; **Foreign language fluency, cultural awareness & technical competency** for tech support, sales/marketing French, German, Spanish, Dutch, Swedish

Key Target

The Plan establishes an overarching target of doubling the annual output from honours degree ICT undergraduate programmes to 2,000 graduates by 2018. Projected output in 2011 is approximately 1,000 graduates.

Fig 1 below shows how the recent increases in the numbers of acceptances onto ICT related undergraduate programmes will translate into increased graduate output over the period to 2014. The gap between the projected growth in output and the target of 2,000 is highlighted.

Fig 1: ICT L8 Graduate Projections and Graduate Gap 2010-2014[8]



The measures in the Action Plan include short term and medium term responses.

Upskilling and conversion responses

Part 1 of the Plan outlines actions to increase the domestic supply of honours degree graduates in the short term through expansion of conversion and reskilling opportunities.

Because the stock of students which will be graduating up to 2014 is already in the higher education system, the only way in which domestic supply can be increased in the short term is through the provision of reskilling and conversion programmes for graduates with qualifications and skills in other cognate disciplines. The two key actions contained in the Plan that aim to bridge the gap and increase the domestic supply in the short term are maximising the uptake of Springboard[9] ICT programmes and the introduction of a range of new honours degree level graduate conversion programmes from early 2012.

Part 2 of the Plan sets out actions that aim to boost the longer term supply and quality of graduates from the higher education system.

Attracting more students to ICT

While recent increases in enrolments on undergraduate ICT related programmes are encouraging, it is estimated a further annual increase of 10% on the current rate of acceptances onto these programmes over the next 4 years, allied to improved retention rates, will be required if a target domestic output of 2,000 graduates is to be achieved by 2018. Participation by female students, in particular, needs to be increased and a target of increasing female acceptances onto ICT related programmes from 15% to 25% is being established.

[8] Based on the following assumptions: 4 year degrees; 60/40% split between universities and institutes of technology; Base numbers – CAO acceptances ICT 2006-2010; Universities – 16% non progression into 2nd Year; 3% into 3rd Year; 3% into 4th Year; Institutes of Technology – 25% non progression into 2nd Year; 7% into 3rd Year; 8% into 4th Year; Non progression estimate uses 2009 rates from HEA Report on Progression – specific rates for 1st year into 2nd year; general rates L8 4 year degree for 3rd and 4th Year estimate; Demand taken as 2036 (from Forfás paper) – currently 1400 or 55% demand met by inward migration.

[9] Springboard provides opportunities for unemployed people to gain new higher education qualifications in areas of identified skills needs. These include the provision of 1,400 places on ICT programmes under the first phase of Springboard, from which 550 people are due to graduate with awards at honours degree or masters level by June 2012. A new call for proposals for a further phase of Springboard will issue in early 2012.

If these targets are to be met it will be essential to communicate to students, parents and teachers, the range of attractive career opportunities available for ICT professionals – both in multinational and Irish owned companies. The Action Plan includes some measures that will be taken by the Discover, Science and Engineering programme and other Government and industry sponsored initiatives to promote a greater interest amongst students in STEM (science, technology, engineering and maths) disciplines. The ICT sector itself has the key role to play in promoting awareness and interest in ICT related careers amongst young people and further responses which are identified will be reflected in the Plan.

It is also of key importance that adequate capacity and infrastructure in schools to facilitate the promotion and learning of technology related activities is provided. In this regard the process to roll out 100mbp broadband to all post primary schools in Ireland is well underway and should be completed by 2014.

Improving retention and quality

Retention levels on ICT and electronic engineering programmes are of particular concern with drop out rates on honours degree level programmes ranging from 16% to 25% before the end of 2nd year[10]. This is not unique to Ireland; there are higher non-progression rates in ICT related programmes in comparison to other disciplines in other EU/OECD countries, including UK and Australia. [11] The Plan establishes a target of improving retention rates by 7% in the University sector and 9% in the Institute of Technology sector by 2014.

One of the key factors identified in the high drop out rates is an inadequate level of maths proficiency. The Action Plan reflects the key measures that are being taken to improve the mathematical proficiency of students entering higher education. These include the implementation of the National Strategy on Literacy and Numeracy, the ongoing process of curriculum reform and development at second level and the continuing professional development of maths teachers. Specific targets for increasing the ranking of Irish students in the OCED Programme for International Student Assessment (PISA) and the proportion of students taking higher level maths in the Junior cycle and Leaving Certificate examinations are included in the Plan.

Actions aimed at providing more opportunities for students to gain a greater understanding of computer programming before entering higher education and a review of the existing retention supports for third level students are also included.

Alignment of higher education programmes to changing needs

The pace of development in technology and ICT is such that effective enterprise/academic interface is critical to ensuring that the range of higher education programmes are continuously aligned and adapted to the changing enterprise needs. A new high level ICT Foresight group is being established to advise on ICT programme development and the broader issues of enhancing the quality and retention of students on those programmes.

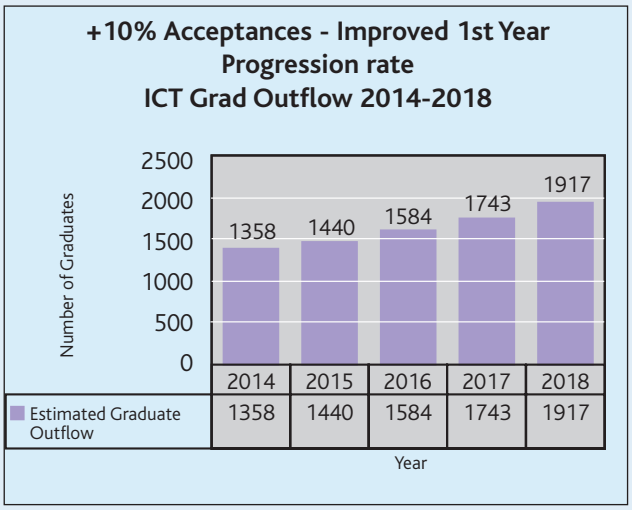
[10] A Study of Progression in Irish Higher Education, HEA, October 2010

[11] Christian van Stolk, Jan Tiessen, Jack Clift, Ruth Levitt, Student Retention in Higher Education Courses, International Comparison, Prepared for the National Audit Office UK, 2007 and Staying the course: the retention of students in higher education. 26 July 2007, National Audit Office UK

Meeting the Targets

If the targets for increasing attraction into ICT programmes by 10% year on year and for improving the progression rates of those who have entered the programmes to the average progression rates for honours degree level programmes, then the estimated graduate outflow to 2018 will be boosted, allowing the overall target of doubling graduate output to be achieved. This is illustrated in figure 2 below.

Fig 2: ICT L8 Graduate Projections 2014-2018 with increased Acceptances on 2010 (+10% per annum) with Improved 1st Year Progression Rate to average Progression Rate[12]



Conclusion

Ensuring the sustainable supply of highly skilled ICT graduates into the future will require close collaboration and interaction between the education system at all levels, the HEA, the enterprise development agencies and the enterprise sector. The Action Plan will be published on the websites of the Department of Education and Skills, the HEA, IDA Ireland and Enterprise Ireland. The process of engagement between all of the stakeholders will continue and progress in relation to the Action Plan will be reviewed on an ongoing basis by the Expert Group on Future Skills Needs, the Enterprise Engagement Forum chaired by the Secretary General of the Department of Education and Skills and by an annual meeting between the Minister for Education and Skills, the HEA, Enterprise Ireland, IDA Ireland and representatives of the enterprise sector.

[12] Based on the following assumptions: 4 year degrees; 60/40% split between universities and institutes of technology; Base numbers – CAO acceptances ICT 2010 with 10% increase on 2010 acceptances cumulatively to 2014; Universities – 9% non progression into 2nd Year; 3% into 3rd Year; 3% into 4th Year; Institutes of Technology – 16% non progression into 2nd Year; 7% into 3rd Year; 8% into 4th Year; Non progression estimate uses 2009 rates from HEA Report on Progression with ICT progression rate improving to average progression rate for L8; general rates L8 4 year degree for 3rd and 4th Year estimate

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Part 1: Up-skilling and Conversion Actions that will be taken in the short term to increase the domestic supply of high level ICT skills over the period 2012-2014

Key Target

The Plan establishes an overarching target of doubling the annual output from honours degree ICT undergraduate programmes to 2,000 graduates by 2018. Projected output in 2011 is approximately 1,000 graduates.

Actions/Tasks	Responsibility	Success Criteria/Output	Timeframe	Resource/Other Issues
1. Springboard Maximise uptake of 1400 available places on Springboard 2011 ICT programmes providing qualifications from L6 to L9 NFQ. Launch Springboard 2012	HEA/Springboard Providers/Industry DES/HEA	Estimated Graduate output – Level 8/9 June 2012 – 415 graduates	Majority of programmes to commence by Oct 11 and will be completed by June 2012 Call for proposals end Feb 2012 – Programmes to commence Apr 2012	ICT Ireland/ISA /Engineers Ireland working with HEA to promote uptake
2. Jobbridge National Internship Programme Maximise number of internship places to be made available for unemployed graduates including Springboard participants	Industry	No of Internships provided to Springboard and other graduates	Commencing immediately	ICT companies to consider placement opportunities for Springboard ICT Grads
3. Level 8 Conversion Programme Launch 1 year full time HDip L8 Conversion Programme in core computing/programming skills	HEA	768 places to be offered countrywide	From March 2012	For NFQ Level 8 job-seekers with cognate/ numerical skills and underlying aptitude for programming €4m
4. Review of Graduate Skills Conversion Programme 1,700 places annually on Masters Degree level Programmes directed at needs of ICT/Biopharma sector	HEA	Review to inform continued delivery/refocus from the 2012/13 academic year re conversion of non ICT sector persons	Review to be completed by end March 2012	Current annual allocation of €3.6m - to be reviewed and re-prioritised
5. Skillnets Provide Core Training Network Programme (TNP), new Job Seeker Support Programme (JSSP) with work placements. Introduce 3 ICT training courses under new Future Skills Needs Programme (FSNP)	Skillnets		TNP courses are underway. JSSP & FSNP delivered between Sept 2011 and June 2012. Participants will complete JSSP and FSNP June 2012.	

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PART 2: Actions to ensure an increased output of appropriately skilled graduates in the medium term 2015-2018

Actions to increase the number of students with good maths skills into ICT undergraduate programmes

Actions/Tasks	Responsibility	Success Criteria/Output	Timeframe	Resource/Other Issues
1. Introduction of bonus points for students taking higher level maths	HEIs	Increase take-up of HL Maths to 30% during lifetime of National Literacy and Numeracy Strategy	Bonus points will be available from September 2012	
2. Promotion of career opportunities to parents, second and third level students including ICT and Foreign Languages				ICT Ireland and the ISA and their members have financially supported these outreach activities.
Rollout Smart Futures Campaign: Smart Futures Online Careers Fair Smart Futures Champions Programme Smart Futures e-skills week Smart Futures TY programme	Industry/ ICT Ireland/ Irish Software Association/ Discover Science and Engineering (DSE)/ Engineers Ireland/HEIs/ Careers Guidance	Increase in the numbers choosing higher level maths and science subjects at second level. An increase in the numbers choosing ICT related programmes in higher education An increased awareness amongst guidance counsellors and teachers on the opportunities in the ICT sector.	Smart Futures Online Careers Fair – taking place from Jan 23-27 2012. Smart Futures Champions – ongoing visits to schools by 'champions' from industry	Discover Science & Engineering spend on STEM career related activity for 2012 will be €600,000
Engage early second level students through Discover Sensors programme which supports inquiry based learning in Junior Certificate Science.	Discover Science and Engineering	12,000 students to be targeted	During 2012	
Highlight the careers potential arising from a STEM education in Science week 2012	DSE	120,000 participants	November 2012	
Strongly focus programmes to more fully engage young people with the physical sciences.	DSE	Discover Primary Science and Maths to target 2,960 schools and 4,800 teachers	During 2012	

Actions to increase the levels of mathematical proficiency of students leaving the second level system

Actions/Tasks	Responsibility	Success Criteria/Output	Timeframe	Resource/Other Issues
3. Transition Year:				
ICT Ireland and ISA in association with careersportal transition year internship programme launch	ICT Ireland/ISA	100 places to be made available in ICT companies around Ireland for TY year students. This programme aims to promote the sector as a career of choice and showcase the diversity of opportunities available in the ICT sector.	March 2012 Start	
Support awareness raising in schools of TY opportunities in internship programme	DES		2012	
4. Scratch Programme				Based on free resource from MIT, NCCA module and materials for students and teachers developed by UL and available free to schools on www.scratch.ie are training programmes run by UL (4 in Oct 11) LERO Ed.Outreach Programme funded by SFI and Scratch is co-sponsored by Irish Computer Society And supported by NCTE
Seek opportunities to promote and extend Scratch Programme in schools in TY and junior cycle:	LERO – Irish Software Engineering Research Centre	155 schools currently registered and 50 have Scratch fully in place. Target is to increase to 350 schools	By September 2013	
Support awareness raising by LERO in UL through communication with schools	DES	Continue teacher education programmes in support	For 2012 school year	
5. Awareness Raising	HEA/HEIs	Report available to inform deliberations of high-level forum (2.10 below).	By March 2012	
The HEA to review the impact of higher education awareness measures by HEIs				

Actions to increase the levels of mathematical proficiency of students leaving the second level system

Actions/Tasks	Responsibility	Success Criteria/Output	Timeframe	Resource/Other Issues
6. Implement Project Maths	DES Project Maths Imp Support Group – Industry/HE/2nd Level	Improve take-up of HL Maths at LC level to 30% by 2020 Improve take-up of HL Maths at JC level from 40% to 60% Better Maths skills for 2nd level Grads	Modules rolled out to all schools from Sept 2010 All strands implemented by LC Exam 2014 JC Exam 2015	€2.3m CPD €2m Substitution costs to 2013
7. Improve CPD Opportunities for 2nd Level Teachers New Postgraduate Qualification for maths teachers	DES DES	Programme rolled out Improve % of Maths qualified teachers	Ongoing Tender issued Dec 2011 – Programme to start Sept 2012	CPD for Maths Teachers to support Project Maths rollout
8. Implement New National Numeracy and Literacy Strategy	DES	Introduce standardised assessments of reading and maths at second level; Increase proportion of 15-year olds at Level 4 or above in PISA by 5 percentage points; Halve percentage of students at 15 years old scoring at or below L1; Increase proportion taking higher level mathematics in Leaving certificate to 30%; Increase proportion taking higher level Maths in JC from 40% to 60%	Strategy published July 2011 Over lifetime of strategy to 2020	€6m in 2012 rising to €19m in 2017

Actions to ensure higher education programmes are aligned to changing needs of ICT enterprise sector

Actions/Tasks	Responsibility	Success Criteria/Output	Timeframe	Resource/Other Issues
9. **Seek proposals/ response from HEIs for streamlining of programme offerings within individual institutions**	HEA/HEIs	Streamlined courses for 2013. High-level forum (2.10 below) to offer guidance on the streamlining of programme offerings.	2012	Within existing resources
10. **High level ICT Foresight Group** Establish and engage on ICT and Electronic Engineering programme development with representation from key Industry and HEI decision makers.	HEA to lead on establishing forum	High-level forum will, in the first instance, consider and act on streamlining (2.9), retention report (2.12), work placement (2.11) and attraction measures (2.1 to 2.8).	First meeting of Foresight Group January 2012	Forum will be supported within existing resources. John Hennessy (HEA) to chair.
11. **Undergraduate Work Placements** Commission study on best practice in incorporating work placements into undergraduate programmes – written request issued to HE expert in this field	HEA	Report available to inform deliberations of high-level ICT Foresight Group (2.10 above).	Report available June 2012	Cost of report to be met from within existing resources

Actions to improve Retention Levels on undergraduate ICT Programmes

Actions/Tasks	Responsibility	Success Criteria/Output	Timeframe	Resource/Other Issues
12. Retention Measures Commission report to identify the most effective retention support measures in higher education institutions Report to be considered by ICT Foresight Group	HEA	Improve retention (non-progression) rates for ICT and Electronic Engineering honours degree programmes by 7% in the University sector and by 9% in the Institutes of Technology by 2014.	Research Report available February 2012 Recommendations June 2012	Annual funding of €1.5m for measures to support retention provided by HEA to higher education institutions
13. Explore feasibility of providing alternative ICT related progression pathways for students enrolled on ICT programmes likely to drop out each year.	HEIs	% of these students will progress to other ICT related programmes	By 2014	

Glossary

CAO	Central Applications Office
CPD	Continuous Professional Development
DES	Department of Education and Skills
DSE	Discover Science and Engineering
EGSFN	Expert Group on Future Skills Needs
EU	European Union
Forfás	Ireland's Policy Advisory Board for Enterprise and Science
FSNP	Future Skills Needs Programme
HDip	Higher Diploma
HE	Higher Education
HEA	Higher Education Authority
HEI	Higher Education Institution
HL	Higher Level
ICT	Information and Communications Technology
IDA	Industrial Development Agency
ISA	Irish Software Association
IT	Information Technology
JC	Junior Certificate
JSSP	Job Seeker Support Programme
LC	Leaving Certificate
LERO	The Irish Software Engineering Research Centre
MIT	Massachusetts Institute of Technology
NCCA	National Council for Curriculum and Assessment
NCTE	National Centre for Technology in Education
NFQ	National Framework of Qualifications
OECD	Organisation for Economic Co-operation and Development
PISA	Programme for International Student Assessment
Scratch	Scratch is a visual programming language
SFI	Science Foundation Ireland
STEM	Science Technology Engineering and Maths
TD	Teachta Dála (Member of Parliament)
TNP	Training Network Programme
TY	Transition Year
UK	United Kingdom
UL	University of Limerick

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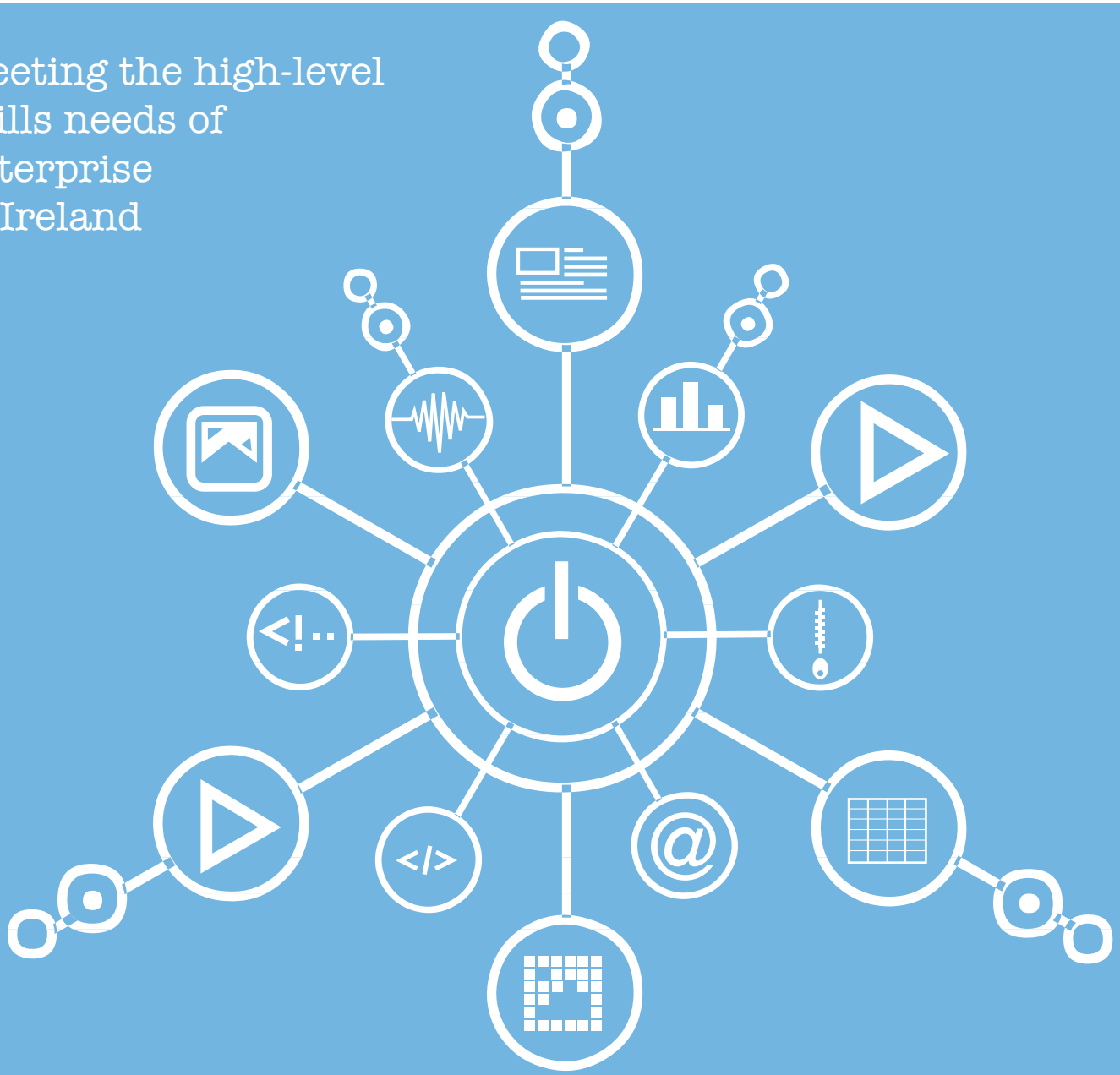

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