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## Knowledge Exchange Seminar Series (KESS)

Educational innovations supporting women to return to STEM  
careers

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### Northern Ireland context

The importance of STEM industries to the growth of the Northern Ireland economy and the need to ensure that Northern Ireland's young people have the skills, knowledge and understanding in STEM-related subjects are well-recognised. The *Success through STEM Strategy* published in 2011 set out a series of recommendations to increase the number of young people with STEM qualifications to meet the future needs of STEM businesses. The STEM Business Group then took forward five of the *Success through STEM Strategy* recommendations including that of Addressing Gender Bias. In 2013, the STEM Business Group produced a report, *Addressing Gender Balance – Reaping the Gender Dividend in STEM* (2013) which involved extensive consultation with STEM businesses.

The report noted that

- 11% of high level posts are in STEM
- Men outnumber women by nearly 3 to 1 in these posts
- More females than males progress to Higher Education<sup>2</sup> (83% female, 71% male)
- There are important differences in the subjects studied:
  - 62% STEM enrolments are male
  - 29.8% of all STEM graduates are female

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- 26% students in Computer Science are female
- 21% students in Engineering and Technology are female

The *Addressing Gender Balance –Reaping the Gender Dividend in STEM* report set out a clear business case for gender diversity in terms of value to the NI economy. The report also included a STEM CEO charter as one of a number of tools to help business engage with the diversity issue. There were also case studies in good practice from local STEM organisations and, in addition, there were good practice guidelines relating to: role-models prior to recruitment, supportive personnel policies, networking opportunities, career development, mentoring, role-models post-recruitment and monitoring progress.

The following year, the STEM CEO Charter was launched by the STEM Business Group in conjunction with the Department for Employment and Learning and the Equality Commission. The STEM CEO Charter enables STEM organisations aims to demonstrate their commitment to equal opportunities and to addressing the current underrepresentation of women in STEM jobs. In addition, a STEM Employers Equality Network (SEEN) has been set up to share good practice and provide advice and guidance on gender issues in the workplace.

This is all extremely valuable work in encouraging women into STEM employment. The Northern Ireland Assembly is aware of the importance of the issue and **MLAs held another debate on women in STEM (science, technology, engineering and mathematics) sectors, on 24 March 2015**. Yet, as noted earlier, over two thirds of women with STEM qualifications don't go back into the STEM sector work after a break.

Materials from the Open University's *Return to SET* course were used in the Re-Enter programme delivered by Women in Technology and Science (WITS) and funded by North-South body InterTrade Ireland and launched by the Minister for Enterprise Trade and Employment, Mr. Micheál Martin T.D. The Re-Enter pilot programme identified suitably scientific and technically qualified women who wished to return to the workforce following career breaks. Participants studied the *Return to SET* course and were offered mentoring, support and networking opportunities during the programme. The programme, which ran from 2007 to December 2009, was very successful.

'Results from the 20 graduates who participated on this programme show that 14 of the 20 women participating have returned to Science, Engineering and Technology careers and a further five are actively seeking employment.' (Inter-Trade Ireland, 2009)

### Return to SET course evaluation

In total, between 2005 and 2011 over 1000 women from the UK and Ireland participated in the 10 week online course for women aiming to return to their careers after a break. The course was developed in response to the publication of the UK government's Maximising Returns report (People Science Policy, 2002) that had highlighted the high numbers of qualified women who were leaving the sector. The employability content of the course thus differed from many other higher education initiatives, as the target group were already graduates seeking to return to work following a period of absence from the labour market. The task of the course could therefore be seen as aiming to rebuild career capital as well as serving as a site for 'collective identity alteration' (Smith 2010). This was done through a series of activities that aimed to boost employability potential.

A follow up study showed that after 5 years over 70% of women were now working, the majority in a STEM occupation. Of those who were now in work, about half had changed careers and the remainder had returned to their original professions.

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Outcome	No of respondents	%
<b>Working</b>	<b>47</b>	<b>71</b>
In STEM (full or part time)	39	59
Not in STEM (full or part time)	8	12
<b>Not working</b>	<b>19</b>	<b>29</b>
Caring full time	9	11
Full time study	4	6
Unemployed looking for work	4	6
Not in work/not looking for work	4	6
<b>TOTAL</b>	<b>66</b>	<b>100</b>

*Table 1: Employment outcomes for women returners 5 years after completing T160*

Qualitative comments and interviews revealed that transitions had not been straight forwardly linear, reiterating earlier findings that women who leave STEM professions tend to move in and out of the labour market and often do not follow a linear career route (Herman and Webster 2010). Some had returned to work and then left again, other had tried to change careers but not succeeded so returned to their original occupations. Half of those who returned to work had changed careers, often moving into sectors that were considered to be more compatible with combining family care and career (such as education and health). Nevertheless, the majority of these were still in STEM related occupations.

The narratives revealed that many had faced barriers related to gendered cultures within SET industries and heteronormative assumptions (their own as well as those of family members and employers) about domestic divisions of labour especially childcare that affected their availability for work. However there were some exceptions where the redundancy of a male partner had enabled/ driven women to accelerate their own careers. For some women, additional barriers exacerbated their difficulties in returning to STEM – these included disability, ill health (their own or that of their children), and age discrimination. It is important that the intersection of barriers is recognised. Three dimensions that affected employability were examined (Individual, Personal and External) and a new framework suggested that incorporated key factors for women returners (see Table 2)

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McQuaid and Lindsay (2005) framework	Key factors for women returners to STEM
<b>Individual</b>	
<b>Employability skills and attributes:</b> Essential attributes; Personal competencies Transferable skills	Confidence/self-esteem
Qualifications	New qualifications and training
Work knowledge base	Career history, Voluntary/unpaid work
<b>Labour market attachment</b>	Career break length
<b>Demographic characteristics</b> Age, gender, ethnicity	Intersection of age and gender discrimination
<b>Health/well being</b> Health/disability	Own and children's health
<b>Job seeking skills</b> CV/ interview skills/labour market awareness	Articulation of career break on CV
<b>Adaptability and mobility</b> Geographical mobility; occupational flexibility	Partner's work location
<b>Personal</b>	
<b>Household circumstances</b> Direct and indirect caring responsibilities	Caring responsibilities (children and elders)
<b>Work Culture</b> Family work culture	Gendered divisions of labour in household
<b>Access to resources</b> Financial capital	Financial support – external agencies Financial support – partner's work status
Social Capital	Networks – work or professionally related Networks – additional support with childcare (eg extended family)
<b>External</b>	
<b>Demand factors</b> Labour market and macro economic factors	Location of SET employers
<b>Recruitment practices</b>	SET specific employment cultures Unconscious gender bias by employers
<b>Vacancy characteristics</b>	SET work culture norms Lack of part time work/Flexible work options Fixed term contracts
<b>Enabling support factors</b> Employment policy factors	Flexible/part time work entitlements Intermediaries/support agencies (including T160 and other UKRC services)
Other enabling policy factors	Local childcare availability, Public transport

Table 2: Three dimensions of employability influencing the outcomes for women returners to STEM – (Herman 2014)

## On ramping strategies

While individual stories of return varied enormously, the data revealed a number of common experiences, especially in the strategies that had been used to gain employment. The goal for women participating in the course had been getting back into STEM related work, and so it was particularly interesting to analyse what had helped those who had achieved successful returns. Five main strategies emerged from the narratives:

- Getting a foot in the door – this included volunteering, carrying out unpaid work, or working in a non-STEM role within an organisation which was perceived to have been instrumental in the transition to their current employment. For example one woman had worked in a non- professional role (as a temporary administrator) and had then found out about and secured a STEM job within the same organisation by looking at their (staff only) vacancy lists.
- Networking– several women gave examples of having found jobs, which had not been publicly advertised, via contacts and people they knew (either friends and family or otherwise via previous professional contacts)
- Retraining – about half of those who had found jobs had undertaken further subject specific retraining. For some this took the form of upskilling in their previous occupational sector (such as one woman who had been a mainframe programmer but then retrained to do Java programming) while for others there was a total change of career (albeit usually still STEM related)
- Helping hand – this category included accessing agencies or funding resources specifically for women returners to support their transition into employment. For example two women who were aiming to return to their academic research careers, obtained Daphne Jackson Trust fellowships<sup>1</sup> that had enabled them to make a successful transition back to academia.
- Back to Basics – this entailed a trade-off ie working in a lower status job often at low rates of pay, in return for flexibility and proximity to home. There were several examples of women who had become teaching assistants or school science technicians who explicitly talked about how this was a trade-off strategy which they hoped was temporary until their children were older.

## Recommendations for policy makers and educational institutions include:

- Dedicated public funding should be provided to support women returners enabling a holistic approach that ensure success.
- Employers should be encouraged and supported in developing returnships for career break returners.
- Provision for women returners should include community building and peer support  
Women returners are often in a position of low self esteem and reduced professional confidence, and benefit from exploring their concerns and developing solutions within a group context, where they no longer experience a sense of isolation. This shared experience can be effectively supported using online tools and environments, and can also benefit from face to face meetings and tutorials.
- Employability strategy need to take account of diversity and unequal opportunities  
Education providers and employers need to be aware of gender and other factors affecting employment opportunities. Constraints that shape and influence the work prospects of students do exist and we should ensure that these are addressed rather than assume a level playing field.
- Promote networking as a job seeking strategy

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<sup>1</sup> The Daphne Jackson trust offers 2 year part time paid fellowships for SET researchers who are returning after a career break. For more details see <http://www.daphnejackson.org/>

Using networks and contacts in successfully returning to work should be highlighted as an important strategy and educators/ policy makers should encourage this in approaching employability, alongside more traditional job seeking skills.

### Next Steps and presentation

In our presentation we will show materials we have developed from these experiences to support the whole range of returners. Returners have different sets of needs and different backgrounds. Our research findings led the development of a new way of structuring the resources so it could serve all users.

We will discuss how our learning materials can be embedded with local offerings.

### References:

Herman, C. (2014) Returning to STEM: gendered factors affecting employability for mature women students, *Journal of Education and Work*, DOI: [10.1080/13639080.2014.887198](https://doi.org/10.1080/13639080.2014.887198)

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