Returning to STEM:
Gendered factors affecting employability for mature women students

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Abstract
This paper adds to current discourses around employability by arguing for an explicit recognition of gender, in particular in relation to women's employment in male dominated sectors such as science, engineering and technology (SET). This is not limited to young first time graduates but continues and evolves throughout the life-course. Mature women students, who are returning after career breaks, face a number of barriers in re-entering such employment sectors. Drawing on data from a longitudinal study of women graduates in science, technology, engineering or mathematics (STEM), who participated in a UK government funded online programme aimed at supporting them to return to work, the paper examines three gendered factors identified as being of particular influence on outcomes – gender role normativity, locality and mobility and structural and institutional barriers. The paper concludes by identifying strategies deployed by those that successfully returned to employment, including re-training, networking and doing unpaid or low paid work.

Keywords: gender, STEM, employability, career break

Introduction

Employability has become an important driver in UK Higher Education Institutions, but it is often implicitly assumed that all graduates are young and about to embark on careers for the first time. This effectively invisibilises the experiences of mature students and particularly those who have taken career breaks and are studying in order to return to work or change careers. Moreover, employability as it is currently articulated, fails to take account of gender, in particular the implications for employment in male dominated sectors such as science engineering and technology (SET). This paper aims to make the case for a life course perspective on employability, and for an explicit recognition of gender in employability initiatives within higher education. Following a brief overview of current research about women and SET employment, the paper offers a critical review of recent employability literature from a gender perspective, showing how employability is often shaped and constrained by gendered assumptions. The paper then explores data from women who have returned to SET careers, showing how employment outcomes are influenced by gender normative beliefs, locality and mobility as well as structural constraints within SET industries. Finally the paper identifies key employability strategies - re-training, networking and doing unpaid or low paid work - used by women to successfully return to SET occupations.

Background

Women continue to be under represented in science, engineering and technology professions (Kirkup et al. 2010; EC 2012; Hill et al. 2010, Smith 2011) and this issue has generated a considerable body of research from a range of disciplinary perspectives (Bebbington 2002; Cohoon and Aspray 2005; Ceci and Williams 2010). While the frequently used 'leaky pipeline' metaphor has been criticised for offering too simplistic a perspective (Bickenstaff 2005), it is clear that from the point at which subject choices begin to be made at school, right through to higher level degrees at university, the numbers of women studying science, technology, engineering and mathematics (STEM) subjects progressively declines. Likewise, the subsequent transition from education into SET employment has been a particular focus of concern for both employers and educators alike. Despite many years of campaigning and numerous policy interventions in the UK, it continues to be the case that fewer women STEM graduates progress into SET professions than their male counterparts (Kirkup et al. 2010; Smith 2011; Peters and McWhinnie 2012).

As well as viewing this issue from an educational perspective, analyses of women's under representation in STEM have also focused on gendered cultures in SET organisations (Barnard et al. 2010) and on practices that perpetuate male dominance. This includes career pathways that assume an ideal worker who has no caring or other non-work commitments, thus making it harder for women to feel a sense of entitlement to sustain and progress their careers (Herman and Lewis 2012). A particular concern has been on the large numbers of qualified women who leave SET careers and those who fail to return after taking a career break (People Science

Policy. 2002; Hewlett et al., 2008; Herman and Webster 2010; Panteli 2006; Mavriplis et al. 2010). In the case of women who remain employed (ie coming back from short maternity breaks) there are a number of strategies deployed to combine care and career (Herman, Lewis and Humbert 2012), and employers are increasingly seeking to develop on-ramping strategies (Hewlett. 2007). But for those who take extended breaks and lose connection with previous employers, the career break itself, as well as being a period out of work, often entrenches gendered patterns of domestic labour which in turn can reinforce gendered workplace cultures (Lovejoy and Stone 2012). At least a quarter of women return to lower paid jobs after a career break (Connolly and Gregory 2008; Tomlinson et al. 2009, 2005; Jenkins 2006). Among women SET graduates who take career breaks, the majority return to work into other sectors, with only a third returning to SET jobs (People Science Policy 2002).

There has to date been little explicit connection drawn between this body of work and the growing interest in employability which has become a major imperative within Higher Education in the UK. Indeed employability might itself be critiqued as a gendered construct, in that it leaves women's experiences frequently marginalised (Stevenson and Clegg 2012) and often leaves invisible the overwhelming labour market disadvantage that face women both in terms of gender pay gap and in career progression, especially if and when they become mothers (McIntosh et al. 2012). There are various interpretations of the term employability producing a good deal of fuzziness about its meaning (McQuaid and Lyndsay 2005). Recent UK policy directives have explicitly articulated the role of employability in higher education as being linked to economic growth (HEFCE 2011, p5). Moreover English HEIs are now required to provide an employability statement for prospective students (Pegg et al. 2012). Discourse on employability within higher education is often focused on acquisition of relevant generic 'employability' skills (Hooley, Hutchinson and Neary2012; Mason, Williams and Cranmer2009; Bridgstock 2009) although some argue that more emphasis should be on the capacity of graduates within a job role and their long term contribution to society rather than simply skills to enable them to gain immediate employment after graduation (Holmes 2011). Yorke (2006) for example, defines employability as *a set of achievements – skills, understandings and personal attributes – that makes graduates more likely to gain employment and be successful in their chosen occupations, which benefits themselves, the workforce, the community and the economy (p10).*

Having a degree was once seen as sufficient to guarantee employment, but the link between higher level qualifications and potential for employment has become more tenuous with the increase in numbers of graduates. Thus 'graduateness' is not in itself evidence of employability but instead individual graduates are now required to develop their own narratives of employability (Tomlinson 2007). This move to individualised responsibility includes a requirement for continual personal improvement and impression management involving *"embodied and interactional practices"* (Smith 2010). Such an individualised view takes little account of social and economic inequalities that influence the chances of successfully finding employment (Moreau and Leathwood 2006) and ignores the fact that there are systematic

disadvantages facing some groups and not others regardless of objective criteria such as qualifications or other 'attributes' (Blasko et al 2002). Critiquing earlier definitions of employability discourse as seeing only either 'supply-side or demand-side factors'

McQuaid and Lyndsay (2005) developed a holistic framework that recognises the interplay of individual, personal and external factors in a dynamic relationship, in which the interaction of factors is crucial, implying that the same set of 'employability' attributes of an individual may produce differing outcomes in different contexts. However while gender is mentioned as one demographic variable, the framework does not specifically acknowledge gender as a cross cutting factor affecting employability, nor does it differentiate between employment sectors that have differing gendered cultures or contexts in which employability assets or attributes may have different gendered meanings and implications. For example Duberley and Cohen (2010) in their study of women academic scientists, observe that for women having a family is seen as career limiting, while for men it has a positive impact on employability (employers see them more favourably, more stable and reliable). Thus what is considered as career capital for some may be experienced as a deficit for others.

Employability also has gendered implications in the context of SET industries where assumptions about ideal workers require that SET professionals should be mobile (able to relocate, travel abroad regularly or commute significant distances) and able to work long hours, all of which may be incompatible with childcare or other family commitments (Andrew 2009; Ackers 2004). Moreoever, little account is taken within employability discourse of the overt or unconscious bias of recruiters or employers in their hiring practices which may affect women's chances of success in job seeking, especially in SET. Thus gender is effectively ignored as a contributory factor to employment outcomes within much of the current employability discourse.

Further gendered implications in employability emerge when considering the issue from a lifecourse perspective. Employability is not just about the initial entry into employment but is a lifelong process including maintaining, progressing and making transitions between employers (Hillage and Pollard 1998). In particular a period out of paid employment can have a significant impact on prospects for a successful return to work, by reducing or depreciating the value of existing career capital. So, for example, professional contacts may be out of date and no longer useful, and links into social networks non-existent. Moreover, human capital assets such as qualifications and skills that are not considered to be current also have less value. For women returning after periods of family care, this often contributes to their return to lower skilled occupations (Jenkins 2006).

A range of strategies are increasingly being advocated and are becoming seen as necessary to enhance employability, all of which reinforce the notion of individual responsibility for creating 'employable selves'. Smith (2010) identifies three such strategies– identity work, training/networking to increase social and human capital and labouring in unpaid jobs - as being increasingly used during periods of economic

turbulence and unpredictability by job seekers, whether straight out of education or returning after periods of unemployment. Once again it is clear that these are not gender neutral and it is worth unpicking further their gendered implications, especially for mature women returning after career breaks.

Identity work in the form of impression management is an ongoing requirement for many professional roles (Ybema et al. 2009). The gendered implications of this have been highlighted for women in SET professions who have to negotiate dual and seemingly contradictory roles of being a woman and an engineer/scientist (Jorgensen 2002; Faulkner 2009; Watts 2008;Steinke 2013). For unemployed job seekers, identity work assumes a specific functional role with a focus on presentation of the self as a set of skills and achievements, and the creation of 'products' or tools such as a CV. For the long term unemployed, especially older people, the maintenance of a working identity becomes even more precarious and can be undermined by how they are perceived by others (Riach and Loretto 2009). In the case of women returning after career breaks, identity work also entails managing the transition from a domestic, private identity to a public identity within the workplace (Marks and Houston 2002; Lovejoy and Stone 2012).

Training to update skills and increase human capital is of particular relevance in SET industries. As already noted, out of date skills and qualifications can become devalued human capital for those out of paid work. Within the IT industry especially, the need for continual updating is well recognised even among those in employment (Barley and Kunda 2004), and rapidly changing technology means such knowledge quickly loses value. Formal qualifications may be perceived to be of more significance and of more value to women than men in SET sectors as a way to establish credentials and gain legitimacy within such male dominated environments (Ellen and Herman 2005).

The use of social networks is well documented as an important strategy in job seeking (Stoloff et al.1999; McDonald 2005; Donelan et al. 2008). However, women may be at a disadvantage when it comes to networking especially when they have been outside of the labour market for sometime as their networks are often local and they lack the range of weak ties that can act as bridges to wider networks (Stoloff et al,1999). In addition, jobs are increasingly gained by 'non-searching' rather than active job seeking, something that disadvantages women especially those outside of the labour market (McDonald 2005) However, women's strong ties to local networks are necessary to facilitate the childcare and family support that enable them to work in the first place. Increasingly online networks are affording opportunities to extend networks beyond traditional boundaries and there is evidence that women in SET are able to benefit from these (Donelan et al. 2008).

Finally, various forms of unpaid labour are becoming increasingly important as routes into employment. Internships, work placements, volunteering and other forms of 'auditioning' have become a precursor for employment among new graduates in many sectors, the SET industries being no exception. As well as unpaid roles, working in temporary or marginal jobs can provide similar employability and

capital building benefits (Smith 2010). For women who have taken career breaks, unpaid or low paid jobs can present an on-ramping strategy, an opportunity not only to update skills, but also to build confidence about being back in a working role after a period defined by motherhood (Marks and Houston 2002; Tomlinson 2006).

Thus the significance of gender in employability is rarely articulated, resulting in specific gender barriers to finding employment, especially those of mature women, often being invisible. In order to better understand the ways in which gender impacts on employability outcomes, the next section will explore data from women who have returned to work in science, engineering and technology careers and point to ways in which interventions might best support women STEM graduates at different stages of the life course.

Methodology

Between 2005 and 2011 over 1000 women from the UK and Ireland participated in a 10 week online course for women aiming to return to their careers after a break. The course, entitled Return to SET, and referred to by students and staff by its course code T160, 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. So unlike other interventions that are perhaps extra curricular or co-curricular (Cramer 2006), employability was central to the course content, with the key goal being returning women professionals to SET employment. 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, p285). This was done through a series of activities that aimed to boost employability potential

The course was organised into three sections – in the first part, students reflected on previous achievements and developed their CV using an ePortfolio tool to collate and present their skills and achievements. In the middle section, they explored opportunities and careers in SET and reflected on work life balance, and the final section was focused on setting goals, job search skills and action planning. The final assessment included production of a CV and Action Plan. As well as online content and interactive forums, face to face tutorials and networking events were also held locally. A detailed description of the course content and methods, has been reported elsewhere and is beyond the scope of this paper (Herman and Kirkup 2008; Herman and Webster 2010; Herman et al. 2011).

Following an initial evaluation in 2007, a sub-group of participants were recruited to be part of a longitudinal study with the aim of tracking their long term career progression and outcomes. Data in this paper is drawn from the most recent contact made with these women five years after they had completed the course, in 2011 and 2012 which included a postal survey that was sent to 167 women in the longitudinal

Original McQ&L framework	Key factors for women returners to SET
Individual	
Employability skills and attributes: Essential attributes; Personal competencies Transferable skills	Confidence/self-esteem
Qualifications	New qualifications and training
Work knowledge base	Career history Voluntary/unpaid work
Labour market attachment	Career break length
Demographic characteristics Age, gender, ethnicity	Intersection of age and gender discrimination
Health/well being Health/disability	Own and children's health
Job seeking skills CV/ interview skills/labour market awareness	Articulation of career break on CV
Adaptability and mobility Geographical mobility; occupational flexibility	Partner's work location
Personal	
Household circumstances Direct and indirect caring responsiblities	Caring responsibilities (children and elders)
Work Culture Family work culture	Gendered divisions of labour in household
Access to resources 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)
External	
Demand factors Labour market factors Macro economic factors	Location of SET employers
Recruitment practices	SET specific employment cultures Unconscious gender bias by employers
Vacancy characteristics	SET work culture norms Lack of part time work Flexible work options Fixed term contracts
Enabling support factors 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 1: Three dimensions of employability influencing the outcomes for women returners to SET - adapted from McQuaid and Lyndsay (2005)

cohort. 23 of the 66 respondents were then interviewed by telephone. Interviews took between 45 minutes and an hour each and were focused on career outcomes and impact of the T160 course, but encompassed a much wider holistic exploration of contextual factors that had contributed to outcomes. The interviews were recorded and transcribed prior to analysis.

The interview transcripts were analysed using a coding scheme adapted from McQuaid and Lyndsey's Employability framework (2005) with the aim of identifying individual, personal and external factors that had contributed to career outcomes in the 5 year period since completing the course. Additional sub codes were included to ensure that gender was made visible as a cross cutting theme. Additional codes were also created during the analysis as new themes emerged, and the coding framework was further reviewed and refined after the initial round of analysis. The resulting adapted framework (shown in Column 2 of Table 1) identified key individual and personal factors which were of particular relevance for women who had taken career breaks and were aiming to return to work, as well as external factors that were specific to SET employment.

Results

Of the 66 women who responded to the postal survey, 47 (71%) were now working (in employment or self employed), while 19 (29%) were not working. Most of this latter group were either full-time carers, full time students, or retired and only four women described themselves as unemployed and actively looking for work. However there was some overlap in categories, so for example some women who were working part-time also defined themselves as carers, and some had combinations of part time jobs and self employment. Types of jobs that the women were currently employed in were quite wide ranging and included those who had returned to their original careers as well as others who had retrained and changed direction. While a small number had found jobs in non SET occupations, the majority of those in work (79%) were working in a SET role even if this was different from their original career. This figure is noteworthy, given that previous research has indicated only a third of women in the UK return successfully to their SET careers after a break (People Science and Policy 2002). However it must be remembered that these women had explicitly chosen to enrol on the course, and had therefore already expressed an aspiration to return to SET. The majority (18) of the 23 telephone interviews were with women who were now working, and 5 were with those who were not.

Outcomes from the course
The interviews initially explored what the women felt they had gained from doing the T160 course and whether this had been of any benefit in their return to work. For most of them the details of the course were quite hazy, given that it was 5 years ago. Nevertheless it was the case that most of them had experienced participation on the T160 course as a significant time of transition, a turning point in which they reformulated their career objectives and aspirations. With its emphasis on personal development planning and CV writing , this was an opportunity to do 'identity work'

focused on presentation of self and impression management (Smith 2010). Often the participants had not carried out any personal development for many years and the course enabled them to articulate their capabilities and competencies.

The course was also important in developing a range of employability skills to enhance job seeking, such as researching the local labour market. Recognising that many of the women would be seeking flexible or part time jobs, one of the activities on the course asked them to carry out research on the work-family policies of potential employers. This was how Hester describes finding the traineeship that led to her current job, attributing this to the course activity

> I think the useful thing about the course was that I remember one of the
>
> things we had to do was identify employers within the area that were
>
> flexible, had a sort of a flexible working policy and the NHS was one of those,
>
> so I looked on the NHS website and low and behold there was a trainee
>
> position, they were looking for a trainee so I applied for it and I got it …

As well as producing a practical outcome, the process of articulating their skills and experiences in ways that would present them in the best light for prospective employers helped to enhance self confidence. It was also important to be able to represent their career break in a positive way as Kim, whose revised CV had helped her resume her medical research career, describes

> the other thing that the course was very good at, […], was to explain the gaps
>
> on your CV. Sort of like whereas previously I would have just left them out,
>
> you know, for example raising children, you know, […] you think "Well yeah, I
>
> did volunteer and I did do this and I did do that and I supported the
>
> playgroup" and I kind of don't add any value to those things so therefore I
>
> don't write them down but I thought actually when it comes to selling
>
> yourself on paper I suppose it's better to explain it than just leave it as a gap

In addition to identity work and job seeking skills, the networking opportunities afforded by T160 via online forums as well as face to face tutorials and regional networking events, were cited by many of the women as important. For some the main benefit was developing confidence by 'being in the same boat' and having social contact through the networks they had established on the course. Stephanie describes the importance of meeting others in the same situation:

> I think for me the main thing was just having the contact with other people
>
> and being able to talk to other people….I'd been working full time prior to us

moving to [x] and then when we moved here suddenly I was sort of plunged

into this experience of not having a job and not really knowing anybody

either and so, and then through the course, meeting various sort of people

and being able to actually talk to them and realise that it wasn't only me that

was in this situation was great really.

However, while the T160 course had clearly had long term positive impact for many of the women who took part, there were events or situational factors in the intervening years which were much more significant in shaping their career outcomes, which will now be explored further.

Employability, gender and the lifecourse

Using the adapted framework as shown in Table 1, further thematic analysis explored the range of individual, personal and external factors that had influenced outcomes and revealed a matrix of interconnected and interdependent factors. In particular there were three key factors that emerged from the analysis that cut across the individual, personal and external categories suggested by McQuaid and Lyndsay in their original employability framework (2005). These were gender role normative beliefs, locality/mobility and structural and institutional barriers, the combination of which produced gender constrained employment choices and outcomes across the women in the sample.

Gender role normativity

Most of the women had partners or husbands who worked full time and these couples had adopted a traditionally gendered pattern in their home lives. Normative beliefs about gender and work roles were reflected in the gendered divisions of labour within households. So, decision making about future work had involved an assessment of current capabilities or 'horizons for action' (Hodkinson and Sparkes 1997) which was strongly informed by wider gender role assumptions and behaviours. Rather than being simply based on 'preference' as some have argued (Hakim 2002), such decisions were made within a constrained set of parameters (Leahy and Doughney 2006) resulting from a low sense of entitlement to sustaining their SET careers once they became mothers (Herman and Lewis 2012).

Locality and mobility

Locality and mobility were also important in shaping decisions about work, both in terms of geographical proximity of the work itself, but also (connected again to gendered domestic division of roles) the location of a partner's job, or of other extended family members for childcare support. Employment outcomes were often primarily influenced by the availability or not of locally based work opportunities and the lack of suitable work within the locality was often a constituent argument in a decision to retrain or take a lower paid 'demotion' to a less than ideal job. Sometimes the lack of local work was part of a wider economic recession, but often it was to do with the physical location of SET industries in particular geographical areas and not others.

Structural and institutional barriers

Many of the women felt constrained by working norms within SET occupations where there were felt to be few opportunities for women to resume careers after a break, especially on a part time or flexible work basis. Finding a post that offered flexibility, options to work from home (either regularly or for example when a child was sick), ability to work term time hours, part time contracts and so on were often cited as important factors in decision making. Employment conditions in some SET sectors make it difficult to return to what are often linear and proscribed career 'paths' or 'ladders'. Thisis especially true of scientific research careers. Out of the three who had attempted to return to an academic research career, all had some success initially, but none had secured a permanent position and they were now doing temporary teaching only jobs, or short term contract research.

On-ramping to an academic STEM career is particularly difficult after a period of absence because this creates a gap in publication record. One of these women, Doris, had a successful career as a research scientist prior to her career break, and she reflected on how the combination of all three of these constraining factors – location, gender roles and structural barriers (in this case the short term contract culture in scientific research), had been a backdrop to her career decision making:

> I suppose I had unconsciously made a decision that my husband's career always came first and my daughter and the rest of my family came first.[...] And that may have been a mistake but I mean certainly, well I wouldn't say it was a mistake, I mean it's the way it is. I didn't get the grant I applied for and that was it. That was the end of that because I had a family and I had to stay and I couldn't commute anywhere else at that time. And, you know, it just wasn't suitable to get up early and come in late if I went down to London, which would be the next place where there was an academic who worked in that field.

Following the course Doris did return to work albeit in a different role, but this clearly entailed compromising her original career ambitions:

> So [after the T160 course] I moved into an administrative job in the university here
> …I'd gone into really an office job for I suppose it must have been for four years. I didn't really enjoy the job actually. [laughing] but I thought, you know, this is as good as it's going to get, it's local, it's fairly well paid and it's using my skills

Since then she has taken up a teaching role in another university but not managed to return to her research career, and she felt it was now unlikely she would be able to return to this, especially as age was perceived to be a barrier in the context of cultural norms in her field of scientific research

> I have come to the conclusion that it's almost impossible to return to,
>
> certainly, to straight bench research…. there's an unwritten law that if you
>
> walk through the door and you're clearly over twenty five or thirty [laughing]
>
> you're just not welcome really.

After completing the course, Ros, an environmental scientist, had taken a job which entailed a long commute but found it unsustainable in terms of work life balance and her other caring commitments. So when her contract ended after 8 months, she restricted her job searching to the local area.

> the thought of commuting and the childcare,… they're perhaps self-imposed
>
> barriers that I don't then start to explore some opportunities perhaps just
>
> because I can't be away that long, or travel that far, or doing the hours really.
>
> When I did work in City X I found it very difficult to manage . . . it wasn't so
>
> much after school but before school. At the time there weren't very good
>
> childcare facilities in [the town where I live]

Again a combination of structural factors (lack of part time work opportunities in SET), locality and gendered domestic roles all influenced Ros's decision making. Ros now works in a community education project which is closer to home but recognises that this has entailed a compromise with her original career aims:

> It fits very well around my family life at the moment, so in many ways it's
>
> ideal for that, it's just that I'm perhaps not fulfilling myself I suppose in the
>
> sort of topic areas I'd like to cover.

Strategies for success

We have already seen how identity work was one of the central tasks of the T160 course and how this produced increased confidence and provided skills and tools for successful job seeking. There were three other key strategies that had enabled successful returns to work. These were re-training, networking and undertaking low or unpaid work.

Re-training

Obtaining new qualifications or skills was an important precursor for many of those who achieved a successful return. 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. For example Stephanie who had been a mainframe computer programmer before her career break, undertook a training course in Java, a more up to date computer programming language. In her case the qualification provided her with the confidence boost to apply for other jobs. In fact it was not necessarily the qualification itself but the increased self esteem that led to her successful interview for a Project Management post

> I think it was significant in that… I didn't ever feel that I had enough
> knowledge to apply for those jobs and I think the result, I mean the course
> was only really an introduction [to Java], but I think it gave me that
> confidence to actually apply for jobs. … I mean the job I applied for was a
> trainee job, a developer, and then that got me the interview [for the Project
> Management post].

Stephanie's experience illustrates the importance of getting 'a foot in the door', a way in to employment, which in this case was the chance to be interviewed for another job that had not originally been advertised.

> when I went for the interview they then realised that, although I was a
> trainee Java developer, I did have twenty years worth of other experience in
> IT, and as it turned out the company also supported a lot of mainframe
> systems and all of my previous experience had been on mainframe systems.
> So I just think it was, yes, the course was very significant in that it just gave
> me the confidence to apply for that particular job and it just turned out that
> my experience fitted very well to the company.

Networking/contacts

Networks and contacts also helped several women get a 'foot in the door' either through family or friends, ex-colleagues or professional networks. These experiences were sometimes described as serendipitous opportunities rather than intentional strategies. Alison, a Chemistry graduate, had succeeded in finding a part-time job in an international pharmaceutical company after her 7 year break. But it was Alison's husband who had opened the way for her current job through a chance conversation

> my husband … was on secondment there in a different department, but
> because he had to speak to the department I'm now in as part of his work in
> chatting just sort of 'oh, well I know somebody who would quite like a job

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here', so he gave my CV to the Head of Department and then it went from

there. That was not a usual kind of way in.

Encouraging women to use their social networks as a resource to aid employability was one of the objectives of the T160 course. Although women are perceived to be good networkers, they were often unaware of the value of the contacts they had. Sharon, a bio-scientist who was now employed as a Teaching Fellow in a university, describes how she was originally reluctant to network but remembered the advice she had been given on the course about the value of networking

> they used to put the message across and say, 'you will be able to make
>
> contacts and the way to find a job is not necessarily to go for the applied
>
> jobs, the advertised jobs, people may create jobs for you', and of course
>
> that's exactly what happened with me because I went to the supervisor and
>
> … basically he created a project, he had a sort of an idea of something, a half-
>
> baked idea that he would like to have done, and here I came along, and then
>
> he said 'well, I'll apply for the funding', so he did create the job, […] I thought
>
> 'yeah, right, that will never happen', and it did!

Doing unpaid or low paid work
As well as formal qualifications, new competencies and skills gained via unpaid work also provided a route to employment, as Sharon describes:

> … I actually let people know within the [department] that I wanted certain
>
> expertise in practical techniques, and if they were using those techniques I
>
> was prepared to give my time for free, so I did that.. so I updated my skills….
>
> It was completely unpaid and I'd go in 2 or 3 days a week and just be another
>
> pair of hands in the lab and do the work, … I picked it up and ran with it more
>
> or less, and I did that from August until I got this post in December.

However, despite the positive outcome of this period of unpaid work, Sharon's experience brought up conflicting emotions and had affected how she perceived herself

> I have to say though it was very difficult, it was a difficult thing to do…
>
> because there was no salary, and I felt a loss of my self-esteem because I
>
> wasn't being paid and I felt that I was good and it was very difficult, so I
>
> found it at an emotional level I found it actually much more difficult than I

ever thought I would

As well as doing unpaid work, many of the women took up work in a lower status job often at low rates of pay, in return for flexibility and proximity to home, effectively entailing a trade off . This experience was often used as a first step into employment. Before her current job, Alison had worked for a while as a science technician in a school which she felt had helped to acclimatise her again to the world of work, acting as a bridge into her later job.

> I did get another job which again was just while the girls were at school but that was just a sort of a very mind numbing job, and it just made me think 'right, I definitely don't want to have to do this for very much longer' so it was good from that point of view. It was good because it got me back into having to be organised and to go to work and come back, and think about things other than sorting people out for school.

Susan, whose previous career had been as a biochemical researcher in a large multinational company, also became a school science technician

> … that was my obvious route in because I'd been out of Science for so long, and … when the children were little that was quite a big problem or an issue for me because I haven't got any relatives to look after children in holidays and that sort of thing, so holidays have become I suppose a problem as well so then obviously that's where the Technician job is brilliant because I've got the holidays.
>
> …I thought it would be a good place to start because I was well over qualified for it so it was just a job that I could go and do, and do well to start with. It was within my confidence range and it suited my life style as well

Once again in Susan's example, it is clear that considerations of locality, working terms and conditions (in this case being able to work in school term times only) and gendered home roles, were combined in her narrative and led to a solution that 'suited her lifestyle'. Most importantly perhaps, her final comment reveals a critical factor that underscored many of the stories of return, namely low self confidence.

Discussion

This paper has argued that, especially in the case of highly gender segregated sectors such as STEM, gender needs to be acknowledged as a cross cutting theme, rather than just an individual demographic variable, in discussions about employability. Personal circumstances such as work family culture are highly gendered, informing

assumptions and expectations about gendered divisions of domestic labour and childcare. Local labour market conditions, including the location of SET industries, also influence decision making and constrain choices about work options. Moreover, many SET workplaces whether in industry or academia, have strongly gendered cultures and their recruitment practices and terms and conditions of work are all influenced, albeit often unconsciously, by gendered assumptions.

It was clear in this study that the range of perceived options for employment were often constrained by existing gendered division of labour/ roles within the family. Doris's description that her husband's career had taken precedence over their own was commonplace and this was rarely contested but was accepted as ubiquitous and inevitable. One or two exceptions occurred when a partner had been made redundant and traditional gender roles had been reversed meaning that the women had become the main 'breadwinners' for short periods of time. But by their exceptionality and brevity these situations were not challenging of normative expectations.

The plethora of initiatives to support women in STEM that have taken place in the past 30 or so years (Phipps 2008) can be seen as evidence that there is a permanent and continuing need for such measures given the structural gendered constraints facing women. Specific focus on women's academic research careers in STEM has resulted in particular policy initiatives linked to research funding in UK universities (Athena SWAN 2013) and this is driving culture change in this sector. Similarly, other employer kite mark schemes and initiatives have supported employers concerned with retaining their women employees. However, interventions to support women who have had a career break are usually short lived (Phipps 2008; Panteli 2006; Mavriplis et al. 2009; Herman et al 2011), and current UK government policy looks unlikely to devote any public spending on this target group.

In terms of further research, it would be helpful to look into the longer term impact of interventions over the life-course. From data presented in this paper, it is clear already that outcomes immediately after an intervention do not necessarily mean that there has been a successful 'return' to a broken or frayed career. Many of the women had had several periods in and out of the labour market. Destination data can only provide a snapshot of impact at a particular moment in time. Indeed it is often only in the longer term that the impact of a career break can be assessed (see for example Biemann et al. 2012). Will those women like Susan who had taken the 'self demotion' route by working as a low paid technician in a school, actually be able to accelerate their careers at a later date as they had hoped?

While Higher Education Institutions in the UK understandably focus on their students' transitions into a first job or career in their interpretation of employability, it is clear from the experiences of mature students (illustrated here by women returners to SET) that employability is not simply a one off event but a lifelong process. Indeed it is well recognised that professional development continues to be needed at different stages of the life course, and that lifelong learning is an essential part of this development process. This may include technical upskilling in the case of

SET (especially in IT), but also the acquisition and performance of transition skills that enable a successful move from one job to another or into work from a position of unemployment. It was clear from the narratives of the women in the study that they were in varying states of work readiness and needed different levels and types of support.

Thus advice or services offered to mature students, career changers and returners must take on many complex and interrelated issues. Moreover it remains the case that large numbers of women continue to take careers breaks of varying lengths, followed by periods of part time working, both of which have can a significant effect on their employability and career progression. So a broadening out of the employability agenda to include a lifelong perspective should also include specific recognition that women's careers are more likely to be non linear and interrupted.

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