Gender issues in the career development of computer science staff

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Abstract

Women form a tiny minority of staff who lecture in Computer Science at universities in the UK. This gender imbalance reduces the scope for women to contribute to research and development and reinforces in students’ minds the impression that computing is a male dominated profession. To encourage more women to consider a career in lecturing, research was undertaken on the factors that influenced the careers of a sample of female computer science lecturers. The paper presents the findings of the research and makes recommendations for improving the position of women lecturers.

1 Introduction

Government statistics indicate that women form a very small minority of Computer Science academics at UK universities. There are only ten female Software Engineering professors, for example, compared with 210 males. At senior lecturer/researcher levels, the figures for females and males are 79 and 474 respectively [1]. Although this gender imbalance can be found in other Engineering disciplines, the centrality to computing to social, economic and technological progress makes it particularly worrying. With so few women at universities contributing to research in IT, there is a real risk that the development and application of computing will reflect male interests. The paucity of women lecturers may also reinforce in students’ minds the impression that Computing is a ‘man’s profession’, making it difficult to reverse the decline in the numbers of women embarking on careers in Computing [2, 3].

Although steps clearly need to be taken to increase the numbers of women lecturing in Computing subjects, there is very little research to guide...
policy-making. A report by Greenfield et al. [3] on the careers of women in Science, Engineering and Technology (SET) makes some useful recommendations but does not focus on Computer Science staff per se nor provide much qualitative data on career development issues. It was to fill this gap in the literature that the research described in the paper was carried out. Semi-structured interviews were conducted with a number of female Computer Science lecturers at various stages in their career. The aims were to find out what had attracted them to a career in lecturing and the factors that had influenced their career development. The results reported here are the first stage in what will be a long-term study of the career development of women Computer Science lecturers at selected universities in the UK and abroad. The next section describes the methodology used in more detail.

2 Methodology

The decision to interview the women was based on the desire to ‘see the world through their eyes’ and obtain as much qualitative information as possible about their careers. The interview method is particularly well suited to this type of data gathering [5, 6]. Surfing the Web sites of Computer Studies departments of universities located the participants. Where contact details of female members of staff were given, an email was sent requesting their assistance with the research. Care was taken to ensure that those contacted were employed at ‘new’ (post 1992) and ‘traditional’ universities and that the universities were situated in different geographical regions.

A stratified random sampling method was adopted to ensure that the research would not only represent the overall population but ensure that participants from both traditional ‘red brick’ universities and the ‘new’ universities were fairly reflected in the sample. A sample of 30 women were selected for interview by telephone. The interviews were conducted via telephone because the respondents lived over too wide a geographical area to make face-to-face interviews viable. A schedule was devised to guide the questioning. This sought information on the participants’ background, roles and career history; their motivations for pursuing a career lecturing in Computing at university and factors that had helped or hindered their career development. The latter was based on a review of women’s literature which reveals the importance of such factors as having a mentor, supportive parents and/or a supportive spouse, self-belief, family friendly employment policies, the ability to network and a willingness to work long, unsocial hours [7,8,9,10,11,12,13]. Assurances were given that the information gathered would be treated in strictest confidence and that no details would be published that could be used to identify participants or their institutions.

3 Results

Of the thirty women contacted, twenty agreed to take part in the research. Seven of these were employed at traditional ‘red brick’ universities; the remainder at
‘new’ universities. Although members of the sample occupied positions at all levels of the hierarchy, fourteen were at senior lecturer level and above. This is much higher than the national average but was justified on grounds that there may be more to be learned from examining the careers of women who have been relatively successful [14].

In terms of biographical data, the average age of the women was 47 years. Half were married, the rest were either divorced, single or separated. Fifteen had children but because of the high average age of the participants, most were now grown up. Only six had children under the age of ten. The sample was very well qualified. Twelve held a PhD, seven an MSc. Although most had majored in technical subjects, a number came from Arts backgrounds and had worked in non-computing fields before entering academia. This may help to explain why a large number (14) specialised in the softer areas of Computing such as HCI, E-Commerce, Systems Analysis and Knowledge Management. Only six taught traditional Computer Science subjects such as programming, object oriented methods etc. Half the sample had worked in industry at some point during their career; the other half had only ever worked in academia. Of the latter, two had previously been school teachers the other four had worked in Further Education (FE) colleges.

When asked to describe their roles, most said they spent about 43 per cent of their time on teaching and 19% on course administration. The amount of time devoted to teaching varied according to seniority. Those with departmental responsibilities spent 30% of their time on teaching and 50% on management. The average amount of time allocated to research was 25%, slightly higher than the national average for university lecturers. Differences in the amount of time devoted to research emerged between staff teaching in the new and old universities. Women in the new universities spent 18% of their time on research compared with 32% in older establishments. This might suggest that different factors are important in influencing the careers of staff at different types of institution, i.e. traditional universities place greater emphasis on research than teaching/management and reward those with strong research backgrounds. This could have important implications for the careers of the women since Greenfield (2001) maintains that childrearing responsibilities can limit the amount of time available to spend on research. When asked about this, only one of the interviewees believed that childrearing had a detrimental impact on her research activities and career. However, everyone felt that research was important for career mobility. They were also reluctant to take career breaks. Only three of the mothers had taken more than six months off work following pregnancy.

A key objective of the research was to find out what had attracted the interviewees to a career lecturing in Computer Science. Although obviously interested in research, this is not what had brought them into academia. Only six had followed the traditional researcher career route through Higher Education (HE) and only one said that the desire to carry out research was the main reason for working in HE. For seven of the women it was ‘the desire to teach and pass on knowledge’. This probably reflects the large number of the sample who had worked exclusively in academia. Although most were mothers and the academic
year suits family commitments, only one of the interviewees sited this as the main reason for wanting to teach. A recurrent theme of the interviews, however, was that teaching and motherhood mixed quite well, particularly where the university provided childcare facilities. As to why the interviewees wanted to teach at universities rather than other educational institutions, the results suggest that Higher Education is perceived to offer better career opportunities and higher status. Those who had worked in schools or Further Education Colleges left usually “for progression”.

The statistics quoted at the beginning of the paper on the numbers of women computer lecturers suggest that the interviewees were overly optimistic about career opportunities available. However, they had risen to quite senior positions so the question arises of, to what do they attribute their success? When asked to rate the factors that were important on a scale of 0-5, the overwhelming majority felt that their success was due mainly to self-belief/assertiveness. It was the lack of these qualities that was seen as the main constraint on women’s career development. The most senior member of the sample put it this way: “I think a key problem is the attitude of women towards men, we value men more highly than ourselves and think we can’t do the job.” Apart from self-belief, the women felt that a certain amount of luck, the ability to make informal contacts and a supportive spouse or partner were important. These findings are consistent with other studies of women high-fliers which suggest they have a strong belief in their own abilities but also recognise the need to network and gain support to be successful [13].

A factor that emerged as very important in influencing the women’s success was their ability to ‘make themselves visible’. The careers literature suggests that women often find this difficult and dislike promoting themselves. In the present sample, the interviewees demonstrated no such reservations. They made themselves visible within the university by sitting on departmental and university committees, acting as course or programme directors and assuming external examiner roles. Visibility within the academic community was achieved by editing journals, organising conferences and managing research teams. Although the interviewees shared most women’s distaste for organisational politics, it was clear that they recognised the need to engage in politics to advance their career.

Apart from personal factors, there is evidence that institutional differences affected the interviewees’ career development. This is suggested by the sharp divisions in their views on the support received from their university. A minority had been promoted several times internally so that they now occupied influential positions. These women had nothing but praise for their institution and their ‘supportive male colleagues’. Others were less sanguine. While employment policies were generally considered good, appraisal interviews were felt to be ineffective, particularly as a vehicle for providing feedback on performance and chances of progression. Six of the interviewees definitely felt they had not had the same opportunities as their male colleagues and believed that senior male staff would choose men for key posts ‘even when they were clearly less competent’. One of the researchers complained that male supervisors saw female research assistants as ‘easy to control’. While she felt this might
actually help women in the initial stages of their career, it was a major impediment later on, when they needed to be seen as having leadership ability. This observation was made by an interviewee at one of the traditional universities but, overall, no clear differences emerged between the old and new universities in terms of the perception of gender bias or opportunities for career development. The sample included senior staff at both types of institution and their views contained a mixture of both positive and negative comments.

One possible constraint on the career development of the interviewees was the lack of suitable role models and mentors. Less than half the members of the sample had been mentored by a senior colleague. Research on mentoring suggests that individuals who have a mentor are more likely to achieve career success and higher earnings than those who have not been mentored. With so few women occupying senior positions in Computing Departments or within universities, the interviewees found it difficult to obtain the support and guidance they needed. They were obliged to rely on senior male colleagues to act as mentors. While this can work well, studies suggest that it is fraught with problems and can place women in an invidious position.

The lack of appropriate role models and/or mentors may account for the interviewees’ modest career ambitions. Although a picture has been built up of a successful group of women, when asked about their long-term ambitions, they did not see themselves occupying the highest echelons of academia. Only five said that by retirement they would like to be a Professor or Chair. One said she might like to become a vice chancellor but quickly qualified this with ‘it will never happen’. Many expected to end their careers either at the same level or one grade higher. This suggests that their careers had reached a plateau or the effects of early sex role differentiation are so ingrained, they persist even amongst the most able women.

4 Conclusions

The main objectives of the research were to (a) determine what made a career teaching Computer Science attractive to the women, (b) examine the factors that had influenced their career development in academia. Although the sample was not typical in that it contained a higher than average number of ‘senior’ staff, the results provide interesting insights into the careers of the women that could be useful in guiding recruitment and career development efforts.

In terms of recruitment efforts, the key finding is that most of the women seem to have demonstrated a strong early commitment to education. Over half had only ever worked in education and were very motivated to teach. While it is important to attract staff with industrial experience, recruitment efforts amongst women should perhaps be directed at those who have already demonstrated an interest in teaching/research as a career. The ideal recruiting ground, of course, is amongst the university’s undergraduate and postgraduate Computer Science students. Some female students may have considered a career in academia but been discouraged by the lack of female role models or the paucity of careers guidance. If women staff could be persuaded to discuss career opportunities with
students and to take an active role in mentoring female students, more women might entertain the possibility of a career in lecturing.

The interviewees’ accounts of their career experiences in academia suggest that women need to be very proactive in promoting their career if they want to be successful. This appears to be something that they learned over time through trial and error. Although supported by partners and informal networks, the women clearly lacked careers advice and the guidance of a mentor. One solution is for women staff to offer peer and mentoring support to their colleagues, particularly newcomers. There are also external support schemes, however, from which women can benefit. The Athena Project, for example, organises local networks of women in Engineering and there is a nationwide mentoring scheme from which Computer Science lecturers can benefit (and to which, of course, they can contribute) [17].

The research findings suggest that some of the women felt that appraisal interviews failed to provide the feedback needed to improve performance and achieve personal career goals. This suggests that it is important to ensure that those conducting appraisal interviews are trained both in the correct procedures and in managing diversity. UK universities have been criticised for failing to provide adequate HR support. It would appear from the findings that there is a case for closer monitoring of appraisal and also for central HR/Staff Development to become more actively involved in supporting female staff. One way they can do this is by providing careers guidance and support to those in the initial stages of their career and career reviews for those well into their career. Some universities appoint staff development co-ordinators from the academic staff to manage staff development locally. If women Computer Science staff were to assume this role, they would be in a very good position to provide support to female colleagues and ensure that their career development needs are met. As staff development responsibilities demonstrate management abilities, taking on this role may actually benefit the careers of the women.

For many women the key constraint on the career development is family commitments. The findings indicate, however, that the interviewees successfully managed to juggle career and family responsibilities. Indeed, there was quite a strong feeling that lecturing was compatible with motherhood. This is partly because the university calendar fits around the school calendar and partly because lecturing is not a typical 9-5 job, so women have more flexibility to organise their time. A key finding, however, was that the women were reluctant to take a career break because they felt it would adversely affect their chances of promotion. This concern (particularly amongst mothers) could be alleviated if staff were encouraged to keep in touch using mobile computing. Unlike their colleagues in Physics or other ‘hard’ Engineering subjects, Computer Scientists can frequently dispense with an expensively equipped laboratory. The use of mobile facilities would enable staff to keep in close contact with the university, thereby reducing the impact on their careers of prolonged absences.

One final point from the findings that must be mentioned is the women’s areas of specialisation. Many were teaching the ‘softer’ aspects of Computing and had come from ‘non-traditional’ backgrounds. Virgo in a study carried out
nearly two decades ago observed that the interpersonal and management skills women possessed could be applied very effectively to the soft areas of Computing and suggested that employers ought to consider this when recruiting for Computing jobs [11]. The findings bear this out and suggest that efforts need to be made to persuade women that Computing is not all bites and bytes but concerns important human and social issues. Two of the interviewees had come into Computing via conversion courses. As these do not require a first degree in Computing and often focus on the softer elements, there may be a case for promoting them to women and perhaps offering scholarships for exceptional candidates.

Most of the initiatives suggested above require changes at institutional level and/or Government support. There is already Government awareness of the need for change, largely due to the work of Greenfield who has drawn attention to the paucity of women lecturing in science subjects. Changes at the institutional level are likely to take a long time to effect, however, because of the small numbers of women who are qualified to teach at this level. If, however, awareness is raised of the importance of recruiting women (and other groups traditionally under-represented within Faculty) then at least steps can be taken that will begin to alter the large gender gap that exists and provide women with the opportunities to fully contribute to the development of computer technology.

References


