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EDUCATION & EMPLOYMENT: A PRELIMINARY STUDY OF FEMALE BUILT ENVIRONMENT UNDERGRADUATE STUDENTS IN SOUTH WALES

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Abstract
Recently available figures for South Wales' university's and college's intake indicate a ratio of 83 male to 17 female students on undergraduate built environment courses. It could be contended that any increase in the numbers of females attending such courses should reflect more females at the 'coal face' but what of the experiences, perceptions and expectations while on those courses? The female respondents were questioned utilising semi-structured, digitally recorded discussions in relation to education, employment and how and why they arrived at their careers determining the influences in choosing that career path. Issues arose including poor careers advice, inappropriate work experience, lack of peer support, a general lack of knowledge of the industry and the perception of outmoded male attitudes. The aim is to ultimately gain a longitudinal view of female experiences over the 'life' of their courses and concurrent employment, to ascertain over time if the respondent's views have changed and original expectations met. It is suggested a better understanding of women's experiences through a longitudinal study may support the sector to improve the number of successful female built environment technicians.

Keywords: Women, built environment, careers, education, longitudinal study

INTRODUCTION

The imbalanced ratio of female to male construction workers in the built environment sector is well documented (Chwarae Teg 2009; Kirkup et al. 2010) and that gender imbalance is reflected in the ratio of female to male built environment undergraduates in the South Wales education sector (Unistats 2009). Anecdotal and documentary evidence has been provided various reasons for the low uptake of women into the industry; outmoded sexist attitudes and discrimination; negative stereotyping of construction; lack of peer support and work-life balance (Loosemore *et al* 2003; Gurjao 2006; Clarke and Gribling 2008; Watts 2010) to list but a few. With an aim to counter the industry image debate organisations such as CITB-ConstructionSkills have presented promotional campaigns in order to attract more females into the sector; campaigns such as "*Positive Image*" (2007) and "*Girls Allowed*" (2010); ConstructionSkills reporting favourable results following the *Positive Image* publicity.

Construction industry labour shortages are reported in times of high industry output as opposed to the economic nadir we currently find ourselves in. Indeed, McDermott (2011) of KPMG reported in *Construction Manager*, construction firms are "*...pricing below break-even levels*" but it can be argued that 'good times' always follow 'bad' and the call for more professionals will increase again. Greed (1991) suggested "*At at a time of 'man' power shortages, we must do all we can to enable, and not deter, women to participate fully...*" indicating a benefit it "*...actually saves money...*" through the "*...efficient use of...*" human resource management, reducing the "*...cost factor at all stages of the development process*". A factor reiterated as a benefit of diversity by David (2010) restating McEnrue (1993). Of particular concern is Fulcher's (2010) report indicating "*...practising female architects has dropped an alarming five per cent since 2008...*" although contradictory to that "*...statistics suggest an increase in women registering...*". The contention '*man*' power shortages will continue to be reported, particularly at high periods of construction output, will prevail unless real positive actions are taken to entice more professional women and possibly alleviating both the HRM issues and gender imbalance. It is also contended that until female pre-school leavers and women of working age are made aware of the full range of disciplines available; both the 'clean' and 'dirty' jobs; continuing evidence of the gender imbalance on built environment courses will remain. In providing clear information and continual positive promotion of the industry, a change of more women's attitudes will be witnessed as far as industry stereotyping is concerned and highlight the positive aspects and not only the negative characteristics of the sector. Industry stakeholders must ensure is women realise construction is not merely *muck and bullets*! (Murphy and Ren 2010).

This paper aims to provide a preliminary perspective of female experiences at the early stages of their built environment courses primarily through open question interviews. The questions purposely focussed on previous school, current education and their concurrent employment experience. This paper contains some of the responses provided by the interviewees and an analysis of the discussions followed by my conclusions from the analysis. It is envisaged to follow on with consequent research over the 'life' of their programmes through yearly staged interviews, the overall aim of ascertaining a long-term portrayal of those experiences will hopefully provide a clearer picture of the issues that arise. Also, their perceptions over time and a measure of their original expectations are to be considered. It is suggested a better understanding of women's experiences through a longitudinal study may support the sector to improve the number of successful female built environment technicians.

LITERATURE REVIEW

Industry Awareness and Image

A number of organisations and institutions have researched and advised on the causes for the lack of females in construction occupations and are consequently attempting to reverse the trend; an example in Wales is the *Women in Construction* initiative. Others such as Salford University's *Construction & Women* (2009) project and the National Association of Women in Construction (NAWIC 2009); NAWIC attempting to improve the opinion of women toward the industry, provide support in their chosen professions and ultimately elevate the image of female professionals. Similarly, the Women in Project Management (WiPM 2010) Specific Interest Group (SIG); an arm of The Association of Project Management (APM) (2010); aim to provide information for those interested in working in the discipline, declaring a focus on *"…school leavers, graduates and returners to work"*. Crucially, the focus on diversity and not separation or segregation is professed to promote good working practices

amongst both sexes. Watts (2010), chief executive of the Construction Industry Council (CIC) reported and enforced the issue of the image problem but also added on a positive note the role of the Royal Town Planning Institute (RTPI) in faring better than most institutions questioned on diversity employment practices. Examples provided construction organisations who have *broken the mould*, Mott Macdonald and Mace specifically named as two firms demonstrating good practice. Watts' argument is the industry will always have image problems and competitive disadvantages if it continues in the same vein, notwithstanding the slow growth in female employees.

Influences

Amaratunga et al. (2008) provides an encouraging image through the *Construction & Women* project with vignettes of women with a professional involvement who generally speak positively of their experiences. In contrast the project also refers to the fact "*…women tend to lack access to informal networks…and wide range of developmental experiences...that build the credibility to advance..."* Positive images are also provided by ConstructionSkills (Northern Ireland) (2008) with case studies of young women working in civil engineering, quantity surveying and health and safety. Good and bad points of their job roles are given but two replies reflect previous assertions being stereotypes and lack of women, although the advice is *"…not to be put off by stereotypes"*. Powell et al. (2006) reported issues of women within engineering, responses similar to previous researcher's findings; particularly women being amongst the minority. Reasons proffered include, poor careers advice, lack of family support, lack of supporting professional engineers as *role models* and quoting Dryburgh (1999) similar *cultural and occupational barriers* experienced in construction; mirroring those discussed in depth by Dainty et al. (2000) considering the broader aspects of female underachievement. As an antidote, Shanmugam et al. (2006) suggested "*…raise awareness…*" by "*…women working on construction committees…*" utilising them as "*…role models*"; the concept discussed by Lu and Sexton (2010), highlighted by McCarthy (2010). Lu et al. (2008) confirm in the managerial context, the need for role models to encourage and champion female employees, developing burgeoning careers. Clarke and Gribling (2008) argued the industry's structure and intrinsically created barriers influenced employment also reaffirming promoting the industry and better utilising schools as breeding grounds.

Education and Training

The drive by organisations including SSCs and Chwarae Teg in Wales to improve the uptake of women arguably should be making inroads on the professional female presence. This drive primarily concentrated on trade aspects; carpenters, decorators and the like but what of the boost for technical and managerial? SummitSkills (2010) highlighted the need for lines of learning and professional routes to be made clearer in schools as opposed to current practice, stating they *"…are guilty of not supporting females in their career choices if they are seeking non-traditional employment…"*

Table 1 **Male to Female Ratio of South Wales Built Environment Students**

	Ratio		Numbers	
Total Students	Male	Female	Male	Female
1570	83	17	1180	390

Historical statistics available to the CIB (1996) from the University and College Admission Service (UCAS), indicated an average 12% of the student cohort on built environment courses as female; similar to contemporary figures (11.6%) provided by bConstructive

(2009). The currently available figures for South Wales' universities' intake (*Table 1*) indicate a ratio of 83 male to 17 female students (Unistats 2009). It could be contended any improvement in numbers of females attending courses should indicate more females at the 'coal face'; is a student increase of 5% in 13 years acceptable? On the contrary the Royal Institute of British Architects (RIBA) (2009) provided information to *The Panel on Fair Access to the Professions* comparing male to female entrants on RIBA validated courses. According to their figures, 42% of *Part 1* entrants were women compared to 35% on the *Part 2* course, an increase between the two years. What are the experiences of female students while in education and employment? Powell et al. (2009) discussed a number of issues ranging from tutor positive discrimination to feeling they were only there in an attempt to improve numbers in the gender divide. Fulcher (2010) provides concern stating "*Universities have achieved close to 40 per cent female participation on architecture courses, indicating that the profession is still failing to make use of the pool of qualified labour*".

RESEARCH METHOD

Naoum (2007) stated unstructured interviews tend to be *very general* and used mainly when the researcher wants to see where the respondent will lead the interview. Merton and Kendal (1946) are quoted by Naoum in discussing the semi-structured approach and reiterate the characteristics; interviewees are known to be or have been involved in the situation under review. The semi-structured approach was preferred alluding to the above; the aim to research the respondent's experiences following the processing of an interview guide. As Caven (2008) argued referring to Jones (1983) and Evetts (1996), the interview method of information gathering is appropriate, the views of participants subjective and broadly career based. The internal validity of the findings, discussion and conclusions were tested by seeking feedback from the respondents as Burns and Grove (2005) attest, to ensure the results of the study truly reflect the views of the respondents.

Prior to the discussions/interviews commencing, participants were assured confidentiality of information proffered; consent for digital recording also requested. Enquiries sought the influences in choosing their careers and who were party to that influence. Much has been discussed regarding the quality of careers advice provided by advisors and schools; similarly of work experience so associated information was sought. Questions were included to discover how information relating to the built environment was provided, their experiences in employment and views on the role of training agencies in engaging females into the industry. Opportunities to provide further comments or observations allowed participants to add personally considered comments.

INTERVIEW RESPONSES

Career Choice

Of the respondents, four chose their current career; otherwise the careers "*chose them*" through progression or as some stated "*by luck*". Of those four, one always wanted to be a surveyor, following her father into the industry, an 'engineer', "*I used to occasionally go to work with my father to jobs*"; another showed interest "*...before I was ten*" in engineering. The other had some idea of what she wanted to do (architectural technician), received careers advice and thought "*...that sounds good...*" the career followed. While another worked in a

social housing organisation, a post "*...that sounded interesting...*" was advertised in another department and successfully gained the position.

Family Influences

Family influences varied including "*…they didn't mind as long as I went into something sensible*"; another's parents "*…advised from their own experiences…of the education system.*" A respondent's father arranged for her to speak to a local authority surveyor regarding built environment routes but "*…was focussed on what I wanted to do anyway...*". Another was influenced by her uncle, a QS; another, her family from a farming background, stated "*...my parents talked to me and asked what I wanted to do and tried to push me in the right direction. They said they would support me…*" whatever she decided. Fathers and brothers in the industry initially had no influence "*...my brother is civil engineer and my father a mechanical engineer...*"; "*...my father is a QS but I became a teacher…and hated it! I* (then) *decided to go into construction*". Others were influenced on their parent's careers and attitudes towards career advancement, some working in the industry not discussing the option including one father who "*…tried to put me off construction…I was too young and shy!*".

Another used to draught jewellery as a profession "*...and was good at it...*" in some respects an architectural profession "*...naturally followed...*" applying the design aspect. Others enjoyed buildings generally, "*I was always interested in buildings…pubs not houses*" (for aesthetic reasons!) found it interesting. Another established, she built up her curiosity as her "*...mother used to do a lot of decorating*". A non-British student was influenced by her uncle a QS who "*...taught her about building*". Family support differed "*…I used to go home crying from work…*" but was told by her family "*…keep with it, it would be fine"*, aged 16 working in a smoke-filled builder's office. A small number of respondents did not talk of careers at all with family.

Career Paths

The original careers of respondents varied significantly, including stable hand, teaching, travel agent, medical researcher, nanny, accountancy, administration and shoe factory worker. Some changed employment reasoning boredom, needing a career change and in one case, repetitive strain injury. Most worked their way "*up the ladder*" or between departments into their current positions. The majority received careers advice at some time, the perceived standard of advice varying; most did not know what they wanted to do while in school. Advice provided was generally perceived the "*...usual suggestions...*" of nursing, chemist, child-carer or teacher, not having mapped out a career path advice considered inappropriate or poor. Typical responses were "*...advice may have been useful if I had taken more notice*"; "*...had little bit of advice after O levels but in retrospect it was poor*"; "*...not much advice… only girl's jobs*".

School and Teacher's Advice

Whether teachers advised on construction depended mainly on the age of respondent, the youngest of them receiving some information, as one confirmed "*...they were happy to talk if you had any questions, but only knew a great deal about their own subjects*" another confirmed they (teachers) "*...knew the job titles but did not know what went on in the jobs…could not say what a QS or structural engineer did*". One declared she attended woodwork and metalwork classes and "*...enjoyed it...*" If advice was offered by teachers it was more in the vein of becoming teachers, working in travel and tourism or taking science at university. When questioned if the built environment had been discussed as a career option,

not one replied positively, information aimed at the boys and not girls. One individual declared "…*teachers seemed surprised when I said I was applying to do architecture*".

Work Experience

Work experience is arguably an important stage toward a working life for schoolchildren nearing school-leaving age. Almost half of participants did not receive work experience. Those that did, experienced working in hotels; two in equine centres; one being "...*bored at an accountancy office*"; two in pharmacies, one just "...*sweeping up at the end of the day*". Another described "...*sweeping up cockroaches*" at a stadium and at a swimming baths "...*waiting for someone to drown*"! Only three declared work experience worthwhile and relevant to construction.

Recruitment, Training and Work

Participant's experiences during recruitment and/or training provided a variety of responses; both positive and negative. An assistant QS confessed her recruitment "...*was easy*…" and now "…*if any help was needed I could ask anyone*"; even though they are all male "...*I am the only female who goes to site*". A similar response was "…*the boss took me out onto sites during my initial training…I now go on my own but if I have a problem my boss will help me*". Others had worked in sectors such as the fire service, "…*a male dominated environment…so it does not faze me…*" and have "…*never felt discriminated…wherever I have worked has always been positive*". Another recounted the informality of her interview process, "…*I took in a portfolio of my work and was told I had the job...*" as an architectural technologist.

A concerned participant stated "... *I wanted to be a trainee…it took me three 'shots' to be where I am now...there is an element of 'old school'...*" A piece of advice she provided when applying for jobs was "…*not to indicate you're a woman to get to the interview stage…it happened in a few places where I have been invited to interview…when attending the interviews, there were a few 'raised eyebrows'...*".

A negative experience in work placement "…*in a private practice, I often felt subject to sexual discrimination. There would always be comments from one of the directors and after 6 months I got moved into a room with him by myself. This made me feel very uncomfortable on a daily basis and the comments continued…even always assumed I would make his tea!*" Now working for another employer "…*it is completely the opposite…encouraged to progress and I feel as if I am part of a team…I know I have a lot to learn I feel like they want me to be here and want me to learn…not sure if this is the difference between private practice and local government?*"

One confessed she came into construction *late* and considers construction a "…*negative environment to be in for a woman. It may sound harsh and may not be an intentional thing; a lot of men I work with and around tend to see you as the little girl in the office…does not matter how bright you are, it is very hard for them to see past that barrier…it has been hard for my boss to accept what I can do…as I become more confident and realise what I know and my value* (is to the company)…*I find it hard to step out of the role I did before…"* Ironically, she admitted "...*the foremen and tradesmen are more accepting in the change in my role…more difficult for the manager…the policies are in place, it's just the acceptance of them*".

Some advice proffered to women was "*...be confident and give commitment, it seems as if commitment is one of the big issues…childcare...and young parents having to finish at 3.30…if you're a QS or an architect it's a long day, you have to be there for the full days and full weeks*".

Further Thoughts

Respondents opinions for the gender imbalance included "*...industry image*"; "*…confidence to get into the industry*"; "*...traditionally a male dominated environment, women probably worry that prejudice will occur*"; "*...not many women are aware of the various options within the construction industry from school age*". One suggestion was "*…more a fact that women don't choose to come into the industry….needs more advertising…I grew up in that environment* (father a QS) *but if not in it, it can be daunting but it's not bad actually…things have changed a lot*". Another suggested to "*Look at recruitment as a whole…careers have changed…advice needs to change…lot more information to* (school) *children*". One concern was "*No media coverage…* (her) *daughter would not be given advice at all about construction at school*".

Almost half mentioned SSCs targeting schools offering advice to potential candidates; comments such as "*Go back into schools more often…improve image…still think of 'girls jobs' and 'boys jobs'*; and "*…more hands on experiences and experiments from primary school age…imagination needs to be stimulated early*". Another confirmed "*More promotion within schools, the younger schools, primary schools. The last year of primary school is where you really think, when you are going up to comprehensive…target the younger years…not just year 9 or 10 where they have to make a decision*". She added, *"Knowing what I know now I would have done design technology* (in school) *but nobody told me*" of the options available.

Some enforced the need for change. "*People in industry* (training) *need to get used to women being in the industry…marketing…showing women*"; and "*...introduce girls early through work experience…vet placements early on for suitability*". A criticism railed at an SSC was they "*...are only good for chasing bills at the end of the year…don't support the employer to support apprentices…no idea of taking on females*".

ANALYSIS OF DISCUSSIONS

Careers advice for school leavers remains effectively under-utilised, not providing the full range of employment opportunities, significantly construction (SummitSkills 2010). If school teachers cannot provide the information, more thorough careers advice must be provided to include visits by suitably vetted built environment employers, considering Clarke and Gribling's (2008) assertion, to attract the required calibre of prospective candidate at an early age whether male or female. Successful women may help to improve diversity (Gurjao 2006, Lloyd 2009) in targeting schools more effectively, schools otherwise tending to guide towards the stereotypical male/female careers. The choice of subjects including woodwork, the 'male' fields of study, must be encouraged improving the reported stereotypical nature of learning in school.

Generally, any initial careers advice provided was either inappropriate or poor, on the whole directing the recipients towards the aforementioned stereotypical occupations; only those with a career in mind used the service effectively. Some admitted they did not listen to advice

and could not comment on the usefulness of the process. Subsequent advice prior to or during career changes from services such as Careers Wales was deemed to be more appropriate but used by only a small number of the women.

Issues were encountered during work experience (if provided); participants expected to generally work at 'conventional' female workplaces, three arranging their placements at built environment related organisations. Work experience was in the main unsatisfactory, participants utilised as 'cheap' labour by the hosts. A more rigid system of work placement is necessary, hosts vetted for suitability. By utilising an effective process with worthwhile realistic training for the incumbents, arguably more candidates of the calibre required for the industry will progress. It must be ensured both sexes are provided with equal opportunities and offered the chance of attaining qualifications outside the stereotypical job roles. Most of the interviewees did not initially choose to be involved in construction, those that did, influenced by parents or close relatives in the industry. Bearing in mind Lu and Sexton (2010), even parents in the industry may dissuade their daughters from taking construction careers but some will have a positive effect if only by osmosis. Those that end up in construction tended to 'fall' into the positions than arrive there with a clear career path, begging the question if clearer career paths are mapped out with pre-school leavers, would more females take on the technical roles in the built environment? Many participants did not remain with their original professions but eventually moved to their current positions by a chain of events and by chance.

A concern is the poor image of the built environment amongst the general public, until that issue is thoroughly addressed it will continue to pervade public psyche. To counter that, as a contractor referred, there are fantastic landmark buildings to be proud of so stakeholders must promote that it can be a very rewarding industry to be employed in. There are not many sectors where its incumbents can stand back and proudly say "*I was involved in part of that*".

The significant gender imbalance can in part be connected to the lack of effective media coverage, as one interviewee stated "*…women don't choose to come into the industry…*". A problem of the general lack of awareness of the possibilities is; everyone is a "*builder*" in the negative sense. To counteract O'Donnell's (2008) ineffective promotion assertion, a broader spread of parents and prospective school leavers may be targeted to effectively highlight the range of careers on offer.

The apparent lack of knowledge of industry networks requires addressing to offset McCarthy's (2010) view of the lack of provision of a supportive network. Used effectively the networks can provide further support to complement *ambassadors* as discussed by Murphy and Ren (2010). The use of peers providing support and advice to individuals (Lu et al. 2008; Lu and Sexton 2010) is not a new phenomenon but the call from most interviewees for more of this form of encouragement provides added weight for a clear structure of peer support and networks. The ConstructionSkills model of 'ambassadors' should be utilised thoroughly and from evidence provided, employed to encourage not only females already working in the industry but those considering a construction career whether school leavers or those considering changing vocation.

The ConstructionSkills-Wales (2010) document "*Be part of tomorrow*" enthuses careers opportunities available in construction. It would be interesting to follow up how effective such publications are in terms of attracting youngsters into the industry, particularly girls, as it includes two case studies of successful women. It is apparent, reiterating O'Donnell (2008)

there is a lack of sustainable and thorough promotional campaigns and ongoing review to deduce the effectiveness of those campaigns. Campaigns are seemingly initiated in waves pertaining to contemporary issues and themes at the time. Comments made by a number of respondents were they had seen little or no publicity for opportunities in the built environment, if it was there; it was not reaching those that mattered.

To test the internal validity of my interpretation of the discussions, the participants were requested to provide feedback on my analysis, from that a number of similar replies were returned. Responses ranged from simple confirmation or agreement of the accuracy of the reported results or as in one particular case a further affirmation of the issues already discussed. H, a female trainee QS employed by an SME, confirmed the need for better promotion of successful women in the industry, the success of that arguably increasing female uptake, "*...if they are aware of the roles and possibilities that are within the industry for them*". She continued, "*Career's advice needs to be much broader...with the acceptance of women doing 'men's work' such as roles within construction and men doing 'women's work' such as nursing. Career advice should not be aimed at the stereotypical roles for the different sexes, but should give everyone a broad range of advice*.

H did not differentiate between the sexes and confirmed, "*Specialist career days should be set up where each sex can find out about the roles without discrimination*". The issue of poor built environment advice provided in schools was also touched upon continuing on the *Career Days* theme, stating, "*These should be made compulsory within school so that girls would attend instead of thinking they didn't need to go as it was for the boys. Without the knowledge of the roles, then many women will not find construction as an attractive industry to work*". H summed up her response declaring, "*With knowledge and acceptance, it will be a big help to allow females into the industry*".

CONCLUSION

Considering the Eaton and Morton's (2008) scenario and employing that method with role models as Lu et al. (2008) and McCarthy (2010) discuss, opportunities will arise to provide for realistic and effective work experience for both sexes, the objective being to attract more females into the industry. It could be considered a 'token' gesture towards women but Lawrance's (2009) argument counters that with the "*…massive under representation … undermines…a sense of social justice*…" albeit relating to an engineering context. Similarly, as Keith Clarke of Atkins was reported by Swiszczowski (2007) "*Diversity and differences enrich organisations and are the opposite of tokenism…achieving diversity is not convenient but is a right*".

The inclusion of the built environment (reflecting the CIB's (1996) emphasis) as part of the school curriculum in the 14-16 provision and in the process of being "rolled out" in Wales as a 'pilot' is the Principal Learning qualification. Already used in England, it may be arguably provided at the moment, only to 'disaffected' schoolchildren. Included in the qualification is a wide range of learning criteria connected to the industry with a provision for work experience. By utilising effective placements with worthwhile realistic training for the students, hopefully more candidates of the calibre required for the industry will come forward as a result of the process. An assurance and willingness from all educational establishments must be provided that both sexes are presented with the equal opportunity of attaining the qualification, not guiding the girls into stereotypical job roles as reported. Whether male or

female, it is recognised that a "sense of humour" is required for what can be a very demanding and challenging industry to work in regardless of occupation or profession. The case of "*getting used*" to old industry attitudes is another matter and is unacceptable, the industry needs to move on and accept modern values to become a modern, unbiased industry.

Finally, the question posed by Dainty et al. (2005) why should women (and ethnic minority and disabled people, not discussed here) be attracted to an industry where evidence of negativity apparently remains? Do women need to 'undo' (Powell et al. 2009) their gender to cope with the industry? What changes are needed to make the industry not only attractive but also a viable option for others other than men to build a career in it?

REFERENCES

Amaratunga, D; Haigh, R; Elvitigala, G; Shanmugam, M (2008) *Construction and Women, Promoting construction careers for women in the North West*, [online] Available at: www.buhu.salford.ac.uk [Accessed 10/01/11]

Association of Project Managers (2010) *Women in Project Management SIG* [online] Available at: http://www.apm.org.uk/WomenInProjectManagement/WomenProfile.asp [Accessed 10/01/10]

Burns, N. P. D. & Grove, S. K. (2005). *The practice of nursing research: conduct, critique, and utilization,* St. Louis, Mo.: Elsevier/Saunders.

Chwarae Teg (2009) *Policy Briefing-Women in the Economy in Wales*, (Prepared for the Department of Children, Education, Lifelong Learning and Skills, Welsh Assembly Government (DCELLS) February 2009) [online] Available at: http://www.chwaraeteg.com/downloads/POLICYBRIEFINGedandskillsFinal.pdf [Accessed 10/01/11]

Caven, V (2008) Architecture: A Good Career for Girls? In: Dainty, A (Ed) *Procs 24th Annual ARCOM Conference*, 1-3 September 2008, Cardiff, UK, *Association of Researchers in Construction Management,* pp. 901-910

CITB-ConstructionSkills (2007) *Positive Image 2007 - Top Line Results to Date,* Item 14 CB/07/210/7 SECTION B

ConstructionSkills (2010) *bConstructive: Girls Allowed* [online] Available at: http://www.bconstructive.co.uk/careers/know/women/index.aspx [Accessed 10/01/11]

ConstructionSkills-Wales (2010) "*Be part of tomorrow - Change your world with a career in construction*". ConstructionSkills.

ConstructionSkills (NI) (2008) Women in Construction, *Women in Construction Network NI* [online] Available at: http://wicn.co.uk/docs/wic%20booklet.pdf [Accessed 10/01/10]

Clarke, L. & Gribling, M. (2008) Obstacles to diversity in construction: the example of Heathrow Terminal 5, *Construction Management and Economics*, 26: 10, 1055-1065, Routledge

Dainty, A. & Bagilhole, B. (2005) Guest Editorial. *Construction Management and Economics,* 23**,** 995-1000

Dainty, A.; Bagilhole, B.; Neale, R. (2000) A grounded theory of women's career under-achievement in large UK construction companies. *Construction Management and Economics,* 18**,** 239-250

David, A. (2010). Diversity, Innovation and Corporate Strategy, In: Moss, G (ed.) *Profiting from Diversity.* Basingstoke: Palgrave Macmillan, pp. 19-44

Fulcher, M (2010) 'Alarm' as number of women architects falls for first time in nearly a decade. *Architect's Journal, Women in Architecture*. 11/11/10, p8-9

Greed, C. (1991) *Surveying Sisters: Women in a Traditional Male Profession.* London: Routledge

Gurjao, S (2006) *Inclusivity: the Changing Role of Women in the Construction Workforce,* Englemere: Chartered Institute of Building

Kirkup, G.; Zalevski, A.; Maruyama, T.; Batool, I. (2010). *Women and men in science, engineering and technology: the UK statistics guide 2010*. Bradford: the UKRC

Lawrance, R (2009) Building bridges with women. "*Human Resource Management International Digest*", 17(1), 3-4.

Lloyd, K (2009) quoted in *Construction Manager* article *Does your office have this diversity?* October 2009, London: United Business Media

Loosemore, M., Dainty, A.; Lingard, H. (2003) *Human Resource Management in Construction Projects,* Abingdon: Taylor & Francis

Lu, Shu-Ling & Sexton, M (2010) Career journeys and turning points of senior female managers in small construction firms. "*Construction Management and Economics*", 28(2), 125-39

Lu, Shu-Ling; Sexton, M; Abbot, C; Jones, V (2008) Senior Female Managers in Small Construction Firms within the North West of England: An Update, In: Dainty, A (Ed) *Procs 24th Annual ARCOM Conference*, 1-3 September 2008, Cardiff, UK, *Association of Researchers in Construction Management*, pp. 921-929

McCarthy, C (2010) We need women role models. *Construction Manager*, "Feedback" March 2010 London: Atom Publishing

McDermott, F. (2011). KPMG: contractors pricing jobs to break even *Construction Manager* January 2011 p5 London: Atom Publishing

Murphy, M. & Ren, Z. (2010) Engaging female employees at technical and professional status in the South Wales construction sector. *In:* Egbu, C (Ed.), *26th Annual ARCOM Conference*, Leeds. Association of Researchers in Construction Management, Vol. 1, 553-62.

Naoum, S G Dr. (2007) *Dissertation Research & Writing for Construction Students,* 2nd Ed. Oxford: Butterworth-Heinemann

NAWIC (2009) *Aims of the National Association of Women in Construction* [online] Available at: http://www.nawic.co.uk/content/view/8/8/ [Accessed 29/12/09]

O'Donnell, A (2008) Gendered choices. Young women's perspectives on non-traditional training and careers in Northumberland. "*Education and Training*", 50(6), 474-88

Powell, A; Bagilhole, B; Dainty, A (2006) The problem of women's assimilation into UK engineering cultures: can critical mass work? *Equal Opportunities International*, Vol. 25, No. 8, 2006, pp. 688-699, Emerald Publishing Group

Powell, A; Bagilhole, B; Dainty, A (2009) How women engineers do and undo gender: Consequences for gender equality. *Gender, Work and Organization*, Vol. 16, No. 4, 2009, pp. 411–428, Wiley-Blackwell

RIBA (2009) *RIBA Response to The Panel on Fair Access to the Professions: Call for Evidence* [online] Available at: http://www.architecture.com/Files/RIBAHoldings/PolicyAndInternationalRelations/Policy/FairAccessToProfession/RIBAresponseToFairAccessToProfession.pdf [Accessed 10/01/10]

Salford University (2009) Construction & Women*, The Research Institute for the Built and Human Environment* (BuHu) [online] Available at: http://www.buhu.salford.ac.uk/caw/index?id=1 [Accessed 18/10/09]

Shanmugam, M; Amaratunga, R; Haigh, R; Baldry, D (2006) Construction and Women: the Lessons Construction can Learn from Other Sectors, *COBRA 2006*, the construction and building research conference of the RICS, University College, London 7th-8th September

SummitSkills (2010) *A Fresh Approach to Diversity,* A report into female and ethnic minority group issues within the Building Services Engineering Sector produced by SummitSkills for the Welsh Assembly Government

Swiszczowski, L (2007) SET Workplace Cultures: Making a Positive Impact. "*Good Practice Guide 10*" UK Resource Centre for Women.

Unistats (2009) *Search Results* [online] Available at: www.unistats.com [Accessed 10/01/11]

Watts, G (2010) Let's face it, we have an image problem. In: *Construction Manager.* January 2010, p12 London: Atom Publishing

WiPM (2010) *APM Women in Project Management Specific Interest Group* [online] Available at: http://www.apm5dimensions.com/group/apm-women-project-management-specific-interest-group [Accessed 10/01/10]