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Segregation in a Male-Dominated Industry: Women Working in the Computer Games Industry

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ABSTRACT

This paper focuses on occupational segregation within the games industry in terms of gender role identity and differences between female game workers in relation to their attitudes towards women's career barriers and their own career progression and promotion. Women are both underrepresented in the games industry workforce as a whole and in certain roles within the industry. Women in the industry tend to be concentrated in more traditionally 'feminine' roles such as marketing and administration. Women are underrepresented in core creation and development roles, such as coders, designers and artists; roles that tend to require technical skill and knowledge. Using data extracted from a large study of female game workers, this study adds to the scarcity of research into the area of women working in the computer games industry. It would appear that occupational segregation still persists in this relatively new, male dominated industry. Findings suggest gender role identity and attitudes are important issues when looking at segregation within the industry. Implications for future research on the games industry are discussed.

KEYWORDS

Gender; computer games industry; gendered occupational segregation; gender role identity; career barriers.

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INTRODUCTION

According to the Equal Opportunities Commission (EOC)[1], occupational segregation remains one of the strongest influences on young people's choice of career (Miller et. al., 2004). People tend to choose occupations where their own gender is represented (Miller et. al., 2004). Despite over thirty years of legislation outlawing discrimination on the grounds of gender, occupational segregation persists in the UK and across Europe. Occupational segregation is a social phenomenon that persists despite the growth of female participation in the labour market overall. The EOC has stated that occupational segregation has a negative effect on individuals, businesses and the economy and that the Government needs to address occupational segregation in order to improve UK productivity, competitiveness and prosperity (Miller, et. al., 2004). Agriculture, industry (manufacturing) and financial services remain dominated by men, while the service sector (including health, social work and education) remains largely female-dominated (Thewlis, Miller and Neathey, 2004). Information and communication technology (ICT) and the science, engineering and technology (SET) sectors remain dominated by men in almost all European states (Thewlis et. al., 2004).

Occupations are social categories; people within an occupation share things such as preferences and experiences (Weeden and Grusky, 2005). Therefore, occupational categories are an important part of a person's sense of self (Taylor, 2010). Taylor argues that:

> 'a worker's occupation is imbued with meanings about the identity of the worker and the appropriateness of the worker's role in that occupation - and these meanings can have negative or positive implications for perceptions of interactions and support among workers' (p190).

A worker may not necessarily be in a minority in an organisation, but they may be within their occupation in that particular organisation, and they will therefore feel the cultural effects of working in a gender incongruent occupation. Thus, the gender composition of the occupational category regardless of the gender composition of the worker's environment can have an effect on the worker (Taylor, 2010).

In the next section, previous research relating to occupational segregation, the segregation of women in the ICT/SET sectors and specifically within the computing gaming industry is discussed. The paper then continues with the research aims and the methodology section. The result section focuses on horizontal and vertical segregation through looking at the three key themes of the analysis: (1) gender role identity, (2) attitudes towards career barriers and (3) the attitudes towards the female game-workers' own career progression within this male dominated industry. The discussion section follows the same focus as the results section. The paper concludes with some summarizing remarks and implications, a look at the study's limitations and suggestions for future research.

BACKGROUND

Occupational Segregation

Gendered occupational segregation is an important issue, especially since segregation into different occupations remains a key factor contributing to the gender gap in earnings (Forth, 2002). According to the Guardian newspaper, British women suffer the largest pay gap in Europe (Revill, 2007). Internationally, women's wages are unequal to men's (Weichselbaumer and Winter-Ebmer, 2005). In a recent study, Mumford and Smith (2007) found the earnings gap between men and women in Britain is due to a combination of things such as: the different personal characteristics or traits between men and women, workplace segregation and occupational segregation. When women are segregated into certain jobs, those jobs usually pay less, have fewer opportunities for progression, less job autonomy, and less authority within the organisation. From their student research sample, Chalk et. al. (1994) found that both the male and female participants in their study feared what Chalk et.al. viewed as feminine jobs. This was mainly due to the low pay and low status associated with feminine jobs. Higher salaries are given to jobs believed to be masculine rather than feminine, even when duties are similar (Alksnis et.al., 2008).

Implicit stereotypes have also been found to impact on gender differences in estimated salaries; with money and wealth viewed as masculine (Williams et. al., 2010). It is even suggested that women expect to be paid less than men (Hogue et. al., 2010). Both genders in Hogue et. al.'s research expected to be paid less in female-dominated compared to male dominated occupations, highlighting the importance of attracting more women into male dominated occupations. Indeed, evidence has shown that in typically male occupations there are increased opportunities for advancement and career progression than in predominantly female occupations (Tomaskovic-Devey, 1993, in Hultin 2003). Furthermore, due to gender segregation, men and women have less interaction at work and therefore gender-role stereotypes can be perpetuated. Women in male dominated occupations have been found to receive less support than men but more support in mixed gender occupations; whereas, men receive high levels of support in female-dominated occupations. Therefore, being in the minority is an advantage for men, but a disadvantage for women (Taylor, 2010).

Gender segregation contributes to continuing skills deficits in the UK, which is recognised by the government in relation to some sectors, e.g. ICT (Hewitt, 2001, in Miller et. al., 2004). Segregation can occur both vertically, concentrating individuals in the lower echelons of an organisation, and horizontally, concentrating individuals in particular occupations, making some occupations either 'men's' or 'women's' work. The glass ceiling is a term often used to refer to the vertical segregation of women since it is women who tend to experience this form of segregation the most. The term 'glass ceiling' has been described by the Glass Ceiling Commission in the USA as:

> '... invisible, artificial barriers that prevent qualified individuals from advancing within their organisation and reaching their full potential. The term originally described the point beyond which women managers and executives, particularly white women, were not promoted. Today it is evident that ceilings and walls exist throughout most workplaces for minorities and women. These barriers result from institutional and

> psychological practices, and limit the advancement and mobility opportunities of men and women of diverse racial and ethnic backgrounds'. (Miller et. al., 2004, p24).

Segregation in SET and ICT Industries

The Widening Women's Work in Information and Communication Technology (WWW- ICT, 2004) report funded by the European Commission (Valenduc et. al., 2004) found that many companies had a culture of masculinity which can involve groups of young men decorating workplaces with pictures of nude women, sharing genderist jokes and socialising in all male groups. Not all women, however, are put off by this work environment, but the outcomes of the WWW-ICT project suggests that companies that claim to be 'gender-neutral' are actually gender-blind and do not notice or act upon gender inequalities. It seems women have to fit in with existing systems rather than the industry looking to understand different workplace practices and cultures. Although gender is only one aspect of the culture, Bagihole et. al. (2008) argue that it is fundamental to the cultures of organisations. Bagihole et. al. put forward the need for SET organisations to challenge the perceived duality between masculinity and technology, as well as to embed work life balance and flexible working practices into the organisational culture and highlight their availability to men not just women.

With regards to promotion, the WWW-ICT report suggests that ICT organisations have a flat structure with little hierarchy. Flat organisations lead to an informal working environment, but career ladders can be short or nonexistent. A lack of formal structures and progression processes can make it particularly difficult for women to gain advancement. The report found the ICT industry was the opposite of more formal bureaucratic models of other industries. This can be a disadvantage to women since it has been suggested that women tend to achieve better in organisations where career paths are clear (Wickham et. al., 2008). Wickham et. al. (2008) challenge the argument that bureaucracy is inherently patriarchal. Through a study of software firms in Ireland the authors found that bureaucratic companies benefited women more than the non-bureaucratic, individualised companies. Within the bureaucratic organisation, they found women can insist that rules and regulations imposed by equal opportunity policies and legislation are enforced. Within the software companies the authors found that women had to choose between career and motherhood due to inflexible practices within the companies. Wickham et. al. suggest that the software companies initially appear welcoming to women due to flexible working but it turns into a trap. Similarly, in an earlier study, McIIwee and Robinson (1992) compared the mobility of female engineers in a bureaucratic company with an innovative computer firm and concluded that women's mobility is greatest where the masculine culture of engineering is minimised by bureaucracy.

According to James and Cardador (2007), women's cognitions and beliefs about technology and science are more negative than men's, resulting in a disinterest in the employment sector. One reason for a disinterest in computer games as an occupation is the long hours that have become standard within the industry (Fullerton et. al., 2008). Another reason relates to the identity of women within the industry. For instance, Wajcman (2007) argues that women are asked to exchange aspects of their gender identity for a masculine version and forsake

their femininity without this de-gendering process occurring for men. It has also been suggested that in order to cope with the challenges to their own gender identity and those of the men with whom they work, women in ICT and SET industries must develop strategies (Newell, 2002). One such strategy is for women to make their gender identity invisible (Griffiths et.al, 2007) or become more masculine (Wajcman, 2007).

Computer science in western countries has often been characterised as 'masculine' (Wajcman, 2000; Clegg and Trayhurn, 2000; Natale, 2002, Wilson, 2003). For example Wajcman argues that...

> 'technologies have a masculine image, not only because they are dominated by men but because they incorporate symbols, metaphors and values that have masculine connotations' (Wajcman, 2007, p.289).

This image reinforces the association between masculinity and technology and therefore potentially excludes women. Thus, the image becomes another barrier for women entering and remaining in ICT/SET.

Segregation in the Games Industry

The games industry is made up of a number of specialities including development, production, design, level design, audio design, art and testing (Green et.al.,2007). Recent figures contained in the 2008 Oxford Economics report suggest that the UK games industry has over 9000 employees. A report by the online games magazine, MCV (2008) suggests that the percentage of women within the games industry in core creation or developmental roles is around just 6.9%. More recent figures produced by Skillset (2009) found that women represent 4% of the game industry's workforce, a decrease from 12% in 2006 (Skillset, 2006). This figure is inclusive of the non-developmental as well as the developmental roles women occupy within the industry. Developmental roles within the industry are those roles that are involved in the creative and developmental aspect of game development. These roles create everything within the games from the content, the style of play, the reward systems and ultimately influence who the target audience of the game will be. Reasons for this reduction of women within the industry in recent years are unclear. According to Skillset (2009) the creative media industries workforce as a whole has declined within the three years between the two censuses. It would therefore appear that the industry is losing its battle to increase its appeal to a more diverse workforce.

Both horizontal and vertical gender segregation is claimed to exist within the games industry. Vertical segregation represents the difference in parity in the numbers of women and men in the more senior roles within the industry. For example, according to Krotoski (2004) only 0.4% of female employees in the UK games industry are in lead, director or management positions, whilst 1.2% of male employees hold these jobs. Research by Haines (2004) found that nearly a quarter (23%) of senior positions within the twenty UK games companies in her study were filled by women. However, Haines study revealed that senior women were more often found in managerial and senior roles in the less technical areas of games development or in areas more associated with traditional female roles, such as marketing, rather than direct games development. Women are more than likely to be represented at the senior levels in some areas due to the

increasing numbers of women in these areas. This suggests that there is horizontal as well as vertical segregation within the industry. According to the International Game Developers Association (IGDA) (Gourdin, 2005) when dividing job descriptions by gender, the only category that comes close to parity is that of operations/information technology/human resources. The functions of writing and marketing/PR/sales have relatively healthy representation of females. However, male workers heavily dominate most of the core content creation roles such as art, design, audio and especially programming, as can be seen from table 1 below.

Table 1. The percentage of men and women in each job description within the gaming industry.

	Males %	**Females %**
Ops/IT/HR	53%	47%
Writing	70%	30%
Mkt/PR/Sales	75%	25%
Production	79%	21%
QA	87%	13%
Executive	88%	12%
Visual Arts	89%	11%
Design	90%	10%
Audio	90%	10%
Programming	95%	5%

The findings of the report published by the IGDA support earlier research conducted in the North West of England (Haines, 2004). Haines found that the majority of women in the games industry work in managerial, administrative, marketing and PR (public relation) roles. They reported that 73% of women working in games worked outside the main jobs of creating the games. Haines research found that only 2% of programmers were female, 3% worked in audio, 5% were game designers, 8% production staff and 9% were artists. Due to the lack of women in these roles, women in the industry have little voice in the content, interaction styles, character representation and the reward systems involved in games. All of these roles affect what is created and how games are perceived (Flanagan, 2005). With regards to the larger ICT and SET sectors it has been observed that women tend to work in the softer and less technical areas such as design, rather than coding (Poggio, 2000 and Panteli et. al., 2001). This appears to also be the case within the gaming industry. The games industry is within the umbrella of the ICT and therefore wider SET sector. However, games development is a relatively new industry, only really having been established as a mainstream industry since the development of the Sex

Discrimination Act (1975) over thirty years ago. This is in comparison to the established ICT and SET sectors. Due to the claims of both vertical and horizontal gendered segregation within the games industry and the wider ICT and SET industries it was deemed appropriate to see if there were any differences between women working within the industry in terms of current grade or level and professional identity in relation to their attitudes towards career barriers, promotion and progression and gender role identity. This research may help fill any knowledge gaps in the literature and ascertain if this new technological industry is more integrated between the genders than the sectors with which it is associated.

RESEARCH AIMS

In light of the literature on gendered occupational segregation, it was proposed that women's experiences and attitudes will vary depending on the role and grade they occupy within the industry. The paper focuses on three areas: gender role identity at work; attitudes towards women's career barriers; and, attitudes towards their own career progression and promotion. These three areas were viewed as particularly pertinent to occupational segregation since previous research suggests that women adopt strategies, such as becoming either masculine or gender neutral (androgynous), in order to fit into male domains. Attitudes towards women's career barriers were viewed as important to segregation since women may experience more career barriers due to their minority status in more male dominated roles within organisations and industries. It was therefore proposed that women in the more female-dominated occupations will have a more positive attitude towards women's career's than women in more male dominated occupations. Attitudes towards career progression and promotion were deemed relevant to segregation since promotional issues impact on segregation, especially vertical segregation.

METHODOLOGY

454 women working in the computer games industry completed an online questionnaire that forms part of a larger study. The study is based on an international sample of female game workers who occupy varying professional identities and grades within the industry. The sample included women who work in the very male domain of game development (N=349) and also women working in more traditional female-dominated roles; non-developmental roles (N= 105) such as: Human Resources (HR), marketing and administration. The data extracted for this paper are the findings from the gender role identity, attitudes towards women's career barriers and attitudes towards career progression measures from the larger study. Participants tended to be young, single or living with a partner, childless and the majority played computer games in their leisure time. All analysis was conducted using SPSS version 15. The questionnaire gathered personal and professional information and included the measures detailed below.

The nature and strength of an individual's gender role identity at work was measured using Bem's (1974) sex role inventory (BSRI). The original scale consists of sixty characteristics and participants are asked to describe themselves on each of these traits by using a seven point Likert scale, ranging from 1 'never true' to 7 'always true'. The scale measures three primary sub scales: masculinity ($\propto$=0.86), femininity ($\propto$=0.82) and androgyny ($\propto$=0.85).

Bem developed the scale which consists of twenty masculine characteristics, twenty feminine characteristics, and twenty neutral characteristics. Bem developed the scale from a list of 400 characteristics which were judged by male and female undergraduate students on two separate occasions (100 students in total). According to Bem: 'a personality characteristic qualified as masculine if it was independently judged by both males and females in both samples to be significantly more desirable for a man than a woman' (p.157). The same method was applied to the feminine characteristics. On the basis of the median split of the responses to masculine and feminine adjectives, each individual may be classified into one of four categories: undifferentiated; feminine; masculine; or, androgynous. An undifferentiated person has a relatively low score on both the femininity and masculinity scales; a feminine typed person has a high score on the feminine scale and a low score on the masculine scale; the reverse is true of a masculine typed individual; and, an androgynous person has high scores on both scales. The short version of the BSRI consists of twenty items, ten masculine and ten feminine characteristics, and yields more comparable and reliable scores ranging from $\propto$=0.84 to $\propto$=0.86 for the masculine score and ranging from $\propto$=0.86 to $\propto$=0.87 for the feminine score (Bem, 1981, see Campbell et. al., 1997). However, for the purpose of the current study one of the feminine characteristics, 'loves children', was omitted. Our rationale for omitting this characteristic was that there was no direct contact with children in these specific workplaces and we wanted respondents to focus on their actions and motivations within the workplace when answering the questionnaire.

Therefore, the gender role measure used in the study contained just nineteen characteristics, as opposed to twenty. For the masculine gender role identity a score between 0-30 was viewed as low, 31-49 medium and 50-70 high. For feminine gender role identity a score between 0-25 was viewed as low, 26-40 medium and 41-63 high. For the androgyny gender role identity scores between 0-23 was viewed as high, 24-46 medium and 47-70 low. The current research forms part of a larger doctorial study, which in part aimed to further refine and develop the BSRI. Cronbach alpha's for the sample were masculinity ($\propto$=0.879), femininity ($\propto$=0.895) and therefore higher than Bem's original study masculinity ($\propto$=0.86), femininity ($\propto$=0.82). As part of the larger study factor and reliability analysis was conducted on the BSRI, finding that the BSRI is still a useful tool to measure gender identity today (see Prescott and Bogg, forthcoming).

Attitudes towards barriers to women's career progression were measured by six questions that asked participants to indicate the extent they agree/disagree with statements on barriers to women's career progression, measured on a six point Likert scale, ranging from 1 'very strongly disagree' to 6 'very strongly agree'. Participants were asked the extent they agreed/disagreed that: the glass ceiling exists; equal opportunities legislation means there are no barriers to women in employment; some careers are more female friendly than others; there are no covert barriers to women's achievement; women are well represented in their profession; and, women are well represented in their organisation.

In order to look at attitudes towards career progression and promotion, five questions asked participants to indicate the extent to which they agreed/disagreed with statements on career progression and promotion, measured on a six point Likert scale, ranging from 1 'very strongly disagree' to 6 'very strongly agree'. Participants were asked: if promotion was important to

them; if they intended to climb the career ladder, and were they prepared to make personal sacrifice in order to do so; if they were progressing in their career; if there were not enough opportunities for them to progress in their career; and, if being recognised in their field was important to them.

RESULTS

The majority of women in the study were in a developmental area within the games industry (76.9%, N349/454), as this was the main study sample of the larger PhD study. Twelve professional identity categories were included in the study. Nearly a quarter, (23.1%, N105/454) of the participant's had a professional identity of 'other', which included those working in human resources (HR), administration, recruitment and marketing. Table 2 shows a breakdown of the professional identities of the women in the study. None of the core content creation areas within the games industry had much female representation. It could however, be argued that women are less represented in the more technical areas of games development such as coders, QA, and engineers. These identities were also poorly represented in the IGDA report (Gourdin, 2005) previously highlighted. Executives in the current study were more reasonably represented as were artists/animators, designers and producers, in contrast to the findings of the report published by the IGDA. Findings indicate that women are more represented in the less technical and perhaps less masculine roles within the industry such as art, design and production; compared to the more technical and highly masculine roles of coding, QA and engineering.

Table 2. Professional identity of the female participants

Professional Identity	Number	%
Artist/Animator	66	14.5
Coder	26	5.7
Writer	11	2.4
Designer	62	13.7
Producer	58	12.8
QA/Tester	24	5.3
Audio/Sound Engineer	5	1.1
Lecturer	23	5.1
Researcher	6	1.3
Engineer	11	2.4
Executive	57	12.6
Other	105	23.1
Total	454	100

Horizontal Segregation

Developmental (non-traditional/gender incongruent) versus non-developmental (traditional/gender congruent) roles
T tests analysis yielded just two significant differences between women working in developmental and non-developmental areas of work within the games industry. Significant results were found for androgyny gender role identity and just one of the career barriers statements. No significant results were found for any of the career progression and promotion statements.

With regards to attitudes toward career barriers, women working in a developmental role disagreed significantly more with the career barriers statement 'women are well represented in my profession' (t=-4.072, df=423, p=<0.01). Women in a developmental role had a significantly less androgynous gender role identity than women in a non-developmental role (t=2.693, df=233.280, p=<0.01).

Table 3. Significant t test results for participants area of work and the measures in the study

Statement	T	Df	P value	Develop Mean	Non-develop mean
Androgyny	2.693	233.280	<0.01	10.73	8.60
Career barriers statement 5: women are well-represented in my profession	-4.072	423	<0.001	2.54	3.15

Differences between the professional identities
A number of one-way ANOVA's revealed significant differences between the different professional identities. For instance, QA (M 5.21) professionals agreed significantly more strongly than writers (M 3.82), engineers (M 3.64) and executives (M 4.28) with the career progression statement, 'promotion is important to me'. Executives (M 4.58) felt the gender role characteristic 'forceful' was significantly more a characteristics of them at work than artists (M 3.55) and coders (M 3.38) did. In relation to the characteristic of 'leadership abilities', coders (M 4.65) felt this was significantly less a characteristic of themselves compared to lecturers (M 5.96) and executives (M 5.93). Artists (M 3.48) perceived themselves as significantly less dominant at work than producers (M 4.53), QA's (M 4.75) and executives (M 4.42). Executives (M 52.98) had significantly more of a masculine gender role identity compared to artists (M 46.47). Writers (M 1.36) had a significantly less androgynous gender role identity at work compared to women working in a non-developmental role (M 1.03), artists (M 1.08), coders (M 1.00) and designers (M 1.03).

With regards to the career barriers statements, there were significant differences between the professional's identities for four of the six statements. Lecturers (M 4.61) believed significantly more strongly than coders (M 3.42) that 'the glass

ceiling exists'. Lecturers (M 2.70) disagreed more strongly that 'equal opportunities legislation means there are no barriers to women's career advancement' than writers (M 3.82). Lecturers (M 2.04) also disagreed more than artists (M 3.30) that 'there are no covert barriers to women's achievement'. Women working in a non-developmental role (M 3.15) agreed significantly more with the statement that 'women are well represented in my profession' than the engineers (M 1.64) did.

Table 4. Significant one-way ANOVA results between the professional identity of participants and the measures in the study

Statement	**f**	**df**	**P value**
Career progression statement 1, promotion is important to me	2.992	11,442	<0.001
Bem gender role characteristics, forceful	2.322	11,442	<0.01
Bem gender role characteristics, leadership abilities	3.113	11,442	<0.001
Bem gender role characteristics, dominant	2.483	11,442	<0.05
Masculine gender role identity	2.398	11,442	<0.01
Androgynous gender role identity	2.698	11,442	<0.01
Career barriers statement 1, I think the glass ceiling exists	2.558	11,442	<0.01
Career barriers statement 2, equal opportunities legislation means there are no barriers to women in employment	1.840	11,442	<0.05
Career barriers statement 4, there are no covert barriers to women's achievement	2.558	11,442	<0.01
Career barriers statement 5, women are well represented in my profession	2.675	11,442	<0.01

Vertical Segregation

As mentioned previously, vertical segregation within the industry is reflected by grade or level. Earlier research found women to be in the lower echelons within the industry (Krotoski, 2004), or in management positions in the non developmental areas of the industry (Haines, 2004). In the current sample a quarter, 25% (N 112/450) of female participants were managers, nearly a quarter, 24% (N 111/450) were middle level, 18% (79/450) were senior and 15% (N 68/450) were junior. Table 5 shows the number of participants by grade for each of the professional identities in the study. The female participants in the current study tend to be well represented by grade and professional identity. However, the least represented grade was lead, which is perhaps one of the highest technical grades.

Table 5. Grade by professional identity

Grade /level	Artist	Coder	Writer	Designer	Producer	QA	Audio Engineer	Lecturer	Researcher	Engineer	Executive	Other	Total
Junior	13% (9)	6% (4)	3% (2)	16% (11)	13% (9)	6% (4)	2% (1)	4% (3)	3% (2)	2% (1)	3% (2)	29% (20)	100% (68)
Middle	19% (21)	5% (6)	0% (0)	12% (13)	12% (13)	5% (6)	2% (2)	7% (8)	2% (2)	2% (2)	14% (16)	20% (22)	100% (110)
Senior	14% (11)	3% (2)	4% (3)	19% (15)	15% (12	5% (4)	0% (0)	5% (4)	1% (1)	4% (3)	8% (6)	22% (18)	100% (79)
Lead	27% (10)	0% (0)	6% (2)	8% (3)	8% (3)	6% (2)	3% (1)	3% (1)	3% (1)	3% (1)	11% (4)	22% (8)	100% (36)
Manager	12% (13)	6 % (7)	2% (2)	14% (15)	14% (15)	4% (5)	0% (0)	4% (5)	0% (0)	1% (1)	20% (23)	24% (26)	100% (112)
Other	2% (1)	16% (7)	5% (2)	11% (5)	13% (6)	7% (3)	2% (1)	5% (2)	0% (0)	5% (2)	9% (4)	25% (11)	100% (44)

One way ANOVA's revealed just three significant differences between the grades of the participants. Women in the manager grade agreed more (M 2.99) than women in the junior grade (M 2.93) that 'there are no covert barriers to women's achievement'. Women in the junior grades had a significantly higher (M 45.36) feminine gender role identity than women in the middle grades (M 44.20). With regards to androgyny, women in lead roles (M 12.67) had less androgyny than women in both manager (M 9.36) and other grades (M 8.25).

Table 6. Significant one-way ANOVA results between the grades of participants

Statement	f	df	P value
Career barriers statement 4: there are no covert barriers to women's achievement	2.387	5,444	<0.05
Feminine gender role identity	3.041	5,444	<0.05
Androgynous gender role identity	2.600	5,444	<0.05

DISCUSSION

The findings highlight the different attitudes of women working in the games industry. This paper has shown differences between women in different professions and grades in terms gender role identity at work and their attitudes towards the career barriers to women's career progression and to a lesser extent their attitudes towards their own career progression. Like the wider ICT and SET industries, women need more representation in all areas and roles within the industry. With regards to vertical segregation however, women in the current study tended to be in more senior grades in contrast to the findings of women in ICT and SET. It would therefore appear that occupational segregation still persists in this new, male dominated industry.

Occupational segregation is an important issue within the industry especially since participants can be categorised into two distinct groups: those employed in developmental and traditionally more male dominated roles and those in a non-developmental and traditionally more female-dominated roles. According to Taylor (2010) a worker may not be a minority in an organisation, but they may be a minority within their occupation, within that organisation. Therefore, they will feel the cultural effects of working in a gender incongruent occupation. Thus, the gender composition of the occupational category regardless of the gender composition of the workers environment can have an effect on the worker.

Women working in a developmental role within the games industry are a minority in the industry, their occupational group, their organisation, their team and their role is not traditionally congruent with their gender. Women working in the non-developmental roles within the games industry are in a minority in the industry and organisation, but they may not necessarily be in a minority within their team and are not in a minority within their occupations. They may well work daily with other women and their role is traditionally feminine and considered more congruent with their gender. This is an important consideration when discussing women working in the games industry.

Identity in a male domain

There were a number of differences between the female game workers in the study and gender role identity. Therefore, this paper suggests that gender role identity is an important issue when looking at segregation within the industry. Women in the developmental and therefore male-dominated roles were less androgynous than women in the non-developmental and more female areas of work. This finding is surprising since previous research on women in ICT found women in male-dominated roles become more androgynous and less gendered in order to fit into the male environment; in essence becoming gender neutral (Griffiths, Moore and Richardson, 2007). Researchers have criticised female engineers who hide their femininity for not only failing to challenge the gendered culture of engineering, but because they also maintain an environment which is hostile to women (Powell, Bagihole and Dainty, 2009). It may be that women in the traditionally female roles within the games industry are using similar strategies in order to cope in this male domain due to the women being significantly more androgynous.

With regards to professional identity, the finding that executives having a significantly higher masculine gender role identity compared to artists/animators is interesting since it could suggest that women in a powerful executive position

either adopt or naturally have more masculine characteristics than those in other areas of the games industry, especially those in the more creative, artistic roles in game development. It also begins to raise the issue of how similar research that includes men might compare. This could possibly indicate that for women to go into more senior management or executive level, they need to adopt masculine traits as previous research suggests (Powell and Butterfield, 2003) and a recent paper on distancing from feminine identity endorses (Derks et. al., 2010). Feminine traits include warmth, kindness, selflessness and sympathy (Schein, 1973). Masculine traits include aggression, forcefulness, rationality, competitiveness, decisiveness, strength, self-confidence and independence (Schein, 1973). The finding that writers had significantly less androgynous gender role identity than women in a developmental profession, artists/animators, coders and designers, may indicate that writers in the industry are more gendered or less gender neutral than some of the other professions. However, reasons why this difference exists are unclear. The professional identity of writers in the games industry has one of the lowest percentages of females in the study and a relatively low percentage in the IGDA report (Gourdin, 2005), which may have some bearing on the findings.

In relation to grade, the finding that women in management positions have a significantly higher feminine gender role identity than women in middle grades, is surprising. Prior research suggests that in order to progress in their careers, women need to adopt what are seen as more masculine traits (Kawakami, et. al., 2000, Schein & Muller, 1992, Schein, Mueller and Jacobson, 1989 and Willemsen, 2002). However, the WWW-ICT, 2004 report found that women are often directed towards project management even if they prefer technical work, due to assumed interpersonal and organisational skills (more feminine skills). This may be one explanation for this finding of the study. When looking more closely at the women in the current study, the two largest professional identities of managers was firstly 'other' (24%), that is the non-developmental roles, and secondly, executives (20%), where it is unclear as to their actual role within the industry i.e. technical or non-technical. Therefore, the managers in the study may have been in more stereotypically feminine roles within the industry, which could also possibly account for the difference.

Women's career barriers

Attitude toward the barriers to women's career progression revealed a number of significant differences. The study found that women in the developmental roles recognise that women are not well represented within their profession. This is understandable as women in developmental, and generally more technical, roles are underrepresented within the industry, more so than women in traditionally feminine, non-developmental roles, as previously discussed with reference to Taylor's (2010) assertions. However, there was no difference between the two groups with regard to representation in their organisation. This may indicate that the minority status of women is not as evident within their organisation (i.e. women working in a variety of roles), as opposed to minority status of specific professions within the games industry.

With regard to differences between the professional identities of the female game workers, differences were found between four of the six attitudes toward career barriers. Lecturers in particular showed the most differences, revealing a more negative attitude towards women's career progression, than some of the

more core content creation roles within the industry. This perhaps suggests that the academic working environment has a number of barriers towards women's career development. Women working in a non-developmental role agreed significantly more with the statement that women are well represented in their profession than the engineers did. This makes sense since the non-developmental roles are more female-dominated and engineering had a particularly low percentage of female respondents in this and other studies (IGDA, 2005; Skillset, 2009).

Grade is an important issue for women in the workplace. Previous research suggests that women tend to be concentrated in the lower echelons of industries; especially in male-dominated industries (Thewlis et. al., 2004; Office of National Statistics, 2003; Faulkner, 2001). There was only one significant difference found between the career barriers statements and grade. Women in a junior grade felt there are covert barriers to women's achievement, significantly more so than women in management grades. This finding could imply that since managers have progressed and achieved a senior level within the industry, they do not see covert barriers existing. It is possible that having risen to a management position, and in consideration of the proposition of Derks et. al. (2010) regarding women distancing from feminine identity, it is possible that cognitive restructuring has taken place and such women no longer identify the existence of covert barriers.

Career progression and promotion attitudes

The industry has a wide variety of roles, requiring a wide range of skills. Roles include artists, QAs, coders, writers, designers and those in HR, administration and marketing. Attitudes towards promotion and progression revealed only one significant difference, that promotion was significantly more important to QAs than it was for writers and executives. For the executives this might be explained due to the nature of their professional identity, as they are already senior and may therefore no longer be looking for promotion, or there is simply nowhere else to be promoted to. However, it is more difficult to explain the difference between QA's and writers. One possible explanation could be that becoming a QA is considered one way for avid gamers to get into the industry and, once in, move into other roles such as coding (a covert career path), whereas this may not be the case for writers.

CONCLUSION AND IMPLICATIONS

There are a number of issues important to segregation within male-dominated industries. This paper has looked at occupational segregation within the games industry in terms of gender role identity and differences between female game workers in terms of their attitudes towards women's career barriers and their own career progression and promotion. Attitudes towards career progression and promotion did not yield many significant differences, whereas gender role identity and attitudes towards career barriers revealed interesting differences. If women who enter the industry are moderating their gender role identity in order to fit into the industry, then greater numbers of women entering will not necessarily lead to a more female friendly working environment. According to Kanter (1977) increasing the numbers of women in an environment will result in a more welcoming working environment. Reviewing women's identity threat in male domains, Hirshfield (2010) concluded that more women in a given environment, may not necessarily change the dynamics of a male environment,

and women may become concentrated and isolated into female-dominated areas and subfields. The current research tends to support Hirshfield's, rather than Kanter's viewpoint. The games industry wants to attract more women to its workforce in the hope of gaining a more diverse audience. However, if future generations of women enter the industry, the industry still may have a gender divide in terms of the roles women occupy. Women may not necessarily be in positions where they can influence what games are made, how and for whom. Therefore, a very important and significant finding from the current research is that gendered occupational segregation is an important consideration in male-dominated industries and spaces.

With regard to segregation, there are a number of practical methods the industry could employ to attract and retain more women and a more diverse workforce. For example, over half of the participants in the study were in a senior grade. The industry would therefore benefit from not only more women in senior roles, but also through making these senior women more visible. This visibility may help in the eradication of the industry's image as 'for boys only' and possibly attract more women. These senior women could also act as role models for the next generation of female game workers. Eccles (1994) suggests that inaccurate and insufficient information about professions is the main reason why young women do not consider or rule out occupations that might fit their self-schema. The industry may therefore benefit from highlighting the various roles and skills required in the industry as well as the various backgrounds, both educational and occupational, that women who enter the industry come from.

Limitations of the study

The study has several important limitations. The current paper focuses solely on a female sample. However, this is the first paper in a series focused on these issues. Although the current paper looks at women's perceptions, other forthcoming papers will report on gender differences on a number of measures.

Another potential limitation was in the use of the Bem Sex Role Inventory (BSRI), as the instrument is over 30 years old and may no longer be considered to reflect the gender role identity of women today. Since its development over 30 years ago the reliability and validity of the BSRI (both long and short versions) and its relevance to men and women today has been debated (Wilcox and Fancis, 1997; Holt and Ellis, 1998; Choi et. al., 2003 and 2007). Some authors suggest that instead of measuring a global construct of masculinity and femininity, the BSRI actually measures instrumental and expressive traits (Spence, 1983; Spence and Helmreich, 1981 and Adams and Sherer, 1985).

Reliability for the BSRI for female game workers in the current study was very good. Part of the aim of the larger study from which this paper is derived was to further refine and develop the BSRI. Findings from the larger study suggest that the BSRI is still a useful tool and relevant today, although the scales have altered slightly with more characteristics viewed as masculine than feminine (see Prescott and Bogg, forthcoming). The authors of the present research view masculinity and femininity not as global constructs or traits, but rather as state based characteristics, which may change, depending on influencing factors such as career or working environment.

The BSRI is the most widely used and accepted sex role inventory and it has been associated with a number of other psychological constructs, such as self-

efficacy (Long, 1989) and self esteem (Whitley, 1983). In addition, whilst a number of older studies used the BSRI with student samples more recent studies have included various workforce and professions in study samples, such as Peng (2006) whose sample included male and female students, nurses, police offices and managers; Loughery's (2008) research with male nurses and Powell and Geenhaus (2010) with male and female managers.

In the current study, attitudes towards women's career barriers and attitudes towards promotion and progression were original questions based on the literature reviewed and pilot development. Therefore, face validity was appropriate to the sample population, but requires further exploration to identify other relevant factors and relevance to other populations/professions. In addition, it would also have been useful to have obtained information about the size of the organisation and team participants worked in. This may have influenced the way women feel about their working environment, their minority status or even their gender status. The games the women made may also have had some significance as working on female popular game genres may link to a more female-friendly working environment in this male-dominated industry.

Finally, this research utilised a cross-sectional design in that it looked at women who work within the industry, in various positions at a given point in time Future research should aim to incorporate a longitudinal design in order to capture changing career attitudes and the concept of 'state or trait' in relation to gender identity further.

Future study directions

There is a paucity of research with regards to women working in the games industry. The current research findings have made a key contribution to the area. More research investigating both women's and men's experience of working in the male domain of the computer games industry will help gain further knowledge into new industries and new media, as well as help gain a further understanding of the wider ICT and SET industries. These issues are important if the UK games industry wants to succeed in attracting a more diverse workforce.

Segregation within the industry gives rise to potential areas for future investigation. For instance, more women in senior roles may reduce the image of the industry as a male domain and impact on gender identity. Environmental changes within the industry, such as those relating to work life balance issues and flexible working practices may influence gender role identity as a possible coping strategy of working in a male domain.

This study adds to the small body of research into the area of women working in the new industry of computer games. Further qualitative research in the form of women's experiences in the workplace would aid research and give women in the industry a voice to express their issues and concerns. Understanding why women have chosen to enter specific roles and not others may also add to our understanding of gendered occupational segregation. More longitudinal research would also add weight to the research area, especially to explore if women change their gender role identity as a strategy, or if certain types of women are attracted to the industry because of their gender role identity. Longitudinal research may also help in understanding if attitudes towards women's career barriers and their own promotion, change during their time spent in a male-

dominated environment. Women need a voice and equal representation across the ICT/SET sectors, including this relatively new industry of game development. The games industry may be relatively new, but it is a large industry with a significant influence over today's media landscape. In 2009, computer games outsold films; including DVD's and cinema tickets sold (Wallop, 2009), highlighting the importance of women's participation in such an influential industry.

ENDNOTE

1. In October 2007 the Equal Opportunities Commission was amalgamated with the Disability Rights Commission and the Commission for Racial Equality to form the Equality and Human Rights Commission.

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