**Paper title:**
# Passion, women and the games industry: influences on women's participation in the Australian Digital Content Industry

**Authors:**
**Anitza Geneve**
a.geneve@student.qut.edu.au

**Karen Nelson**
kj.nelson@qut.edu.au
Phone: +61 7 3138 1950

**Ruth Christie**
r.christie@qut.edu.au
Phone: +61 7 3138 6840

Faculty of Information Technology
Queensland University of Technology
GPO Box 2434, Brisbane, Australia, 4001

**Summary**
Initial case study findings share insights from women working in the Australian Digital Content Industries. Influences on their participation are explored through a theoretical framework and proposed model.

**Research period:**

- Data collection for Phase 1: 2007
- Data collection Phase 2: 2008-09
- Estimated date of completion: 2010

**Passion, women and the games industry: influences on women's participation in the Australian Digital Content Industry**

**ABSTRACT**

This paper seeks to share initial research findings from a current case study that explores the influences on women's participation in the Australian Digital Content Industry (DCI) sector of games production. It provides rich descriptive insights into the perceptions and experiences of female DCI professionals identifying influences such as; existing gender ratios, gender and occupational stereotypes, access into the industry and future parental responsibilities. The theoretical contribution includes the use of Bandura's (1999) Social Cognitive Theory (SCT) as a "scaffold" (Walsham, 1995) to guide data analysis and to assist in the analytic generalisation of the case study findings. It is proposed the lens of 'human agency' and theories such SCT provide a way to explain how these influences manifest and why they are important in influencing 'women's agency'. Emerging from the empirical case study data within the DCI industry context and theoretical explanations offered by SCT, the proposed 'Sphere of Influence' conceptual model (Geneve, Nelson and Christie, 2008a) provides a heuristic framework for further exploring these influences.

**KEYWORDS**

Participation, Digital Content Industry, Conceptual model, Gender

**INTRODUCTION**

Over the last several decades numerous researchers have questioned: 'Why are there lower rates of participation by women in comparison to men within the industries directly associated with computing?'. Research includes: in Australia, Trauth, Nielsen and von Hellens (2003); in the United Kingdom, Panteli, Stack, Atkinson and Ramsay (1999); Moore, Griffiths and Richardson (2005); in the United States, Trauth (2002) and Ahuja (2002); and in 'non-western' countries such as Malaysia, Othman and Noordin (2005). Most research has focused on the Information Technology (IT) and Information Systems (IS) sectors of the Information Communication Technologies (ICT) professions. Such previous research suggests that women's participation in ICT industries is approximately 20%, where the variation is often dependant on the sector and role. Within the DCI, games production has been identified as an important emerging sector within economies and also one where there is an identified skills shortage. Although there is little statistical data for participation rates of women in the sector, anecdotally it is suspected the number of women participating (including entry numbers and ongoing retention) both in Australia and internationally is significantly lower than men: which may indicate that the quality of participation differs

for women. This research project identified less than a 10% participation rate of women working in technical roles, although it is noted that this is not a statistically valid figure. There were a number of examples where rates were even lower, such as in one international games development company only 2 of the 80 staff were women.

In response, the case study sets out firstly to provide descriptive accounts of the perceptions and experiences of female DCI professionals working in the games development sector. The hermeneutic and emic approach underpinning the case study focuses on the meanings the women ascribe to influences, acknowledging the participant's active phenomenological role in processing environmental influences. The findings presented in this paper include the women's insights into a range of influences over their lifetime, including experiences from their early childhood, describing how they arrived at their current occupation and what it's like to work in the industry, and also their concerns for the future, particularly issues surrounding parenting responsibilities. Such insights raise concerns for the games production sector to consider. For example, why does a participant who holds a Computer Science degree and has achieved years of happy employment as an AI programmer feel as though she may have no choice but to move to another industry when she begins a family?

Secondly the case study draws on existing literature from the ICT context and also social theories such as Social Cognitive Theory (Bandura, 1999) for theoretical guidance to move from being descriptive towards explanatory. With such a complex plethora of influences manifesting over a lifetime we may question why there are any women in the industry at all. As Ramsey and McCorduck (2005) suggest "circumstances almost seem designed to wedge them from the work they love". However, although participants in the case study did identify a range of 'negative' influences, a key theme emerged regarding how passionate they were about their current jobs, a finding similar to previous research in the DCI context (Gill, 2007) and the IT context (Griffiths, Keogh, Moore, Tattersall and Richardson, 2005). This passion related not only to their work and the products they produced but also the people they worked with — the "like-minded individuals who are passionate about games" (g6). Therefore, positioned from a human agency perspective, this study seeks to explore not only the 'negative' influences circumstances present but also those considered as positives. The aim is to identify what has supported the women's participation along their career pathway. Importantly women are seen, not only as the 'victim' of circumstance, but also as agents having the potential to change the impact of those influences.

The key contributions of this paper include:

1. the sharing of rich descriptive insights from women working in the DCI, an area where there is currently little empirical research;
2. the presentation of the proposed 'Sphere of Influence' model;
3. an explanation of the findings utilising a theoretical scaffold, primarily Social Cognitive Theory.

It is also hoped that, beyond an account of which theoretical and methodological approaches are fruitful in studying gender issues in ICT, the research offers a way to vocalise the concerns and successes of the women working in the games production sector of the Digital Content Industry.

Following a brief background to the research problem and overview of the research design, an explanation of why SCT is a suitable theoretical framework, with which to explore how women's participation is influenced by their sense of agency, is then offered. An initial model which highlights the key areas of interest that emerged following the literature review is presented. Using SCT as a scaffold, this paper then explains how several influences, that participants in the case study identified, can influence their participation. Following the analysis of the emergent data, the 'Sphere of Influence' model is proposed as a way to structure environmental influences and also to understand the interaction between the environment and agent.

**LITERATURE REVIEW**

Although there is a significant body of academic research on the declining participation rate of women in the ICT field, across both education and career pathways (see the review by Ahuja, 2002 and by Sorenson, 2002), there is a paucity of studies focusing on the new media workers' experience in the emerging Digital Content Industries (DCI). Of notable exception within the European context are: Gill (2002) emphasising gender and Perrons (2003) exploring work life balance; and in the United States, Batt, Christopherson, Rightor and Jaarsveld (2001) and Pratt (2000) who identified the worker's need for social interaction.

Of the plethora of factors identified which effect women's roles in the ICT industries, such as gender and occupation stereotyping and also the lack of role models (Coohon and Asprey, 2006), there is a dearth of research about the 'women in IT' problem that utilises theory to explain women's actual experiences (Adam, Howcroft and Richardson, 2004). Trauth, Quesenberry and Morgan (2004, p.114) suggest that "one of the research challenges in studying the under representation of women in the IT field is the lack of sufficient theory to provide a basis for understanding and explanation about this gender imbalance".

## METHODOLOGY

Phase 1 of the exploratory case study of the DCI utilised qualitative methods, including semi-structured interviews, to gain insights from six women working in the games production sector.
As figure 1 illustrates, the unit of analysis are those female DCI professionals employed as 'Interactive Content Creators'. Therefore participants are in technical production roles, rather than being primarily technology enabled users (see research by Venkatesh and Morris, 2000). Employed within a diverse range of 'core' DCI organisations, including large multinational games development companies and smaller start ups, their occupations included animation prop builder, artificial intelligence (AI) games programmer, assistant games producer and games designer.

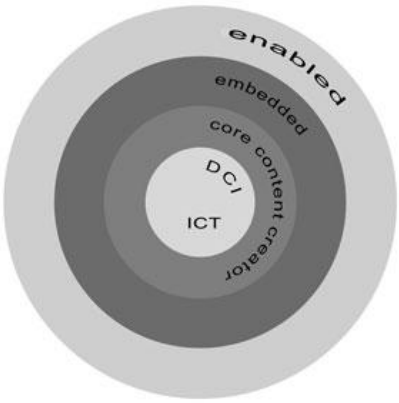


Figure 1: Authors' concept to illustrate women's participation in DCI, ranging from core interactive content creator in the DCI, embedded content creator in other industries and through to enabled user of digital content.

The exploratory case study followed a number of guidelines including; the principles proposed by Klein and Myers (1999); those proposed by Yin (1994), in generalising to a theory and use of a rival theory; the use of complementary theories and "scaffolds" (Walsham, 1995); and the use of case study protocols (Stake, 1994). Data analysis followed an iterative cycle of thematic mapping and pattern matching where the data analysis can interpret the participants' account as a 'fit with literature' and/or a 'fit with theory', where 'fit' involves pattern matching. Yin (1994) suggests pattern matching is one of the most desirable techniques in case study analysis where, if patterns match, the internal reliability of the study is enhanced.

## THEORETICAL SCAFFOLD

As a theoretical guide or scaffold Social Cognitive Theory (SCT) (Bandura, 1999) provides a unified

framework to explore human agency without treating the concept of gender in an essentialist manner. Bandura's model (figure 2) and theory suggests a reciprocal triadic relationship exists between the environment (E), the person (P) and their behaviours (B), where not only does the environmental circumstance present influences but a person's sense of agency (including personal, proxy and collective) can in turn influence the environment (or the person). In this way the concept of agency can bridge the constructivist and essentialist polemics that plague the 'gender in IT' issue. Noting Ahuja's (2002, p.22) comment towards previous research in the area, that "it is crucial that interactions among these factors be considered" the research approach considers both the context of the influences and also the process of the "emergent interactive agency" (Bandura, 2001) or as Savickas (2005) suggests 'not only the P-E but the dash'.

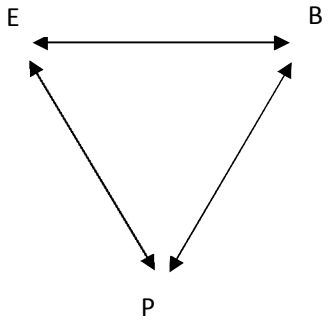


Figure 2. 'Emergent Interactive Agency' (Bandura, 1986, 2001) E-environment, B-behaviour, P-person

There are several justifications for utilising Bandura's (1999) SCT as a middle range theory (Merton, 1968) or "scaffold" (Walsham, 1995). In utilising the various mechanisms of human agency that Bandura proposes, such as self-efficacy and vicarious learning from role models, we may begin to explain how women overcome negative influences and develop and maintain their passion towards their DCI careers, along their own unique pathway. Although SCT identifies cognitive and behavioural mechanisms it does so in a non prescriptive and non-essentialist manner, allowing for what Trauth, Quesenberry and Morgan (2004) may describe as the women's "individual differences". Bandura (2001) also suggests that agency also extends beyond a personal agency to include proxy, collective and moral agency. Collective agency may be particularly relevant to an industry where, as Contu (2005) identifies, the labour is organised often in teams.

## FINDINGS

The findings from phase 1 of the case study can be described as: firstly providing rich descriptive accounts of the influences female DCI professionals have perceived; and secondly finding evidence of the usefulness of SCT to explain the processes or the 'emergent interactive agency' between the environment and the person or agent. Figure 3 illustrates the initial areas of interest, as identified from the literature review and theoretical framework, which included Bandura's model (see figure 2). Table 1 indicates how the focus on the different aspects of the model helps answer the research question.

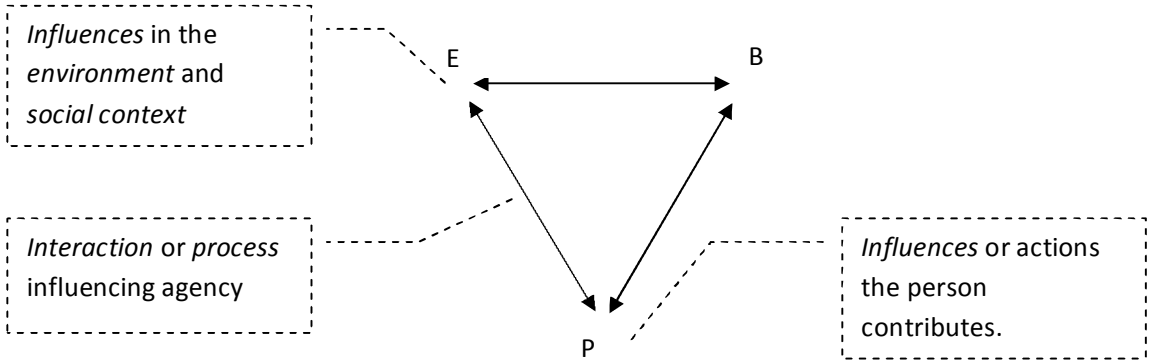


Figure 3. The initial areas of interest in Bandura's model as identified from the literature review.

Table 1: How initial research findings help answer the research question.

| **Model aspect** | **Research questions** |
|---|---|
| *Influences* | What are the influences |
| The characteristics of the *environment* and *social context along a pathway.* | Where do they occur |
| The *interaction* or *processes* between the environment and the agentic person. | How do influences manifest and why do they influence agency |

The research findings identified;

1. a plethora of influences including gender ratios, stereotyping, parental responsibilities;
2. a description of the contexts influences manifested in and;
3. how influences manifested in the interaction between the person and the context and why this influenced the participants sense of agency.

## DISCUSSION

### Pathways along a lifespan

Gurer and Camp (1997), presenting the "shrinking pipeline" metaphor, suggest women are a minority in the ICT workplace due to a gradual decline of participation rates over a lifespan. The research findings view this pipeline as a 'pathways along a lifespan' concept. Where the influence of factors varies over a lifespan and each woman responds differently, creating her own pathway through various environments. Similar lifespan concepts have been identified in other domains such as career development theories (Gottfredson, 1981, 2002; Super, 1990; Lent, Brown and Hackett, 1994) and more recently in the ICT domain (Moore, Griffiths, Keogh, Richardson and Tattersall, 2006).

How an influence may vary over a lifetime was evident when participants discussed gender stereotypes associated with ICT. They suggested that, although gender stereotyping may adversely influence younger girls, there would be less of an influence on the women working in the industry. Previous research also suggests young girls are more likely to choose career paths (or interests) that are gender appropriate (Miller, Pollard, Neathey, Hill, and Ritchie, 2005; Gottfredson, 1981; Miller & Budd, 1999; O'Connor & Goodwin, 2004) rather than those "traditionally performed by the opposite sex" (Francis, 2002; Miller and Hayward, 2006). There was evidence that stereotypes became less of influence as the women developed a sense of personal agency, through mechanisms such as gaining confidence through direct industry experience. SCT may ascribe this to mastery experiences and positive feedback or reinforcement which strengthens a sense of self-efficacy. Several participants reflected how surprised they felt when they realised 'it wasn't as hard as they thought' and that 'they just picked it up' (this was in reference to computing skills). The theme of 'strength and confidence', 'inner strength and self-confidence' and 'strong desires' has been identified by women in the industry in previous empirical research (Trauth, 2002, p.109).

> "Even though, that years after starting in the workplace retrospectively I can go, oh, I was still really lacking confidence, it was building up. I think a lot of the experiences since working professionally have been really positive, very few set backs."(m5)

A 'pathways along a lifespan' approach reflects that, as a person travels through the different stages of life, they are exposed to certain environments and influenced by the social agents within those environments. Participants identified that in their childhood the social agents of greatest influence were parents and at the late education stage it may be friends or peers who exerted the greater influence.

Although a family, friends, education, and work pathway may be typical in certain cultures, the 'pathway' does not suggest there is a fixed progression through social contexts. It also acknowledges the unique characteristics of the new media industry, where multiple pathways exist. For example, most ICT professionals have not obtained a computing degree (Wardle and Burton, 2002). Furthermore the DCI sectors may challenge a traditional 'lifespan' notion. For example, traditionally age may mean seniority in the workplace whereas, in the games industry, it is not uncommon that a forty year old would be retraining to enter the industry and an eighteen year old already has five years experience and is in an upper management role or even, as what one participant described, a 'garage CEO'[1].

**Gender and occupational stereotypes and agency**

Eagly and Steffen (1984) suggest one reason stereotypes continue to exist is that they may represent partial truths or 'a kernel of truth'. Similarly, participants suggested, "in all stereotypes there's always a tiny bit of truth ..." (g10). One describing the Quality Assurance (QA) division at a games company explained, "you walk into that room and it's like yep that's where the stereotype comes from" (g6). The question here is what part of the stereotype do participants perceive as being an influence: the ratios, their ability and affinity with technology, or the gender trait stereotypes?

Several authors including Bandura (1999), Giddens (1984) and Bhaskar (1991) emphasise the importance of the knowledgeable activities of agents, where awareness and reflection is an important step in influencing thinking patterns and behaviour that may perpetuate or challenge stereotypes. Such an awareness and reflection was apparent in participants as they noted stereotypes were "valid" but not "really an accurate picture" (g10). One participant articulating that, although aware of the negative influence on women of people holding gender stereotypes, she herself held stereotypes towards certain occupational roles, specifically that programmers were 'male and geeky'. Reflexively she added "there's a couple that are but then there's a lot that aren't" suggesting "there's this idea that all male programmers are going to be overweight and big glasses" when in reality they are "good looking" and "a lot are body builders and surfers"(g4). Furthermore, participants were aware of stereotypes, they perceived, other people had of women. Such second order expectations may be rejected (Webster and Whitmeyer, 1999) and indeed participants noted that challenging the stereotypes can at times be rewarding, although it was not always clear in their account if they are challenging their colleagues or their own beliefs. Although

[1] A garage CEO is a person who has given themselves the title of Chief Executive Officer of a company they operate from a home or a garage. The term can suggest illusions of grandeur but also has some credibility as several successful business people in IT started their own business in this manner.

they suggested that these stereotypes do not affect them in the workplace to any great extent this seems dependant on the level of awareness, self-efficacy and coping strategies.

Ramsey and McCorduck (2005) suggest that it is difficult for researchers to describe aspects of culture such as "systemic stereotyping, dualism, and devaluation" or the "subtle" factors (Webb and Young, 2005). Indeed participant responses varied when asked to describe the manifestation of stereotypes in their various organisational environments. However the majority suggested there were not many negative influences. One participant in the games industry replied, "I was sort of racking my brain to try to think of a negative in that context". There was only one negative she felt she had personally experienced. She described feeling awkward in her "immediate sphere of daily life" when her colleagues seemed to restrain from swearing in front of her, apologizing if they accidently did so. She felt frustrated that even after "being together for so many years" and "feeling comfortable working" the apology came because she was "one of the only women they see in their day". Insightfully the participant suggested the action was not malicious. However she described how her colleague's actions triggered her gender stereotypes against herself, making her feel like a 'girl'. She questioned, "what else did they think' and 'how else did they modify their behaviour around her', "are they doing other things to accommodate this woman in their presence …and how far does it go… the way they consider the women in our company"(g2). Although identified as a 'minor thing' another participant felt that if the males couldn't swear freely, "if they couldn't interact with each other in that natural way because there's a women present" then "suddenly that would introduce gender problems"(g7). This triggering of gender stereotypes seemed to, not only influence self-belief, but more so a concern of wanting to fit into the team and not to be treated any differently to the male workers; to foster what Bandura (2000) identified as a "group's capability operating as a whole" or "collective agency".

To summarise, we can further refine the question of how do stereotypes influence agency or participation by asking; what, where, how and why sub-questions. When participants identified experiencing negative gender stereotypes in their youth (in relation to a women's capacity to work with computers – this is the *what* factor or influence. *How* the factor is an influence is explained when they describe their experiences of 'verbal persuasion' (see Bussey and Bandura, 1999) by teachers and peers and a lack of positive female role models at school or other social settings. In recounting how this lowered their "self-efficacy" (see Bandura, 2000) towards using computers, leading them to restrain from joining in certain activities because of their desire to fit into the collectives normative expectations, they provide an explanation of *why* it influenced them. However when participants provide an account of how they built up their low

confidence over time, from the negative influence earlier in their lifespan through positive or mastery experiences in the workplace, they provide an account of how their agentic actions have aided their participation.

**Gender Ratio**

It is important to note that current ratio imbalances, where women are in the minority, may lead to women often being evaluated first by gender, then by their ability (Valian, 1999). This evaluation is not only by those around them but also by themselves. As Oswald (2008) suggests, "situations that heighten self-relevant stereotypes, both positive and negative, can result in a target assimilating to the stereotyped role" (p.197). Participants identified that when such gendered stereotypes are triggered, maintaining a confidence in their ability (or self-efficacy) and also the acknowledgment from one's peers of those skills were seen as an important way to remain feeling valued in the collective. As one noted that, although her technical ability was intrinsically "gratifying" she felt it was important for her to "prove" her technical credibility to her male colleagues. Here the emphasis was on being firstly perceived as a valued skilled member of the team and then she could add "as a by-line 'and I'm a girl!'"(g2). When asked how establishing her technical proficiency had an influence she noted it made the males "more comfortable in an environment where slowly bit by bit more females are starting to join the industry".

For Bandura (1999, p.35) agency not only suggests that people are "partly the products of their environments", but by selecting, creating, and transforming their environmental circumstances they are producers of environments. Participants displayed a self awareness of the need to be active in responding to those environmental circumstances which made them feel 'different', marginalized or like the "odd girl out" (Trauth, 2002). The women in one games company instigated 'ladies lunches' in response to not only the low number of women employed in the organisation but also the distribution of hem women throughout the work environment. Held on a regular basis these lunch events provided participants an opportunity to informally network with other women in the company and discuss social and professional issues. This initiative was seen as important by the participants as the company's rapid growth had lead it to becoming "so big all the girls had sort of been scattered around" and that they may not "even pass each other in the corridor" which lead them to feeling they were in the "minority"(g1). This social support may enable both proxy and collective agency in a number of ways but most simply in assisting the women to identify with a collective in the workplace.

Although participants found it difficult to articulate specific examples of overt sexism due to being in the gender minority there were examples in the everyday practices of the subtle influences that Webb and Young (2005) have previously identified. Indeed participants noted that male colleagues seemed supportive of the notion of having more women in the industry, commenting, "Yeh I even heard one of the guys the other morning when he was making coffee that he's worked in other companies before there were a lot more women and he wishes there were more women at xxxx just because it alters the dynamic of the team and gives different viewpoints....yeh just different perspectives". However the research suggests that a higher ratio of men masculinises an environment and the male majority leads to a male norm in the collective. Consequently practices that may be more favourable to men than women prevail. For example, although not intended to directly disadvantage women, if employees are required to work long hours then this demand can be seen as a negative influence for the women who may have, or are contemplating having, parental responsibilities. The long hours, or perception of long hours, within the ICT industries has been cited as one of the 'barriers' to women's participation in ICT (Whitehouse and Diamond, 2006; Clayton and Beekhuyzen, 2005; Ahuja, 2002). If the women work in an environment where there is an expectation that everyone in the team or 'collective' works long hours as "most of the people who work in games do it for the love of games."(g10) and the majority of the employees are male and the men have lower levels of parental responsibility then the women can feel they're letting down the team. The individual women are required to find a way to manage the expectations of the workplace and also a way to fulfil their own desires towards personal commitments. Participants also suggested that in some ways, this 'passion' could be abused by the industry itself by setting up an unsustainable expectation to work long hours.

> "It's a cycle in that you know everyone is passionate about work to put in these hours so then it's expected, and so then it becomes the norm and then everyone else has to put in." "It's a labour of love. And that's the same sort of people you get to work ridiculous hours."(g12)

Interestingly though, several of the participants challenged the 'norm' by actively choosing to not work longer than they believed to be necessary. They also noted that this option was role dependant, differing across types of organisation (public and private), and most heavily influenced by project lifecycles. Insights contrasted previous literature and widely held stereotypes that ICT careers were more demanding than other career paths, when one participant noted that the hours in her previous occupation as a high school teacher exceeded those she was currently doing in her role as a production assistant in a games company.

**Parental responsibilities**

Maternity leave is a specific example of how parental responsibilities can influence participation. Firstly, it is evident that the current male to female ratios seems to have influenced work practices. As one participant noted, the games production organisations have not "had to think about maternity leave"(g1) as no one at her company had taken maternity leave. "Like (company x) is fantastic with paternity leave but there's no such thing as maternity leave. I'm pretty sure I'll be one of the first to get maternity leave". Similarly another identified that she did not believe her company would provide "any kind of maternity pay or anything like that. And you know they probably don't have to because they're all men working in the industry" (g6).

Secondly, even if the issue of maternity leave was clarified, many of the women do not believe that they can have children and continue working. There were a number of reasons provided such as the lack of role models and little or no option to work part-time or to have flexibility around the hours they worked, not only between projects, but also during. A majority could not think of one female role model who was managing to continue a career and family commitments. Another participant, who has a degree in computer science and several years experience as an AI programmer, spoke of leaving the industry when she was ready to have children because she believed there was little chance of part-time work. "And I'd love to do that but try telling a games company that you're only going to work four days a week ..."(g9).

It became evident that industry demands may not only directly influence women's decisions to participate but also influence their planning for future decisions where they self select out of the industry due to a perceived incompatibility with their roles and a future 'gendered burden of care' (Liff & Ward, 2001) for their children. Their decisions were based on not only direct experience (as many did not yet have children or know of women who did) but vicarious experience where the women had observed the impact on their male colleagues.

> "In this industry I would be concerned about having a family just because seeing the guys at work who are just there all the time and I know they've got babies at home that they should be spending time with and they don't have the opportunity because we're on deadlines." (g7)

The issue of future family responsibilities identified the need to view the 'desire to participate' over a lifespan as it was not only past and current experiences that influenced agency but also their envisioned future desire to have a work/life balance and even a family. Those that planned to continue working and

raise children acknowledged it would hinge on the support of their employers. However often it was not clear how this support may be provided. The influence of 'information' or more so lack of it as a resource (see figure 5) was evident when two participants at the same organisation described very different perceptions of how the company would be supportive. One believed the company would be very supportive (although she could not articulate how) and the other assumed she would need to leave. Their perceptions were not based on a policy within the company but rather an understanding based on vicarious observation or hearsay.

Not one of the games industry participants had a child and this reflected the DCI industry which is characterised by being comprised of a young workforce whose current priorities may not include parenting. However the following comment, from a participant who holds a PhD and works as a games designer, should raise alarm bells for the industry, as it is suggested that for the women currently working that there is a perceived future incompatibility of work and family. "I guess it's usually a really young industry so there's a lot of people in their twenties that don't have kids and aren't married, aren't really thinking of having kids at the moment. I guess I haven't really thought about it, like I'm working on my career first and I imagine that it would pretty much come to a halt if I did decide..." (g12).

**Access into the industry**

Participants who actively made a decision to follow a pathway to work in the industry found initial access or entry one of the most difficult barriers to overcome. As in previous research, social relationships and connections were a key positive influence in gaining access and that these connections or 'informal networks' (Gill, 2002) could occur in unlikely places, where "having friends who are involved in the industry is a good way to start" (m5). For instance, only a few of the women applied for their current positions via an advertisement, although several had previously applied for others and had many rejections. Rather they had heard of the position through social acquaintances, such as room mates. Therefore there was for many an element of luck, or 'serendipity' (Webb and Young, 2005) or as Bandura describes 'fortuity' (2006, p.166) in knowing someone, more often than not a male who had already gained employment. One particular instance involved a woman who whilst working in a café became friends with the 'guys' from a nearby games company who came in regularly for coffee. She said, "I heard a lot about how work was going, what kind of hours they were working, all the social kind of things"(g7). Although she had "loved" playing on a computer as a child (with her brother) and "spent a lot time, messing around with DOS and all that sort of thing"; and in her university days formed an "atari fanclub" it was not until she had an insight into the conditions of working in a games company that she

even considered it as a career. Of those that responded by actively seeking information about entering the industry the internet was a key resource, primarily the websites of games companies. The lack of credible information about the roles in the industry was identified as a key negative influence.

## SPHERE OF INFLUENCE- the proposed model

It is proposed the 'Sphere of Influence' conceptual model (Geneve, Nelson and Christie, 2008b) provides a heuristic framework for exploring and understanding the influences on participation. Developed iteratively from the meta-analysis of key literature and the theoretical frameworks the initial model (figure 3) has evolved further to provide a way to organise and understand the emergent data. As figure 4 illustrates the key components of the model include; the influences (within both the environment and person), the contexts and the processes identified in the 'emergent interaction'.

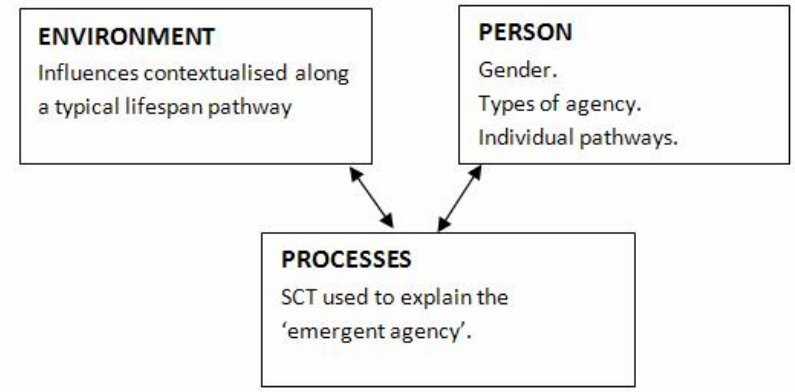


Figure 4: A simplified representation of the 'Sphere of Influence' model which may be used to explain the environmental influences, individual agent and the processes that influence agency.

### Influences

Initial research findings matched many of those identified in the key 'gender in IT' literature. In particular, those that can be described as environment (social and structural) influences, including; stereotypes perpetuated by the media (Gill, 2002) and the 'long hours' associated with roles in the DCI. Additionally there were a number of interesting variations that occurred as a consequence of the persons or agents actions, for example the participant choosing not to work the long hours.

**Context**

Although the case study initially aimed to understand the DCI organisational context, it became evident that key concepts such as: influences manifesting over a 'lifespan', including childhood, educational and workplace contexts; and individuals having unique pathways through these contexts needed to be recognised.

**Processes**

There is evidence that the theoretical framework offered by Bandura can begin to explain, not only what the influences are and where do they manifest, but also how the influences manifest and why this influences the women's participation. Participants used similar terms and concepts as presented in Bandura's theory such as the influence of role models, negative feedback or reinforcement and mastery experiences.

The research to date has primarily modified the 'environment' category of Bandura's model (see figure 2) by adding granularity based on the emergent data. As Figure 5 illustrates participants identified the following characteristics of the environment or context.

1. cultural
2. mediated
3. socialisation contexts (family, social, institutional/education, work and communities of practice and social agents (parents, friends, peers, teachers, colleagues, employers)
4. available resources

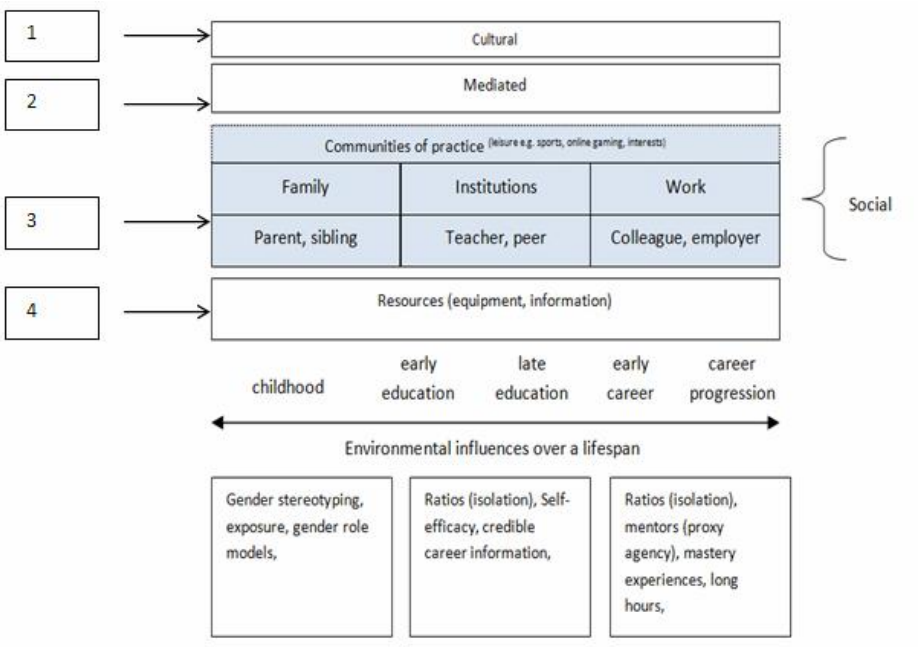


Figure 5: An expansion of the 'environment' category from the 'Sphere of Influence' model with an example of the types of influences over a lifespan.

To summarise, following is an insight to how the model may be used to understand 'stereotypes', a particular influence that was identified by participants as manifesting over an entire lifespan. The model suggests the contexts of the influence and SCT provides an explanation to how the interaction influences the person. In the model (figures 4 and 5) stereotypes manifest in the environment as: (1) *cultural* phenomena, formed by historical, socio-cultural, economic or political influences where "culture goes beyond the norms or values of a group in that it is more of an ultimate outcome" (Schein, 1984). These macro level distal 'cultural' norms are *mediated* or perpetuated by the (2) media in its various forms such as literature, television and via technologies such as the internet. Furthermore, proximal influences such as (4) *resources* including learning resources or simply access to technology can either further reinforce or challenge stereotypical assumptions and 'norms'. These resources focus more on the structural or material phenomena rather than the (3) social resources, such as mentors offering proxy agency. The social category encompasses *socialisation agents*, (3) which may influence stereotypes through verbal persuasion and role modelling, across a number of *lifespan contexts* such as family, institution, workplace and communities of practice.

**Conclusion**

Although this research project initially began with a focus on identifying the influences for women working in core DCI organisations, both those that influenced them entering and staying in the industry, it became evident from the data that influences occurred over a lifespan for these women. That experiences from their childhood, education, the industry itself and even future considerations such as beginning a family could all be an influence in their cumulative decision to participate.

Previous research supports the research findings, that there are many complex influences throughout a woman's lifetime that will influence their desire in choosing to pursue a career in the industry. Even if women enter there is a suggestion that over time their desire is worn down with the many negative influences within their circumstances. The women who remain in the industry have not only encountered the 'negative' influences but importantly they are able to identify the ways in which they responded. SCT provides a way to understand how this sense of agency, a 'pathway to desire' is formed over time and does this in a non essentialist way when considering the gender aspect. Therefore the exploration is not posited from a position of lack, where the category 'women' needs to be defended. Nor does the research simply add to what is at times presented as a long list of unsurpassable barriers. Rather the theory of human agency suggests that in being active agents there is an element of control by the women. However, importantly women are not held entirely responsible for their circumstance, for example they cannot be held responsible for barriers such as other people's sexist attitudes but rather what fosters their sense of agency is recognised, identifying how they overcame barriers.

This approach may provide useful insights for future intervention programs targeting women's participation, particularly as the programs to date do not seem to have increased the participation numbers. For example in recognising what can support a sense of agency or desire, such as adequate information to base career goals on, strategies may then address the lack of resources such as information for young women when they are at the life stage of considering a career. Or in recognising that women succeeding in the industry cannot see a continuing career path once they have children may prompt the industry to provide role models that are managing to balance such commitments.

In summary, in addition to providing rich descriptive insights to the influences on women's participation this paper has identified the suitability of SCT as a theoretical framework with which to explain the processes that influence participants' sense of agency and therefore participation. The findings to date have proposed an initial expansion to Bandura's SCT model. The proposed 'Sphere of Influence' model

adds a level of granularity to the environment category and allows for the 'unique and individual experiences' to be conveyed for the 'person' category. Future research will hope to refine the model further.

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