

Women Talking About IT Work: Duality or Dualism?

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ABSTRACT

This paper explores the way that professional women working in the IT industry discuss the nature of their work. The research is part of an ongoing project (WinIT) commenced in 1995, which seeks to understand the declining female participation in IT education and work. An examination of our interview data using concepts from Giddens' structuration theory shows that a number of dualisms provide the women with interpretive schemes through which they can interpret and make sense of their working lives. Such dualisms may provide ontological security as representations of the routines which women in the IT industry enact in their daily activities. This paper suggests that the way women talk about their work reinforces widely held impressions of the IT industry. The use of structuration theory helps show how this talk is not always consistent with the women's lived experiences. The interviews reveal contradictions in these dualisms, indicating that these polarised views of women and IT work are being undermined by women in the IT industry. In order to understand better how women help configure the institutional realm of IT work, we propose that more qualitative studies of women at work in IT as well as women talking about IT are needed.

Keywords

IT Skills, structuration theory, women in IT, Australia

1. INTRODUCTION

This paper uses some concepts from Giddens' structuration theory

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to examine the way that women talk about working in the IT industry. The research is part of an ongoing project (WinIT) commenced in 1995, which seeks to understand the declining female participation in IT education and work. This research attempts to capture the experiences and perceptions of women who work in this very competitive, declining female workforce. The data was collected through interviews with primarily female IT Professionals, and a small number of male IT Professionals.

Statistics on the representation of women in the IT industry are worrying. There has been a small, though noticeable, rise in female participation in the traditionally male-dominated professions of science, engineering and medicine. However, there has not been a corresponding trend in the information technology sector. At the end of 1999 women represented just 29 percent of the workforce in the US technology sector, according to a study by the White House Council of Economic Advisers. That is down from 40 percent of the workforce in 1986 [9]. By the start of the last decade, the proportion of females in the Information Technology (IT) workforce was beginning to decline in most western countries [25]. This is despite the idea that "women may prove to be a key resource of skilled technology workers for International IT markets" [17]. This is a complex issue and has attracted increasing research interest for example, see the review by Ahuja [2].

The WinIT research carried out to this point has sought to develop an understanding of complexity and social embeddedness of the problem of IT recruitment. Particularly, the research has focused on the cultural and gender factors affecting female recruitment [26]. A conceptual model of the identified factors was developed and such an approach was found to be useful in examining the situation with relation to high school students and first year university students [18]. The research considers factors such as media representations of IT, peer, school and parental influences. Both male and female students lacked information about IT work and education and did not demonstrate any understanding about the nature of IT work. Overwhelmingly the students perceived IT as a masculinised domain and the female students mainly saw IT courses as boring and difficult.

Our more recent research has focused on women working in the IT industry and IT academia, where the significance of informed choice is more evident [23] [25] [19]. These women have resisted in some way the influences, which discourage young women from entering IT and have persisted in developing their IT careers. This paper presents early attempts to reexamine texts of professional women's interviews using some concepts from structuration theory. These concepts were initially established as relevant through a rereading of the interviews.

Until 1999, the first two authors of this paper (the primary researchers of WinIT) had been primarily focusing the WinIT project on university and high school students. In 1999, the WinIT research was extended to cover female IT professionals and initial results were published [19] [25]. In collaboration with Professor Eileen Trauth in 2000, the research focus further expanded to include more interviews with professional women in IT. Both parties carried out interviews with women from a variety of backgrounds.

In the last two decades structuration theory has been applied to information systems research in a number of ways [29] [15] [28]. This paper is in the growing tradition information systems research where "particular concepts from Giddens' writing are adopted" [15]. Most of these studies have focused on the nature of technology and its relationship to human agents in information systems development and use. We intend to extend this application to the problem of the relationships between the IT education and commercial industries, social perceptions of IT education and work and the human resource requirements of the IT industry.

Theory of structuration is used in this paper as a basis for analysing the changing relationship between social structures (the IT education and commercial industries) on the one hand, and human agency (students and IT professionals) on the other hand. It is not our intention to describe Giddens' theory of structuration, or discuss its many critics. At this stage of the research we intend to apply some of the concepts of structuration to the interview data to seek further illumination of the complex topic of women in IT. Halford and Leonard [14] suggest that Giddens offers "considerable promise for the development of fuller understandings between gender, power and organisation" (p.232).

The research deals with two extremely complex areas. Firstly the attitudes and motivations of young people, particularly females, choosing educational and career paths and the social factors which influence them. Secondly, the nature of an industry which is difficult to compare to any other – being of fairly recent origin, not governed by the same professional and regulatory constraints as other complex industries (such as engineering, accounting and law) and subject to recent upheavals in terms of skills demands and shortages.

The interview data is discussed throughout the paper using the concepts of duality and dualisms, routinisation and interpretive schemes and signification. The focus is on structures of signification since the research has so far collected only interview and survey data. To use the other dimensions of Giddens' duality of structure it would be helpful to undertake observation and the examination of documentation to identify how domination and legitimation occurs through the use of power and sanctions.

2. DATA COLLECTION AND ANALYSIS

Interviews were conducted in 1999-2000 with thirty-two (32) female and two (2) male IT professionals working in Australia. The interviewees represent a range of ages, employment sectors, educational backgrounds and ethnic backgrounds. The males were interviewed primarily to provide insight into the female experience. Working in technical areas, the interviewees are referenced to explore the duality of the IT industry, as it is perceived by women working in the industry. The importance of operating within a male domain, including the extent of outside-work socializing with male colleagues (such as attendance at sporting events) as necessary for career progression has been identified previously [27]. The implication is that while women have been socialized away from IT, the IT field has been constructed as a masculine domain. A follow-up study by the collaborating authors in 2000 [23] enabled a deeper exploration of the current position of Australian women working in technical positions in the IT industry.

This paper revisits the interview data discussed in the Trauth et al. paper [23] and in the von Hellens et al papers [25] [27] from the perspective of structure and agency. It aims to explore perceptions of the IT industry through the eyes of female IT professionals. The data collection was a collaborative effort between von Hellens and Nielsen, Australian-based researchers, and Trauth, a US-based researcher.

Semi-structured open-ended interviews of approximately 90 minutes in duration allowed interviewees to express their personal views and discuss their individual experiences in the Australian IT industry. Four main areas were covered, including demographic information, personal history, general questions about gender and IT, and recommendations regarding how society, the IT profession and educational institutions might address the gender imbalance in IT [27]. The interviewed women are not a random sample, they were gathered primarily from the 'Women in Information Technology' (WIT) whose has a mission to sustain an active network of women in the IT industry, facilitating career development and promoting enhanced industry management in Brisbane, Australia [30]. These women are both the subjects of our study and informed observers of the skills issues faced by women in the industry.

The respondents were *IT practitioners* working in a range of levels at a range of industries in various parts of Australia and *academics* in IT faculties. The respondents drew upon their own experiences to offer insights about the themes, which were explored in this study. The female subjects offered two perspectives on the topic; their experiences of entering and progressing in the IT field, and helping other women enter and succeed in IT [27].

Initial sorting and analysis of the interview data was carried out with the aid of NUD*IST, an Australian software application. NUD*IST is an acronym for Non-numerical Unstructured Data, Indexing, Searching and Theorising and is designed to aid users in handling Non-numerical and Unstructured Data in qualitative analysis, by "supporting processes of coding data in an Index system; Searching text or searching patterns of coding and Theorising about the data" [21]. NUD*IST was used to aid in structuring the large amounts of interview data collected from the IT Professionals.

An examination of our interview data using concepts from structuration theory shows that a number of dualisms provide the interviewees with interpretive schemes through which they can interpret and make sense of their working lives. Such dualisms may provide ontological security as representations of the routines which women in the IT industry enact in their daily activities. The interviews of professional women reveal contradictions in these dualisms, indicating that these polarised views of women and IT work are being undermined by women in the IT industry.

3. DUALITY AND DUALISMS

Central to structuration theory is the notion of *duality* [12]. In keeping with modern trends in sociology Giddens rejected the notion of outright *dualism*, in which the fundamental forms of things are viewed as of two contrasting irreducible types (for example nature and nurture). According to many writers on Giddens' notion of duality attempts to resolve the 'agency/structure debate' [28]. This debate concerns the paradox of social reality whereby "the properties of the elements of social phenomena obtain many of their characteristics from the larger phenomena of which they are a part, while the larger entities obtain their characteristics mostly from the relations between the parts of which they are composed" [7]

"Structuration is an approach to understanding the social world that replaces the dualisms of social theory with a duality of reciprocal interdependencies" [5]. Giddens criticised contemporary sociology for treating the relationship between the individual and society as a dualism, in which individual and society are separable, and for producing social theories which focus on one side of the paradox; functionalism for example regarding the individual as produced and determined by society, whereas interpretivism regards the individual as the producer of social reality. In contrast to dualism the notion of *duality* proposes a dialectical interaction between conceptual pairs with no claim that that these concepts are ultimately irreducible. Thus Giddens' approach is to propose a duality of structure in which "the structural properties of social systems are both the medium and the outcome of the practices that constitute these systems" [10].

The authors identified a number of *dualisms* in the way women typically represent their work experiences in the IT industry (summarised in Table 1 & 2). This paper briefly explores some of these dualisms and how contradictions in their expression seem to indicate that polarised views of women in IT are being modified. In other words the dualisms are viewed as social structures which influence individual actions both in an enabling and constraining manner, but which over time may be reinforced, modified and transformed by individual actors.

Writers in women's studies have shown how such dualisms are constructed [3] depending on prevailing social tendencies (such as the dualism between individual and society as a product of the Enlightenment). They have also shown how the notion of dualism enables the promotion of one type of experience over the other so that dualisms often consist of unequal conceptual pairs, (such as active/passive, public/private) associated with gender and power [20].

A dualistic approach to the problem of female participation in IT can be seen in much of the literature, particularly that proposing

the idea of inherent differences (e.g. [24]) which identifies gender differences in adoption and usage of technology.

| <i>Dualisms of skills and attributes</i> |
|--|
| Home/work |
| IT industry/career certainty |
| IT work/emotion |
| Intuition/analysis |
| Programmer/people focused |
| Soft skills/technical education |
| Solving problems/talking to people |
| Technology/business problems |
| Technical/management |
| Technical/people skills |
| Technology/communication skills |

Table 1 Dualisms in IT work

The dualisms in Table 1 represent IT work and skills as a set of either/or propositions. To be good at programming infers lack of communication skills. Technological knowledge is distinct from business knowledge. To be a woman means having good communication skills but lesser technical skills. Private or home concerns are separable from work.

The dualisms in Table 2 represent skilled IT work and gender as a set of either/or propositions. To be assertive, to have political and networking skills and to be interested in continuous learning and rapid change infers masculinity. Having a broad perspective and attention to detail are viewed as being feminine traits.

| <i>Issue</i> | <i>Men</i> | <i>Women</i> |
|--------------------------------------|------------|--------------|
| Communication | Uncommon | Common |
| Attention to detail | Uncommon | Common |
| Broad perspective | Uncommon | Common |
| Continuous learning and rapid change | Common | Uncommon |
| Assertiveness | Common | Uncommon |
| Left brain | Common | Uncommon |
| Noisy vocalism | Common | Uncommon |
| Political skills | Common | Uncommon |
| Networking | Common | Uncommon |
| Programming | Common | Uncommon |
| Technical skills | Common | Uncommon |

Table 2 Gender Specific Dualisms in IT work

The Dualism of Hard versus Soft Skills

One of the most interesting dualisms is the separation of soft and hard skills, not only in terms of their association with women and men, but also in terms of how they are learned and valued. This is expressed by one interviewee as follows; 'Skills like communication and organisational .. they're things that you can train into yourself from a little child – your parents can help you with those. But things like technical skills like IT would need ... you will only get that at a tertiary institution.'

This separation of hard and soft skills has been identified as one of the major factors limiting women's opportunities both within and across occupations. Soft skills are seen as "less difficult to acquire and as involving less complexity and responsibility; and partly because it is assumed that women acquire these skills 'naturally' and that since formal training is not required they need not be highly valued" [14].

However, this dualism is complicated by the lack of clarity of what constitutes some of these skills. For example communication and people skills are discussed in relation to women as 'soft' and feminine skills. However, the women interviewed all represented men as being much more accomplished at other skills which are part of communication - networking skills, political astuteness, taking credit for work accomplished and being vocal about their opinions in group discussions and meetings.

The Dualism of Home and Work

Another frequently occurring dualism is that of home/work and private/public life. This dualism is reinforced by women's choices to delay or not have children and their need to accommodate their

working lives to their private responsibilities and vice versa. This is obviously not unique to the IT industry but the women interviewed perceive that it presents different problems where the majority of the work force is male and is not presented with this conflict. The workload associated with the need to keep up with the rapid rate of change is seen as difficult to reconcile with family responsibilities and makes women apprehensive about taking even short breaks from their careers, for example for maternity leave.

This quite obviously relates to the division of labour in both the public (work) and private (home) spheres, where women still anticipate greater responsibility for home duties. As one woman explained, 'I look forward to getting married and having children [but] I don't want to give up my job. I look after the house, I don't know why that is but I end up doing that... And when the children come along, I'm just not sure how I'm going to cope with all that and an all-consuming job ... and yet I don't want to work in a job that is not all-consuming.'

The dualism mentioned above positions the private and public spheres as separable irreducible concepts, entrenched since industrialisation. However Siltanen and Stanworth [22] point out that the relationship between the work and private spheres has always been subject to mutual influences. Until recently the influence has been largely in one direction with work schedules and activities impinging on home life. More recently the increased participation of women in the workforce has undermined this dualism as women seek to reconcile work and home obligations through for example demands for maternity leave.

Dualisms and the Division of Labour

Despite the recent work on new IT enabled organisational forms, the interviews of professional women confirmed that without exception they perceive their workplaces and career paths in the IT industry in terms of traditional work specialisations. The dualisms referred to above reflect a traditional division of labour into hierarchies of skills, associated with gender, power and authority. These hierarchies are reinforced through award systems and management evaluation criteria, which purport (claim) to be objective and equitable but which "reflect entrenched managerial values" [1]. Responsibility and complexity are defined according to existing social practices; hence the undervaluing of many feminised occupations such as nursing and child care which take responsibility for human lives but which are assumed not to require the same level of training as a profession requiring more 'hard' skills such as medicine.

Giddens [13] points out in his discussion of Connell's work [8] on gender and power that masculinity in this regard involves the reproduction of masculine images which "do not necessarily conform to the actual personalities or actions of men ...remote from everyday life but nonetheless sustaining an aura that influences everyday contexts of actions" (p216). The gendering of IT work in this regard seems to have three consequences, as revealed in the interviews. It requires both men and women to 'adapt' to a masculinised domain, and it discourages many women and men from choosing IT as a field of study or career. Both the men and women interviewed indicated that they found the working arrangements and valuing of specific skill sets in the IT industry difficult.

Routinisation

The dualisms listed in Table 1 & 2 are expressed in the interviews in a taken for granted way. In structuration theory the habitual, taken for granted nature of everyday activities is called routinisation; according to Giddens the “the predominant form of day-to-day social activity ... in the enactment of routines agents sustain a sense of ontological security” [12]. Moreover, routine is “integral to the continuity of the personality of the agent ... and to the institutions of society” [12].

The unselfconscious reference to and representation of traditional dualisms allows women to operate without continual self-consciousness or anomie about the nature of the work. Anomie [16] may exist where there is a conflict between personal goals and the availability of structures to support those goals, or where there is uncertainty about organisational values. Giddens [11] proposes that the self-identity of social agents depends on “ontological security”: “the ability to construct a coherent narrative of selfhood, including the reliability of social institutions and the continuity of self-identity over time” [11]. In an area such as IT which is rapidly changing and which presents its professional workforce with continual challenges (including the recent dotcom crashes) the need for the ontological security provided by routinisation would be particularly strong.

Although each of the women maintain that the IT industry is interesting to them and would be to more women if they understood it better, they represent IT as set of irreconcilable male and female attributes and domains, to which women must adapt. If they are able to perform well in the industry it is because they use their female attributes (such as attention to detail) to perform male tasks. However, challenges to these dualisms are evident through the contradictions, which emerge in many of the interviews. This was shown through earlier analysis of the interviews [23] in which topics such as harassment, promotion, female acceptance in the workplace, the perception of individual difference, communication skills and networking, the need for attention to detail and the need for a wider view were all discussed in a contradictory way.

This paper has discussed the way that women talk about the IT industry. The fact that there are contradictions in the way they talk indicate that it is not entirely representative of their lived experience and that changes are occurring or have already occurred which may undermine these dualisms. These contradictions may result from what Giddens’ calls discursive and practical consciousness [12]. The former refers to what actors are able to say about their situations. The latter refers to what actors know and believe but are unable to express.

However inadequate and limiting they may be, the spoken dualisms can exert a powerful influence on how an enterprise is perceived, in that they appear to reflect a natural order (such as the distinction between work and home). The French philosopher Barthes [4] named this process as ‘myth’ - the association of a meaning with a phenomenon or concept in a way that appears natural, authoritative and unquestionable, through the repeated association or disjunction of particular words and phrases.

Dualisms as Interpretive Schemes

The dualisms expressed above may be viewed within structuration theory as the interpretive schemes through which signification is achieved. Interpretive schemes are “the stocks of knowledge that human actors draw upon in order to make sense of their own and others’ actions” [28]. Giddens’ concept of interpretive schemes is useful in showing how these women deal with the contradictions in the way they conduct their daily working lives, “making that conduct appear rational, understandable and accountable to self and other” [6].

The emergence of contradictions points to the possible transformation of structures of signification. In structuration theory interpretive schemes are not immutable or monolithic. The meaning of particular expressions such as ‘communication’ needs to be interpreted within the social context [10]. For example, many of the women interviewed identified networking skills as an instinctive skill at which men excel and which provides them with an advantage. Male networking is carried out not only formally but also informally through common/social interests such as sports, after work drinks sessions and so on, whereas women were more likely to go home after work and take on household and family duties. However, more recently women are developing networks through formal purposeful activities such as women in IT associations. One interviewee saw this as a means for enabling women to utilise their natural assets, “It’s all sharing and giving and more so than with guys”.

4. DISCUSSION

paper has used the notions of duality and *routinisation* to illuminate the problem of agency and structure in the IT industry as it relates to female participation. The paper does not attempt to make general statements about the applicability of these ideas to other IT work contexts. As Giddens [13] points out, “structuration theory is not intended to be a ‘theory’ of anything, in the sense of advancing generalisations about social reality ... structuration theory offers a conceptual scheme that allows one to understand both how actors are at the same the creators of social systems yet created by them” (p204).

Repetition of the *dualisms* discussed above would tend to reinforce them as natural states of affairs and/or as difficulties, which women must overcome. They appear to be consistent with our research into high school students’ perceptions of IT. We intend to confirm whether these are the impressions which most young women hold about IT work and which they identify as at least partly responsible for their rejecting IT as a career choice.

The women interviewed in this research study also show the capacity for reflexive monitoring, which by itself may enable change to be carried This out. They do not necessarily challenge the truth of the dualisms but they are able to see where and how they originate. Many of their statements report discussions with men which show similar problems being experienced by males in the industry particularly with regard to the separation of home and work.

Structuration theory illuminates two problems in studying female participation in the IT industry. Firstly, to understand the production and reproduction of social structure requires a longitudinal study but the rapid rate of change in the industry including high staff turnover make this difficult. Without a

longitudinal study it is difficult to identify how individual agents reinforce, modify or transform institutionalised traditions within the IT industry

Secondly, the rapid rate of change makes it difficult to conceptualise in a meaningful way what constitutes the IT industry. Definitions produced by industry organisations (such as the Australian Bureau of Statistics) do not necessarily reflect the experience of people working in the industry. Furthermore, staff in the IT industry differ from other complex, highly paid occupations. Although the IT industry generally hires a significant number of university graduates, it lacks institutionalised forms such as required professional education, membership of associations, defined career paths and professional sanctions, which are characteristic of other complex occupations such as law, medicine, accountancy, architecture and engineering.

Attempting to establish why women are not attracted to IT work is hampered by this lack of clarity. The women interviewed were themselves from a diverse set of backgrounds, with different educational qualifications and work histories. They proposed aptitudes and skills rather than specific professional education as important for success in the industry. They see the IT industry as diverse, offering many different options for work and careers.

The role of individual women in reinforcing, modifying and transforming the social structures is therefore difficult to identify. As individual actors they perceive that they have overcome barriers and succeeded in the industry. They also talk about themselves as different from other women they know, indicating that they are challenging the dualism of gender. They consider that they possess the 'key skills going into the next millennium [21st century]'.

5. CONCLUSION

As with all social science research, this study involves what Giddens refers to as 'the double hermeneutic' [11]. Subjects can take up and reject or reaffirm the research on Women in IT. In this way research projects themselves may help to bring about change as more interviewees consider the implications of the questions they are asked. This is related to the idea of the meta level observer which is discussed in Trauth et al. [23].

A limitation of the research so far is that it has relied on interviews and surveys with no data drawn from observation. Giddens makes a distinction between *discursive consciousness* [12] – what actors are able to say about social situations, including the conditions of their own action, and *practical consciousness* which enables actors to perform their work as skilled agents, but which they are unable to express. As indicated earlier the difficulty in expressing what is routine in their work lives may be manifested in the contradictions in these women's discourse.

Female participation, along with other human resource issues in the IT industry, has now attracted a good deal of research effort. Although there have been many success stories in attracting women into IT education, overall their participation remains low. From the equity as well as the human resource point of view, this remains a matter of concern. This paper indicates that the way women talk about their work reinforces widely held impressions of the IT industry. The use of structuration theory helps show how this talk is not always consistent with the women's lived

experiences. In order to understand better how women help configure the institutional realm of IT work, we propose that more qualitative studies of women at work in IT as well as women talking about IT are needed. It is suggested that a 'proper' application of structuration theory would require a longitudinal study.

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