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## A NEW PARADIGM FOR CONSIDERING GENDER IN INFORMATION SYSTEMS DEVELOPMENT RESEARCH

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### Abstract

*The aim of this paper is to sketch a new paradigm for understanding the role of gender in information systems development (ISD) research, attending to organizational and social concerns of the context of IS development as well as the consequences of its deployment within organizations. Employing theoretical concepts and observations advanced within social studies of technology (SST) for comprehending the innovation process, a conceptual framework for studying ISD as innovation is constructed. This is delivered by combining insights derived from studies of gender and organizations concerning the social division of labor; gender and technology, concerning the masculinity of technology culture; and gender and computing, concerning the differences and inequalities of development and use. It is hoped that once fully developed the new paradigm will begin to provide explanations for organizational phenomena (such as user rejection); deepen our understanding of the innovation process; improve ISD practice through increased awareness of social issues; suggest further potential topics for ISD researchers; and furnish a framework for effecting this work.*

## 1. INTRODUCTION

Approaching the issue of information systems development (ISD) from an innovation perspective (Quintas 1996), this paper seeks to enhance our understanding of the ISD process by introducing theoretical concepts and observations advanced in sociology and technology management disciplines under the heading social studies of technology (SST).<sup>1</sup> According to Wajcman (2000), although the SST approach was novel in the mid-1980s, it has now become almost an orthodoxy in the treatment of technology in general. However, this is far from the case in IS research. Specifically, the proposal of the paper is that a focus on gender within this approach will mean an increased awareness of organizational and social concerns of both the IS development process and the consequences of IS deployment into organizations.

The way for a discussion on the possibilities for a conceptualization of gender in ISD research is opened to some extent by recognizing the relative paucity of treatment of gender issues within IS research (see Adam et al. 2001). This paper proposes one potential means to theorize both the way user interaction with developed information systems is gendered, and the way the technology itself comes to be gendered through the process of its design, development, and diffusion into organizations and society as a whole.

A new paradigm and conceptual framework for carrying out this task is developed over the course of the paper. In order to achieve this, an interdisciplinary approach has been adopted, as depicted in Figure 1. In addition to the contribution of SST and ISD literature to the framework, it can be seen that feminist research in general is a rich resource and fits well with the critical management studies<sup>2</sup> approach.

The paper is structured as follows. In the next section, the case for a gender-aware approach to ISD in organizations is made. Section three goes on to look at technology organizations and the division of labor. The framework is then presented in its entirety and some implications for the IS innovation process are drawn in section four. In section five, some brief conclusions are made.

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<sup>1</sup>Monteiro (2000) summarizes the “broad church” of SST as follows: systems thinking, as developed by Hughes (1983) looking at infrastructures; the social construction of technology (SCOT) (Bijker et al. 1987) emphasizing interpretative flexibility and relevant actors; and actor network theory (ANT) (Akrich 1992; Callon 1991; Latour 1987) dealing with networks, inscription, translation, and irreversibility.

<sup>2</sup>A critical perspective framework has been variously summarized (for examples, see Alvesson and Deetz 2000; Burgoyne and Reynolds 1997) and entails a questioning of assumptions, is sensitized to power relations and is committed to emancipation.

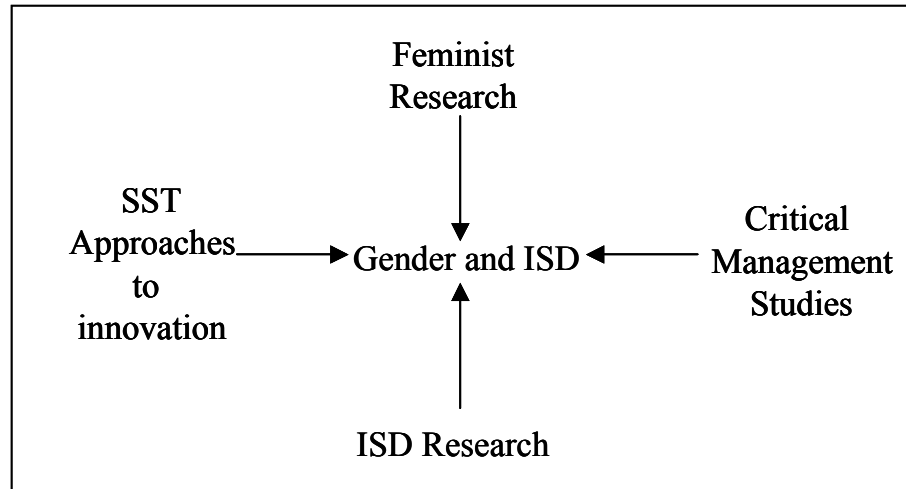


Figure 1. Inter-Disciplinary Research for Studying Gender and ISD

## 2. A GENDER AWARE APPROACH TO INFORMATION SYSTEMS DEVELOPMENT IN ORGANIZATIONS

### 2.1 Under-Theorization of Gender and Information and Communication Technologies

The record of negative experiences of women with information and communication technologies, at least in the UK, has been documented (Adam 1997; Rasmussen and Hapnes 1991). In computing, engineering, and technology undergraduate degree courses, men still dominate. Despite some excellent studies on gender differences in relation to computers (for examples, see Frenkel 1990; Klawe and Leveson 1995; Kwan et al. 1985), as well as the under-representation of women in computing (Grundy 1996), within the IS literature, the role of gender and ICTs is largely under-theorized.<sup>3</sup>

The aim of the paper is to provide a coherent conceptual framework for examining gender issues in ISD research and this achieved by combining the SST style analysis of the contexts that shape technology (Edge 1997; Williams

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<sup>3</sup>Thus, within Matthew Jones' (2000) listing and examination in the use of social theorists at previous IFIP 8.2 conferences, no writers explicitly associated with feminism appear, despite the forward-looking nature of this conference. Exceptions include Bowker et al. (1995) and Wilson and Howcroft (2000).

and Edge 1996) with feminist literature concerning both technology and organizations. My assumptions are that gender is a vital social factor shaping organizational life and that it is inconceivable that both the development process and the interaction of users with information systems is not in some way shaped by the gendered spheres we inhabit. Consequently, focusing on issues of gender can offer a different starting point for understanding the organizational and broader societal context of IS development and implementation. The theoretical and empirical focus will then be on those activities concerned with the sexual and social division of labor; the organization of work by management; and the allocation of skill labels, skilled status, prestige, and rewards (Webster 1996, p. 5).

Wajcman (2000) recently concluded that the absence of women from view is due in part to the concentration by SST on technology at the design stage, where male “heroes” dominate. So, one strategy to include women would imply “widening the lens” to other areas of technology development and diffusion—i.e., “further downstream” where women are hidden.

## **2.2 The Contribution of Organizational Sociology**

Writers in the gender and computer field have deliberated new research perspectives for some time (see, for example, Grint and Gill 1995; Lander and Adam 1997, pp.1-59). Further, in the same way that this literature ignores mainstream feminism, resulting in a “pressing need to establish appropriate theoretical bases for gender and computing research” (Adam 1997, p. 17), so too it tends to neglect the work carried out by organizational sociologists. On the other hand, the sociologists, who *have* examined users and information systems, rarely focus on the role of gender: it is a neglected area, prone to ghettoization (Alvesson and Billing 1997). For the present, then, I am keen to elaborate on Star’s (1995, p. 89) comment that computer scientists need social scientists.<sup>4</sup>

## **3. TECHNOLOGY, ORGANIZATIONS AND THE DIVISION OF LABOR**

### **3.1 Gendered Spheres in the Workplace**

The role of gender in organizations has for too long been neglected (Alvesson and Billing 1997). Still, there are valuable theoretical developments

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<sup>4</sup>Cited in Adam (1997, p. 18).

for the synthesis of feminist analysis of organization with ISD literature. First, what can we learn from our understanding of the social and organizational context of ISD by focusing on gender in organizations? According to Alvesson and Billing (1997, p. 8): “A gender perspective will not only mean dealing with the way men and women are constructed as individuals...but will also include a broader view on organizations.”

Although we should not totalize organizational life “through seeing everything in terms of gender” (Alvesson and Billing 1997), still the existence of separate spheres at work is well documented (see, for examples, Alvesson and Billing 1997; Dex 1985; Ledwith and Colgan 1996; Walby 1988). Cockburn (1988) describes the way in which we utilize different areas of the workplace and cluster in different echelons, different skills, and different areas of service provision. Hence, “constructions of masculinity and femininity permeate social life, and guide and constrain people’s behavior in particular through defining the identities of men and women” (Alvesson and Billing 1997, p. 19). While we are at work, we are not only producing goods but also producing culture and the study of gender makes visible gender relations which have been subsumed, providing “a vivid illumination of the way that technology is inescapably a social and political phenomenon” (Knights and Murray 1994, p. 18).

### 3.2 The Notion of Gendered Jobs

Following on from the idea that skills are assigned to people according to sex, we find the notion of a gendered job: “one which capitalized on the qualities and capabilities a woman had gained by virtue of having lived her life as a woman” (Davies and Rosser 1986, p. 103). The corollary of this is that skills acquired in this way are not acknowledged as skills in the same way as learned knowledge and skills, nor are they financially rewarded.<sup>5</sup> Women’s work tends to be regarded as semi-skilled merely *because it is women’s work*. Further, despite news of women breaking through the IT glass ceiling (Wilde 1997), it has also been argued that in “high-technology” work, men dominate and have resisted the encroachment of women who are systematically excluded from managerial positions yet over-represented in the lower echelons of computing in an organizational process which is itself profoundly masculinized (Knights and Murray 1994, p. 17; Webster 1996). Skilled work is not just defined by

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<sup>5</sup>Nursing is an extreme example as in the UK 92% of nurses are women. Although nowadays most nurses receive training, this has not always been the case. Indeed, the idea that special training is needed to supplement women’s supposedly instinctive caring skills is relatively new.

objective dexterity or training, but the very fact that men rather than women carry it out (Davies and Rosser 1986; Phillips and Taylor 1980). This will have implications for the context of systems development, the modeling of work by systems developers, and the interaction of users with the developed IS.

### 3.3 Technology as Masculine Culture

The discussion of skills above relates to views of technological ability. Cockburn and Omerod (1993) suggest that occupations involve sex segregation because the technological know-how required to carry them out is usually culturally denied women, in that the qualities required for entry to the professions and success in them are seen as masculine. But it may not be that women are simply excluded by a male dominated culture (Rasmussen and Hapnes 1991). Rather, they can internalize the views of society and (resistance aside) are shaped by it. Thus, in relation to technology:

Technology enters into our sexual identity: femininity is incompatible with technical competence; to feel technically competent is to feel manly. The gendering of men and women into “masculine” and “feminine” is a cultural process of immense power. People suffer for disregarding its dictates (Cockburn 1986, p. 12).

Women, then, are perhaps as susceptible to the belief in their own lack of technological ability as men are likely to delight in their own supposed superiority (Smith 1997).

### 3.4 Women and Computers

From an optimistic viewpoint, the move away from the heavy industrial technology associated with the proliferation of ICTs in organizations could have inaugurated a period in which “the gender stereotyping of technology would diminish” (Wajcman 1991, p. 150). Indeed, computing could have been gender neutral or appropriated by women because of its alliance with the typewriter and compatibility with the skills of the secretary (Webster 1989, p. 52). Nevertheless, computing is dominated by men—although it appears the picture varies between the UK, Europe, and the U.S. (Klawe and Leveson 1995). Rubery and

Fagan (1994, p. 39)<sup>6</sup> report that in Britain, the proportion of female entrants into computer science degree programs has steadily dropped from an initial low level of 24% in 1978 to a mere 13% by 1989, while 1995 figures suggest women constitute only one fifth of computer science undergraduates in the UK.<sup>7</sup> Similarly, a recent *Labour Research* (2000) report stated that UK government statistics show that while during the 1980s women made up a quarter of the IT industry, this figure fell to between 20% and 22% in the early 1990s, and 19% in 1993; and that the proportion of female software engineers fell from 14% in 1994 to 5.6% in 1998.

### 3.5 Bringing Women into View: Research Focus on Users

Above I argued that the relative paucity of women in computing suggests that, concentrating solely on the *development* of technologies (where women are more likely to be excluded), women are in danger of being invisible. Yet, employees and users play a role in shaping the development and application of technologies (Knights and Murray 1994; Webster 1996). Thus, by broadening our scope to the *use* of technology as a change *process*, women as users play an important role. This is very much in keeping the perspective of innovation through implementation—“innofusion” (Dutton et al. 1995)—especially in relation to software. One implication of this is that more user-oriented approaches are likely to be more compatible with a gender sensitive approach.

This discussion completes the construction of the conceptual framework presented in Figure 2. In the following section we will discuss possible implications for ISD research.

## 4. IMPLICATIONS FOR INFORMATION SYSTEMS DEVELOPMENT RESEARCH

The main concern of this paper has been to begin to make a case for the significance and value of a perspective that focuses on the gendered nature of society, organizations, work, and technology. It is intended that the ensuing conceptual framework be applied by others—academics and practitioners alike—to enhance their understanding of the ISD process and the nature of the

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<sup>6</sup>Cited in Webster (1996).

<sup>7</sup>However, it is dangerous to ascribe these difference to *natural abilities*. Segal (1987, p. 146) criticizes this approach because it signals “the return to conventional ideas of fundamental and comprehensive cognitive, emotional and moral difference between women and men.” Also, a rejection of such theories is important because it assumes an individual account of learning (Wajcman 1991, p. 157).

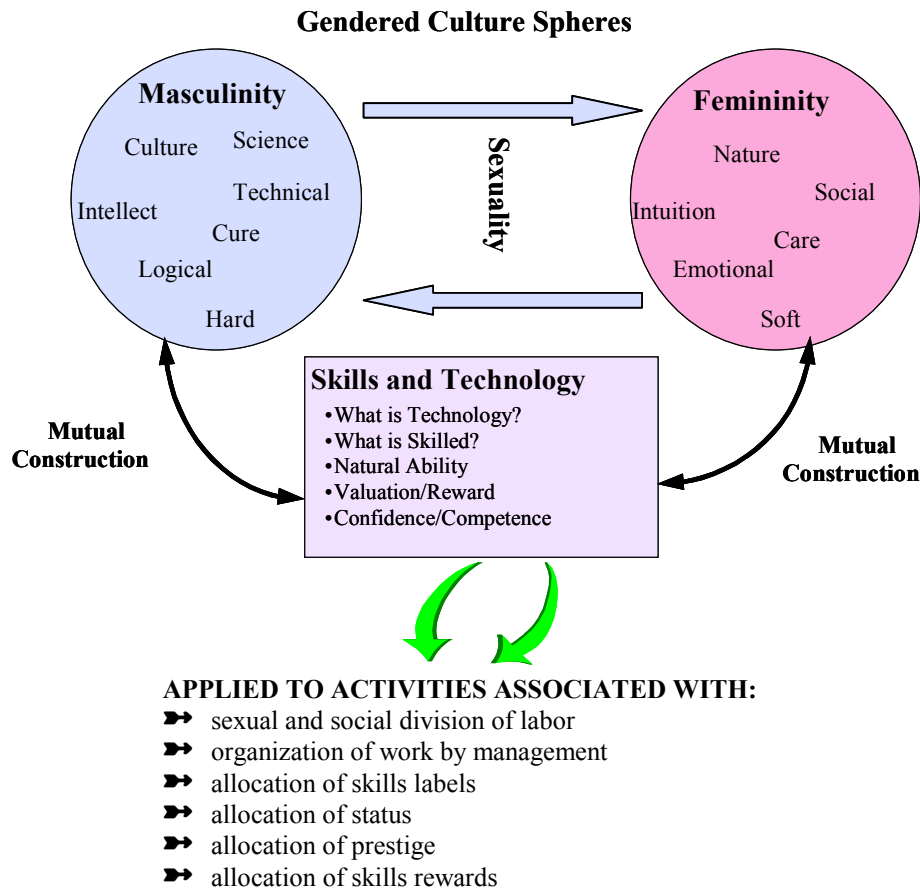


Figure 2. Gender, Information Systems, and Organization

information system this produces. It is beyond the scope of this paper to provide an illustration of the application of the framework. However, there are some implications to be drawn from the preceding sections to inform future work. These are described below and summarized in Table 1.

#### 4.1 Information Systems Development Social and Organizational Concerns

It has been clearly stated that the social and organizational concerns of ISD should be deemed to include gender issues. However, this should not be limited to



Table 1. Significance of Gender Framework for Information Systems Development Research

<p><b>Breadth of study</b></p> <ul style="list-style-type: none"> <li>• Do not restrict field of study to “impacts”—avoid technological determinism</li> <li>• Analyze the ways gender spheres are replicated in ISD process: inclusion and exclusion</li> <li>• “Widen the lens” of research into ISD to include women: focus on users as creators</li> </ul> <p style="text-align: center;"><b>Theoretical and empirical focus for study of ISD in organizations</b></p> <p>Apply conceptual framework to:</p> <ul style="list-style-type: none"> <li>• Those activities associated with the sexual and social division of labor</li> <li>• Those activities associated with the organization of work by management</li> <li>• Those activities associated with the allocation of skill labels, status, prestige and rewards</li> </ul> <p style="text-align: center;"><b>Technology, organizations, and division of labor</b></p> <p>Be attentive to the following and their implications for ISD:</p> <ul style="list-style-type: none"> <li>• Social and organizational concerns of ISD includes gender issues</li> <li>• Gender may be built into developed IS</li> <li>• Gendered spheres exist in the workplace; this will impinge on work and skill</li> <li>• Existence of gendered jobs impinges on views of “compatibility” with IS</li> <li>• Social constructivist perspective on gender and technology suggest things open to change</li> <li>• Technology and gender are mutually defining; what is deemed “technical” can be altered</li> <li>• Technology seen as masculine culture; this affects user interaction</li> </ul>
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the “impacts” stage—post development—but rather be a consideration throughout the innovation process. In examining existing information systems, we may choose to re-examine their construction in order to bring out the way in which gender issues have been implicated in the process: how the existence of gendered spheres impinges on work and skill. The pre-existence of gendered jobs may be the cause of resentment to an existing state of affairs; or alternatively it may give rise to resistance to new states; it may influence views on “compatibility” of the IS with users’ working lives.

## 4.2 ISD Actors

The statistical evidence of many studies has shown that in certain cultures men are more likely to be at ease with the ISD than women. I believe we should

seek to make the cultural environment less hostile for those who do not suit the dominant one at present.

### **4.3 Users**

If there are fewer women involved in the design process, then a shift of focus to the users can be a way of bringing women into view. The tendency in our culture toward dichotomous classifications of the world ensures that the association of technology with masculine culture, although not stated explicitly, may make IS more alien to some female users, depending on the degree and intensity of the division of labor at work. In addition, it is likely that methodologies placing users at the center of developments will be more compatible with such an approach.

### **4.4 Work**

ISD should take into account, encapsulate and build models of the way work is performed prior to the systems development project. In so doing, it may be enlightening to evaluate to what extent that work is gendered in nature and whether new systems will deepen the degree of divisions or else seek to overcome them. This will depend largely on one's view of the role of systems professionals. However, established ways of adjudging that work (in terms of skill, status, prestige and reward) may bode badly for the success of any new system, and thus change becomes desirable on all sides. Alternatively, of course, people may prefer (as they often do) to keep changes to a minimum.

## **5. CONCLUSION**

The imperative expressed in the paper calls for a focus on issues of gender which can offer a starting point for understanding the organizational and broader societal context of IS development and implementation. In this paper, I sought to review some of the literature concerning gender, work, and technology as part of beginning to provide a new paradigm for viewing gender in ISD as well as constructing a conceptual framework to apply to ISD. I have made the case for a social shaping approach to the issue of women's apparent disadvantage in their relationship with what is considered to be "technology." Implicit in this approach is a stance against notions of technological and biological determinism. I have set out to show that both technology and gender are socially con-

ducted and mutually defining (see Figure 2). Such an approach is intended, moreover, to persuade that women's relationship with technology is not a fixed entity but rather due to social convention. One consequence of this is that the relationship is open to change—a non-incidental consideration given that “gender research...is clearly a political project” (Alvesson and Billing 1997, p. 11).

## 6. ACKNOWLEDGMENTS

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