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December 1997

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Executive Summary

Initially the information technology (IT) field was suggested as being an area where men and women would be equally represented. However, it appears that female participation started to decline in the 1980s at the same time as IT became more widely available through the advent of personal computers and distributed systems. Research into gender and computing suggests that the decrease of women in IT education is partly due to the masculine meanings ascribed to computing and the apparent male domination of the field. We suggest also that the changing nature of IT field, especially the blurring of the distinction between the use and development of information technology artefacts has made the field less appealing to women and this has not been assisted by the information processing and technology (IPT) subject at High School. However, although the percentage of women entering IT education is declining, Asian women continue to outnumber other ethnic groups in IT education in Australia. Our study explores how the perception of computing as a field of study and work is formulated among female students, whether or not this perception is changed at university and how Asian female students perceptions differ from Western students.

Our research showed among high school students that computing subjects were seen as
- difficult, especially the programming component which was also boring and frustrating;
- only suitable for someone who likes to work alone and dislikes social interaction
- uninteresting and not preferred by Western female students as a field of tertiary study because they would restrict career opportunities
- boring, by Asian female students, but also offering job security and wider career choices

The IPT course was delivered in a significantly different way in the three schools and affected motivation to study IT at university.

Our study among first year female students in Bachelor Information Technology course in Griffith University, showed that Asian female students
- were uncertain about their career possibilities and felt disadvantaged and were not expecting to get a job in Australia

- felt that the course was harder than they initially thought it would be
- preferred working collaboratively but found it hard to avoid accusations of plagiarism

This paper suggests that the philosophies favoured by some Asian cultures - collectivism, uncertainty avoidance and long term orientation - together with femininity help formulate new meanings of computing which are essential for the motivation to undertake IT studies and which help develop collaboratory work practices that suit the changing nature of the IT industry. A preliminary conceptual model of the interrelationships of these factors is presented.
Introduction

Recruitment of women into the IT field remains a problem and research indicates a decreasing percentage of female students taking computer science courses (Cottrell 1992; Klawe and Levenson 1995) since the 1980s, coinciding with the time when IT became more widely available through the advent of personal computers and distributed systems. These technologies brought computers closer to the end-users and computer-based systems became an important part of work. To investigate the problem of female participation we have chosen to study the influence of cultural factors because with few exceptions, women are treated as an undifferentiated category and research focuses on the psychological characteristics (Brosnan and Davidson 1996; Teague and Clarke 1994, 1996), and social relations which inhibit their participation.

Our research (Greenhill, von Hellens, Nielsen and Pringle 1996a, 1996b) indicates there is a significant cultural difference in that women of Asian extraction constitute between 30 and 40 percentage of female students, outweighing other ethnic groups in IT education in Australia even though the Asian population in Australia is less than 5%, and also that particular factors also affect their participation and success in IT education.

This paper examines the results of some of the findings from our research among high school and first year university students into factors that motivate female students to undertake IT studies. We introduce a model of these factors to show the interaction between them. Such a model could help develop and implement strategies to obtain a more satisfactory gender balance in IT education and industry. This paper discusses the blurring of the distinction between the development and use of the IT artefacts and how this has made the field less appealing to women. The paper also contributes to the discussion on information technologies for the new organisational forms, especially the networked organisations which are organic in structure (Morgan 1986) and are characterised by collaboration and continuous negotiation with partners. (Rockart and Short 1991, Applegate 1994) Comparative research on Western and Asian cultures suggests that the latter can be characterised as collectivistic rather than individualistic (Hofstede 1991 and 1994, Bryan, et al. 1994) and that Asian cultural influences may be beneficial to the use of collaborative technologies.

We suggest that the Australian IT education and industry may benefit from the contribution of diverse cultures which may enable Australia to more easily relate to the requirements of the new connectivity. Although Australia has one of the most ethnically diverse populations in the world, the findings of this study may have applicability to any country which has significant ethnic minorities and which is concerned with equity of access to and participation in the IT industry and IT education.

Research Strategy and Findings
Our research is exploratory attempting to identify all potential cultural and gender based factors affecting female participation and success in IT education. Qualitative research is needed in cultural studies (Igbaria and McClosky 1996); therefore surveys among female students in the IT course at the university and secondary schools were complemented with open questions and focus group interviews, and an interpretivist approach was used in the analysis of the interview material.

Our research started in 1995 with focus group interviews among first year university students. Focus grouping is a research strategy that involves intensive discussion and interviewing with a small group of people on a given focus or topic, revealing "wild card" type of issues that may flow from free group discussion. (Malhotra 1993) Information collected in the focus group interviews has helped us identify the emerging cultural factors that are influencing the career choices of the students and their success in IT education. The inter-relationships of the factors has been developed into a conceptual model.

In 1996 we also carried out a survey which provided background statistics on the proportion of Non-English speaking females in the schools as well as specific details about their access and exposure to computing facilities. Questions about the general background were included, such as age, gender, country of origin, native tongue, number of years spent in Australia, previous computer training at school and elsewhere, computer usage outside the school and opinions on tertiary studies including names of preferred university courses.

Given the multi-disciplinary nature of the research behind this paper, it is important that we have the different fields - computing and IT as well as humanities - represented in our project to assure the credibility of the research. Because of the very different backgrounds and skills of the authors the research has involved extensive collective discussion and planning. The focus group interviews have been recorded and the transcripts have been read by each of the authors who have all contributed to the analysis and interpretation of the data from the perspective of their research discipline.

University students: cultural differences and collaborative study practices

A pilot study of cultural and gender based factors involved focus group interviews among female students in the Bachelor of Information Technology course at Griffith University in South-East Queensland, Australia. The total number of female students in the BInfTech was initially 48 (17 % out of the total of 270 students enrolled) but by the end of first year eight female students had dropped out. Fourteen students were interviewed in 1995 covering a third of all first year female students. Nine of these students may be described as Asian and five as Non-Asian. Open-ended questions covered perceptions of the course, the nature of the study environment, reasons for and problems of choosing IT education, and the difference between expectations and perceptions regarding the course content and job opportunities.

The pilot study indicated that the IT course was perceived as very difficult. (Greenhill, Greenhill, von Hellens, Nielsen and Pringle 1996a, 1996b) The Asian female students had expected programming to be difficult, with the university course turning out to be much harder than the IT courses at school or at TAFE (Technical and Further Education) college. Even more difficulties were perceived with the essay writing for non-technical subjects - the two courses on oral and written business communication in relation to computing and a course on analysing information systems. The assignments for these courses involves critical analyses and discussions of the use of computers in organisations. The students were confused about the difference between working cooperatively and plagiarism. On the one hand students were encouraged to get together to work out what to do in an assignment, as that is how they will work in the IT industry after graduation. But on the other hand, work has to be submitted individually, and using material from another students work is treated as cheating. Examples of injustice were reported by those interviewed. Also, groups of male students were seen to be getting higher marks than all female groups. In addition, students had mixed feelings about taking this problem to the lecturers in case they were remembered unfavourably. This is a problem when female students are small in number - they have a sense of being easily identifiable. Plagiarism was certainly an issue where staff and student opinions differed. Students felt that staff were "paranoid" about it and that not much could be done to differentiate one student's work from another's. Students felt it was unfair that even when they had the same information in their essay as their collaborator had in his/her essay, for some reason they were given a lower mark.

The students were expecting the IT course to be more about using different facilities and different versions of software, with less emphasis on programming which was seen as a more appropriate course for computer science than for IT. It became clear that the Bachelor of Information Technology course had not been clearly enough described in the QTAC (Queensland Tertiary Admission Centre) booklet. However, the course was still seen as useful for getting a job, even though it might not be very relevant to future work. The students felt IT is quite important today in any profession. The Asian female students confirmed that they probably would get a job but not in Australia.

During September and October 1996, further focus group interviews were carried out with eight first year female students from Griffith University. Ethnically three of these women were of Asian origin and five of other origins. As with the pilot study, the overall perception of the course persists that it is difficult and demanding. Both Asian and Non-Asian students expressed the need to cooperatively

study and compare ideas, especially when they had problems with programming tasks. Two Non-Asian women emphasised their desire to study individually and, irrespective of this, felt confident in their ability to successfully complete both the programming components and the degree. All the remaining students appreciated and enjoyed the help they received in group study, particularly in a trouble shooting context.

The interviews also showed the importance of pressure from home to do IT where the Asian girls are "told" to do this course and parents sit over one student to make sure she does her work. They speak of pressure exerted as they are aware of their family responsibility for providing for their parents when they are old.

High School students: cultural differences in the perceptions of IT as a field of study and work

During July and August 1996, surveys and interviews were carried out in three suburban Brisbane High Schools, chosen because of their comparatively high enrolments of Asian students. They included two private schools (fee paying) - one girls' school and one coeducational school and one state (public, free) coeducational school close to a suburb which has a relatively high Asian population. All students doing the mathematics course that is the entry requirement to university level IT courses were surveyed (see table below for the survey audience).

The surveys were followed by focus group interviews carried out by two researchers. The interview questions aimed at finding out why computing courses were or were not preferred and what are the students' perceptions of IT education: the course content, the skills and personal characteristic required, and the type of occupation that a person graduating with an IT degree would enter; from where the students received advice and information about IT courses and how accurate it was. Students were also asked if they felt that women could be equally successful in an IT profession as men.

Schools	Focus groups Interviews with female students in groups of 3 to 4	Survey audience Female students Asian	Non-Asian	Male students
School 1 - all girls private school	11 girls, each group was a mixture of Asian and Non-Asian students	51	109	na.
School 2 - coeducational private school	12 female students, all were Non-Asian	2	17	18
School 3 - coeducational state school	8 female students, all were Non-Asian	1	9	17
Total =	6 Asian, 25 Non-Asian female students	54	135	35

Table: Focus Groups and Survey Audience in High Schools

The pilot study among university students had indicated that the information technology course turned out to be different from what was expected, particularly in relation to the programming component. This seemed to indicate problems in the implementation of the Information Processing and Technology (IPT) curriculum (BSSS 1991) in the High Schools. The students' opinions varied significantly between schools primarily because one teacher was more successful in encouraging students to study IT, and her students showed a broader understanding about IT career options. More data needs to be collected, on the implementation of the IPT course to assess its effect on student perceptions of IT study and work.

The description of students' views of IT professions is relevant for our paper as it helps conceptualise the relationship between the experience in the High School and the motivation to undertake IT studies in the university. The High School students perceived computing as a field of study as "boring"; programming was regarded as difficult because of the variety of technical problems that need to be sorted out before a program can function. Computing was unappealing to female students as there was no need for social skills and interaction. Computing professionals were regarded as being anti-social people who prefer working alone all day long. To be good at maths was also an essential characteristic. Computing was seen as a difficult and very limited area of study and work with limited career options. To study computing was not necessary as many other jobs use

computers. The Non-Asian ("Western") female students especially had this view whereas Asian females emphasised that IT studies would open up career opportunities in other areas. The applications of IT education appear to be perceived and valued differently by Asian and Western female students.

We have no evidence that Asian students have a better understanding of the IT industry, but the research shows that they perceive it differently. Also, apparently negative factors such as lack of computer knowledge, difficulty, lack of interest and male domination of IT studies do not inhibit the participation of Asian female students. Slightly more female Asian students had taken computing courses outside the school. (7% as opposed to 3%). Asian females were also more inclined to choose computing and IT subjects at school (27% as opposed to only 10 % of Non-Asian females). Of all students - male and female - about 30% are taking IT subjects.

18% of Asian female students indicated that IT will be their *first* preference, as opposed to 8% of non-Asian students, and only a third would not consider IT courses at the university, whereas two thirds of Non-Asian female students were "not interested" or "don't like computers". The survey showed that both groups had very similar views about the type of work and IT professional would do, programming and software testing being predominantly seen as the main activity in that profession. Positive factors identified in this study - the usefulness of computing and the likelihood of getting a job may be much stronger motivating factors for female Asian students than for other female students.

Searching for Factors of Culture and Gender

The Relationship between Information Systems Development and Use

We have mentioned earlier the problem of the blurring of the boundary between the development and use of Information Technology. This coincides with the advent of the personal computer and distributed systems and the increasing variety of end user developed systems. The impression has been created that pc-based systems will eventually replace the more conventional mainframe- or minicomputer-based systems, and that less specific computing and programming knowledge and system development skills are needed, as anyone with domain knowledge and some understanding about pc tools can develop the systems they will need for their work.

Our research in high schools seem to indicate that this (end user computing) has an effect on female perceptions of the usefulness of IT education. Since female participation in IT education started to decline around the same time as the rate of computer usage increased in the mid 1980's, it is useful to consider the way that information technology is represented to the general community and to potential students. Therefore we have considered the major computing course taught at secondary schools in Queensland.

The Board of Senior Secondary School Studies introduced a course entitled Information Processing and Technology (IPT) and provided a syllabus for use in Queensland Secondary schools aimed at promoting the awareness and understanding of the theory, practice and effects of IT (BSSS 1991: 2). The course contains six areas: information systems, algorithms and programming, artificial intelligence, social and ethical implications, and computer systems, with the greatest emphasis on the first two areas. The potential uses of IT are discussed in the information systems component (from a data base design point of view) and in the social and ethical implications component (from the social, moral and legal point of view). A critical analysis of computer systems in a commercial, industrial and educational environment is included in the computer system component. The IPT syllabus neither addresses specifically the construction of new reality - social practices - that involves computer-based systems nor the problems and issues of managing the change from the 'old' way of doing things to the 'new', hopefully better work environment, even though both of these areas contribute to the success of IT applications. (Hirschheim, Klein, and Lyytinen 1995).

The objectives for the IPT course were set out by the Computer Studies advisory committee in late 1982. The committee believed that the majority of students would aim to become users of the technology and that only a small minority would want to continue their studies and become designers of technology. (Carss 1987: 25-26) The construction of an automobile was given as an analogy. What seems not to have been taken into account is the nature of computer technology - it is

different from the automobile or steam engine. Successful adoption of traditional industrial technologies requires learning to overcome the technical difficulties, i.e. 'single loop learning' (Argyris 1976) or 'training' which concerns the operation of the technology. Computer-based systems and software programs represent "intellectual technologies" which expand the intellectual power of human brain. The full potential of traditional industrial technologies can be achieved through 'training' whereas 'training' in successful adoption of intellectual technology also requires "double loop learning" - to understand how to use computer-based systems in a work context. (Pyburn and Curley 1984) The double roles of people working with computers - as users and/or as developers - makes IT different from most other traditional, industrial technologies, since the ability to utilise the full potential of such an 'intelligent' technology requires not only basic skills in the use of the technology, but also an extensive understanding of how to apply it to everyday work. Moreover, the successful development of IT artefacts requires extensive knowledge about the way the artefacts are used and applied, as well as the traditional knowledge of design and development.

Modelling the Culture and Gender Factors

Our examination of the representation of the Information Technology indicates that students have a false impression of education and work in that area, and we suggest that these impressions make IT unappealing to some female students. However we have also found that female students of Asian background are not discouraged by their perceptions of the relevance of the IT education. Either these students perceive the distinctions between development and use differently or such considerations are less important to them.

Given our interest in the reasons why there is such a large proportion of Asian females undertaking IT studies in Australia, it feels natural to use findings from other studies of the differences between Asian and Western IT and management cultures (Hofstede 1994; Franke et al. 1991; Burn et al. 1992 and 1995). We have used findings from these studies of job characteristics perceived by IT professionals and students in Hong Kong and US and studies into the characteristics of national cultures and we have combined these with our own findings to propose a conceptual model to explain the factors relevant to female students' decision to undertake IT studies and successfully complete university education and to explain the factors relevant to networked organisations and the connectivity of the new IT environments. (Figure: Cultural values affecting female participation and success in IT Education.)

The Asian cultural values tend to support *collectivism*, the integration of people into cohesive groups whereas Western cultural values support *individualism*, the tendency to look after themselves (and their immediate families). Research by Greenhill, von Hellens, Nielsen and Pringle (1996a and 1996b) shows that in IT education collectivism contributes to the sharing of information and research results by the Asian students to the extent where the boundaries between the work completed by individual students and their peers become unclear and even resembles plagiarism, especially in situations in which the work initially was meant to be produced by individuals as opposed to groups. This collective approach seems to be particularly appropriate in network organisations where all work contributes to the organisational goals, but it remains problematical in educational settings. Research into the organisational forms of the future points out that many tasks will be done primarily by teams (e.g. see reference to Drucker, The New Organisation, in Scott Morton, 1991: 209)

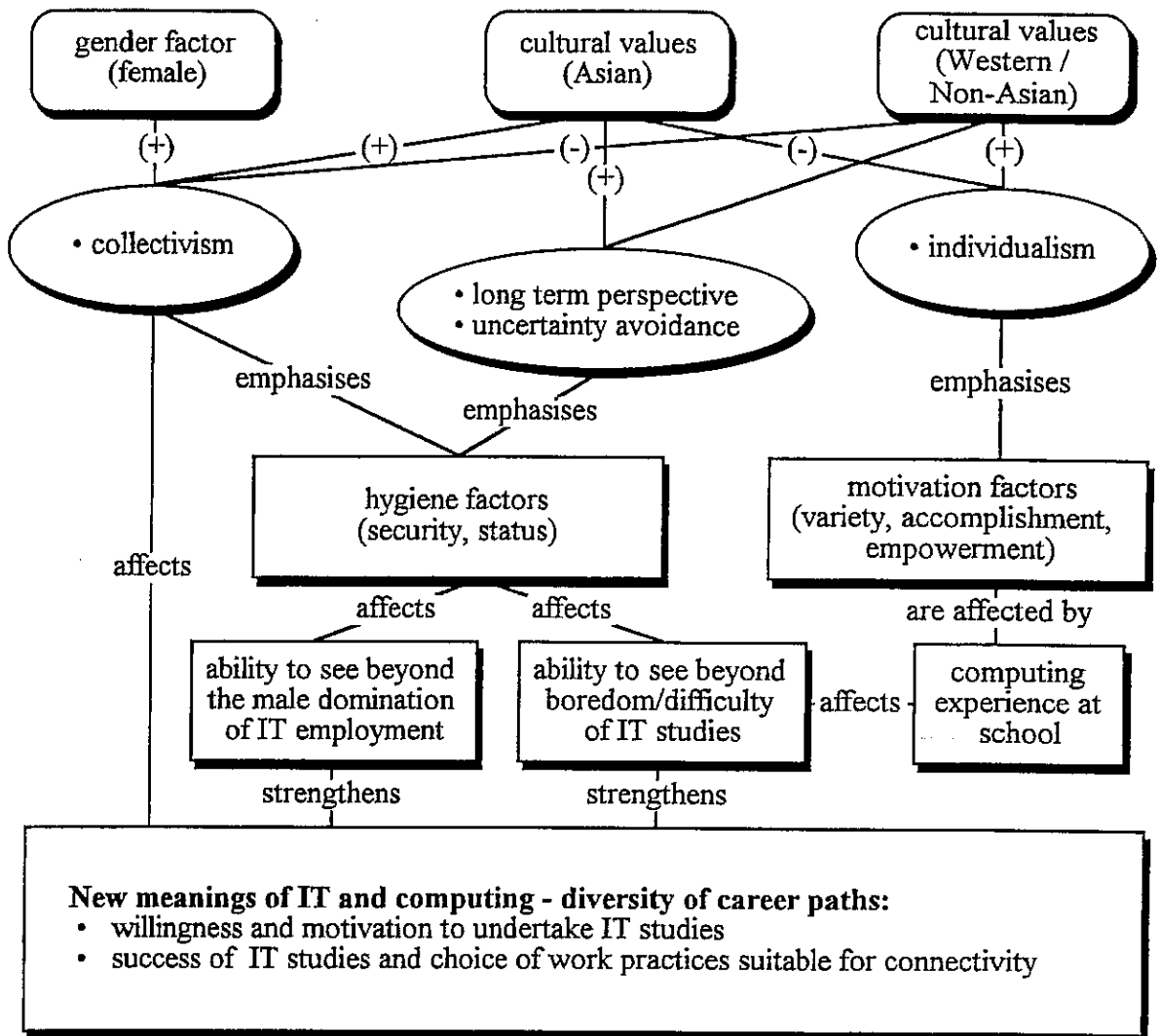**Figure: Cultural values affecting female participation and success in IT Education.**

The gender factor, with *femininity* representing a caring and modest attitude towards others, is suggested to strengthen the group work phenomenon, whereas *masculinity* - an assertive or competitive orientation may contribute to long term success in the achievement of the organisational goals, providing that the effectiveness of operations is secured. Masculinity/femininity has been identified as a dimension of national culture (Hofstede 1980 and 1994). The study by Igbaria and McClosky (1996) of MIS employees in Taiwan indicates that Taiwanese culture varies greatly from North American culture on three out of the four dimensions of culture, include a marked difference on the masculinity scale, the Taiwanese culture is far more feminine ("Dominant values associated with the feminine role include not showing off, putting relationships with people before money, minding the quality of life and helping others.") than the American culture. Another dimension which is relevant to the present study is that of certainty. Igbaria and McClosky (1996) also found that the Taiwanese culture is higher in uncertainty avoidance and that the career orientation of Taiwanese employees is most closely associated with security, service and challenge rather than autonomy, independence and entrepreneurial creativity.

The Asian cultural values of *long-term* orientation (Hofstede 1994), as well as the tendency to avoid uncertainties (*uncertainty avoidance*) seem to strengthen the students' ability to see beyond the initial employment as an IT professional. Our research in the High Schools seems to indicate that despite the negative image the students have about IT as a field of study and work, the Asian students were able to see an IT course as a relevant option to many other careers.(Greenhill, von Hellens, Nielsen and Pringle 1997) It is also possible that the changes in the nature of the IT industry with the advent of the personal computer and the blurring of the distinction between

development and use are perceived differently by Asian students. Our research shows that an IT profession is viewed as more likely to improve their job prospects.

The conceptual model shows clearly the influences and motivating factors which relate to gender and culture. Additional factors shown in the model relate to well established research into psychology of work which states that any work situation contains elements with a positive motivation potential (the real motivators), and elements with a negative potential (the hygiene factors). (Herzberg et al. 1959)   The motivation factors are the intrinsic elements of the job, such as the work itself, achievement, recognition, responsibility, advancement. The hygiene factors have to be present in any work situation to prevent the demotivation, but they cannot motivate by themselves. Company policy, administration, supervision, salary and working conditions are examples of hygiene factors, the extrinsic elements of the job. The 'hygiene factors' such as security and stability are also appreciated among Asian female students, whereas these factors did not motivate Non-Asian female students.

We have not yet incorporated into the model the problem of the blurred boundaries between development and use. At present we consider this to be an inhibiting or confusing factor for Western female students but its significance for Asian students is not clear. Further research will investigate the importance of this problem and its relationship to the representation of the IT industry which is still narrowly conceived by most female students.

Conclusions
Our study showed that the female students were confused about skills required in the IT industry and very negative about the prospects for female graduates. Improvements need to be made in the way that IT education and work are explained to students. University staff need to be made aware of the variety of reasons students have for choosing IT education, as many of these seemed to be based on more or less unrealistic or even false perceptions of the kind of jobs they are likely to get as IT graduates, and staff should provide facilities to change the negative attitudes. The differences in the nature of the IT industry and jobs between Asia and Australia should be investigated and taken into account to better prepare students for a global IT environment. The use of collaborative work by Asian female students (which our research showed to be prevailing and occurring uncontrolled) should be clarified and its appropriateness for the organisational forms characterised by collaboration and connectivity should be considered.

The current research indicates some differences between Asian and "Western" female students and will be extended to consider more specific ethnic differences. A longitudinal study of female students as they progress through their university studies and enter the work force will contribute to the further development and validation of the conceptual model of cultural factors affecting female participation and success in IT education and industry.

During the course of this study, the authors have attempted to understand the causes of low female participation, with a view to improving recruitment, educational practices, and course content. The higher participation of Asian students indicated that the barriers inhibiting female participation could be overcome and that useful lessons could be learnt and perhaps transformed into practice. However, the relationship between student perceptions of the IT education and industry amongst different cultural groups is complicated by motivations which may be culturally incompatible. Our research suggests that the motivation of Asian and Western female students in Australia to enter IT studies is significantly affected by different factors but this needs to be confirmed by further research. Further investigation is also needed into the way that IT education and industry continues to be represented in a manner that discourages girls from choosing IT studies, despite the requirements for 'feminine' people centred skills in the new networked organisation.

References

Applegate, L. M. "Managing in an information age: transforming the organizations for the 1990s", in Baskerville, et al. (eds) Transforming organizations with Information Technology, Amsterdam, 1994: 1-94

Argyris, C., Increasing Leadership Effectiveness, John Wiley & Sons, New York, 1976.

BSSS, Board of Senior Secondary School Studies, Senior Syllabus in Information Processing and Technology, September 1991.

Brosnan, M. J. and Davidson, M. J. "Psychological gender issues in computing", Gender, Work and Organization, Volume 3, No. 1, January 1996: 13-25

Bryan, N. B., McClean, E. R., Smiths, S. J., and Burn, J. "The Structure of Work Perceptions among Hong Kong and US IS Professionals: A Multidimensional Scaling Test of the Hofstede Cultural Paradigm", Proceedings of the ACM SGCPR Conference, Alexandria, 1994.

Burn, J., Couger, D., and Ma, L. "Motivating IT Professionals. The Hong Kong Challenge", Information & Management, 22 (1992): 269-280

Burn, J., Ma, L. C. K., and Ng Tye, E. M. W. "Managing IT Professionals in A Global Environment", Computer Personnel, Volume 16, No. 3, 1995: 11-19

Carrs, Brian "An information processing and technology syllabus for upper secondary school", Proceedings of the 5th Australian Computers in Education Conference, 1987: 24-30

Cottrell, J. "I'm a stranger here myself: a consideration of women in computing", Proceedings of ACM SIGUCCS User Services Conference, Cleveland, 8-11 November 1992.

Franke, R. H., Hofstede, G., and Bond, M. H. "Cultural Roots of Economic Performance: A Research Note", Strategic Management Journal, Volume 12, 1991: 165-173

Greenhill, A., von Hellens. L., Nielsen, S. and Pringle, R. (1996a) "Asian Women in IT Education. An Australian Examination", Proceedings of the First Australian Conference on Computer Science Education (ACSE-96), Sydney, 2-4 July 1996: 171-176

Greenhill, A., von Hellens. L., Nielsen, S. and Pringle, R. (1996b) "Larrikin Cultures and Women in IT Education", Proceedings of the 19th Information Systems Research Seminar in Scandinavia (IRIS-19), Gothenburg, Sweden, 10-13 August 1996: 13-28

Greenhill, A., von Hellens. L.A., Nielsen, S.H. and Pringle, R. (1997), Australian Women in IT Education: Multiple Meanings and Multiculturalism, to appear in the proceedings of the Women Work and Computerizaton Conference (WWC'97), Bonn, Germany, May 24-27, 1997

Herzberg, F., Mausner, B., Snyderman, B. The Motivation to Work, John Wiley & Sons, New York, 1959..

Hirschheim, R., Klein, H. and Lyytinen, K. Information Systems Development and Data Modeling. Conceptual and Philosophical Foundations, Cambridge University Press, 1995.

Hofstede, G. Culture's Consequences: International Differences in Work-related Values, Sage, Beverly Hills, CA, 1980.

Hofstede, G. Cultures and Organizations: Software of the Mind, McGraw-Hill, London, 1991.

Hofstede, G. "Management Scientists Are Human", Management Science, Volume 40, No. 1, January 1994: 4-13

Igbaria, M. and McClosky, D. W. "Career orientations of MIS Employees in Taiwan, Computer Personnel", A Quarterly Publication of the SIGCPR, ACM Press, Volume 17, No. 2, April 1996: 3-24

Klawe, M. and Levenson, N. "Women in Computing: Where Are We Now?", Communications of the ACM, January 1995, 38(1): 29-44

· Malhotra, N. K., Marketing Research: an Applied Orientation, Englewood Cliffs, New Jersey: Prentice-Hall, 1993.

Morgan, G. Images of Organization, Sage Publications Inc., 1986.

Pyburn, P.J. and Curley, K.F. "The Evolution of Intellectual Technologies: Applying Product Life Cycle-Models to MIS Implementation", Information & Management, No.7, 1984: 305-310.

Rockart, J.F. and Short, J.E. "The networked organisation and the management of interdependence", in Scott Morton (ed), The Corporation of the 1990s. Information Technology and Organizational Transformation, Oxford University Press, 1991.

Scott Morton M.S. (ed) The Corporation of the 1990s. Information Technology and Organizational Transformation, Oxford University Press, 1991.

Teague, G. J. and Clarke, V. A. "A Psychological perspective on gender differences in computing participation", SIGSCE Conference Proceedings, Phoenix, Arizona, 1994: 258-262

Teague, G. J. and Clarke, V. A. "Improving Gender Equity in Computing Programmes: Some Suggestions for Increasing Female Participation and Retention Rates", Proceedings of the First Australian Conference on Computer Science Education (ACSE-96), Sydney, 2-4 July 1996: 164-170