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# KNOWING-DOING GAPS IN THE ICT WORKPLACE: GENDER AND CULTURE

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## **Abstract**

*Knowledge that is not applied, results in a 'knowing-doing gap'. While education, training and knowledge management practices will affect what we know; how, when and with whom we use that knowledge will be mediated by cultural influences at the societal, organizational, group and individual levels. Based on a study involving 119 ICT workers in multicultural Australia, we found patterns of knowledge usage behaviour using a psychology-based scenario approach across a number of gender and culture-based cohorts: Male, Female, Anglo, Non English Speaking Background, Western and Eastern. In this paper we focus particularly on the results of statistical analysis of the data by gender and culture to compare 'ethical' (should do) responses with their corresponding 'realistic' (will do) responses.*

*Keywords: Multiculturalism, knowledge usage, non-English speaking background (NESB), workplace based scenarios*

## 1 Introduction

Despite the possibility of long-term and sustainable competitive advantage associated with knowledge assets, it is obvious that realisation of these benefits depends on the effective application of the knowledge rather than by virtue of any intrinsic value in the knowledge itself (Alavi and Leidner, 2001). Pfeffer and Sutton (1999) termed the disparity between knowing but not applying knowledge: the ‘knowing-doing gap’. Alavi and Leidner (2001) have posed three research questions specifically concerning knowledge application: “1) how can an organization encourage application of knowledge that is made available?; 2) what factors contribute to the knowing-doing gap in organizations and how can they be reduced or eliminated?; and 3) what organizational practices can help bridge the knowledge application gap?” (p. 28). Relevant to the second question, Pfeffer and Sutton (1999) found that talk, memory, fear, measurement, and competition were the key factors which impeded putting knowledge into action. On the other hand, they found that firms that turn knowledge into action avoid the ‘smart talk trap.’ At the same time, in the knowledge application literature, we observe knowledge management strategies involving organizational practices, culture and behavior and little focus at the individual level (also shown in the literature surveyed in Leidner and Kayworth’s (2006) review of Culture in IS research and IT culture), which is where most knowledge resides and from where it originates. For example, Grant (1996) suggests three ways in which organizations can encourage application, namely the use of directives, routines and self-contained task teams.

Education, training and knowledge management practices will affect what we know; but how, when and with whom we use that knowledge, will be mediated by cultural influences at the national, societal, organizational, subunit and individual levels; just as more broadly culture influences IT resulting in distinctive IT cultures (Leidner and Kayworth, 2006). This study considers the effect of cultural background on the knowledge usage behaviors of individuals within the context of multi-cultural Australia. In this paper we analyze two factors affecting the individual and their usage of knowledge: *gender* and *culture*. In this way, we seek to directly (but partially) address Alavi and Leidner’s (2001) second research question and provide some discussion of approaches to the first and third research question (which we consider to be very close in meaning).

## 2 Gender

Despite the advent of feminism across Australia and the institutionalization of a number of proactive feminist policies such as the Equal Pay for Equal Work Act, data from the Australian Bureau of Statistics’ (ABS) Average Weekly Earnings surveys between 1990 and 2010<sup>1</sup> reveals a persistent gender wage gap in the range of 15.5 to 17.5 per cent. Of relevance to our study, are the low participation rates of females in ICT in Australia of around 20% who are primarily of Asian background (Trauth, Nielson and von Hellens, 2003). Also, the lack of females in higher positions in our study is consistent with the findings that only 2% of Australian boards have a female chair and only 8.3% of directors in the ASX 200 are women (EOWA, 2008).

Trauth (2006) categorizes two classes of gender and ICT research: *implicit-theoretical* (where theory is not directly discussed but views such as essential differences between males and females help the research design and data interpretation) and *insufficient-theoretical* (the research explicitly utilizes theory-in-use but these theories do not adequately explain the data itself). The key theories in use are *essentialism* and *social constructivism*. Essentialism explains differences between the genders and ICT due to fundamental differences between males and females at the biological, physiological and/or psychological level; such a view, at best, leads to two ICT workforces segregated into male and female and a “separate but equal” attitude. In contrast, social constructivism sees that the ICT workplace and the male and female identity have each been constructed by the society in which we live: ICT and

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<sup>1</sup> [www.ausstats.abs.gov.au/ausstats/meisubs.nsf/0/967E1D61D897A8CDCA257840000F7025/\\$File/63020\\_nov%202010.pdf](http://www.ausstats.abs.gov.au/ausstats/meisubs.nsf/0/967E1D61D897A8CDCA257840000F7025/$File/63020_nov%202010.pdf)

technology in general have become constructed as a male domain containing “men’s work” (Faulkner, 2001) exhibiting traits commonly attributed to males such as individualism, competitiveness, aggressiveness, self-sufficiency and technical ability (Acker, 1990). While social constructivism is the basis of much research in this area, the view can lead to solutions which continue to treat the genders differently and does not recognize that a universal theory is impossible, as what is “male” or “female” differs across cultures. As an alternative, Trauth (2006) has proposed the *individual differences theory of gender and IT* which “takes into account the uniformity of social shaping messages conveyed in a culture. However, it also takes into account the varied influences of individual background and critical life events that result in a range of responses to those messages” (p. 1156).

### 3 Culture

The 2006 Australian census data (Department of Immigration and Citizenship, 2008) reveals that over one fifth of the population were born overseas, with 50% of the population either born overseas or had one or both parents born overseas. Using 2008 data, Australia was ranked 18<sup>th</sup> in terms of immigration per capita, placing it ahead of Canada, the USA and most of Europe (Department of Immigration and Citizenship, 2008). The term Non-English Speaking Background (NESB) is preferred in Australia over *ethnic* for people of non Anglo-Celtic origin.

Culture has been defined as “the learned ideas, values, knowledge, rules and customs shared by members of a collectivity” (such as those based on ethnicity, gender, sexuality, indigeneity, age, disability) (Holmes et al., 2003 p. 157). In this paper we are interested in ethnicity-based collectives. Ethnicity can be defined as “the cultural background of a group of people who share a belief in common ancestry. A resource that can be mobilised for identification purposes” (Holmes et al., 2003 p. 154). The ethnicity-based culture literature describes a number of orientations, dimensions or characteristics; Table 1 summarizes those potentially relevant from a knowledge management perspective.

Dimension	Characterisation	Dimension	Characterisation	Source
<b>Masculinity</b>	Gendered society in which there are differentiated roles and characteristics attributed to each gender. Assertive-ness, competitiveness and materialism.	<b>Femininity</b>	Genders less differentiated or assigned to certain roles and attributed with certain characteristics. More nurturing, emphasis on quality of life and relationships.	Hofstede, 1980, 2001
<b>Individualism</b>	Orientation to self, individual.	<b>Collectivism</b>	Orientation to common goals and objectives of the in-group. Distrust of out-group.	Hofstede, 1980, 2001; Trompenaars, Hampden-Turner, 1997; Triandis, et al., 1988
<b>Low Context</b>	The rules of engagement are more explicitly defined. Communication and codification are used to establish and maintain relationships which are often shorter term or task-oriented. Social networks are loose and wider.	<b>High Context</b>	Foster and value long and close relationships in which knowledge, trust and shared understanding are implicit. Social networks are dense and intersecting with strong boundaries (less tolerance for out-groups).	Hall, 1990
<b>Universalism (Rules)</b>	Orientation to rules, decision making more black and white, truth can be discovered.	<b>Particularism/ (Relationships-Context)</b>	Orientation to protection and fostering of long term relationships, right or wrong depends on the situation.	Trompenaars, Hampden-Turner 1997
<b>Achievement Orientation</b>	Status is ascribed based on past achievements, less regard for hierarchy.	<b>Ascription Orientation</b>	Accord status based on age, seniority, gender, education, social connections, profession or wealth.	Trompenaars, Hampden-Turner, 1997
<b>Neutral emotion</b>	Domination of reason over emotion.	<b>Affective</b>	Domination of emotion over reason.	Trompenaars, Hampden-Turner, 1997
<b>Concern for face</b>	Concern for what others think of you, attached to status, associated with collectivist cultures.			Ho, 1976
<b>Work Ethic</b>	Some cultures live to work (e.g. Germany) others work to live (e.g. Latin countries). Stronger work ethic common in migrants. Women do more unpaid work than males.			Alcorso, 1995

Table 1: A Summary of Key Cultural Dimensions

We note that exposure to other cultures, which is very high in multicultural countries such as the US and Australia, are likely to influence the culture of the ethnic minority groups within it. For example, Michailova and Husted (2003) found information hoarding within Russian organizations due to high levels of uncertainty brought about by rapid economic changes; however this finding is not consistent with the behavior of collectivistic cultures.

## 4 The Approach

Due to the connection between knowing and doing we employ a scenario-based technique which through eliciting responses to problem scenarios seeks to compare the application of knowledge to specific situations. The technique has been extensively used in organizational psychology to measure tacit knowledge or practical intelligence (Wagner and Sternberg, 1991). As knowledge is contextual, we restricted our domain of interest to ICT-related knowledge. Sixteen ICT workplace scenarios with 6 to 13 ways of responding to them (which we call answer-options) were developed following interviews with 14 ICT practitioners and theoreticians. Two 7-point Likert scales ranging from very bad to very good were used to gather an “ethical” (should-do) and “realistic” (would-do) response to each answer option. A screen shot of an actual scenario, is shown Figure 1. A sample answer option is “*approach the network manager with contacts of your own (made during your time in the previous organization), whom you feel could offer an even better deal*”. Biographical data including age, gender, qualifications, affiliations, languages spoken at home, and professional level (according to the Australian Computer Society (ACS) categories), were also collected. To minimize the amount of effort required as well as false responses, each participant was randomly assigned 4 or 5 of the 16 scenarios.

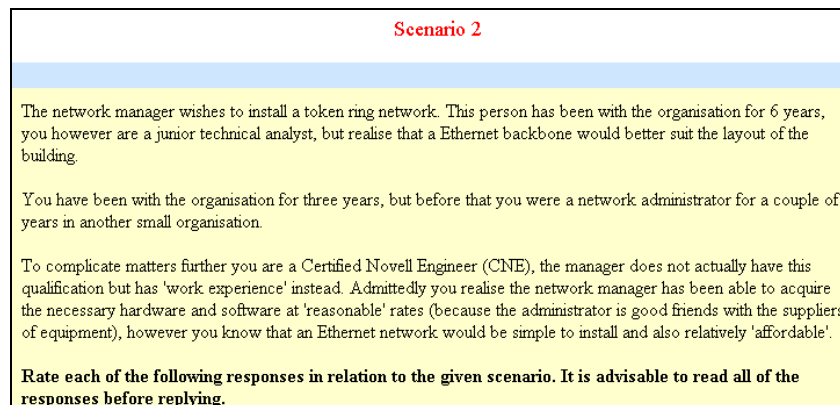


Figure 1: Scenario 2

## 5 Findings

Two Australian organizations participated in the study. The organizations were of varying sizes (121 employees in total). Both organizations were large and highly multicultural. The smaller organization had approximately 1700 employees, 16 of which were ICT workers, and could be described as either a machine organization or professional bureaucracy (Mintzberg, 1991) whose main business was furniture retailing, but for whom the section of the organization under study was the ICT branch of the company. The larger organization had over 10,000 employees with around 1,400 ICT workers. From the smaller company, 13 of the 16 ICT workers chose to participate. In the large organization, despite having prepared over 1,200 personally named letters, only 165 were given the letters by management for reasons unclear to us; resulting in 108 actually participating. Such are the limitations of using ‘real’ subjects from industry who can not be ‘voluntold’. To increase the sample size we have combined the data from both organizations. Our main concern was that each individual included was working in a multicultural ICT workplace at the time of the study. Note that at the start of the survey, participants

were informed that the terms “ethical” and “realistic” were to be interpreted as “should-do” and “would-do”, respectively. The gender imbalance characteristic of the ICT workplace in Australia was evident in our dataset which included 81 males and 38 females (and 2 unknown). We removed the data for the 2 unknown participants, leaving data for 119 participants. The age spread within the genders is similar for both genders and we did not analyze the data from this dimension in this paper. Table 2 summarizes the professional levels of the participants by gender; note the predominance of males in senior roles.

	Female	Male
1: “Little practical experience in IT work, may be supervising ancillary staff” <i>i.e. recent graduate</i>	3	0
2: “Experienced and capable of performing a wide range of IT work”	8	22
3: “Experienced in specialised IT areas, well developed liaison skills”	26	39
4: “Managing a number of teams and the allocation of resources”	0	16
5: “Typically report to CEO, manage major function, extensive IT coordination”	1	4

Table 2: Sample size by Australian Computer Society professional levels (1: graduate, to 5: CIO)

We considered two different ways of operationalizing the culture construct and forming cohorts based on languages spoken at home. First, we have separated our dataset into Anglo-English speaking and NESB. Given that the culture-based literature makes major distinctions between Eastern and Western cultures we also broke our dataset into Eastern and Western cohorts. Both groupings resulted in similar numbers in each cohort. Our dataset comprised an Anglo/English speaking cohort of 67 individuals (51 males and 16 females) aged from 60-62 descending to 20-24 years of age. There were 52 personnel comprising our NESB population with 30 males and 22 females. Ages ranged from 55-59, down to 20-24 years of age. Prior to the 1970s, Australian immigration was primarily restricted to migrants of European descent; in our study we termed this group Westerners which included 68 participants of whom 15 spoke a language other than English. Only 6 of these 68 participants were female. The ages ranged again from 60-64 down to 20-24 years of age. Our Eastern population was composed of 38 individuals (16 females, 21 males, 1 unknown), ranging in age from 55-59 down to 20-24 years of age, who spoke an Asian language and were of Eastern origin. Fourteen participants did not fit into Eastern or Western groups as they were of African, Middle Eastern or Pacific Islander in origin. It is interesting to note the much higher proportion of females in our Eastern cohort compared to the very low proportion in the Western cohort. This gender and ethnicity distribution is similar to what is found in the ICT industry, particularly in Australia (Trauth, Nielson and von Hellens, 2003).

### 5.1 Quantitative Analysis of Ethical Vs Realistic Practice in the Workplace by Gender/Culture

The problem we faced with quantitatively analyzing individual scenarios by gender/culture was the low number of responses to each scenario. In order to increase the numbers we grouped scenarios together using the literature-based cultural characteristics they demonstrated. From a total of 125 answer options, we found that 75 answer-option combinations contained cultural characteristics/issues. Some scenarios contained more than one cultural characteristic. Between two and fourteen answer-options were related to each characteristic, with exact numbers indicated in Table 3; this represents an average of 8.5 answer-options exhibiting a cultural attribute. Note that a novel aspect of this research, is that the cultural characteristics being demonstrated by the employees is derived from responses to context based scenarios, rather than *direct* questioning of participants about their character. Participant Likert scale responses were assigned a numeric value (Strongly Disagree=1, Disagree=2, Mildly Disagree=3, Neutral=4, Mildly Agree=5, Agree=6, Strongly Agree=7). Participant responses for questions relating to each attribute type were averaged, providing a score in the range of 1 to 7 for each category (for both their ethical and realistic response). Note that for any questions that were phrased in the negative, scores were reversed (i.e., a score of 1 was assigned a value of 7; a score of 2 was assigned a value of 6, and so on).

Statistical analysis was then performed on the difference between a participant’s ethical and realistic scores (diff = ethical minus realistic). Adopting the approach of averaging the scores under each attribute type was deemed necessary in order to account for the fact that participants had answered a

different number of questions relating to each category (on the basis of the 4 or 5 out of 16 scenarios and corresponding answer-option sets that had been allocated to them). Taking the difference between the ethical and realistic score allowed the extent to which there was a difference between people's ethical ideals and how they would behave in practice for each attribute type to be measured. Since a difference was being used, the fact that people were responding to different questions (and often a different number of questions) was in some way countered; i.e. the extent to which people behaved differently to their ethical values could be detected. While the approach of assigning values to Likert scale responses is commonly used by researchers, it should be noted that performing such a transformation from descriptive to quantitative data is not without limitations and any results need to be considered in context. All tests performed on Likert scale question responses were two-tailed student T-tests. Even though some samples contained more than 30 observations, applying analysis in this way is technically more precise and allows direct comparison with samples of less than 30 people.

## 5.2 Results – Entire Cohort

Analysis was performed on 119 participants. Participant responses were subsequently analyzed on the basis of their gender and their cultural background. Using the cohorts already described, cultural background was analyzed in two ways, in order to search for significant effects: whether the person was an Anglo/English speaker (A) or NESB (N) and whether the person was an Easterner (E) or Westerner (W). Table 4 indicates the results of the tests. Note, that for each test and result reported below, the degrees of freedom = n-1, where n represents the number of individuals in the sample unless specified otherwise, and the mean of differences ( $\bar{d}$  = ethical – realistic). An interpretation of the 'relationship' result in Table 3 would be that when it comes to relationships in the workforce, the participants' responses indicate their behavior in practice falls well short of their ethical ideals.

On the other hand the passivity result indicates that respondents' level of passivity is well above their ethical ideal. Many interesting results can be seen such as the inverse relationship between ascription and achievement issues on the actual behavior and ethical ideals of participants. Note also the highly statistically significant results for relationships and high context attributes (not surprising since their definitions are very similar) and also for ascription and passivity attributes.

Cultural Characteristic	# of Scenario-Responses	Attribute Type	individuals in sample (n)	mean of differences	st. dev. differences	T-value test statistic	p-value (to 3 d.p.)
Rules	5	Passivity	118	-0.33	0.87	-4.126	0.000**
Relationship	8	Ascription	118	-0.31	0.92	-3.701	0.000**
Low Context	2	High Context	101	0.44	1.21	3.617	0.000**
High Context	8	Relationship	107	0.41	1.26	3.394	0.001**
Save Face	6	Achievement	67	0.40	1.47	2.223	0.030*
Work Ethic	11	Rules	90	0.21	1.17	1.669	0.099
Achievement	5	Assertiveness	117	0.12	0.95	1.424	0.157
Ascription	14	Work Ethic	116	0.13	1.29	1.076	0.284
Passivity	12	Save Face	102	-0.06	1.13	-0.528	0.599
Assertiveness	14	Individualism	118	0.55	1.17	0.493	0.623
Individualism	10	Low Context	42	0.02	1.26	0.123	0.903
Collectivism	7	Collectivism	104	0.02	1.21	0.145	0.885

Table 3: Number of occurrences of a cultural characteristic in an answer-option

Table 4: Statistics for quantitative comparison between cohorts' ethical and realistic responses for each cultural dimension.  
\* indicates statistically significant result (5% significance level);  
\*\* indicates highly significant result (1% significance level).

## 5.3 2x2 Factor Analyses Based on Cultural Background and Gender

For the Anglo vs. NESB, Male vs. Female analyses the following results were statistically significant:

- Anglo people and Females were both more likely to rate ethical behavior relating to

*relationships* higher than their actual practice (p-values of 0.004 and 0.003 respectively).

- Anglo people and Females were both more likely to rate their ethical behavior higher in *high context* situations than their actual behavior (p-values 0.002 and 0.002 respectively). NESB Males were the only group to exhibit a non-significant difference between their ethical practice and their practice in reality for high context situations. Note: this is a stronger result than the one above.
- Anglo Males were likely to rate their ethical behavior higher when it came to *achievement* situations than their behavior in practice (p-value=0.010).
- NESB people were more likely to rate *individualism* ethically higher than their actual practice (p-value=0.017).

Statistical analysis was also performed to detect differences between scores in different categorizations. In particular, two-sample two-tailed unequal variance (heteroscedastic) t-tests were conducted. Observe that the degrees of freedom used in these tests were the combined number in the two samples less two. This analysis exposed the following results (for space, scenario values =  $\bar{d}_1, \bar{d}_2$ , p; question values =  $\bar{x}_1, \bar{x}_2$ , p):

- For scenarios involving *relationship* decisions, NESB Females exhibited a significantly higher difference between their ethical and realistic scores than NESB Males (0.98, 0.06, 0.046). Whereas NESB Females' practice was lower than their ethical standards, NESB Males' ethical behavior closely resembled their practice.
- For scenarios involving *assertiveness* decisions, Anglo Females' differences between their ethical and realistic scores was significantly lower than Anglo Males' (-0.26, 0.20, 0.036) and NESB Females' (-0.26, .28, 0.012). Anglo Females were more likely to rate their realistic behavior higher than their ethical behavior as compared to Anglo Males and NESB Females, perhaps reflecting the fruits of equal-opportunity and affirmative action movements in Anglo cultures.
- For scenarios involving *individualism*, Anglo Females exhibited significantly lower differences between their ethical and realistic scores as compared to NESB Females (-0.44, 0.50, 0.021). Anglo Females rated their ethical behavior lower than their actual behavior as opposed to NESB Females who rated their ethical behavior higher than their actual behavior; this could be an indication of pro-activity in the workforce on the part of Anglo Females.
- In questions relating to *relationships*, there was a statistically significant difference between how Females and Males rated their ethical behavior, with Females having a higher average ethical score than Males (5.16, 4.19, 0.002).
- In questions relating to *high context* there was also a statistically significant difference between how Females and Males rated their ethical behavior, with Females once again having a higher average ethical score than Males (5.16, 4.71, 0.043). Interestingly there was no significant difference in their ratings of their realistic behavior for either this or the previous attribute type.
- In questions relating to *work-ethic*, NESB Males had significantly different ethical standards to both NESB Females (4.79, 3.69, 0.033) and Anglo Males (4.79, 3.67, 0.000). NESB Males had a significantly higher average ethical work-ethic rating than either NESB Females or Anglo Males. Similar results were observed in work-ethic practice, with NESB Males having significantly higher realistic scores than both NESB Females (4.52, 3.31, 0.010) and Anglo Males (4.52, 3.62, 0.004).
- In *passivity* related questions, Females had a higher passivity score than Males in terms of both ethical behavior (3.24, 2.76, 0.035) and realistic behavior (3.57, 3.09, 0.049).
- Finally, in *individuality* questions, Females scored significantly lower on average than Males, in terms of both ethical behavior (3.35, 3.96, 0.034) and realistic behavior (3.25, 3.93, 0.017).

For the Eastern vs. Western/Male vs. Female analyses, the following results were statistically significant:

- Western males were more likely to rate their ethical behavior higher than their actual behavior where *rules* based decisions were involved (p=0.048, d.f. = 18).



- Westerners and Females were both more likely to rate ethical behavior relating to *relationships* higher than their actual practice (p=0.001, d.f.=43 and p=0.003, d.f.=36 respectively).

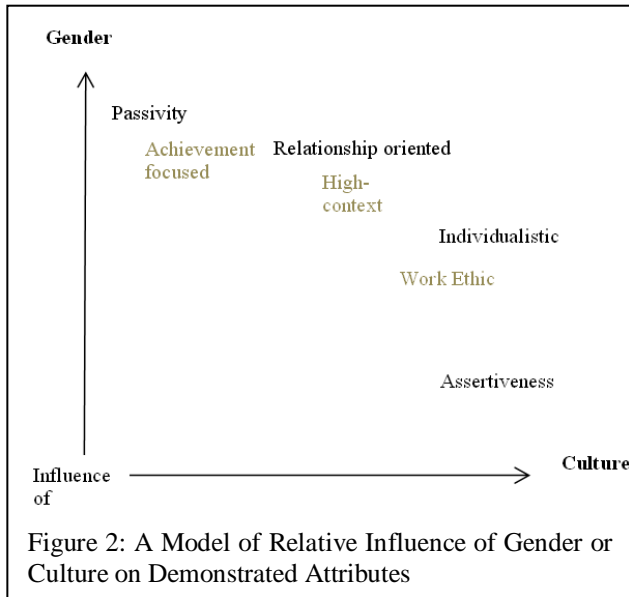
Using two-sample two-tailed unequal variance (heteroscedastic) t-tests (d.f.=combined number in the two samples less two) revealed the following statistically significant results (values =  $\bar{x}_1$ ,  $\bar{x}_2$ , p):

- In questions relating to *work-ethic*, Eastern Males had significantly different ethical standards to both Eastern Females (4.96, 3.65, 0.039) and Western Males (4.96, 3.76, 0.000). Eastern Males had a significantly higher average ethical work-ethic rating than either Eastern Females or Western Males. For work-ethic in practice, NESB Males also had a significantly higher average realistic score than Western Males (4.56, 3.73, 0.019).
- In *achievement* based questions, the average realistic score for Western Males was significantly higher than for Western Females (4.45, 3.00, 0.016).
- Perhaps corresponding to the above result, in *passivity* based questions, the average realistic score for Western Males was significantly lower than for Western Females (3.02, 3.69, 0.016).
- Finally, for questions relating to *individuality*, the average Male score was higher than the Female score for both the ethical measure (3.96, 3.35, 0.034) and the realistic measure (3.93, 3.25, 0.017). This was influenced by the NESB cohort, with NESB Male scores significantly higher than the NESB Female score for both the ethical measure (4.66, 3.23, 0.005) and the realistic measure (4.29, 3.08, 0.016).

Table 5 aggregates the key results presented above and Figure 2 provides a general model of the relationship between gender and/or culture on the attributes we considered. For example, Figure 2 shows that work ethic is strongly affected by both culture and gender as NESB males varied significantly in their responses from both NESB females and Anglo males (see Table 5 and results above). We have not included cultural dimensions that did not show a significant or clear result. It is noteworthy that in some cases the counterpart of one significant dimension does not provide significant results. For example, low context and collectivism did not yield interesting results while high context and individualism did. An explanation may be that there were only 2 and 7 scenarios, respectively for the former, and 8 and 10 for the latter. However, this does not explain why passivity with 12 scenarios showed a much stronger effect than its counterpart assertiveness with 14 scenarios.

Attribute Type	Female	Male	Anglo males	NESB males	Anglo female	NESB female	Western Male	Western Female
<b>Passivity</b>	Avg ethical=3.24, realistic=3.57	Avg ethical=2.76, realistic=3.09					Avg realistic =3.02	Avg realistic =3.69
<b>High Context</b>	Ethical > practice (p=0.002) Avg ethical=5.16	Avg ethical=4.71						
<b>Relationship</b>	Ethical > practice (p=0.003) Avg ethical=5.16	Avg ethical =4.19		Diff=0.06		Diff=0.98		
<b>Achievement</b>			Ethical > practice (p=0.010)				Avg Realistic =3.00	Avg Realistic =4.45
<b>Assertiveness</b>			Diff=0.20		Diff=-0.26	Diff=0.28		
<b>Work Ethic</b>			Avg ethical=3.67, Avg realistic=3.62	Avg ethical =4.79, Avg realistic=4.52		Avg ethical =3.69, Avg realistic=3.31		
<b>Individualism</b>	Avg ethical=3.35, realistic=3.25	Avg ethical=3.96, realistic=3.93		Avg ethical=4.66, realistic=4.29	Diff=-0.44	Diff=0.50 Avg ethical=3.23, realistic=3.08		

Table 5: Comparative summary of key results



## 6 Discussion

There were several results that can be inferred from stochastically analyzing ICT professional's responses to the scenario based questionnaires. Note that there was also a range of statistically significant results regarding absolute test score differences from neutral under each attribute type. Also note that all analysis performed, needs to be considered in the light of the sampling process, with respondents answering different questions (and different numbers of questions) to form their ethical and realistic scores for each attribute type. From the statistical analysis by cultural dimensions, females appear generally more passive, relationship and high context oriented and less individualistic. Males appear more

achievement oriented and individualistic. We also found that Anglo Males were closer to the Females for relationship and high context ideals. NESB males demonstrated higher work-ethic ideals and practice than NESB Females and Anglo Males. Of particular interest is evidence of changing gender attitudes and cross-culturalization. While Anglo males appeared to be less relationship or context sensitive than the other cohorts, Anglo people in general chose answer options demonstrating an awareness of the importance of relationships but the statistically significant difference in their ethical and realistic responses indicated they were not so likely to follow through with a relationship-based approach to problem solving. We particularly draw attention to the discrepancy between the ethical and realistic responses of males towards choosing a passive answer option. Western and Anglo females demonstrated a high degree of assertive and individualistic behavior, though the difference between their ethical and realistic scores was almost perfectly inverse to those of NESB females and Anglo males.

Our comparison of realistic versus ethical responses bears some similarity to Pfeffer and Sutton's (1999) goal to quantitatively measure "differences between what the manager thought should be done and what was actually being implemented" (p. 9). We can also say there was a mismatch between *theory-in-action* and *espoused theory* (Argyris and Schön, 1998), where a distinction is between what is said and written as policy (espoused theory) and what is done and thought in practice (theory-in-action). In our study we were not just measuring the shortfall between theory and practice; we were measuring the shortfall between theory and intention. Also, Horgan and Simeon (1990), using an earlier version of Sternberg's workplace scenarios and responses, found no significant differences in the practical intelligence of males compared to females. They did however find an inverse relationship between grade point average (GPA) and tacit knowledge in females demonstrating the use of different knowledge for business or academic situations whereas males with high tacit knowledge levels also had high GPAs. Male scores tended to vary for the subscales whereas female scores on the subscales were highly correlated revealing that the three were less differentiated by the females. Mentoring was not found to affect levels of tacit knowledge or even levels of success for either gender. Somech and Bogler (1999) were also unable to find any gender differences in levels of tacit knowledge, though males with more tacit knowledge did better academically than males with less tacit knowledge and females did better academically in general regardless of their levels of tacit knowledge. In contrast to the two above studies, we did find differences in tacit knowledge usage between the genders.

Some studies have considered gender and culture, e.g. Luethge and Byosiere (2007) within the Japanese ICT field revealed how cultural attitudes greatly limited the ability of women to achieve more than 14% representation despite structural reforms in Japan. Based on Nonaka and Takeuchi's

(1995) SECI model, they found that Japanese female managers place a higher value and spent more time on tacit knowledge via socialisation variables than did males, and that females utilised certain types of information differently to those of their male counterparts. Our results confirmed a preference for communication-based and relationship-based problem strategies for problem-solving and decision making by females.

## 7 Limitations

With respect to numbers, we recognized an imbalance in the representation of both genders and also the language cohorts, however the ratios were consistent with that found in the Australian ICT workplace. As a survey-based method, our instrument suffers from biases such as social desirability, however our response rates were quite high with 119 (121 if gender is not a dependent variable) out of 168 individuals participating (71%), and self-selection was less of an issue as managers identified and invited their subordinates to participate. Furthermore, Gardner and Martin (2007) point out that Likert scale style questionnaires can have a tendency to 'lump' in certain parts, if the questions are phrased ambiguously. We have sought to minimize ambiguity while retaining sufficiently rich scenarios and answer options to allow us to evoke a practically intelligent response. Furthermore, we believe the richness of the scenarios and responses do not allow individuals to consciously or subconsciously respond to the answer options in a way they might believe the investigator considers preferable (social desirability bias (Fisher, 1993)). Since our scenarios and responses are multi-faceted, behavior-based and do not involve self-assessment of one's character, we also believe there is less likelihood for self-serving (Miller and Ross, 1975) bias.

The operationalization of culture based on language spoken at home is an obvious issue, but one with no easy alternatives or answers in a multicultural society; while people tend to identify with the heritage of their parents and the "mother" country, it is questionable whether an individual who does not speak the mother tongue at all, has truly been molded by that culture and to what extent, since language is often quite tightly bound up with culture. Also, we note the subjectivity in the interpretation of the meaning of numerical differences. We acknowledge other factors not included in the analyses may account for some results, e.g. avoiding an essentialist or even social constructivist view, we can find other reasons why the females in our study could be said to be more passive. One obvious reason is that fewer females were in senior positions and thus it was not their role to make decisions, or acceptable to discuss matters and provide their opinions to those in more senior positions.

## 8 Implications and Conclusions

From an IS practitioner's point of view, culture is particularly relevant to knowledge management. For example, understanding cultural influences across the organization, which may vary not only between offices in different countries and states, but also within the same geographic location will have implications for the design and implementation of strategies such as: the viability of using email for knowledge sharing; the role of Communities of Practices and group decision support systems and other team-based activities such as system development and project management. Similarly, while diversity is seen as essential for innovation, a past-oriented (Kluckhohn and Strodtbeck, 1961), collectivist and ascription oriented culture may be less inclined to diverge from what has been done in the past or question what the group wants, (particularly senior members of the group), or accept new group members.

Management will need to understand the basis of this reluctance and ensure that the new team members are appropriately integrated into the in-group perhaps through formally organized social events or team building activities, known as managed socialization (Moitra and Kumar, 2007). One strategy is to work with existing in-groups and knowledge intermediaries while new intra-organizational groups are formed to facilitate knowledge sharing (Michailova and Hutchings, 2006). Ely and Thomas (2001) found that diversity of itself does not necessarily bring benefit. An integration

and learning perspective was seen to be the key to success by providing rationale, guidance and motivation to deliver sustained and maximized benefits from diversity. Lau and Murnighan (1998) ascertained that the key to handling diversity was to understand the fault-lines within a group so that they could be understood and managed. Cultural differences potentially pose a fault-line and thus understanding the differences can assist in managing and composing groups. Harrison et al., (2002) discusses the notion of deep (psychological) versus shallow (demographic) diversity. By bringing deeply embedded differences and similarities to the foreground, including our culture-based belief systems, we can promote deep level diversity leading to better social integration and resulting in better performance (Harrison et al., 2002). Our study which reveals differences in the ways employees may put their knowledge into action and how ways of thinking and behaving can be aligned to cultural influences, can promote appreciation of deep diversity.

Finally, we take the common view of 'multiculturalism' to mean people from different nationalities/countries/ethnic backgrounds, and a multicultural organization to mean its employees come from a wide range of cultural backgrounds. When it comes to acting upon the range of behaviors, e.g. with respect to knowledge management practices and policies, it would not be feasible to try to accommodate each individual ethnic group. The fact that we were able to identify patterns of behavior by combining ethnic groups supports this approach. Returning to *learning organization* concepts by Argyris and Schön (1998), the use of our tacit knowledge instrument could result in *double-loop feedback* learning, as the process would inform and challenge individuals and management to change by identifying patterns of knowledge usage and reveal underlying and often subconscious biases and patterns of belief based on gender and/or cultural influences. Finally, the results reinforced that both culture and gender are socially constructed and showed that they are co-constructed. In answer to Alavi and Leidner's (2001) questions regarding what factors contribute to the knowing-doing gap in organizations and how can they be reduced, we can say that culture and gender, separately and collectively, affect the way people believe they will and should respond to ICT workplace scenarios. To reduce the knowing-doing gap and better understand knowledge usage patterns of behavior, understanding of gender and cultural influences should be considered as part of any knowledge management strategy plan, particularly when it comes to knowledge sharing and codification strategies.

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