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INTRODUCTION

In the "flat" world of the twenty-first century (Friedman 2006) educators are finding their classrooms filled with students from many cultures. Many observe that these cultural differences among students have a significant impact on the learning process. For example, students from high power distance cultures often seem uncomfortable with professors who want to be called by their first name and Asian students appear quiet and reflective in the extroverted, high participation American classroom. Similarly in organizations, workers from different cultures appear to exhibit different styles of work and problem solving. For example, individuals from high uncertainty avoidance cultures can appear cautious and systematic in their approach to problems while those from low uncertainty avoidance cultures seem more comfortable with risk and trial and error problem solving. Are these perceived cultural influences on the learning/problem solving process empirically verifiable or are these perceptions just cultural stereotypes?

This research addresses these questions by examining how individuals born and currently living in different cultures vary in their approaches to learning. Using the framework for categorizing cultural differences from the Global Leadership and Organizational Effectiveness (GLOBE) study (House et al. 2004), cultures are examined by regional clusters, national characteristics and individual cultural dimensions. Experiential learning theory (ELT, Kolb 1984) is used to describe

the learning process and the Kolb Learning Style Inventory (KLSI, Kolb 2005, Kolb & Kolb 2005) is used to assess differences in how individuals learn. ELT has been used in a number of studies to examine the learning process in cross-cultural adaptation (Van Vianen 2004, Yamazaki 2003,2004, Yamazaki and Kayes 2004) and the Kolb Learning Inventory has been used in many studies to examine cultural patterns, many of which are summarized in Yamazaki's (2005) review published in this journal. Using five-way ANOVA we examine differences in learning style between cultural clusters and representative countries from these clusters controlling for gender, age, level of education and educational specialization, variables that previous research (Kolb & Kolb 2005) has shown to have an influence on learning style. Then we examine the role that various dimensions of culture play in developing preferences for different learning styles among its members.

CHACTERIZING CULTURAL DIFFERENCES

Research on culture spans many disciplines such as Anthropology (Benedict 1946, Kluckhohn 1962, Hall 1976), Psychology (Markus and Kitayama 1991, Triandis 1995) and Management (Hofstede 1980, House et al 2004). Irrespective of the discipline, the scholars have come to more or less a common ground with respect to defining culture. Culture can be conceptualized as 'shared motives, values, beliefs, identities, and interpretations or meanings of significant events that result from common experiences of members of collectives that are transmitted across generations' (House et al 2004, p.15).

This common understanding notwithstanding, the units of analysis chosen by culture researchers vary. The earlier researchers on culture, especially in the field of Anthropology, studied societies

or communities. For example, Kluckhohn and Strodtbeck (1961) studied five communities in America discovering differences in their value orientations. There have been studies that focused on countries like Benedict's (1949) research on the Japanese culture. Research in the latter half of the 20th century increasingly focused on country differences in culture, perhaps resulting from the development of nation states that defines boundaries for governing structures, law and social institutions that paved the way for increased cultural homogeneity within nations. Hofstede's (2001) research on differentiating between the cultures of around 40 countries reinforced the use of country names as the surrogates to represent culture. The more recent Global Leadership and Organizational Behavior Effectiveness (GLOBE) study (House et al. 2004) followed suit. There have also been scholars who looked at the historical evolution of different regions of the world and suggested the possibility for cultural clusters. Huntington's (1996) classification of the world cultures into Western, Latin America, African, Islamic, Sinic, Hindu, Orthodox, Buddhist and Japanese is an example. The GLOBE study empirically arrives at ten cultural clusters—Anglo, Latin Europe, Nordic Europe, Germanic Europe, Eastern Europe, Latin America, Sub-Saharan Africa, Middle East, Southern Asia and Confucian Asia.

Culture researchers have endeavored to build in-depth understanding of the customs and practices within certain cultures and also to develop meaningful ways to enable comparison between cultures. This has resulted in a number of cultural typologies based on the salient features identified by the researcher. Some examples include high context and low context cultures (Hall 1976) based on the amount of dependence on the context used to determine the meaning of messages, low trust and high trust cultures (Fukuyama 1995) based on the relationship between trust and social structures, independent and interdependent self cultures (Markus and Kitayama

1991) based on the extend to which definition of self is in relation to the larger society, and shame and guilt cultures (Benedict 1946) based on whether the standards for behavior are internal or external to the individual. These typologies tend to be dichotomous in nature. Hofestede (2001) introduced the concept of continuous cultural dimensions as the basis for comparison. Dimensions are various categories into which the salient features of the cultures are grouped. Hofestede identified power distance, uncertainty avoidance, individualism-collectivism and masculinity-femininity (later long vs. short term orientations) as the major aspects on which cultures differ. The GLOBE study (House et al 2004) refined Hofestede's work suggesting nine dimensions: in-group collectivism, institutional collectivism, power distance, uncertainty avoidance, future orientation, performance orientation, humane orientation, assertiveness and gender egalitarianism. The proponents of the cultural dimensions approach introduced the practice of calculating scores on each dimension for each culture enabling relative ranking among them. These typologies and dimensions are especially useful in providing explanations when we encounter differences in outcomes that seem to originate from the differences in cultural values and practices. Researchers in variety of fields that range from education to epidemiology have explored the potential impact of cultural variables on outcomes that vary from educational accomplishments to depression.

EXPERIENTIAL LEARNING THEORY AND LEARNING STYLE

Experiential learning theory draws on the work of prominent 20th century scholars who gave experience a central role in their theories of human learning and development—notably John Dewey, Kurt Lewin, Jean Piaget, William James, Carl Jung, Paulo Freire, Carl Rogers and others—to develop a holistic model of the experiential learning process and a multi-linear model of adult development (Kolb 1984). ELT defines learning as "the process whereby knowledge is

created through the transformation of experience. Knowledge results from the combination of grasping and transforming experience" (Kolb 1984: 41). The ELT model portrays two dialectically related modes of grasping experience - Concrete Experience (CE) and Abstract Conceptualization (AC) - and two dialectically related modes of transforming experience - Reflective Observation (RO) and Active Experimentation (AE). Experiential learning is a process involving a creative tension among the four learning modes that is responsive to contextual demands. This is portrayed as an idealized learning cycle or spiral where the learner "touches all the bases" - experiencing, reflecting, thinking, and acting - in a recursive process that is responsive to the learning situation and what is being learned. Immediate or concrete experiences are the basis for observations and reflections. These reflections are assimilated and distilled into abstract concepts from which new implications for action can be drawn. These implications can be actively tested and serve as guides in creating new experiences (See Figure 1).

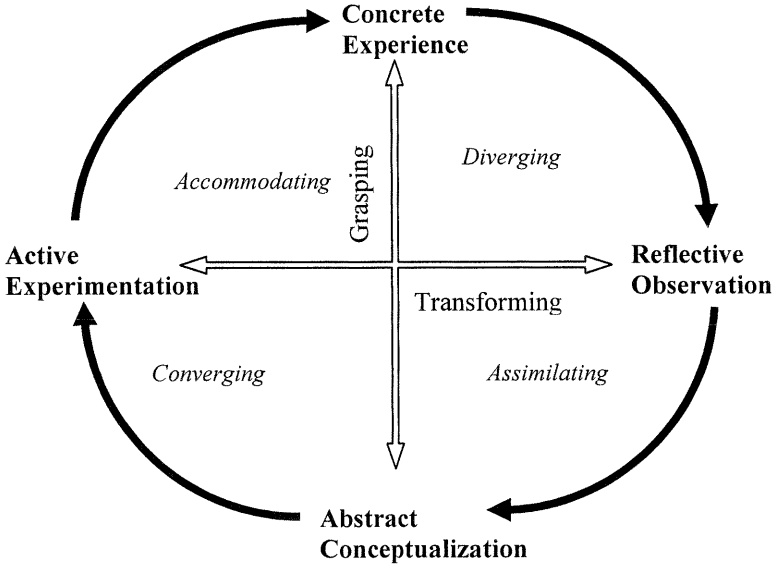


Fig 1 Experiential Learning Cycle

The concept of learning style describes individual differences in learning based on the learner's preference for different phases of the learning cycle. Because of our hereditary equipment, our particular life experiences, and the demands of our present environment, we develop a preferred way of choosing among the four learning modes. We resolve the conflict between being concrete or abstract and between being active or reflective in patterned, characteristic ways.

The Kolb Learning Style Inventory (KLSI, Kolb 2005) is an instrument 'designed to measure the degree to which individuals display different learning styles'. It contains 12 items that ask the respondents to rank four sentence endings that correspond to the four learning modes – CE, RO, AC and AE. This forced choice format makes it possible to assess the relative preferences among the dialectic modes. The combination score AC-CE represents the preference for Abstract Conceptualization over Concrete Experience and AE-RO the preference for Active Experimentation over Reflective Observation.

Those who rely on Concrete Experience for grasping are open to new experiences, depend on people contact for gathering information, are intuitive and make feeling based judgments (Kolb and Kolb 2005, Barmeyer 2004). Those who rely on Abstract Conceptualization are logical and analytical and like ideas and theories. They break the information down to parts, evaluate ideas for their logical soundness and put information in concise logical form. They rely less on people and more on symbols (Barmeyer 2004). While those who make use of Concrete Experience are concerned with the uniqueness of the present reality, those who use Abstract Conceptualization seek theories and generalizations (Auyeung and Sands 1996). A person may transform the experience either through Reflective Observation or Active Experimentation. Those who prefer Reflective Observation watch and observe all sides of an issue in order to understand its meaning

and take time to act. Those who prefer Active Experimentation like to try things out, are more willing to take risks and are practical and application oriented (Kolb and Kolb 2005, Barmeyer 2004).

Learning style types indicate individual differences in approaches to learning based on an individual's preference for using a combination from these dialectic modes.. The four basic learning style types are Diverging, Assimilating, Converging and Accommodating. Diverging learners prefer to make more use of Concrete Experience and Reflective Observation, Assimilating types prefer to learn through Reflective Observation and Abstract Conceptualization, Converging types rely on Abstract Conceptualization and Active Experimentation and Accommodating types use Active Experimentation and Concrete Experience. Recent theoretical and empirical work shows that the original four learning styles types can be refined to show nine distinct style types (Eickmann, Kolb & Kolb 2004, Kolb & Kolb 2005a, Boyatzis & Mainemelis 2000). David Hunt and his associates (Abby, Hunt and Weiser 1985, Hunt 1987) identified four additional learning styles which they identified as Northerner, Easterner, Southerner, and Westerner. In addition a Balancing learning style has been identified by Mainemelis, Boyatzis and Kolb (2002) that integrates AC and CE and AE and RO.

ELT argues that learning style is not a psychological trait but a dynamic state resulting from synergistic transactions between the person and the environment. This dynamic state arises from an individual's preferential resolution of the dual dialectics of experiencing/conceptualizing and acting/reflecting. "The stability and endurance of these states in individuals comes not solely from fixed genetic qualities or characteristics of human beings: nor, for that matter, does it come from

the stable fixed demands of environmental circumstances. Rather, stable and enduring patterns of human individuality arise from consistent patterns of transaction between the individual and his or her environment...The way we process the possibilities of each new emerging event determines the range of choices and decisions we see. The choices and decisions we make to some extent determine the events we live through, and these events influence our future choices. Thus, people create themselves through the choice of actual occasions they live through." (Kolb 1984: 63-64) The environment that this process of self-creation takes place in is shaped by the pervasive influence of culture.

THE RELATIONSHIP BETWEEN CULTURE AND LEARNING STYLE

In *The Geography of Thought* the cognitive, cultural psychologist Richard Nisbett describes how his work with a Chinese student challenged and changed his lifelong universalistic view of human cognition—the view widely shared by cognitive scientists that all human groups perceive and reason in the same way. The student argued that Chinese believed in constant change, the importance of context and relationships between things while Westerners "live in a simpler more deterministic world; they focus on salient objects or people instead of the larger picture; and they think they can control events because they know the rules that govern the behavior of objects" ((Nisbett 2003), p. xiii). His conversations led to a program of research studying these differences between East Asian and American ways of perceiving and thinking based on a model that views cognitive processes as embedded in a nested, culturally determined set of factors—epistemology, metaphysics, attention, social structure, economy and ecology—arguing that "indoctrination into

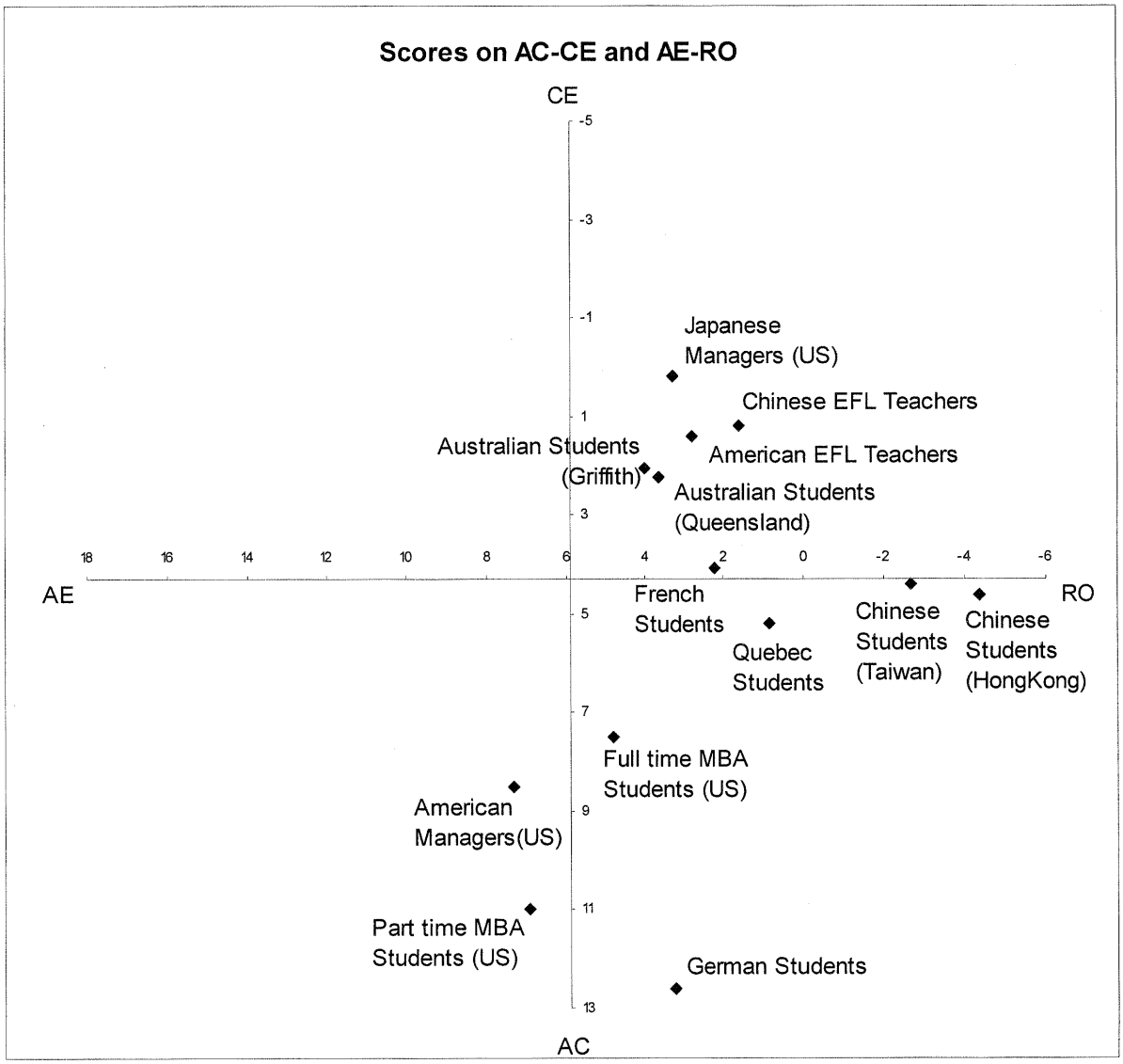
distinctive habits of thought from birth could result in very large *cultural* differences in habits of thought" (p. xiv).

The culture that a person lives in is a pervasive part of the environment in which he or she learns and cultures differ in the values, norms and behaviors that they accept and propagate. Culture acts as a strong socialization agent (Hayes and Allinson 1988, Barmeyer 2004) that influences information processing and cognition (Earley and Ang 2003). Thus there is reason to believe that the differences in cultural socialization tend to influence learning preferences (Hofstede 1997) and produce different learning styles (Reynolds 1997, Wilson 1971 as cited by Kerr 2004,). Within a culture, Triandis says, "as people interact, some of their ways of thinking, feeling and behaving are transmitted to each other and become automatic ways of reacting to specific situations" (1994, p.4). Thus, culture has the ability to shape the ways in which its members receive, process and act on information and experience, shaping the particular way they learn from experience. For example in a high context culture, the one has to pay attention to the non-verbal behaviors and the surroundings to grasp the full meaning of what is being communicated (Hall 1976, Nisbett 2003). This necessitates concrete experiencing of the situation one is in and inculcates the habits of thoughtfulness and reflection. The members of high context cultures may thus be predisposed to Concrete Experience and Reflective Observation. In a low context culture, cognition and communication are context independent. Verbal articulation is essential to communicate. The members of such cultures rely on explicit logic (Hall 1976, Nisbett 2003). The learning mode that reinforced in such cultures may be Abstract Conceptualization.

Review of the past studies

A few researchers have tried to find out if the learning styles of people from different cultural backgrounds varied. A number of studies using KLSI found significant differences in the learning style preferences among the samples from different countries. Yamazaki's (2005) meta-analysis provides a summary of some of these studies. He compiled Yamazaki's and Kayes' (2005) study on Japanese and American mangers, Fridland's (2002) study of Chinese and American teachers, Barmeyer's (2004) study of students from France, Quebec and Germany, Ayueung's and Sand's (1996) study of accounting students from Australia and Hong Kong, and Hoppe's (1990) study of managers from 19 countries. Figure 2 is a graphic representation of the mean scores on AC-CE and AE-RO of the samples from these studies. The cut-off point for AC-CE was 4.3 and for AE-RO 5.9 following the KLSI 2.0 norms that were used in the reported studies.

Figure 2. Mean AC-CE and AE-RO scores



Japanese managers were more concrete and reflective compared to American managers who are more abstract and active (Yamazaki and Kayes 2005). Chinese students in Taiwan and Hong Kong tended to be abstract and reflective when their Australian counterparts were concrete and active (Auyeung and Sands 1996). The authors point towards the cultural differences between the countries as an explanation.

These studies provide valuable empirical evidence that initiates exploration into culture's impact on ways of learning. However, before associating certain countries or cultures with specific learning styles, it is advisable to take a careful look at the study designs and findings from these studies.

Significance of results. The studies by Yamakazi and Kayes (2005) and Auyeung and Sands (1996) found significant differences on both AC-CE and AE-RO scales among the country samples that they tested. Some of the other studies found that the significance levels or the effect sizes were much smaller. The significance level of the difference between the American and Chinese teachers in Fridland's (2002) study was only marginal. Kerr (2004) found that though the practicing accountants from Mexico and USA were significantly different in their preference for abstraction over concreteness, the effect size was less than moderate. Barmeyer (2004) discovered that French, Quebec and German students did not show any significant difference in Reflective Observation. This makes one wonder how strong the impact of culture on learning styles is.

Effect of demographic variables. Previous research with the normative samples of Kolb Learning Style Inventory shows that gender, age, level of education and area of specialization of the respondent have a bearing on learning styles (Kolb and Kolb 2005). Fridland (2002),for example, suspects that academic specialization might have more influence on learning than culture. This would help explain results by Zaulkernan et al. (2006) who found no difference in learning style between Middle Eastern and American computer programming students. The hard, paradigmatic sciences in particular may promote strong socialization into an abstract analytic style of learning that overrides cultural differences. In the studies that Yamazaki (2005) reviewed, these variables

were not included in the analysis. The samples usually had the respondents from the same profession, level of education and age group. Gender is found to be mixed. In some studies, the academic background of the respondents is the same and in others it is not taken into consideration. The general method of analysis used in the culture-learning style studies is a Chi-square test on the learning style types or a one-way ANOVA on the learning modes or the combination scores. While these are useful methods in assessing the significance levels of the 'between groups' differences, they do not take into consideration the influence of other variables that may have an effect of learning styles. It may be necessary to adopt a sampling strategy and method of analysis that allows for inclusion of other variables in the model if we were to assess the impact of culture in comparison to the other influencing factors.

Use of 'culture' to explain the differences. In these studies, culture is operationalized as country from where the sample is or the nationality of the subjects. The learning style differences among the samples from different countries are explained in terms of the difference in cultural dimensions. Auyeung and Sand (1996) attribute the preference for concrete and reflective modes among the accounting students in Taiwan and Hong Kong to the collectivistic nature of those countries while the preference of the Australian students for active and concrete modes is attributed to the individualistic nature of Australia. Hoppe (1990) suggests that reflection is related to uncertainty avoidance. Though the link to the cultural dimension gives additional insights, using only a single dimension may be a very simplistic explanation for how culture could be influential in shaping learning preferences.

Yamazaki (2005) in his meta-analysis elicited multiple ways of understanding the cultural differences between countries by synthesizing the culture typologies from the fields of Anthropology, Cross-Cultural Management and Cross-Cultural Psychology. The dimensions that he describes include high and low context cultures (Hall 1976), shame and guilt cultures (Benedict 1946), Uncertainty Avoidance (Hofstede 1980), O-type and M-type organization (Hayashi 1999), independent and interdependent self (Markus and Kitayama 1991), and field dependent and field independent cultures (Witkin 1976). He explains how the practices and behaviors associated with each cultural type might be instrumental in encouraging certain learning preferences. This definitely is a praiseworthy approach as it helps to delineate the impact of the multiple aspects of culture on learning styles.

All studies except Hoppe's (1990) had been comparisons between samples from only 2-3 countries. This limits the generalizability of the findings. However, including more countries or cultural groups in studies will pose the challenge of meaningfully differentiating between them in order to discover the ways in which they might be affecting learning styles. We found that the cultural typologies and dimensions are helpful in guiding this exploration. But we may have to be mindful that most of the countries cannot be placed at the extremes on these typologies or dimensions and devise ways for recognizing the relative differences between them.

Research questions

In the light of the above observations, the current study addresses the following questions:

1. Does culture have a significant impact on learning styles?

2. What is the relative influence of culture on learning styles in comparison to that of the gender, age, level of education and area of specialization?
3. Can the dimensions of culture be more effectively used to identify the ways in which culture influences the development of certain learning style preferences?

METHOD

Operationalization of the constructs

To measure learning style preference using the KLSI, the two combination scores that indicate the preference for abstractness over concreteness (AC-CE) and the preference for action over reflection (AE-RO) were selected as the dependent variables. The forced choice format of the KLSI induces negative correlation among the primary mode scores (CE, RO, AC, & AE) and thus makes them ipsative. However, the combination scores are non-ipsative (Kolb and Kolb 2005).

The demographic variables included in this study - gender, age, level of education and educational specialization - were operationalized as categorical variables--five categories for age (19-24, 25-34, 35-44, 45-54, 55 and above) and three categories for level of education (secondary school, bachelor's degree, master's degree/PhD). Educational specialization was divided into four categories – Humanities and Social Sciences, Social Professional, Basic Sciences and Mathematics and Applied Science Professional – following Biglan's (1973) classification of 36 academic specialties at the University of Illinois and Kolb's (1984) analysis of the Carnegie Commission study of the American Universities and Colleges (1969).

Culture was operationalized as culture clusters based on the empirical classification arrived at in the GLOBE study (House et al 2004). This was a decade long research program that started in 1994 involving 170 scholars from 62 societies in order to conceptualize, operationalize, test and validate societal and organizational level dimensions of culture and explore its relationship with leadership effectiveness. As part of the study, the GLOBE researchers gathered ratings on a 7-point Likert scale from a sample of 17370 middle managers from 951 organizations in 62 societies (mean n = 251, range 27 – 1790, n more than 75 for 90% of the societies) on the societal practices. The factor analysis of these items generated 9 dimensions of culture: in-group collectivism, institutional collectivism, power distance, uncertainty avoidance, future orientation, performance orientation, humane orientation, assertiveness and gender egalitarianism. After arriving at the mean scores for each society on each cultural dimension, they went on to group the societies into clusters based on the relative similarities and dissimilarities in the societal level scores. The ten culture clusters thus emerged were Anglo, Latin Europe, Nordic Europe, Germanic Europe, Eastern Europe, Latin America, Sub-Saharan Africa, Middle East, Southern Asia and Confucian Asia (Table 1). The empirical validity of this grouping was statistically tested through discriminant analysis. Thus, we can take the societal clusters as a 'coherent and convenient' statistical summary of the 'intercultural similarity and intercultural differences' (House et al 2004, p. 179).

Table 1. GLOBE Society Clusters

Anglo	Latin Europe	Nordic Europe	Germanic Europe	Eastern Europe
Australia	France	Denmark	Austria	Albania
Canada	Israel	Finland	Germany	Georgia
England	Italy	Sweden	Switzerland	Greece
Ireland	Portugal		The Netherlands	Hungary
New Zealand	Spain			Poland
South Africa	Switzerland			Slovenia
(White sample)	(French speaking)			
United States				
Latin America	**Sub-Saharan Africa**	**Middle East**	**Southern Asia**	**Confucian Asia**
Argentina	Namibia	Egypt	India	China
Bolivia	Nigeria	Kuwait	Indonesia	Hong Kong
Brazil	South Africa	Morocco	Iran	Japan
Chile	(Black Sample)	Qatar	Malaysia	Singapore
Colombia	Zambia	Turkey	Philippines	South Korea
Costa Rica	Zimbabwe		Thailand	Taiwan
Ecuador				
El Salvador				
Guatemala				
Mexico				
Venezuela				

Sample

Learning style data for the online users of the Kolb Learning Style Inventory (KLSI) maintained by the publisher, Hay Resources Direct was made available for this study. The demographic details in this database included gender, age group, level of education, area of specialization, country of birth and country of residence. Only the respondents who were 19 years or older and non-students who reported the country of birth and the current country of residence as the same were considered for this study. The stipulation that birth and residential countries be the same was made to minimize inclusion of individuals with cross-cultural living experience that could have shaped their learning styles differently. Cases with missing data on any of the above mentioned variables also were dropped.

Individual cases were grouped into culture clusters based on the GLOBE categorization (Table 1). All clusters except Anglo had a number of cases in the range of 25-307. In the cluster Anglo, three countries – Canada, England and USA - had much higher numbers of cases compared to the other countries. A random sample of 88 cases from each was taken so that the overall number in the cluster was comparable to that in other clusters. The final sample included 1292 respondents from 8 clusters (mean n= 162, range of 25 – 348).

Method of Analysis

The objective of the analysis was to assess the extent to which gender, age group, level of education, area of specialization and the country explained the variability in the learning style preferences. The chosen method of analysis was a 5-way ANOVA as its factor design allows for assessing the main effects of multiple classifying variables (factors) that are categorical in nature. The analysis was performed using the PROC GLM procedure in SAS. PROC GLM has the capability to perform n-way ANOVA with unbalanced groups and specify the appropriate type of hypotheses testing and sums of squares. The output produced by this procedure not only tests significance of the overall model but also indicates the sources of variance and the results of the hypotheses testing on their effects. The partitioned sum of squares is a good indicator of the amount of variation in the outcome variable due to each factor after correcting for all other terms in the model.

RESULTS AND INTERPRETATION

Abstract Conceptualization Vs Concrete Experience

The preference for Abstract Conceptualization over Concrete Experience was denoted by the combination score AC-CE. The overall ANOVA model for assessing the impact of culture, gender, age, education and specialization on AC-CE was significant (F value=4.48, $p<0.0001$) and explained 5.64% of the AC-CE variability (Table 2). The significant sources of the variability were culture (F value=2.39, p=0.02), gender (F value=13.23, p=0.0003) and specialization (F value=9.98, $p<0.0001$). Culture accounts for 21.98% of the variance explained by the model, gender 17.37% and area of specialization 39.33%.

Table 2. Overall ANOVA and Fit Statistics for AC-CE

Source	DF	Sum of Squares	Mean Square	F Value	P Value
Model	17	9229.73	542.93	4.48	<0.0001
Error	1274	154449.24	121.23		
Corrected Total	1291	163678.97			

R-Square	Coeff Var	Root MSE	Mean AC-CE
0.0564	146.90	11.01	7.50

Source	DF	Type III Sum of Squares	Mean Square	F Value	P Value
Culture	7	2028.72	289.82	2.39	0.0197
Gender	1	1603.53	1603.53	13.23	0.0003
Age	4	770.70	192.68	1.59	0.1747
Education	2	464.00	232.00	1.91	0.1480
Specialization	3	3630.29	1210.10	9.98	<.0001

The mean scores on AC-CE for all the culture clusters are presented in Table 3. Confucian Asia scores the highest, indicating the strongest preference for abstraction. The Latin Europe and Anglo cultures have the most concrete scores, indicating a preference for concreteness over abstraction.

Table3. Mean Scores on AC-CE for Culture Clusters

Cluster	n	Mean	Std. Dev
Anglo	348	6.58	12.05
Latin Europe	144	6.53	11.32
Nordic Europe	25	7.36	10.17
Germanic Europe	164	7.74	12.04
Eastern Europe	32	8.75	9.21
Latin America	92	7.38	11.64
Southern Asia	307	7.16	10.03
Confucian Asia	180	10.23	10.89

Mean AC-CE scores for the demographic categories are presented in Table 4. The mean scores for the gender categories suggest that males may favor abstraction while females prefer concreteness. The prior research on the normative data for KLSI has given the evidence for the existence of such difference (Kolb and Kolb 2005). On having a closer look at the mean AC-CE scores for the specialization categories, it appears that those with Humanities and Social Science background or professional training based on Social Sciences may tend towards concreteness whereas those with Basic Sciences, Mathematics or Applied Sciences training may be more comfortable with abstraction. The basic structure of knowledge and dominant method of inquiry in each academic discipline may demand and reinforce certain approaches to learning (Kolb 1984). There had been evidence found for the differences in the learning style preferences based on the field of specialization (Kolb and Kolb 2005).

Table 4. Mean Scores on AC-CE for Demographic Variables

	n	Mean	Std. Dev
Gender			
Male	832	8.56	11.21
Female	460	5.58	11.10
Age			
19-24	46	5.26	7.47
25-34	426	8.34	10.72
35-44	451	7.19	11.67
45-54	290	6.91	11.35
55 & above	79	8.13	12.97

	n	Mean	Std. Dev
Education			
Secondary school	118	5.44	10.58
Bachelor's Degree	566	7.35	11.20
Master's/PhD	608	8.02	11.40
Specialization			
Humanities & Social Sciences	102	3.12	13.20
Social-professional	418	6.19	10.64
Basic Sciences & Mathematics	607	8.29	11.13
Applied Sciences-professional	165	10.61	10.79

On comparing the overall effect of culture and the demographic variables, the area of specialization seems to have a larger effect on determining a person's liking for abstraction or concreteness than culture does (Table 2). This may be because of the fact that educational specialties are particularly focused on the development of and socialization into the ways of learning needed to meet the performance demands of the discipline. In case of culture, the socialization with respect to learning may be more indirect.

Active Experimentation Vs Reflective Observation

The combination score AE-RO is an indicator of the preference for Active Experimentation over Reflective Observation in learning situations. The overall ANOVA model was significant (F value=2.02, p=0.008) though it explains only 2.62% of the variability in AE-RO (Table 5). Age (F value=3.84, p=0.004) was the most significant source of the explained variance. 44.77% of the variability explained by the model is caused by age. Education was marginal in its impact (F value=2.64, p=0.07) accounting for 15.41% of the explained variability at the most.

Table 5. Overall ANOVA and Fit Statistics for AE-RO

Source	DF	Sum of Squares	Mean Square	F Value	P Value
Model	17	4338.26	255.19	2.02	0.0083
Error	1274	161144.95	126.49		
Corrected Total	1291	165483.21			

R-Square	Coeff Var	Root MSE	Mean AE-RO
0.0262	160.10	11.25	7.02

Source	DF	Type III Sum of Squares	Mean Square	F Value	P Value
Culture	7	864.16	123.45	0.98	0.4471
Gender	1	36.05	36.05	0.29	0.5935
Age	4	1942.28	485.57	3.84	0.0042
Education	2	668.72	334.36	2.64	0.0715
Specialization	3	430.11	143.37	1.13	0.3343

Culture did not show any significant effect on AE-RO (The mean AE-RO scores for the culture clusters are given in Table 6.). Some of the past studies also had not found significant difference between samples from different countries on this scale (Kerr 2004, Barmeyer 2004).

Table 6. Mean Scores on AE-RO for Culture Clusters

Cluster	n	Mean	Std. Dev
Anglo	348	7.41	12.27
Latin Europe	144	7.27	12.4
Nordic Europe	25	9.28	12.25
Germanic Europe	164	5.39	11.69
Eastern Europe	32	9.06	10.20
Latin America	92	6.92	11.36
Southern Asia	307	6.96	9.61
Confucian Asia	180	7.04	10.92

The mean scores on AE-RO for the demographic variables are provided in Table 7. Age was the variable that showed the most influence on a person's preference for action over reflection. The mean scores for the various age categories show an initial increase and subsequent decrease. This

may be an indication that action orientation goes up till a certain age after which the tendency is for less action and more reflection. The normative data used for KLSI 3.1 follows the same trend (Kolb and Kolb 2005). It is difficult to identify a clear direction for the relationship between level of education and AE-RO by merely looking at the mean scores. Kolb and Kolb (2005) reports the longitudinal study by Mentkowski and Strait (1983) where an increase in action orientation was found when a person moves from high school to college. However, graduate education may foster more reflection.

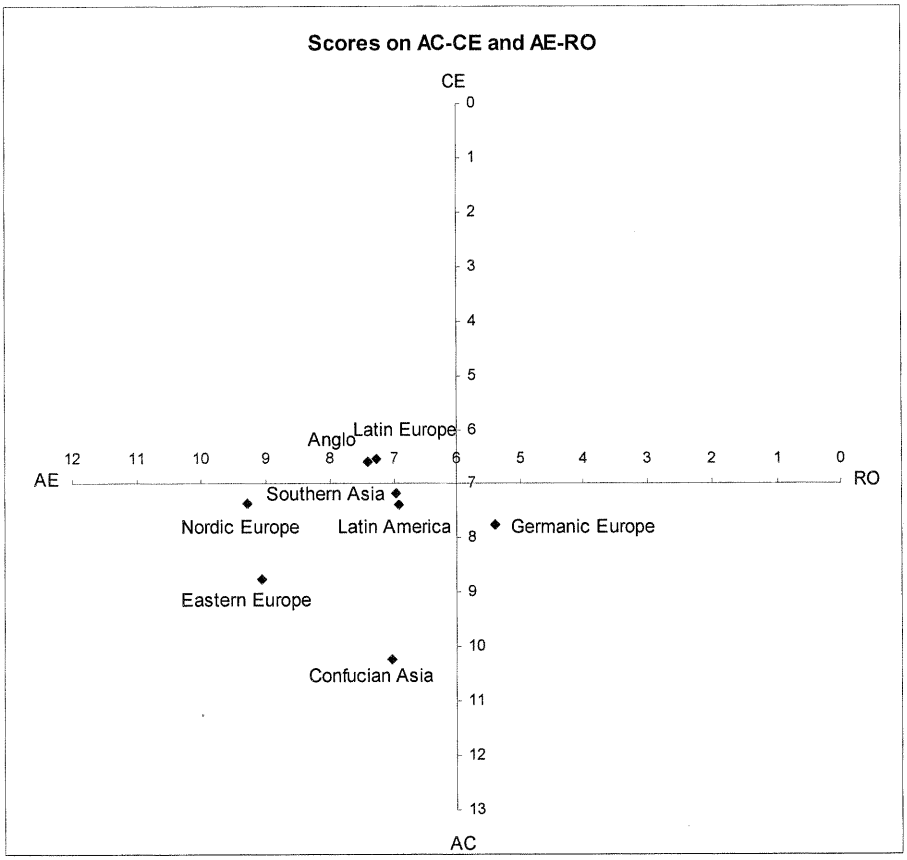
Table 7. Mean Scores on AE-RO for Demographic Variables

	n	Mean	Std. Dev
Gender			
Male	832	6.76	11.12
Female	460	7.50	11.67
Age			
19-24	46	6.87	10.54
25-34	426	8.52	10.58
35-44	451	6.98	11.10
45-54	290	5.66	12.53
55 & above	79	4.35	11.34

	n	Mean	Std. Dev
Education			
Secondary school	118	7.22	12.93
Bachelor's Degree	566	8.00	11.51
Master's/PhD	608	6.07	10.74
Specialization			
Humanities & Social Sciences	102	7.31	11.44
Social-professional	418	7.90	11.83
Basic Sciences & Mathematics	607	6.66	10.89
Applied Sciences-professional	165	5.96	11.43

While culture and the other demographic variables taken together accounted for 5.64% of the variability in AC-CE scale, they account for only 2.62% of the variability on AE-RO. In case of AC-CE, culture emerges as a significant source of variance whereas in case of AE-RO it does not. Figure 3 is a graphic summary of the mean AC-CE and AE-RO scores for the culture clusters. Following the KLSI 3.1 norms that were applicable to this set of data, the cut-off point for AC-CE is 7 and for AE-RO 6. (The sample appears to be more abstraction and action oriented in comparison to the studies reported byYamazaki's (2005). This may be due to the fact that majority of Yamazaki's sample was from the student population and ours was from non-student population.)

Figure 3. Mean AC-CE and AE-RO Scores for the Culture Clusters



Impact of increasing the cultural homogeneity within the group

Each culture cluster, though different from each other, has some amount of internal heterogeneity on account of the cultural differences among the countries that are part of it. We decided to explore if an increased homogeneity within the cultural group – which in turn will deepen its difference from the other groups - would result in culture accounting for a larger portion of the variance on the learning style scales.

We chose one country from each cluster in order to ensure maximum possible cultural homogeneity within a cluster while ensuring the representation of all types of cultures. The choice

of the countries was guided by the sample sizes. We kept a minimum sample size requirement around 30. There weren't countries that could meet this criterion from 3 clusters. From the other clusters, the countries with the largest sample were chosen. In case of USA and India that had very large samples, I randomly sampled 96 and 86 cases respectively. The final sample included 533 cases from the USA, Italy, Germany, Poland, Brazil, India and Singapore. The sample size from each country ranged from 28 – 116 with a mean of 76.

Abstract Conceptualization Vs Concrete Experience

The overall model was significant (F value=3.98, p< 0.0001). All the factors taken together explained 10.99% of the variance in AC-CE (Table 8). The factors that were the significant sources of variance are culture (F value=2.93, p=0.008), gender (F value=2.93, p=0.008), education level (F value=5.63, p=0.004), and area of specialization (F value=6.82, p=0.0002). Culture accounted for 27.61% of the variance explained by the model, gender 8.60%, level of education 17.66%, and area of specialization 32.09%.

Table 8. Overall ANOVA and Fit Statistics for AC-CE (Country sample)

Source	DF	Sum of Squares	Mean Square	F Value	P Value
Model	16	7606.71	475.42	3.98	<0.0001
Error	516	61582.83	119.35		
Corrected Total	532	69189.53			

R-Square	Coeff Var	Root MSE	Mean AC-CE
0.1099	144.06	10.92	7.58

Source	DF	Type III Sum of Squares	Mean Square	F Value	P Value
Culture	6	2100.2	350.03	2.93	0.0080
Gender	1	654.08	654.08	5.48	0.0196
Age	4	465.87	116.47	0.98	0.4202
Education	2	1343.07	671.53	5.63	0.0038
Specialization	3	2440.63	813.54	6.82	0.0002

The mean AC-CE scores for the countries and the demographic variables are presented in Tables 9 and 10 respectively.

Table 9. Mean Scores on AC-CE for Countries

Countries	n	Mean	Std. Dev
Brazil	68	5.41	11.38
Germany	116	8.03	12.73
India	86	7.63	8.81
Italy	43	4.93	12.58
Poland	28	6.43	9.53
Singapore	96	11.07	10.74
USA	96	6.57	11.82

Table 10. Mean AC-CE for Demographic Variables

	n	Mean	Std. Dev
Gender			
Male	311	8.54	11.14
Female	222	6.24	11.65
Age			
19-24	15	1.47	7.95
25-34	214	8.09	11.19
35-44	181	7.87	11.35
45-54	96	7.08	11.45
55 & above	27	6.78	14.26

	n	Mean	Std. Dev
Education			
Secondary school	33	3.00	10.89
Bachelor's Degree	251	6.5	11.57
Master's/PhD	249	9.27	11.04
Specialization			
Humanities & Social Sciences	43	6.12	12.88
Social-professional	153	4.38	11.27
Basic Sciences & Mathematics	263	8.34	11.18
Applied Sciences-professional	74	12.36	9.53

In the country sample, demographic variables accounted for 58.34% of the explained variance. Culture explained 27.61% of the variability. Variability on account of culture was only 21.98% in the cluster sample, and the demographic variables taken together explained a comparable 56.71%.

Active Experimentation Vs Reflective Observation

The overall model was significant (F value=2.21, p=0.004) and explained 6.41% of the variance in AE-RO (Table 11). The sources of significant effect were age (F value=3.2, p=0.01) and area of specialization (F value=2.71, p=0.04). The culture had an F value of 1.97 and a p value .07 and thus had only a marginal significance in explaining the variance. Age accounted for 36.17% of the explained variance and area of specialization 23%.

Table 11. Overall ANOVA and Fit Statistics for AE-RO (Country sample)

Source	DF	Sum of Squares	Mean Square	F Value	P Value
Model	16	3979.25	248.7	2.21	0.0044
Error	516	58069.66	112.54		
Corrected Total	532	62048.9			

R-Square	Coeff Var	Root MSE	Mean AE-RO
0.0641	168.99	10.6	6.28

Source	DF	Type III Sum of Squares	Mean Square	F Value	P Value
Culture	6	1333.01	222.17	1.97	0.0676
Gender	1	6.01	6.01	0.05	0.8173
Age	4	1439.31	359.83	3.2	0.0131
Education	2	263.96	131.98	1.17	0.3103
Specialization	3	915.14	305.05	2.71	0.0445

The mean AE-RO scores for the country sample are provided in Tables 12 and 13.

Table 12. Mean Scores on AC-CE for Countries

Countries	n	Mean	Std. Dev
Brazil	68	7.00	10.41
Germany	116	4.43	11.13
India	86	8.11	9.67
Italy	43	8.00	12.36
Poland	28	9.50	8.8
Singapore	96	5.45	10.21
USA	96	5.47	11.63

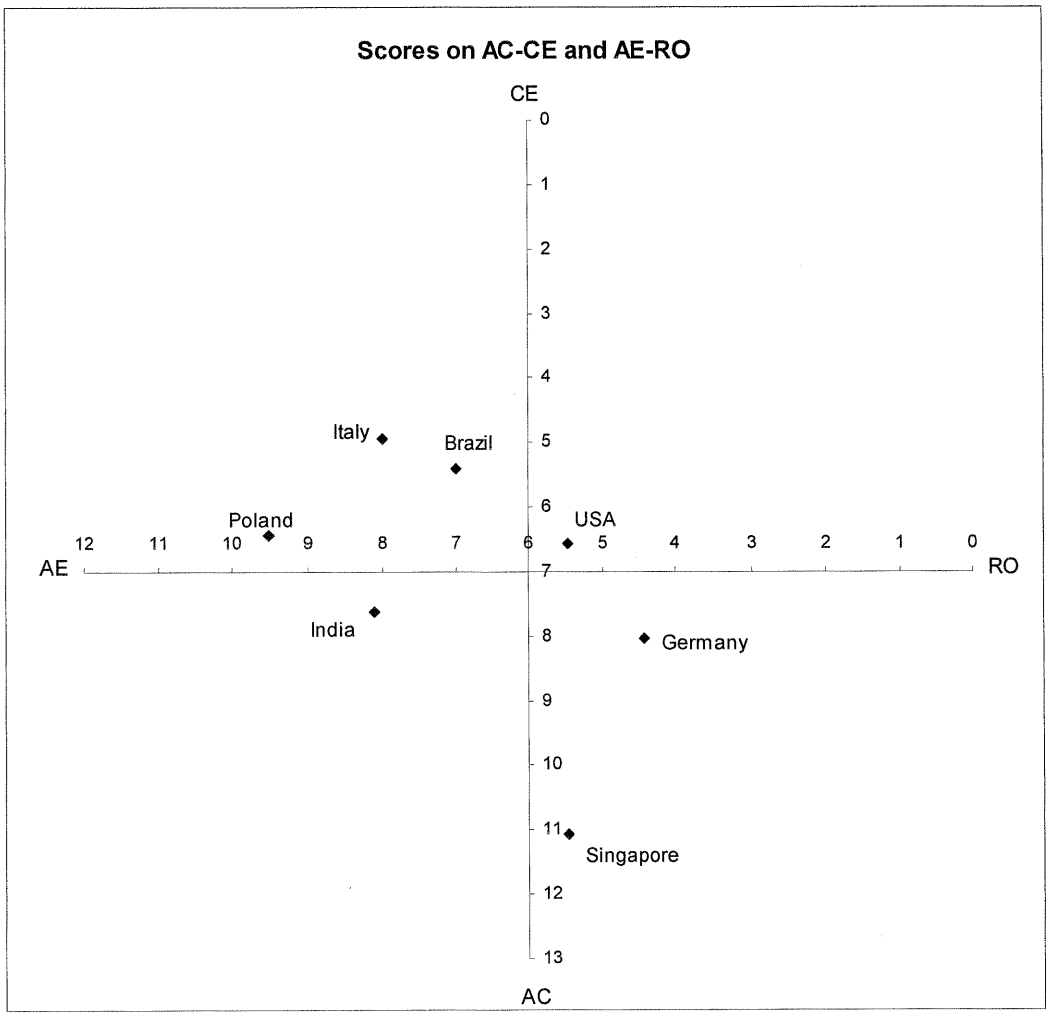
Table 13. Mean AC-CE for Demographic Variables

	n	Mean	Std. Dev
Gender			
Male	311	6.24	11.01
Female	222	6.32	10.51
Age			
19-24	15	6.13	9.83
25-34	214	7.94	9.82
35-44	181	5.24	11.04
45-54	96	5.88	11.05
55 & above	27	1.52	14.08

	n	Mean	Std. Dev
Education			
Secondary school	33	8.21	8.48
Bachelor's Degree	251	6.73	10.43
Master's/PhD	249	5.57	11.40
Specialization			
Humanities & Social Sciences	43	2.58	10.57
Social-professional	153	6.85	11.19
Basic Sciences & Mathematics	263	7.00	10.59
Applied Sciences-professional	74	4.69	10.46

In the cluster sample, the demographic variables were related to 60.19% of the variability explained by the model and in case of the country sample it was 59.16%. Culture did not feature as a significant source of variance in the cluster sample whereas it bordered around being significant in country sample. Figure 4 gives the graphic representation of the mean AC-CE and AE-RO scores for the countries chosen from each cluster.

Figure 4. Mean AC-CE and AE-RO Scores for the Countries chosen from the Clusters



DISCUSSION

From the above results, it is evident that culture has an impact on the learning style scales that is comparable to that of some of the demographic variables. Culture has a significant effect in deciding a person's preference for Abstract Conceptualization Vs Concrete Experience. It may show an impact on the preference between Active Experimentation and Reflective Observation when cultural differences between groups are very large. Overall, it is possible that culture will account for more variability in learning styles when within-group cultural homogeneity and/or between-groups heterogeneity increase.

This brings us to the question – what aspects of culture may be playing a role in shaping learning styles? In the review of past studies, we saw that the researchers resorted to various cultural typologies and dimensions in order to delineate the elements of culture that have an impact on learning styles. The processes of culture are complex and nuanced. Each typology or dimension elaborates one or other part of it. Using multiple typologies or dimensions provides better understanding of the cultural processes from a variety of angles. This may be more effective and even essential in discerning the most influential elements from the intricate patterns that culture creates. Also, while using the typologies and dimensions it may be necessary to avoid picturing the countries as situated at the extreme poles in order to avoid stereotypes. Each country may be closer to one pole than the other.

This section takes a more inductive approach to investigate the dimensions of culture that potentially could affect learning styles by identifying the relationship between the AC-CE and AE-RO learning style scales and the relative positioning on select cultural dimensions of the countries

chosen from each cluster using culture bands and not the country scores to represent the relative positions of each country. Culture bands are a product of the GLOBE study resulting from the Test Banding technique. This procedure groups the country scores into bands in such a way that the scores within a band are considered as being not significantly different. Band 1 indicates highest range of scores on any dimension and the subsequent bands indicate lower range scores (House et al 2004).

Dimensions that impact AC-CE

In Table 14, shows the AC-CE scores for the countries in ascending order along with the bands they fall in select GLOBE dimensions. A cursory glance over the cultural dimensions bands suggests the potential for a broad pattern, in spite of the instances that do not quite follow the pattern. As the levels of institutional collectivism, uncertainty avoidance, future orientation and performance orientation go up, the reliance on abstract conceptualization appears to increase. Below are descriptions of the values and practices that are reinforced when a culture is relatively high or low on a dimension and how that could be influencing learning.

Table 14. AC-CE scores and the select dimensions from GLOBE study

Country	AC-CE	Uncertainty Avoidance	Future Orientation	Performance Orientation	In-Group Collectivism	Institutional Collectivism
Italy	4.93	3	3	3	2	3
Brazil	5.41	3	2	2	2	3
Poland	6.43	3	4	2	1	2
USA	6.57	2	2	1	3	2
India	7.63	2	2	2	1	2
Germany	8.03	1	2	2	3	3
Singapore	11.07	1	1	1	1	1

Uncertainty Avoidance refers to 'the extent to which the members of an organization or a society strive to avoid uncertainty by relying on established social norms, rituals, and bureaucratic practices' (House et al 2004, p.11). The term was first introduced by Cyert and March in their 'A Behavioral Theory of the Firm' (1963) to discuss the uncertainty avoidance behavior by organizations and was adopted by Hofstede (2001) to refer to the societal level phenomenon in cross-cultural research. Uncertainty avoiding societies resort to creating laws and rules and following rituals and religion in order to reduce ambiguity and unpredictability. In the laws they create, they aim to see clarity, structure and purity. In scientific pursuits, they favor deduction, formulating general principles first to apply them to specific situations (Hofstede 2001). The methods by which such societies deal with uncertainty may predispose their members to resort to abstract conceptualization. Members of the less uncertainty avoiding societies are more comfortable with ambiguity, chaos, novelty and convenience. They take every day as it comes. In scientific logic they favor induction, taking note of the empirical facts first to reach general principles (Hofstede 2001). They view what is different as curious. The members of such societies may find it easier to learn from concrete experiences.

Future Orientation implies 'the degree to which individuals in organizations or societies engage in future oriented behaviors such as planning, investing in the future, and delaying individual or collective gratification' (House et al 2004, p.12). This dimension originates from the concept of temporal orientation that Kluckhohn and Strodtbeck present in 'Variations in Value Orientations' (1961). Future oriented societies engage in planning. This requires the cognitive ability to see 'the world beyond its present physical state' (House et al 2004). Thus abstract conceptualization is a necessary condition to envisage the future (Trommsdorff 1983). The plans are evaluated based on

the anticipated future benefits. They want to ensure that there are strong and positive links between the current tasks and the desired future state. They strive to be objective. Future orientation thus fosters abstract conceptualization. Less future oriented societies are able to engage more in the present and enjoy the moment. They may show incapacity or unwillingness to plan to accomplish goals in the future (Keough et al 1999). While planning, the thrust is to ensure that they are compatible with the customs and traditions. Only past experience can legitimize innovation and experience (House et al 2004). This attitude towards future may develop in members of such societies, the habit of absorbing the experiences in order to learn.

Performance Orientation is 'the degree to which an organization or society encourages and rewards group members for performance improvement and excellence' (House et al 2004, p.13). House et al (2004) point out that despite its intuitive appeal, performance orientation had not been used in cross-cultural studies to differentiate between societies. They ground the dimension in McClelland's (1961) nAch (need for achievement) and see a societal level manifestation in Weber's discussion on Protestant work ethic. Highly performance oriented societies are found to value self-reliance, independence and achievement. The achievement orientation in them may make them focus on future. The emphasis is on results than people. What one does matters more than what one is. All these may guide the members of such societies from concrete experience to abstract conceptualization. The societies that are less performance oriented focus on maintenance of tradition, family, affiliation and social ties than on individual achievement. They value one's role and position in society. In communication, they prefer subtlety and pay attention to context (House et al 2004). Such an attitude may favor concrete experience.

Individualism Vs Collectivism perhaps is the most widely used dimension to differentiate between cultures, to the extent that both scholars and laymen often think of it as the only way to explain cultural differences. A number of scholars agree that collectivism is not as simple and straight forward as it is portrayed and have made attempts to fine-tune the concept. An example will be Triandis' (1994) introduction of vertical and horizontal individualism/collectivism. House et al (2004) found out in the GLOBE study that collectivism can be differentiated into In-group Collectivism and Institutional Collectivism. In-group Collectivism is 'The degree to which individuals express pride, loyalty and cohesiveness in their organizations or families' and Institutional Collectivism is 'the degree to which organizational and societal institutional practices encourage and reward collective distribution of resources and collective action' (House et al 2004, p.12). It is 'part of a cultural syndrome that is future and performance oriented' and that tries to reach the envisioned future through collective efforts that are not assertive or dominating. It seems to originate more from a sense of justice, equality, collective action and camaraderie, the basis of which is rationality rather than feeling of kinship. The members of the societies that are high on institutional collectivism may have a preference for abstract conceptualization.

Dimensions that impact AE-RO

The impact on culture on AE-RO was much weaker than that on AC-CE. Table 15 is a summary of the mean scores on AE-RO and the culture bands for the countries chosen from each cluster. Broad patterns representing the relationship between AE-RO and cultural dimensions are observable only in case of Uncertainty Avoidance and In-Group Collectivism. It appears that with the increase in

Uncertainty Avoidance, the propensity for reflection goes up. Countries that are high on In-group Collectivism appear to be more action oriented than others, contrary to the common belief.

Table 15. AE-RO scores and the select dimensions from GLOBE study

Country	AE-RO	Uncertainty Avoidance	Future Orientation	Performance Orientation	In-Group Collectivism	Institutional Collectivism
Germany	4.43	1	2	2	3	3
Singapore	5.45	1	1	1	1	1
USA	5.47	2	2	1	3	2
Brazil	7.00	3	2	2	2	3
Italy	8.00	3	3	3	2	3
India	8.12	2	2	2	1	2
Poland	9.50	3	4	2	1	2

In uncertainty avoiding societies, there is a tendency to consider what is different as dangerous. Breaking rules is not tolerated (House et al 2004). They are more resistant to change. There is fear of failure and preference for tasks with sure outcomes, clear guidelines and less risk. Children are actively protected from experiencing unknown situations. In education, both teachers and students are more comfortable with the structured learning situations with clear objectives and timetables (Hofstede 2001). Thus, the need and efforts for having predictability in such cultures may dissuade its members from active experimentation. The members of cultures that are more comfortable with uncertainty view what is different as curious. They are more tolerant of breaking rules, less resistant to change and innovation, and willing to take risks. They believe in one's ability to influence one's life and others. There is a hope for success. Children are encouraged to experience novel situations. In education, they prefer open ended learning situations where there is room for sense of empiricism, relativity and original and unconventional ideas (Hofstede 2001). The members of such societies may find it easier to learn from active experimentation. Hoppe (1990)

and Yamazaki (2005) have found evidence for a positive relation between uncertainty avoidance and reflective observation.

The element of collectivism that has a possible influence on AE-RO may be In-group Collectivism. However, the association that it shows in this sample seems to be quite the opposite of what had been predicted by previous researchers. In collectivistic societies, the group is the basic unit of social perception. It is important to maintain harmony and save face of the group members. There is respect for tradition, social order and family security (Hofstede 2001, Triandis 1994, House et al 2004). It is considered by the researchers that, in order to be an acceptable member of such a society, one needs to constantly pay attention in the interactions and develop intuition and reflection. However, we may need to take into account the fact that the social roles, duties and obligations are predefined in such societies. The members may not have to reflect on them for sense-making since they are prescriptive in nature. On the contrary, what may be expected of them is to keep fulfilling the duties and obligations. This may bring an action orientation, though it may not be very experimental.

Also, there is a pattern observable in this sample with respect to Uncertainty Avoidance and In-group collectivism. The higher the In-group collectivism is, the lesser is the tendency to avoid uncertainty, except in case of Singapore. This could be an indication that both these dimensions may have interaction effects on AE-RO where the relative strength and direction of the impact that each has will come into play.

The merit in using multiple dimensions and their relative scores: An illustration

The use of multiple dimensions is especially recommended when we encounter findings from similar cultures that appear contradictory. It helps in bringing out the differences in seemingly similar cultures that go unnoticed otherwise.

An example will be the impact of collectivism on AC-CE. Some studies suggest that the members of the collectivistic societies relied on concrete experience to learn (Yamazaki and Kayes 2005, McMurray 1988). But, there are a few studies that discovered that students from some collectivistic societies displayed preference for abstract conceptualization (Yuen and Lee 1994, Auyeung and Sands 1996). The samples used by Yamazaki and Kayes (2005) and McMurray (1988) were of Japanese nationals. Yuen's and Lee's sample was from Singapore and Auyeung's and Sand's from Taiwan or Hong Kong. I used the samples that I have from Japan and Singapore (I didn't have large enough sample from Taiwan and Hong Kong) and performed a t-test to see if they significantly different on AC-CE. The mean score for Japan was 7.62 (S.D 12.15, n=76) and for Singapore 11.07 (S.D 10.74, n=96) indicating a difference significant at 0.05 level (F value - 1.976). Table 16 compares both Japan and Singapore on the bands they belong to on select cultural dimensions.

Table 16. Culture bands for Japan and Singapore on select dimensions

	In-Group Collectivism	Institutional Collectivism	Uncertainty Avoidance	Future Orientation	Performance Orientation
Japan	2	1	3	2	2
Singapore	1	1	1	1	1

Japan and Singapore belong to different bands on all dimensions except Institutional collectivism. Singapore is higher on Institutional Collectivism, Uncertainty Avoidance, Future Orientation and

Performance Orientation, all of which appeared to be positively influencing the preference for abstraction in the broad patterns identified earlier in this section.

CONCLUSIONS, LIMITATIONS AND DIRECTIONS FOR FUTURE RESEARCH

Conclusions

This is the first study to examine the influence of culture on learning style that controls for some of the other factors known to influence an individual's approach to learning. Results of the study indicate that culture as measured by the GLOBE country clusters and by representative countries from each cluster does indeed significantly influence learning style, particularly the extent to which individuals rely on concrete experiences versus abstract concepts in the way they learn. On the AC-CE dimension of the KLSI, culture in the cluster sample accounted for 22% of the explained variance as compared with 17% for gender and 39% for educational specialization while in the country sample the percentages of explained variance were 28% for culture, 8.6 % for gender, 18% for level of education and 32 % for educational specialization. Thus, in both samples while educational specialization accounted for the most variance in AC-CE, culture ranked second ahead of gender, educational level, and age. Analysis of the GLOBE country ratings on individual cultural dimensions suggests that individuals tend to have abstract learning styles in countries that are high in uncertainty avoidance, future orientation, performance orientation and institutional collectivism. Individuals from Italy and Brazil had the most concrete learning styles and those from Singapore and Germany had the most abstract learning styles.

On the AE-RO dimension of the KLSI, in the cluster sample only age had a significant influence on individuals' emphasis on action versus reflection in learning, accounting for 45% of the explained variance. In the country sample age accounted for 36% of the explained variance and educational specialization accounted for 23%. The influence of culture was marginally significant ($p<.07$) and accounted for 34% of explained variance. Analysis of the GLOBE country ratings on individual cultural dimensions suggests that individuals tend to have reflective learning styles in countries that are high in uncertainty avoidance and active learning styles in countries that are high in in-group collectivism, Individuals from Germany had the most reflective learning styles and those from Poland had the most active learning styles.

As might be expected, when homogeneity within the culture cluster categories is increased by using samples from representative countries both the total amount of KLSI variance explained by all factors and the proportion of that variance accounted for by culture increases—from accounting for 22% of 6% total variance to 28% of 11% total variance for AC-CE and from 20% of 3% total variance to 34% of 6% total variance for AE-RO.

Limitations

The study could be improved by larger sample sizes within countries and better representation of clusters particularly the Sub-Saharan Africa and Middle East clusters. The online data collection method used may be biased by being a less than full representation of the population. Judging from that fact that the individuals in this sample had filled in a fee-based online instrument in English,

we can assume that all of them had basic English proficiency, were computer literate and had the means to pay for the instrument either in their individual capacity or by being part of organizations. This biased homogeneity induced by the sampling technique may increase the chances for not detecting a culture based difference when it actually exists. Thus, the chance for a Type II error is higher. However, following Hofstede (2001), it should be noted that a sample that is more representative of the population than this might reveal a stronger impact of culture. Another limitation of this study is the Reverse Ecological Fallacy (Hofstede 2001). It is the situation where one compares cultures on measures created for use at the individual level. The learning style scales are designed for measuring individual level constructs. Aggregating them to the country or cluster levels may be erroneous. Also, not included in this study are some other factors that are known to shape and influence learning styles such as personality types and the current work context (Kolb 1984, Kolb and Kolb 2005).

Directions for Future Research

The exact nature of the influence of cultural dimensions -significance, direction, strength and interactions- needs to be ascertained. The patterns suggested in the discussion section are yet to be validated empirically. In the current analysis the dimensions and their interactions were not included in the design because of the adverse effect that increasing the number of factors in an ANOVA design has on statistical power. A multilevel regression model would be a more appropriate method of analysis. It has the capability to assess the impact of the country or cluster level dimensions and their interactions on individual level outcomes while taking into account the individual level demographic variables. It would eliminate the problem of reverse ecological

fallacy as individual level variables would not be aggregated to the group level. However, the large number of countries from which samples will be needed in order for the model to work poses practical challenges and must await future study.

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