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Comparative Dimensions of Disciplinary Culture

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Comparative Dimensions of Disciplinary Culture

Introduction

Despite calls to promote creativity as "an indispensable quality for engineering" [1], the U.S. engineering educational system has been slow to develop pedagogies that successfully promote innovative behaviors. Engineers need more creativity and interdisciplinary fluency, but engineering instructors often struggle to provide such skills without sacrificing discipline-specific problem-solving skills. At the same time, engineering programs continue to struggle with attracting and retaining members of underrepresented populations—populations whose diversity could greatly contribute to innovation. Interestingly, the lack of diversity in engineering is often attributed to cultural traits of the field, which is often characterized as masculine, individualistic, and function-oriented. To address these issues, we have undertaken a 3-year study to investigate patterns of cultural traits in students across disciplines, and to build an actionable theory of engineering culture that can support pedagogies of inclusive and collaborative innovation as well as strategies for recruiting and retention efforts. In this paper, we present preliminary results from our survey in order to define how Hofstede's dimensions of national culture map to 14 majors in a research university.

Specifically, we are applying Hofstede's original four dimensions of national business cultures (power distance, uncertainty avoidance, individualism, masculinity) [2] to academic disciplines to explain how students develop skills to operate within and across disciplinary boundaries. To do so, we are addressing the following research questions:

1. How do Hofstede's dimensions of national cultures map to academic disciplines?
2. Do different majors have different disciplinary cultures according to Hofstede's dimensions?

This research purpose is to understand how students in different disciplines behave and perceive their majors. The information presented builds up on a pilot study where we applied Hofstede's instrument with no major findings. However, we improved the survey based on the responses and expanded it outside engineering majors.

Literature Review

Hofstede [2] defines culture as patterns of thinking, feeling, and acting that every human being carries. He analogizes culture as the "software of the mind" in that culture is a mental program that is developed by social interactions and experiences collected across an individual's lifetime. In his words, "the programming starts within the family; it continues within the neighborhood, at school, in youth groups, at the workplace, and in the living community" (p. 6). In order to understand this culture, Hofstede developed a series of dimensions to characterize the common traits and beliefs every individual has, with each dimension having two poles. His theory of culture then posits that individuals are located at various points across the spectra of opposite characteristics that comprise each dimension, and individuals with similar characteristics can be grouped under the same type of culture.

Hofstede's theory of cultural dimensions was developed in the mid-1960s, based initially on a survey of IBM employees in more than 40 countries. Hofstede's original analysis yielded four "dimensions," or "values that distinguished countries (rather than individuals) from each other" [3]:

- Power Distance addresses the degree to which those with less power in a given system (workplace, family) may support and expect unequal power distribution;
- Uncertainty Avoidance/Acceptance addresses the degree to which members of a culture can operate comfortably with uncertainty;
- Individualism/Collectivism addresses the relationship between individuals and the larger group; and

- Masculinity/Femininity refers to how emotional roles are distributed across genders, with assertive roles aligned with the masculine pole of the continuum and caring roles aligned with the feminine pole.

Several authors have evaluated applications of Hofstede's dimensions in research, identifying problems such as (i) the use of nation as a unit to analyze culture [4,5,6,7]; (ii) the difficulties and limitations of a quantification of culture represented by cultural dimensions and matrices [4, 6, 8,9]; (iii) the ecological fallacy of assuming that dimensions developed at the national level also apply at the individual level [4,11]; and (iv) the use of data collected from a single company [4,10] along with critiques of reliability [12, 13, 14, 15, 16, 17] and validity [10, 13, 18, 19, 20, 21, 22, 22, 24] in both Hofstede's and derivative instruments. Each of these critiques, while important, also has notable counterarguments.

First, as several authors have argued, countries should not be treated as unit of analysis. Any given nation may have multiple cultures present. Yet Hofstede based his theory on the assumption, from a sociology and anthropologist perspective, that differences in nations can be treated as similar to differences in cultures [5,7,11]. Second, in critiquing Hofstede's expression of culture as quantitatively measurable, researchers argue that because culture is dynamic and adaptive, it is a qualitative variable with meanings that depend upon context and external factors. Hofstede has countered by arguing that in defining cultural differences, quantitative data at the national level is all that is available, and such data is at least a useful starting point in understanding patterns on a large scale [3]. Third, in addressing the critique that Hofstede's instrument is flawed due to ecological fallacy, Brewer and Venaik [4] state that this false mapping may not exist if there is a theory of causation and that under specific situations, people may act according to the dimensions developed for the national level. They explain that despite the criticism of Hofstede's theory regarding ecological fallacy, the model is valuable to explain national-level phenomenon. Similarly, Grenness [11] affirms that "avoiding the ecological fallacy is possible when the aggregated data are collected from groups or samples which are assumed to be or known to be homogenous, e.g. sharing dominant cultural values" (p.80). Using the model thus requires an understanding of the population to be analyzed, including knowledge of the population's homogeneity or heterogeneity. Therefore, understanding how students understand their majors will minimize the ecological fallacy critique to Hofstede's model. Finally, Hofstede's framework and instrument have also received critiques of reliability and validity, including critiques regarding use of a single employer. However, since the original study was conducted, researchers have used Hofstede's instrument in different settings and confirmed internal consistency in its use [e.g. 25, 26]. Different studies have also addressed validity issues with positive results [27, 28]. Finally, several studies in the past three decades [29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42], even when not reporting instrument reliability or methodological validity, have successfully used Hofstede's theory to study cultural differences, arguing for the validity and reliability of the model overall.

Based on these studies, it is possible to argue that Hofstede's instrument and methodology can be reliable if confirmed by rigorous testing and, ensuring the necessary considerations of validity are met, can be a useful framework to study cultures and sub-cultures, such as academic disciplines. Our research will test the possibility of mapping cultural dimensions to academic disciplines, and particularly disciplines within engineering. These disciplines may be considered generally homogeneous as subfield of engineering, although disciplines will vary somewhat across universities. We thus hypothesize that it will be possible to use Hofstede's theory to understand cultural differences in disciplines.

Methods

In order to answer our research questions regarding how Hofstede's dimensions of national cultures map to academic disciplines, we used a version of his survey in a pilot study. After a review of studies that used replicas and adaptations of Hofstede's instrument, and considering the various critiques, the research team selected the survey as adapted by Sharma [43]. Our IRB-approved university-wide survey was delivered online using Qualtrics to a stratified sample of undergraduate students at research university during the Spring semester 2014, obtaining 742 valid responses from 61 different majors across all years. However, we were only able to use results from the college of engineering since it represented 92.5% of the responses (687). Preliminary results did not show significant differences between the 11 engineering majors studied.

In this study the survey was improved based on the analysis of the Cronbach's alpha of the pilot. In addition, to ensure validity, the survey was critiqued by the four authors of the project, who discussed every item in detail. In addition, an assessment expert evaluated the survey and made suggestions. Face validity and content validity were established with consensus of the researchers. The instrument, as mentioned before, has been proven to measure the theory developed by Hofstede. Construct validity has also been proven in previous studies [16, 27, 28, 38, 43] and relates to the measurement of the four different constructs being measured (dimensions) that explain the cultural differences.

The survey was administered online and managed thorugh Qualtrics. Three engineering majors were selected as the base of the study: electrical, computer, and industrial engineering. We decided to select those majors from our college of engineering for several reasons. First, tha departments are innovative, large, and highly ranked relative to other departments nationwide, and thus results from these contexts are likely to be applicable to other departments across the country. Second, both locally and nationally, these two departments are at opposite ends of the diversity spectrum, with ECE among the least diverse departments and ISE among the most diverse. In addition to the engineering majors, we selected 12 other majors based on Nulty and Barret's model. The model divides disciplines into four different –and opposite- clusters (i.e. soft – applied, soft – pure, hard – applied, hard – pure). The results from the survey were processed using SPSS software; data from 401 undergraduate students in 13 different majors were analyzed. Descriptive statistics are presented in Table1. Responses were grouped by discipline and the four dimensions proposed by Hofstede were measured. Table 1 summarizes the arithmetic means based on a 7-point Likert scale:

- For Individualism/Collectivism, 1 is considered to be less individualistic (more collectivistic) and 7 is considered highly individualistic.

- For Power Distance, 7 is considered to have a high power distance (more comfort with/support of hierarchies)
- For Uncertainty Avoidance, 7 is considered higher resistance to uncertainty.
- For Masculinity/Femininity, 1 is the lower value for Masculinity, representing a disposition toward femininity (caring), while 7 is the higher value of Masculinity (assertivenes).

Results and Discussion

Results from the survey are presented in Table 1. Means of the scores for each discipline are reported for each major. Also, the standard deviation and sample size is presented. After analyzing the descriptive statistics we conducted some inferential statistics using T-tests to determine if the differences regarding how disciplines score on a specific dimension of culture were signigicant. We present the results and our data analysis in this section.

Table 1. Arithmetic mean and standard deviation of responses for cultural dimensions

Major	**Cultural Dimensions**							
	Individualism		***Power Distance***		***Uncertainty Avoidance***		***Masculinity***	
	Mean	Std. Dev	Mean	Std. Dev	Mean	Std. Dev	Mean	Std. Dev
Architecture (n = 58)	5.850	0.739	3.940	1.123	4.042	1.169	3.690	1.009
Chemistry (n = 26)	5.491	0.926	4.231	1.051	5.250	1.095	3.644	0.952
Communication (n = 10)	5.864	0.626	4.500	1.405	4.636	1.109	4.250	0.474
Comp Engineering (n = 38)	5.738	0.900	3.840	1.145	4.892	1.272	4.234	1.174
Electrical Eng. (n = 43)	5.197	1.080	4.031	1.120	4.647	1.166	4.505	0.945
English (n = 31)	5.770	0.731	3.897	1.293	4.654	1.237	3.508	1.192
History (n = 22)	5.740	0.912	3.820	0.967	4.522	1.163	3.848	1.172
Industrial Design (n = 18)	6.038	0.703	3.538	1.122	3.597	1.095	3.278	1.018
Industrial and Systems Eng. (n = 34)	5.710	0.949	3.888	1.040	4.313	1.339	4.382	1.068

Major	Cultural Dimensions							
	Individualism		***Power Distance***		***Uncertainty Avoidance***		***Masculinity***	
Marketing (n = 17)	5.890	0.616	4.136	1.183	4.500	1.340	4.136	1.136
Mathematics (n = 40)	5.600	0.897	4.090	1.318	4.867	1.150	3.908	1.211
Physics (n = 39)	5.738	1.067	3.635	1.457	4.514	1.244	3.831	1.066
Sociology (n = 20)	6.060	0.903	4.333	1.593	5.088	1.406	3.813	0.906

Note: Every dimension was measured on a Likert scale from 1 to 7.

According to the mean of the responses regarding cultural dimensions, there are no apparently major differences between the responses by major. However, after conducting statistical analysis we were able to determine some significant differences between how majors score regarding the different dimensions of culture. Overall, students in every major tend to have a high individualistic score. That means that students perceive their independence working on school-related tasks important. In general, they also have a relative low score for power distance. They are not confortable being dominated by people with authority coming from positions of high power. Thus, they would prefer a learning environment where their teachers treat them like peers or colleagues. Although uncertainty avoidance was probably the dimension with more diverse responses between different majors, they tend to avoid uncertainty. Students prefer to have clear instructions and not take many risks. In general students tend to be in a neutral zone regarding masculinity, therefore they try to balance being assertive (masculinity) and caring for others (femininity). In the following paragraph the scores of each dimension will be described in detail and the majors will be ranked based on their scores in tables 2, 3, 4, and 5. T-tests were conducted to identify statistical significance where we saw differences in responses. In some cases there are differences between majors that are statistical significant and worthy to analyze further.

Individualism/Collectivism

Table 2 summarizes the responses regarding individualism across majors. All the disciplines consulted tend to have high independence (i.e. to be more individualistic). The disciplines with higher scores for individualism are sociology, industrial design, and marketing. In the lower end are electrical engineering, chemistry, and mathematics. After conducting T-tests ($t(71)=3.42$, $p=0.001$) we could confirm with 95% of confidence that electrical engineering students ($M=5.197$, $SD= 1.08$) are less individualistic than sociology students ($M=6.06$, $SD= 0.903$). Additionally, the assumption's of homogeneity of variance was satisfied via Levene's Ftest ($F(71)=2.718$, $p=0.104$). We were able also to compare electrical engineering with industrial and systems engineering ($M=5.71$, $SD= 0.949$), in order to see if there were differences between two engineering majors, and we obtained that the difference in their means has statistical significance ($t(94)=2.450$, $p=0.016$) with 95% of confidence. We argued that disciplines like electrical and computer engineering, and mathematics required more individualistic work. Instead, disciplines like marketing, industrial design, and sociology rely more on collective work like team projects. However, results demonstrated the opposite. Students in majors we thought were more collective are representing the more individualistic poles in the spectra. One major that according to Nulty & Barrett [45] we were expecting to be very collective was industrial design because of the type of creative and collaborative work the students do, however, they are one of the most individualistic majors.

Table 2. Scores for Individualism/Collectivism

Major	Sample size	Mean	Std. Dev.
Electrical Engineering	43	5.197	1.08
Chemistry	26	5.491	0.926
Mathematics	40	5.600	0.897
Industrial & Systems Eng.	34	5.71	0.949
Computer Engineering	38	5.738	0.9
Physics	39	5.738	1.067
History	22	5.74	0.912
English	31	5.77	0.731
Architecture	58	5.85	0.739
Communication	10	5.864	0.626
Marketing	17	5.89	0.616
Industrial Design	18	6.038	0.703
Sociology	20	6.06	0.903

Note: The dimension was measured on a Likert scale from 1 to 7.

Power Distance

Regarding power distance, Table 3 presents all the scores in each major studied. Overall, students tend to have low scores of power distance. In general students tend to not be intimated about people in positions of power. We could not find statistical significant differences in power distance scores. One thing to consider is the emphasis made in higher education recently to promote students' awareness of their rights and the importance of fairness and justice.

Table 3. Scores for Power Distance

Major	Sample size	Mean	Std. Dev.
Industrial Design	18	3.538	1.122
Physics	39	3.635	1.457
History	22	3.82	0.967
Computer Engineering	38	3.84	1.145
Industrial & Systems Eng.	34	3.888	1.04
English	31	3.897	1.293
Architecture	58	3.94	1.123
Electrical Engineering	43	4.031	1.12
Mathematics	40	4.09	1.318
Marketing	17	4.136	1.183
Chemistry	26	4.231	1.051
Sociology	20	4.333	1.593
Communication	10	4.5	1.405

Note: The dimension was measured on a Likert scale from 1 to 7.

Uncertainty Avoidance

Table 4 presents the results for uncertainty avoidance. In this dimension, students from chemistry scored considerably higher than the rest of the majors. For example, industrial design (M=3.597, SD=1.095) students, have significant difference on their scores compared to chemistry students (M=5.25, SD= 1.095) (t(42)=2.49, p=0.017) and computer engineering students (M=4.892, SD=1.272) (t(51)=3.241, p=0.002) with 95% of confidence. In addition, we obtained significant statistical difference between industrial and systems engineering and computer engineering (t(69)=2.697, p=0.009). It would be interesting to explore in future research students' perceptions in chemistry about uncertainty avoidance and why they need to have clear instructions. In the case of industrial design it makes sense because design students are motivated to be creative and think outside the box. Regarding engineering, it is also notable the differences between electrical engineering and industrial and systems engineering.

Table 4. Scores for Uncertainty Avoidance

Major	Sample size	Mean	Std. Dev.
Industrial Design	18	3.597	1.095
Architecture	58	4.042	1.169
Industrial & Systems Eng.	34	4.313	1.339
Marketing	17	4.5	1.34
Physics	39	4.514	1.244
History	22	4.522	1.163
Communication	10	4.636	1.109
Electrical Engineering	43	4.647	1.166
English	31	4.654	1.237
Mathematics	40	4.867	1.15
Computer Engineering	38	4.892	1.272
Sociology	20	5.088	1.406
Chemistry	26	5.25	1.095

Note: The dimension was measured on a Likert scale from 1 to 7.

Masculinity

In the dimension of Masculinity we also found some significant difference between the scores. In this dimension Industrial design had the lower scores followed by English, and chemistry. In the other hand electrical engineering, industrial and systems engineering and communication obtained the higher scores meaning that they do perceive their major as masculine (assertive) rather than feminine (caring). In Table 5 all the results are presented. Regarding the t-tests conducted significant difference were observed between industrial design and electrical engineering ($t(62)=4.573$, $p=0.000$) with 95% of confidence. In addition, there is significant difference between industrial design and industrial and systems engineering ($t(52)=3.636$, $p=0.001$) with 95% of confidence. It is interesting to see that in this dimension all the engineering majors are reporting high scores, meaning that students still perceive the engineering profession as "Masculine". One major to analyze further regarding masculinity is communication that also has a high score in this dimension.

Table 5. Scores for Masculinity

Major	Sample size	Mean	Std. Dev.
Industrial Design	18	3.278	1.018
English	31	3.508	1.192
Chemistry	26	3.644	0.952
Architecture	58	3.69	1.009
Sociology	20	3.813	0.906
Physics	39	3.831	1.066
History	22	3.848	1.172
Mathematics	40	3.908	1.211
Marketing	17	4.136	1.136
Computer Engineering	38	4.234	1.174
Communication	10	4.25	0.474
Industrial & Systems Eng.	34	4.382	1.068
Electrical Engineering	43	4.505	0.945

Note: The dimension was measured on a Likert scale from 1 to 7.

Limitations

One limitation of the study is generalization of the findings. The data may not be representative of the majors studied. Neither can we make inferences of the engineering student population as a whole. To address this concern, we are actively working to minimize threats to internal and external validity by including partner institutions in the data collection in the next phases.

Future Implications

This study shows results from a part for our research project. The instrument is being applied in five partner institutions to identify possible differences in perceptions in different types of universities. We are aiming to identify relationships between the dimensions of culture and a) student choice of major, and b) student success within a major. In addition, we are conducting a longitudinal study to understand whether students' perceptions about their academic programs change over time and under which circumstances, leading, to an actionable theory of engineering culture that can support pedagogies of inclusive and collaborative innovation.

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References

[1] W. Clough, “The engineer of 2020: Visions of engineering in the new century”. Washington, DC: National Academies Press. 2004

[2] G. Hofstede, “Cultures and organizations: Software of the mind: Intercultural cooperation and its importance for survival,” London: Profile, 2003.

[3] G. Hofstede, “Dimensions do not exist: A reply to Brendan McSweeney,” in Human Relations, vol. 55(11), 2002, pp. 1355-1361.

[4] R. Baskerville, “Hofstede never studied culture,” in Accounting, Organizations and Society, vol. 28(1), 2004, pp. 1-14.

[5] P. Brewer, and S. Venaik, “On the misuse of national culture dimensions,” in International Marketing Review, vol. 29(6), 2012, pp. 673-683.

[6] B. McSweeney, “The essentials of scholarship: A reply to Hofstede,” in Human Relations, vol. 55(11), 2012a, pp. 1363-1372.

[7] B. McSweeney, “Hofstede's identification of national cultural differences – A triumph of faith a failure of analysis,” in Human Relations, vol. 55(1), 2002b, p. 89-118.

[8] C. Hampden-Turner, and F. Trompenaars, “Response to Geert Hofstede,” in International Journal of Intercultural Relations, vol. 21(1), 1997, pp. 149-159.

[9] D. P. Ford, C. E. Connelly, and D. B. Meister, “Information systems research and Hofstede's culture's consequences: an uneasy and incomplete partnership,” in Engineering Management, vol. 50(1), 2003, pp. 8-25.

[10] M. Søndergaard, “Research note: Hofstede's consequences: a study of reviews, citations and replications,” in Organization studies, vol. 15(3), 1994, pp. 447-456.

[11] T. Grenness, “Hofstede revisited: Is making the ecological fallacy when using Hofstede's instrument on individual behavior really unavoidable? In International Journal of Business & Management, vol. 7(7), 2012.

[12] M. Javidan, R. J. House, P. Dorfman, P. Hanges, and M. De Luque, “Conceptualizing and measuring cultures and their consequences: a comparative review of GLOBE's and Hofstede's approaches,” in Journal of International Business Studies, vol. 37(6), 2006, pp. 897-914.

[13] J. Blodgett, A. Bakir, and G. M. Rose, “A test of the validity of Hofstede's cultural framework” in Journal of Consumer Marketing, vol. 25(6), 2008, pp. 339-349.

[14] P. E. Spector, C. L. Cooper, and K. Sparks, “An international study of the psychometric properties of the Hofstede Values Survey Module 1994: A comparison of individual and country/province level results,” in Applied Psychology, vol. 50(2), 2001, pp. 269-281.

[15] R. Fischer, C. M. Vauclair, J. R. Fontaine, and S. H. Schwartz, “Are individual-level and country-level value structures different? Testing Hofstede’s legacy with the Schwartz Value Survey,” in Journal of cross-cultural psychology, vol. 41(2), 2010, pp. 135-151.
[16] A. Merritt, “Culture in the cockpit do Hofstede’s dimensions replicate?,” in Journal of cross-cultural psychology, vol. 31(3), 2000, pp. 283-301.
[17] S. Chanchani, and P. Theivanathampillai, “Typologies of culture” University of Otago, Department of Accountancy and Business Law Working Papers Series, vol. 4(10), 2002, pp. 02
[18] J. Wallace, J. Hunt, and C. Richards, “The relationship between organisational culture, organisational climate and managerial values,” in International Journal of Public Sector Management, vol. 12(7), 1999,
[19] R. H. Lowie, “Culture & ethnology,” DC McMurtri, 1981.
[20] A. M. Soares, M. Farhangmehr, and A. Shoham, “Hofstede's dimensions of culture in international marketing studies,” in Journal of business research, vol. 60(3), 2007, pp. 277-284.
[21] F. Chiang, “A critical examination of Hofstede's thesis and its application to international reward management,” in The International Journal of Human Resource Management, vol. 16(9), 2005, 1545-1563.
[22] D. R. Fernandez, D. S. Carlson, L. P. Stepina, and J. D. Nicholson, “Hofstede's country classification 25 years later,” in The Journal of social psychology, vol. 137(1), 1997, pp. 43-54.
[23] L. Smircich, “Concepts of culture and organizational analysis,” in Administrative science quarterly, 1983, pp. 339-358.
[24] Y. Reisinger, and J. C. Crotts, “Applying Hofstede’s national culture measures in tourism research: Illuminating issues of divergence and convergence,” in Journal of Travel Research, vol. 49(2), 2010, pp. 153-164.
[25] S. Ang, L. Van Dyne, and T. M. Begley, “The employment relationships of foreign workers versus local employees: A field study of organizational justice, job satisfaction, performance, and OCB,” in Journal of Organizational Behavior, vol. 24(5), 2003, pp. 561-583.
[26] A. Ardichvili, and K. P. Kuchinke, “Leadership styles and cultural values among managers and subordinates: a comparative study of four countries of the former Soviet Union, Germany, and the US,” in Human Resource Development International, vol. 5(1), 2002, pp. 99-117.
[27] E. Callahan, “Cultural similarities and differences in the design of university web sites,” in Journal of Computer□Mediated Communication, vol. 11(1), 2005, pp. 239-273.
[28] A. Marcus, “User-interface design, culture, and the future,” Paper presented at the Proceedings of the Working Conference on Advanced Visual Interfaces, 2002.
[29] M. I. At-Twaijri, and I. A. Al-Muhaiza, “Hofstede's cultural dimensions in the GCC countries: An empirical investigation,” in International Journal of Value-Based Management, vol. 9(2), 1996, pp.121-131.
[30] H. Y. Cheung, and A. W. H. Chan, “Education and competitive economy: how do cultural dimensions fit in?” in Higher Education, vol. 59(5), 2010, pp. 525-541.
[31] D. S. Elenkov, and I. M. Manev, “Top management leadership and influence on innovation: The role of sociocultural context,” in Journal of management, vol. 31(3), 2005, pp. 381-402.
[32] L. Entrekin, and Y. W. Chung, “Attitudes towards different sources of executive appraisal: a comparison of Hong Kong Chinese and American managers in Hong Kong,” in International Journal of Human Resource Management, vol. 12(6), 2001, pp. 965-987.
[33] J. Giacobbe-Miller, D. Miller, W. Zhang, and V. Victorov, “Country and organizational-level adaptation to foreign workplace ideologies: A comparative study of distributive justice values in China, Russia and the United States,” in Journal of International Business Studies, vol. 34(4), 2003, pp. 389-406.
[34] M. Heuer, J. L. Cummings, and W. Hutabarat, “Cultural stability or change among managers in Indonesia?” in Journal of International Business Studies, 1999, pp. 599-610.
[35] M. Huettinger, “Cultural dimensions in business life: Hofstede's indices for Latvia and Lithuania,” in Baltic Journal of Management, vol. 3(3), 2008, pp. 359-376.
[36] C. Li, G. Chick, H. C. Zinn, J. D. Absher, and A. Graefe, “Ethnicity as a variable in leisure research,” in Journal of Leisure Research, vol. 39(3), 2007, pp. 514.
[37] L. Liu, H. Zhang, W. Ma, Y. Shan, J. Xu, F. Peng, and T. Burda, “Understanding chinese characteristics of requirements engineering,” Paper presented at the Requirements Engineering Conference, 2009, RE'09. 17th IEEE International.
[38] A. Naumov, and S. Puffer, “Measuring Russian culture using Hofstede’s dimensions” in Applied Psychology, vol. 49(4), 2000, pp. 709-718.
[39] J. Prašnikar, M. Pahor, and J. Vidmar Svetlik, “Are national cultures still important in international business? Russia, Serbia and Slovenia in comparison,” in Journal of Contemporary Management Issues, vol. 13(2 (Special issue)), 2008, pp. 1-26.

[40] L. Tang, and P. E. Koveos, "A framework to update Hofstede's cultural value indices: economic dynamics and institutional stability" in Journal of International Business Studies, vol. 39(6), 2008, pp. 1045-1063.
[41] J. M. Twati, "The influence of societal culture on the adoption of information systems: The case of Libya," in Communications of the IIMA, vol. 8(1), 2008, pp. 1-12.
[42] C. Yoon, "The effects of national culture values on consumer acceptance of e-commerce: Online shoppers in China," in Information & Management, vol. 46(5), 2009, pp. 294-301.
[43] P. Sharma, "Measuring personal cultural orientations: Scale development and validation" in Journal of the Academy of Marketing Science, vol. 38(6), 2009, pp. 787-806.
[44] J. R. A. Santos, "Cronbach's alpha: A tool for assessing the reliability of scales" in Journal of extension, vol. 37(2), 1999, pp. 1-5.
[45] Nulty, D. D., & Barrett, M. A. (1996). Transitions in students' learning styles. Studies in higher education, 21(3), 333-345.