



Cross Cultural Diversity in Engineering Professionals—Russia, India, America

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Julia Ziyatdinova graduated from Kazan State Pedagogical University in 1999. Her major areas of study were foreign languages and she finished her University course with honors and qualification of teacher of English and Turkish. She continued her training and obtained PhD in Education degree in 2002. The topic of her PhD study was titled "System of Character Education in the US Schools: Current State and Trends for the Development". She also received additional minor degrees in Management (1998) and Psychology (1999) in Kazan State Technological University.

Julia joined the team of Kazan State Technological University as an instructor at the Department of Foreign Languages and the School of Foreign Languages "Lingua" in 1999 and was rapidly promoted to the position of Associate Professor at the Department of Foreign Languages in 2003. Her teaching career was perfectly balanced by the experience of a translator and an interpreter. She is a well-known person at Kazan international conferences and other events for her high quality consecutive and simultaneous interpreting, such as interpreting for the Academy of Sciences of the Republic of Tatarstan.

The new milestone in Julia's career was the position of the Chair of Department of Foreign Languages for Professional Communication in 2007, when she took over all the responsibilities related to foreign language training at Kazan State Technological University. The teaching and research priorities of her department were then focused on professional and intercultural communication for students in a technical university, professional translation and creation of foreign language environment at a university.

Because of her talents and activities, Julia became one of key figures in university international life. When Kazan State Technological University obtained the new status of a National Research University and joined the list of Top 30 Russian universities, Julia was offered a position of a Head of University International Office. She took over this position in April 2011 and rapidly gathered a strong team of professionals to face the challenges of the new university status and transformed International Office into University International Affairs with two offices covering all the aspects of internationalization.

In addition to her intensive career, Julia is also the Director of Center for Intercultural Communication – a company within the University structure offering excellent language training services for students and adult employees.

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Abstract

In this global world, today's engineer is likely to have to work in global international teams with colleagues from other nationalities. The challenge for many engineering curricula is how to include, in a realistic way, this global dimension and increase the student's awareness of the issues that are encountered. However as curricula begins to be developed, it would be beneficial to study what the differences might be between cultures.

To expose the issues that may be encountered for future multidisciplinary teams made up of students from USA, Russia and India, the Miville Guzman Universal Diversity Scale (MGUDS-S) survey and form which assesses cross cultural diversity was used to measure differences between American and Indian engineers. Data using the MGUDS-S survey was collected from a population of Indian professional business people and entrepreneurs attending a personal development program and compared their responses to data collected for a similar survey with predominantly Russian business people and entrepreneurs.

This latter comparison group was made up of experienced professional business people and entrepreneurs from around the world including a large population of academics from Russia, plus entrepreneurs from Mexico, Luxembourg, Australia, South Africa, Uzbekistan, Brazil, and Finland. This international group has quite similar demographics to the Indian group and is being used as a reasonable comparison for project-minded professionals. Both groups should have very similar attitudes as expected. However significant and interesting differences have been found and are discussed in the paper.

A strikingly higher emotional discomfort level was found in Indian male participants for cross cultural diversity. In addition this study studied the differences between male and female responses across cultures. Finally the results of these two studies were compared to the results of surveys with engineering students from U.S.A., Germany, Poland and Russia from previous cross cultural diversity studies conducted by the authors.

Background

In the age of global grand challenges, engineers are likely to work in international teams so as to find good opportunities to be realized together. The challenges have been defined by different organizations, including UNO¹¹, Oxford Martin School⁹, The Millenium Project¹⁰, and etc. A special attention is given to the grand challenges for engineering listed by different organizations, among them the US National Academy of Engineering⁵. This paper does not make an attempt to review these challenges, however, they form a sufficient background for defining the attributes and competencies of a global engineer whose cross-cultural skills are of crucial importance for his professional activities.

A global engineer's competencies have been investigated in different surveys and papers by a number of international authors, and included various sets of attributes, thus Parkinson (2009) emphasized an appreciation of other cultures, an ability to communicate across cultures and in other languages, an ability to work in cross cultural teams and deal with ethnic and cultural diversity and having an international work/educational experience⁷, Osipov (2013) gave priority to self-directed development capabilities⁶, others distinguished critical thinking¹⁴, social competence⁸, intercultural competence¹², foreign language proficiency¹.

We summarize these attributes in three general categories: a global mindset, continuous self-directed development skills, and readiness for innovations. At the root of these attributes is the heightened awareness of various global cultures and a sensitivity to the cross cultural nature of an engineer's profession. The challenge for many engineering education programs is how to include this global dimension in the curriculum. The most common and traditional approach is study abroad programs, however, a limited number of students can afford them due to financial and other reasons. Thus, universities try to find other opportunities for the so-called 'internationalization at home'³ e.g. cross-cultural communication trainings². A comparative analysis of the engineering curricula at the US and Russian leading research universities shows that only few of them succeed in developing a global mindset of their graduates. This process requires a new generation of faculty who are globally engaged themselves¹³.

An approach described in our previous paper¹⁶ focuses on international capstone projects which give good results. For those, however, who were not lucky to go through international projects at their home university, other more internationalized institutions offer special short time professional development programs. This paper will focus on one of the most successful among them, Global Village for Future Leaders of Business and Industry at Lehigh University Iacocca Institute⁴. This is a five week intensive program which gathers around 100 diverse participants from different countries every summer to teach them entrepreneurship and leadership skills and to create a global network of future leaders. The program does not finish after the five week course, and its graduates together with their business partners also participate in a short 10 day Global Village of the Move (GVOTM) program, hosted in different countries every year. In the last 15 years the program was held in Peru (2000, 2011), Spain (2003), Western Australia (2005), Middle East (2006), Malaysia (2010), Italy (2012), China (2013)

In 2014, GVOTM was hosted by Kazan National Research Technological University (Russia), where participants from Russia prevailed, and in 2015 moved to Viva College (India) with predominantly Indian people. The rule for participation in GVOTM is to gather people with real world international experiences who have already worked or are working for international companies, and who are ready to share and develop their global professional networks. GVOTM often results in joint international businesses carried out by its participants.

This study surveys and compares the cross-cultural attitudes of GVOTM participants of 2014 and 2015, whose attitudes are expected to be similar. The data from these groups are considered as the professional baseline to be compared to for regular engineering students from the US, Germany and Poland, and those who participated in international capstone projects.

Population

Data were collected from a population of Indian professional business people who participated in GVOTM 2015. This group included professionals of Indian business and international participants from the USA, Great Britain, Spain, Australia, Israel, Colombia, Bulgaria, Mexico, Puerto Rico etc., in other words, it represented a strong multicultural environment, it was used as the reference group.

A similar demographics was demonstrated by GVOTM 2014: Russian entrepreneurs plus their colleagues from America, Europe and Australia. Comparison of these groups is of special interest as both of them represent multinational and multicultural communities of business professionals. The results of these studies were compared to the results of surveys with engineering students from the U.S., Germany and Poland and students who participated in international capstone project.

Table 1 summarizes the survey demographics. The total number of the survey participants is 315 with non-uniform distribution among different groups. The academic level of the participants is mostly undergraduate, followed by Masters and PhDs.

The survey also provided us with the percentage of international students in the groups and the gender statistics, allowing for a more detailed data processing. Although the majority of the survey participants were male, the percentage of female participants was sufficient for making important conclusions.

Finally, the survey data provide an overview of statistics about foreign languages the students can speak (additional to English) and their study abroad experience. 85% indicated that they have at least certain skills in another language or use it regularly.

Source		Academic		International		Gender		Language		Study Abroad	
All	315	All	315	All	315	All	315	All	315	All	315
American*	30%	Undergraduate	82%	Yes	13,1%	Male	70%	Yes	85%	Yes	33%
GVOTM India	11%	PhD	3%	No	87,3%	Female	28%	No	15%	No	67%
GVOTM Russia	7%	Master	14%								
Int Capstone*	2%	Juris Doctor	0%								
German*	13%	Other	0%								
Polish*	37%	Specialist	1%								
		CPA	0%								

Table 1. Demographics of the Survey.

*Added for comparison from previous cultural diversity studies conducted by authors

Results of the Survey

The survey data were compared using three subscales of the Miville Guzman Universality-Diversity Scale (M-GUDS)-S. Each subscale summarized statistics of 5 questions in the survey. The numerical values for the emotional comfort subscale were stated in reverse response value (higher values mean less emotional comfort).

Table 2 provides comparison of three subscales for two Global Villages on the Move with similar demographics. Each value in the sum of points from 5 questions (each 6 points maximum). The highest value of a subscale is 30 points indicating the highest diversity of contact, relative appreciation and emotional **dis**comfort (in the latter case).

As it was stated above, these two groups are quite similar in demographics and represent similar multinational and multicultural groups. It is not a surprise, that the values are quite similar and these groups demonstrate broad interest in participating in diverse social and cultural activities (high diversity of contact and recognize that diversity could have positive impact on their self-understanding and personal growth (relative appreciation). Their degree of emotional comfort with individuals of a different culture is also high.

	GVOTM India	GVOTM Russia
Diversity of Contact	26,12	26,27
Relative Appreciation	25,53	24,73
Emotional Comfort	10,38	10,09

Table 2. Comparison of survey results of two GMOTM professional development programs.

A more detailed analysis, however, reveals interesting differences even in these similar groups. Table 3 summarizes subscale points for these groups without international participants (only Russians and Indians, but still young entrepreneurs with strong international experience and multicultural awareness). Once again, groups in total demonstrate insignificant differences. However, a strikingly higher emotional discomfort was found in Indian male participants for cross-cultural diversity (almost 30% higher than in female participants). For Russian participants the results are excitingly opposite: now female participants reveal higher emotional discomfort, although the different is not so evident.

	Russian	Indian
	All	All
Diversity of Contact	26,80	25,35
Relative Appreciation	24,93	24,94
Emotional Comfort	10,60	10,76
	Russian	Indian
	Male	Male
Diversity of Contact	25,17	25,00
Relative Appreciation	25,50	23,89

Emotional Comfort	8,50	12,22
	Russian	Indian
	Female	Female
Diversity of Contact	27,40	25,75
Relative Appreciation	24,70	26,13
Emotional Comfort	11,50	9,13

Table 3. (M-GUDS)-S subscales by gender for Russia and India.

The results of GVOTM studies were compared to the results of the same surveys with engineering students from USA, Poland and Germany. The results are shown in Table 4.

Global villagers reveal the highest commitment to diverse social and cultural activities. High scores are also demonstrated by International Capstone Project participants. American, German and Polish students are very similar in their attitude to diversity of contact, while the differences between them and GVOTM groups are significant in all the subscales.

	GVOTM India	GVOTM Russia	America n*	Germa n*	Polish *	Int Capstone*
Diversity of Contact	26,12	26,27	19,81	19,12	19,99	20,86
Relative Appreciation	25,53	24,73	22,16	19,90	21,65	22,43
Emotional Comfort	10,38	10,09	9,54	16,05	12,51	9,71

Table 4. A comparison of attitudes to cultural diversity from different national groups.

*Added for comparison from previous cultural diversity studies conducted by authors

Table 5 summarizes the answers to multiple questions of the (M-GUDS)-S as a detailed comparison of these different groups. The GVOTM India group with many international entrepreneurs was selected as the reference one and mean values of scores were put in its column. The score differences were taken for other groups for comparison with the reference group and between them. A positive difference means that the mean scores are lower that for the reference group. A negative difference indicates higher scores.

	GVOTM India	GVOTM Russia	American	German	Polish	International Capstone
Count	34	22	92	42	117	7
Item	Mean	Difference	Difference	Difference	Difference	Difference
1	5,82	0,10	1,35	1,70	1,74	1,11
2	5,12	-0,16	0,47	1,05	0,65	-0,03
3	1,91	-0,13	0,18	-3,06	-0,06	0,05
4	5,00	0,00	1,50	1,79	1,29	1,57
5	5,03	0,21	0,42	0,89	0,70	0,89
6	2,24	0,78	0,62	-0,41	-0,11	0,66
7	4,47	-0,44	1,02	0,80	0,36	0,76

8	4,88	0,66	0,83	1,26	0,81	0,88
9	1,88	0,38	0,27	-0,43	-0,35	-0,12
10	5,65	0,19	1,15	1,34	1,28	1,08
11	5,26	0,26	0,69	1,29	0,90	0,84
12	2,62	-0,93	-0,10	-0,93	-1,00	0,05
13	5,18	-0,01	1,29	1,37	1,46	0,75
14	5,24	-0,17	0,96	1,14	0,82	0,52
15	1,74	0,19	-0,12	-0,84	-0,62	0,02

Table 5. The answers to multiple questions of the (M-GUDS)-S by different groups.

The results of the GVOTM Russia International Capstone Group have no significant differences from the reference group. The most significant differences for American, German and Polish groups can be found in the answers to questions 1,4,10, and 13: they are less likely to join an organization which emphasizes getting to know people from different countries and get intercultural dancing and music experience. They demonstrate less interest in learning about cultures that have existed in the world and getting to know people from different racial backgrounds.

It is quite interesting that all these questions belong to the first group “Diversity of Contact”, so these groups demonstrate narrower interest in participating in diverse social and cultural activities such as music, dance, celebrations and organization which focus on behavior. At the same time, individual answers to the questions from the relative appreciation and emotional comfort subscales are less different from the reference group and only their sums provide visible deviations (Table 4).

Conclusions and Suggested Approaches

This study discusses a specific part of a large research project in cross-cultural diversity problems in different groups and countries. The authors have already published some results of surveys using the Miville Guzman Universality-Diversity Scale (M-GUDS)-S method [14]. More countries and cultures are expected to be put in the list, while the results in this paper will contribute to developing a methodology roadmap for further research in this project.

1. Although modern students demonstrate self-understanding of diversity importance and reduced emotional barriers in front of different cultures, engineering universities still face such internationalization challenges¹⁶ as insufficient commitment of students to diverse cultural activities. Increased awareness in cross-cultural diversity can be achieved by early analysis of student groups and integrating respective intercultural aspects to their curriculum.
2. A good option for senior students to become less strained in intercultural relationships is participation in international capstone projects offering immersion to intercultural

environment accompanied by intensive study activities to gain useful skills for further career in international companies.

3. Professional development programs can be offered to engineers and businessmen, but a truly multinational and multicultural environment should be an indispensable component of such programs (immersion to other country in a group of professionals with no predominant nationality or culture). A successful example of such a program is Global Village on the Move by Lehigh University and its global partners.

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