

Engaging Engineering Students in Cultural Diversity and Unity Studies

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Abstract — The increase in the number of international students in the universities worldwide has led to new challenges and opportunities in engineering education. Despite the created multicultural environment, its participants still tend to congregate with peers from their native countries, especially in the engineering programs, where more attention is traditionally paid to research experiments and work-based experience, rather than to communication strategies. The paper aims at developing new strategies of engaging engineering students in intercultural communication through participation in cultural diversity and unity studies

Keywords — cross-cultural communication, cultural diversity and unity, engineering students

I. INTRODUCTION

The increase in the number of international students in the universities worldwide has led to new challenges and opportunities in engineering education.

Despite the multicultural environment created at most world universities, its participants still tend to congregate with peers from their native countries, especially in the engineering programs, where more attention is traditionally paid to research experiments and work-based experience, rather than to communication strategies. Cultural diversity has become unavoidable in the era of globalization, and earlier or later intercultural communications skills get to be very urgent for engineering professionals in the global teams where they are engaged in the numerous joint international hi tech projects.

Therefore, it is important to introduce cultural diversity and unity studies into the engineering curricula so as to prepare students for efficient global communications. Moreover, such courses can contribute to intercultural communication and understanding between peers in the university environment thus further promoting these habits into the workplace.

Introduction of cultural diversity studies into engineering curricula is one of the recent trends in global education, where multilingual and multicultural approaches show their efficiency for developing soft skills of the future engineers [1]. When students from different backgrounds start discussing cultural diversity issues in class, they get to know each other better, and this mutual understanding contributes to creating a positive supportive environment to improve other achievements [2]. This approach however, can give positive results only in case professors are ready to teach cultural diversity and unity, being engaged in intercultural communications themselves [3].

At the same time, universities face the problems of training their faculty for teaching cultural diversity to students

II. METHODS

The paper presents an experiment of introducing a course in cultural diversity and unity into an engineering Master's degree curriculum thus engaging students into discussions related to cultural awareness, attitudes and dimensions, distinguishing their similarities and differences based on the results of a survey, learning to embrace their diversity and facilitate a melt of classroom culture.

The motivation behind this study is to promote mutual understanding and enhance cross cultural communications between students with diverse cultural backgrounds which is very important for creating a sense of community in their future business and daily life.

The methodology of this research is based on student centered teaching and learning approaches focusing on students' self-directed learning through personal experience, where they are encouraged to find knowledge and to make decisions independently.

The unit of empirical analysis for the study was a small graduate engineering class comprising a population of nineteen students of which fifteen were local and four students were from other countries.

The initial data regarding cultural diversity and unity was collected from early studies of G. Hofstede [4-5] and H. Triandis [6] as well as recent publications in research journals [7-8] and conference proceedings [9-14], including the author's previous research results [15-17].

EU legislation documents on culture were summarized, and diverse cultural clusters were distinguished. These issues were discussed with students, and students were observed over time to detect any changes in their attitudes.

At the end of the course, a survey based on cultural dimensions theory of G. Hofstede was conducted for the students of the experimental group. The results of the survey were summarized for the group, and the group results were compared to the results from different countries presented in the Country Compass project.

The cultural diversity and unity studies were offered to Master's degree engineering students within the course of the business foreign (English) language for professional communication.

Due to close cooperation between the country of origin and the university with European partners, the focus was given to cultural diversity and unity in the European Union.

The following topics were introduced into the course:

1. Europe : Cultural Identity – Cultural Diversity. The search for a central concept in Europe's cultural identity. The promotion of the culture as a driver of innovation and creative endeavor.

2. 'United in Diversity' – cultural clusters in the EU and their influence on doing business.

3. The placing of culture as a main element of the EU's external relations, in order to foster understanding with other parts of the world.

4. The EU culture in its policy on corporate social responsibility (CSR) in the interests of enterprises. Evaluation of the impact of European policy on CSR. Enhancing the visibility of CSR and disseminating good practices.

5. The EU New Skills for New Jobs initiative Forecasts by the European Centre for the Development of Vocational Training (CEDEFOP). Analysis of emerging trends at sectoral level and the development of sectoral skills councils.

6. Efficiency of health saving technologies and health care systems in the EU.

Before starting the main topics of the course, it was important to introduce the concept of European Union, the history of its foundation, principles laying its activities, and legislation to the students. Although many of the student population members were working professionals with an experience of over 20 years in engineering companies, only few of them could name all the countries and nationalities of the EU, and this practicum contributed to their general knowledge.

When introducing the cultural identity concept, the issues of languages, mental and physical abilities, race and ethnicity, gender, age, SES status, religion, and sexual orientation were discussed. The students were encouraged to learn more facts about each other and to identify their similarities and differences.

At this stage, it was important to learn that out of the total number of 19, 4 students were from other countries with Muslim cultures, and out of the remaining 15 local students, 8 had Orthodox Christian family background, while 7 came from Islam oriented families.

At first glance, these differences could not be easily identified, as all the international students got their Bachelor's degrees in this country and were very well accustomed to its traditions, and all the local students were very much mingled together.

The key point in getting the students to know the cultural diversity issues was to introduce the theory of cultural dimensions by G. Hofstede. This topic was well supported by the website on Hofstede's insights [18], and the GLOBE project [19].

The widest list of cultural dimensions of national cultures was introduced to the students, including: power distance index, individualism versus collectivism, uncertainty avoidance, masculinity versus femininity, long-term orientation versus short-term orientation, and indulgence versus restraint. Students discussed these dimensions and gave examples from their backgrounds.

The country comparison tool from the Hofstede Insights project [18] was used to get a general impression about cultural dimensions in all the countries participating in the European Union.

After the discussions, the students were offered a cultural dimensions test based on G. Hofstede's characteristics [20]. The test was proven to be valid and consistent.

The test was aimed at measuring 5 of the cultural dimensions, and included 5 questions for each of them. The survey used five-point bipolar Likert scale questions where the respondents were offered to give their opinion or attitude towards the given statements.

The power distance set included the statements regarding:

- children's opinion in the family;
- believing and following the seniors;
- responsibilities of employees set by the employer;
- the authority of the boss at work;
- changes in the political system.

The individualism versus collectivism set included the statements regarding:

- connections within a working team;
- feeling of community;
- support to each other;
- promotion principles in a company;
- connections between family and work.

The masculinity versus femininity set included the statements regarding:

- attitudes towards the lucky and unlucky ones;
- motivation in the workplace;
- competition in the workplace;
- male and female differences in caring attitudes;
- love as intimacy and emotional support.

The uncertainty avoidance set included the statements regarding:

- teaching children to live under uncertainty;
- respect towards general vs. specific skills;
- the importance of ID documents;
- demonstration of feelings in public;
- rules of the society.

The long-term orientation versus short-term orientation set included the statements regarding:

- the good and the evil;
- balance and consistency;
- why, what and how questions;
- goal setting;
- consistency of information.

All the students participated in the survey and then discussed the results together.

Although the survey was anonymous, the students stated whether they were local or international.

III. RESULTS

In general, the results of the survey for local students agreed with the results presented for their country of origin in the Culture Compass project of the Hofstede Insights website [14], although some of the indices had lower or higher values, but the general trend was the same.

Thus, the power distance index showed 72 points in comparison with 93 in the Culture Compass. It is still higher than in most of the EU countries. The difference of 21 points could be explained by the young age of the student population who had not faced many of the power holders due to the level of social interaction they had experienced so far. The international students from the former USSR southern countries also showed a very high value of this index 81. Unfortunately, none of the countries of their origin participates in the Culture Compass project, so we have no chance to compare this value to the general country population. At the same time, we can see that both local and international students showed close values of the power distance index, which gives a good background for mutual cooperation.

The individualism index showed 45, very close to the Country Compass value of 39. Thus, collectivism prevails in the culture of the students which can be seen in their supportive team behavior. Unexpectedly, the international students showed a much higher value of this index, 67, despite the general collective atmosphere in their home countries. When discussing the results, the students gave their opinion that they developed the individualistic qualities after 4 years in a foreign country in the opposite to their home culture.

The masculinity index equaled 41 which only 5 points above the average Country Compass value of 36. Thus, caring for others and quality of life are more important than standing out of crowd for the students which is the general trend for the society. International students did not differ much showing the value of 35.

The uncertainty avoidance index scored very high, 85, but not as high as the Country Compass where it showed 95. The international students showed the average value of 92. Both results show that the students feel a lot of anxiety in regard of their future. This can be explained by the numerous reforms in the society and no guarantee of their future employment, these answers were given during the discussion.

The long-term orientation scored as high as 85, four points above the Country Compass results, while the international students showed the score of 53. This significant difference shows that the local students are used to living in ambiguity, and they think that everything can change at any moment, so it is preferable to invest into the long-term future, and higher education is one of the vivid examples: the majority of high school graduates seek university education. The international students, in their term, are less long-time oriented, they have to measure their performance on a short-time basis, while being in a foreign country they have to achieve certain goals in a short period of time.

Thus, the results of the survey showed the differences between local and international students in two cultural dimensions, namely, individualism vs. collectivism and long-term orientation vs. short-term orientation. The results were discussed in detail in class.

Through discussions, students learnt how to deal with these differences and make an advantage out of them rather than a barrier for communication and for joint projects.

Changes in attitudes of students toward cultural differences were observed over time. The students themselves and their professors from other courses stated that the students do much better in team work being capable of a better distribution of tasks without any need of control from the professor.

The outcomes of the experiment with a group of students showed that by introducing a course on cultural diversity and unity into an engineering MSc curriculum we can foster communication between local and international students thus creating a multicultural and friendly environment.

IV. CONCLUSION

Engaging engineering students in the studies of cultural diversity and unity issues contributes to developing their communication skills useful for their future careers in a multicultural world. Promoting culture as a driver of innovation and creative endeavor impacts efficient global cooperation.

Only collaborative learning of students and professors can promote the creation of a common culture which differs from the original cultures of the class participants thus helping each other to appreciate their differences and achieve a synergy effect when the sum of the cultures gives much more opportunities than each of the cultures independently. Introducing cultural issues into engineering programs facilitates sustainability in the global environment.

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