

Global Design Projects in the Americas: The Mondialogo School Contest Opportunity

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INTRODUCTION

The new global economy is demanding for professionals with international competences. In the particular case of engineering, there is an urgent call coming from different sectors, government, industry and academia, for a change in the paradigm in engineering education. This change clearly requires coordinating efforts, and defining and facilitating experiences for the formation of world-class engineers. One effective way of facilitating the learning of the necessary global competences is establishing consistent and consequent international experiences in the curriculum. Among the multiple possible experiences, one of the most effective and financially viable is the multinational design projects where students interact with foreign partners in the solution of engineering problems.

These types of projects are promoted now by the Mondialogo school contest. The Mondialogo is a partnership initiated by Chrysler and UNESCO for intercultural dialogue and exchange among young people around the world. This initiative has developed the Mondialogo Engineering Award which is a school contest where engineering students from developing countries are encouraged to form a team with students from developed countries to create proposals to improve the quality of life of developing countries.

This work reports the collaboration between Penn State University in the U.S., and Universidad APEC in Dominican Republic using global design projects and the progress of the project that was registered for the Mondialogo Engineering Award contest for 2007. This contest offers a great opportunity for students in Latin America and the Caribbean to participate in multinational design projects while targeting specific problems whose solution would improve the quality of life in those countries.

COLLABORATION

In the 2nd LACCEI conference in 2004 Miami, Florida, a group of professors from the U.S., Colombia and Brazil started discussing the necessity of collaboration in the area of design through multinational design projects. In the 3rd LACCEI conference in 2005 Cartagena, Colombia a first work was presented regarding the importance of Global Design projects in the Engineering Curriculum in institutions in Latin America and the Caribbean. The global design projects collaboration started on the Spring 2005 and by the end of 2006 more than 200 students from

nine different universities in six countries (U.S., Brazil, Colombia, Peru, Honduras, and Dominican Republic) have participated in this initiative. The number of teams, campuses and countries that have participated are summarized in Table 1.

Table 1: Network of collaboration

Period	No. of Teams	No. of Campuses	Countries
Spring 2005	18	4	U.S., Brazil, Colombia
Fall 2005	24	7	U.S., Colombia, Honduras, Peru
Spring 2006	10	4	U.S., Colombia, Dominican Republic
Fall 2006	13	5	U.S., Colombia, Peru, Dominican Republic

The multinational design projects were adopted since it has been shown that they are one of the most effective ways to incorporate international experience in the curriculum (see Devon, 1998; Pollard, 2002; Ion, 2004). This type of projects allows the students to work in diverse teams geographically disperse while they are solving a real engineering problem. They are short multi-team projects running as part of a course that usually last for seven weeks. The project is assigned to the students in the different countries simultaneously. Pairs of collaboration are formed among the institutions participating so each team has a corresponding partner in a foreign institution. Participating students discuss the design methodology and the project at a local level first and then they are asked to discuss the problem and share information with their international partners to enrich the final solution of the problem using web conferencing tools and e-mail.

THE PROJECT

During the Fall 2006, the students from Penn State and Universidad APEC worked in a collaborative project consisting of the design of a wheelchair accessible refrigerator with a minimum capacity of 18 cu. ft. where the users should be able to reach all the compartments and all the objects in the refrigerator from their wheelchair without any additional physical effort.

The faculty and students at UNAPEC learned about the Mondialogo school contest and they decided to participate inviting Penn State to be their partner as required by the contest rules.

THE MONDIALOGO ENGINEERING AWARD

The Mondialogo Engineering Award is a competition in which the pupils of engineering of the whole world develop group and technical capacities that allow them to develop technological projects to solve social, natural and humanitarian problems.

The development of these projects must be realized jointly by project teams of investigation consisting of two students groups from universities in different nations with the purpose of fomenting the international interaction. A necessary condition for the student groups to work on the same project is that one of the teams comes from a developed country and the other one represents a developing nation. With this provision, it is sought that the facilities, as well as the technical and structural advances of the developed nations, support and stimulate those of the countries in route of development. Another condition that must be satisfied is that the project proposed by the groups of investigation must address one of the United Nations Millennium Development Goals oriented to the improvement of the quality of life of the developing countries.

Students groups have six months (December – May) to establish the relationship, start the discussion of ideas, develop a collaborative plan, and formulate the project proposal. The final project proposal should include a detailed description of the project including supporting material. It should also include an analysis of the feasibility of the project addressing the social, cultural, economical and environmental impact as well as the ethical conditions in the country of implementation. Finally, the means of interactions between the teams should be described in the final proposal explaining the technological tools used for communication.

The wheelchair accessible refrigerator project was adapted to satisfy the requirements of the Mondialogo Engineering Award by adding the use of thermoelectric devices as means of cooling. Therefore, the proposed refrigerator besides being accessible and easy to use for disabled persons also eliminates the need to use fluorocarbons (CFC, HCFC, HFC, etc.) for refrigeration. This would diminish to a great extent the continuous deterioration of the ozone layer provoked by these chemical agents. The concept of not using fluorocarbons in the cooling system is in agreement with the United Nations Millennium Goal number seven which calls for actions to guarantee environmental sustainability.

The Mondialogo Engineering Award has developed an online project office for the communication between the teams. This online office has a private chat-room, a private and public forum, a portal for files publication, among other tools that can be used by the teams in the

process of interaction. Students are encouraged to use it but they are not limited to this site and they can use any other web conferencing and/or management system for their project.

The teams must finish the project proposal by May 31, date in which the project will have to be sent to “DCAG Communications, Corporate Sponsorship Mondialogo Engineering Award, HPC 1026, 70546 Stuttgart, Germany” via regular mail, or through an e-mail address at award@mondialogo.org.

PROJECT PROPOSAL ELEMENTS

The project proposal will have to possess the following elements:

- An introductory overview (250 words).
- A description of the proposed project (2500 words).
- A review of feasibility of the proposed project (1000 words).
- A description of how intercultural dialogue between team members was conducted (1000 words).
- Conclusion (500 words).
- Signatures of the faculty members associated with each student group, endorsing the fact that the students are registered at their institution and that the proposal is the student’s own work.

ASSESSMENT CRITERIA

The proposals will be evaluated in agreement to quality of project, degree to which the project addresses the Millennium Development Goals, feasibility of the proposed project and quality of dialogue.

CONCLUSIONS

The Mondialogo Engineering Award is an excellent contest that allows the students around the world to work in multinational teams while they proposed projects for the benefit of the society, especially in developing nations. This is a great opportunity for the students to:

- Have an international experience
- Work in an international setting
- Work in global design projects and teams
- Use the technology for communication
- Have a service learning experience
- Foster cultural awareness
- Develop communication and teamwork skills

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