Extended Abstract

Interdisciplinary virtual multicultural teamwork project as an alternative to classroom teaching- **Example of a pilot project funded by the EU**

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Introduction

Technological and social developments in the last couple of years have caused significant changes in the way how people live and work. Internet, for example, has introduced a whole new variety of ways how people can collaborate in virtual teams across geographical and cultural borders (Odlyzko, 2003). The implications of technological progress have the potential to shape our environment significantly. Frauenhofer Institute, for example, has termed this as the "Working Environment 4.0" based on a forecast of 100 experts (Fraunhofer IAO, 2014). This scenario describes the work and living environment of office and knowledge workers in the year 2025. It shows that in the knowledge intensive society of today, the capacity to be efficient, innovative and creative at the same time is a crucial factor for success. Experts agree that the importance of these skills will increase due to the new era of industry 4.0 (Fraunhofer IAO, 2014). An increasing number of people are facing highly flexible and multi-local forms of work in their daily life. Synergetic demands of individuals and organizations support this development (Guichard, 2001; Crites 1974).

A segment which is particularly affected by rapid technological progress and growing requirements concerning constant self-development and flexibility are the students from the IT sector (Karsenti, 1999). In 2010, the Association for Computing Machinery and the Association for Information Systems presented a revised model curriculum for undergraduate degrees in information systems (ACM, 2010). This model identifies leadership, collaboration and communication as the foundation of knowledge and skills required in information systems graduates. Modern economies are highly dependent on technology, requiring engineers to excel in collaboration and communication skills in international settings (Wieman, 2008). However, these competencies are not usually addressed in engineering and information science courses. One of the basic problems is how to create an environment in universities and colleges offering technical courses which helps in the development of such skills.

Method

The Multinational Undergraduate Teamwork Project (MUTW) is one such attempt to find a solution to the existing problem in technical and engineering institutions. Funded as a pilot project by the EU, its main purpose was to test new pedagogical instruments to encourage the development of interdisciplinary and intercultural competencies of the students. In the Multinational Undergraduate Teamwork course, students conduct a major project as members of an international team coming from different technical, management and art disciplines and from different institutions and countries. Except for the kick-off and final meeting, students work in virtual teams and scrum environment. Team members are geographically spread to ensure that the teams are heterogeneous so as to promote international cooperation. The collaboration which lasts a full semester has the aim to develop and present a solution to a given problem. (Escudeiro & Escudeiro 2012). Beside the possibility of developing soft skills, the MUTW project 2015, for example, applies the innovative scrum project management methodology. Scrum is a term that originally refers to a move in Rugby in which a team packs together and they all act together to get the ball from one end of the field to another end. The idea behind scrum is it to create a streamlined project management process that produces a quality end product that is applicable to complex and simple projects. The agile characteristic of this procedure allows dividing projects in smaller chunks that need to be completed. In a scrum environment, self-organizing and iterative techniques are used to achieve success (Moe & Dingsoyr & Dyba, 2010).

Results and Discussion

Quantitative analysis of the results of the pilot project from 2009- 2011 has shown that this program has promoted soft skills without much change in the curricula of the normal teaching (Escudeiro &

Escudeiro 2012). The students are required to interact and cooperate across disciplinary borders in a way to find a solution for a given task on their own. This cooperative learning paradigm guides students to work in teams to accomplish a common goal. Several skills are developed as a result of this cooperative virtual team work. Positive interdependency and individual accountability is needed to be able to work in a team efficiently. Another pillar which is crucial for the successful collaboration is the interaction either virtual or face-to-face. Students need to communicate across cultural and geographical borders which help them to develop these competencies during the course of the project. These collaborative skills include practicing the development of trust, leadership, decision-making, communication and conflict management skills. Progress of the project is caused by a group processing which anticipates a functioning in team collaboration (Tapscott & Williams, 2008).

In this paper, beside the quantitative analysis of the results of the past years, present implementation of the project would be explained and analyzed with the help of social constructivist theory.

Conclusions

The European Association for Education in Electrical and Information Engineering network has pointed out that students complain that there is a large gap between what they would like to know and what is taught in academia with regard to the ability to work in an international context (EAEEIE, 2008). Projects which are carried out on an international level have the potential to help students in acquiring the necessary skills that the labor market demands from them with regard to the arising work environment 4.0.(Bandura & Schunk, 1981). The MUTW project is a good example of how interdisciplinary virtual multicultural teamwork can be structured in a beneficial way for students, which differs from normal classroom teaching. By introducing new innovative project management methodologies like the scrum approach, the program tries to stay on the edge of latest academic findings. As it is proven by research in the case of the MUTW project, such programs can

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References and Notes

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