CROSS-CULTURAL TEAM WORK IN INFORMATION TECHNOLOGY EDUCATION

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Abstract
EVITech has international Bachelor of Engineering programmes in information and media technologies. In this work, I am searching ways to organize first-year team projects in a manner which would support cross-cultural understanding and efficient learning of computer science practices. It is based on methods for network-based project learning developed in EVITech since 1996. Factors contributing to success of application development projects are analyzed. The data are collected from classroom interaction and reports published on project Web sites. We have found that multicultural teamwork can be a very rewarding experience despite its difficulties. Students have ample opportunity to acquire tacit cross-cultural knowledge and competence. Individual students can bring their experience to the team process, thus having an opportunity to integrate their past into the studies.

Keywords: multicultural teams, university course, computer science education, projects over Internet, Web-site development

Introduction

Espoo-Vantaa Institute of Technology (EVITech) offers two four-year Bachelor of Engineering Degree Programs where the language of instruction is English, namely Information Technology and Media Engineering. Both programs have 30 to 40 new students each year. Where the majority of students in IT used to be young Finnish males we now have an increasing number of students from all continents with a diversity of educational and cultural backgrounds, and also a better gender balance.

The international groups are a challenge to us because of their heterogeneity. Classroom practices and teaching vary widely between countries. For example Massoudi (2002) makes a revealing comparison of expectations to students and teachers in Eastern and Western traditions in order to develop a model for ideal or "real teacher". This approach highlights a difference between attitudes - in the Finnish discussion the role of student is increasingly emphasized. There is also great variety in individual learning styles.

In the experimental media engineering program of EVITech, efforts to develop network-based learning methods for multicultural project groups have been made (some are reported e.g. in Markkanen 1999.). The issues of cultural diversity and teamwork have also been addressed in special workshops organized by outside consultants for the media students. So far, this cultural awareness has not penetrated other courses or other programs, neither has the teaching staff been involved.

We need to explore approaches and strategies which would improve the learning process in a multicultural classroom, and which would enable our students to grow to competent professionals. Otten and Nilsson stress that cross-cultural interaction is also a resource for the educational institution which could enrich it and educate its staff and local students. (Crowther et al. 2000) The big question is how we could develop our pedagogy to accommodate the needs of all students, and how we could benefit from this variety of experiences of our students?

The international classroom

The international students in EVITech have diverse backgrounds: some of them come from the expatriate community in Finland, some are immigrants or refugees, and some come directly from their home country to study here. In one classroom of 40 students we typically have people from all continents and from about 16 different countries. Largest groups are Finns (about 30 %), Chinese (25%), Africans (15%) and South Asians (10%).

In the beginning of the studies, the students have very little in common asides from a professed interest in science and technology. People also have varying motivations and goals for their studies. They have to learn to express themselves in a way that is correctly understood by others and in the institutional context. They need to find a place in their own study group.

Application development course

All first-year students take a compulsory class in Application Development in the second term as part of the introduction to computer science. They work in small teams in planning and implementing an application which usually is a web site. The content and topic of the site can be freely selected, main emphasis being in the application of systems analysis and systems

development methods, the basics of systems development life cycle. The students learn also project management, they select roles in their teams, and plan and divide the job evenly. Additionally, they also learn to work as a team, and to deal with typical problems during the software development process.

Part of the learning takes place in classroom, and part through the internet. The process is very transparent, as teams post their plans, reports, products and documentation on a Web-site where everybody can follow the progress. This method was developed in the Finnish programs by Veli-Pekka Lifländer (1999). EVITech has also participated in international team work projects through internet within the EU Leonardo program (Markkanen 1999, Donzellini et al 1999). In addition to learning from one's own team, teams also learn from each other. This brings a kind of friendly competition to the process. One can make a decent web-site even with modest skills, therefore students usually find these projects motivating. As instructor of the course, I intimately follow the creative process and students' feelings toward the task. The choice of topics is much reflected and also discussed in the classroom. Many students invest extra effort in making their pages look good seeing it as a means to find interesting summer jobs.

Project and team work in engineering education has been addressed in many studies. In the ITiCSE 2000 conference, the standardization of the project management on one hand, and motivation of students with real-life projects on the other hand, were suggested as efficient solutions. (Abi-Raad 2000, Hilburn 2000) Smith (1995) stresses careful planning of co-operative learning in order to achieve a positive relationship between team members. Team members should take the responsibility of learning for the entire team. Smith recommends problem based learning (PBL) in engineering education.

During the first year, students tend to group according to nationality if they are allowed to make up teams without guidance. At this point it could be very unfortunate for the project results, as backgrounds affect their skills and outcome of the project, and the results are often uneven. Typically, a bunch of Finnish boys who all have programmed already in high-school, team up. The team has little communication, and minimal documentation but produces fancy programs. As a result they have learned very little of team interaction, client relationship or need to document software. Moreover, when most of the technical skill is concentrated in one

team, the others struggle a lot with developing their technical savvy and may fail to deliver at
all.

I am the instructor of this course for the international IT group since 1998. I have made a
conscious effort to mix up teams so that the largest groups, namely Finns, Chinese and
Africans would be scattered evenly. Even though individuals can have varying profiles within
a nationality, certain skills are not evenly distributed among groups. For example, many of
our Finnish and Chinese students write quite poor English, whereas many African students
write fluently. Our Chinese students are often very quick to learn and strong in science, but
they rarely have any experience in team work. Thus, it would be counter-productive to let for
example Chinese students to make up a team, even though they would prefer it for language
reasons.

I make it clear to the students that if the team is made of a bunch of like-minded buddies they
may not encounter problems, but they also fail to learn to act cross-culturally and to gain the
painful experience of a typical school project. Most students understand the point and are
ready to face the challenge. We also agree that the multicultural effort is assessed positively.
There is a great number of factors which contribute to the success or failure of a project, and
because of the complexity of the situation, it is difficult to control. (Kutay et al 1999, 57)
Teachers have only a limited view to the process because part of the work is done outside the
classroom. Students themselves are inexperienced, and may fail to detect arising problems.
Thus, close monitoring of the teams in every step is very central, however, interference
should be minimal to let the teams learn from the process. Student personalities in a cross-
cultural team make each case different, and often students also try to hide internal team
conflicts. They seem to believe that conflicts are failures which result in lower marks for the
course.

Findings

Students were always free to make up project teams as they wished, but I encouraged them to
form multinational teams for two good reasons. First of all, teams tend to feel rivalry, and it is
not desirable to set nationalities against each other. Secondly, one-nationality teams tend to
have certain typical problems, whereas multinational teams have members with a wider
variety of skills. Naturally, there are no fundamental cultural or genetic differences between
the students at large, and individual students even from the same cultural background can

have very dissimilar competencies. Berry, Poortinga, Segall and Dasden state in their summary about cognitive styles that "cognitive processes appear to be common to all human beings as universally shared properties of our intellectual life; cognitive competencies are developed according to some common rules, but can result in highly varied performances that are responsive to ecological contexts and to cultural norms and social situations encountered both during socialization and at the time of performance." (Berry et al 1992, 130)

Some multinational teams succeeded well in combining their cultural differences into interesting projects. One West-Indian - Finnish - Chinese - African team created a Web-site about cooking in their respective countries. Another team consisting of African, Finnish and Chinese students made a site where they compare marriage customs in their home countries. In the classroom they seemingly enjoyed their projects enormously, as they had a chance to know more about each other's backgrounds and share experiences which they were proud of. There was a certain feeling of finding unity in being different. I see this as a kind of learning experience which cannot be introduced by teaching, only by the students themselves.

Quotes from project reports

"Our inter-personal communication skills are also developed during these three months. We begin to think a better way to encourage each other in stead of quarreling all the time. Actually most of us can do much better even than we could imagined before if communicate with each other properly. We assure that those skills will be a great bonus to us for doing some other projects and for the future working life. " (a student from West Africa)

" Ms. J. H. suggested that it may not be a good idea that people who came from same country be in a group, because we need different idea and we should get used to work with the people who has a different culture. That is why Mikko, Shaaban, Sidney and me- Guifang are working together towards a same target.The project topic is decided to be a wedding culture website since we came from three quite different country- Finland, Tanzania and China. It would be our pleasure to let people get to know more and more about our country and our culture. " (a student from China)

"During construction of this website, I faced challenges where I wanted to implement something on webpage but I didn't have the resources. Also working under pressure where teammate Guifang was putting a lot of pressure. But overall I learned that a good product

required hard work. From the design of this website, I have learned deeply more about marriages in other counties (Finland, China). The different cultures suggest different expectations from married couple. Maybe someday I will marry a Chinese woman…" (a student from Tanzania)

Failures

The study group compositions vary from year to year. It is not easy to explain why some groups hit it, and some never become a tightly-knit class. Technology students are notorious of not being socially talented, which sometimes results in a group with little interaction. In such a case, team work does not start well. In a team of reclusive individuals, it can happen that the team does not often meet not even in the classroom and coordination remains poor despite all the new technology in students' use (they all have mobile phones and email addresses). Often, female students are central in organizing the team work. Without women, there seem to be more difficulties.

Teams do also experience internal conflicts, disagreements and so on, but this is a normal part of the team process. I emphasize to the students that living through these conflicts is part of the learning. Emotions may run high during the process but normally teams find it rather amusing afterwards, if they succeed in their project.

Conclusions

According to the socio-cultural theory of learning based on the thinking of Lev Vygotsky (e.g. 1962) construction of knowledge is done through social interaction. There is interaction not only between teacher and student but first of all between the students in teams and in the group. In multicultural teams they have ample opportunity to acquire tacit cross-cultural knowledge and competence. Through their own discovery they can acquire a deeper understanding of cultural differences than by studying "how-to" lists of cultural rules. If they work in monocultural teams, their process and results often emphasize stereotypes, and the distance between the cultural norm (in this case Finnish) and "exotic" foreign is pronounced. In multicultural teams, on the other hand, this is avoided when people work with individuals and have a common goal. Individual students can bring their unique experience to the team process, and they are given the opportunity to integrate their past into the new study environment. In the best case, a truly multicultural co-operative unity is born.

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