Facilitating Project-based Learning and Regional University-Industry Cooperation over Institutional Boundaries

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Abstract

The information and communication technology departments of three higher education institutions in Turku, Finland decided to improve their collaboration in education and research by moving their activities to the same building in 2006. This created a joint campus for students, faculty members and staff of all the three institutions. Among the first emergent collaborative activities at the new campus was the founding of the ICT ShowRoom event. The event is a student project exhibition and competition open to all students of the joint campus. The event was organized for the fourth time in spring 2011 and it has become an established and integral part of the academic year gathering students, staff and industrial representatives together. In this paper, we focus on discussing how the event has evolved through the years and on sharing our practical experiences as co-chairs of the event. Special emphasis is given to discussing the involvement of local industry and the increasing role of the event as a regional networking platform and facilitator of project-based engineering courses and entrepreneurial spirit.

1. Introduction

Project-oriented courses are important tools to learn core engineering knowledge, skills and attitudes. Getting the opportunity to familiarize oneself in a hands-on fashion with the product and system lifecycle development and deployment is vital for students. This way they develop product and system building skills and get to apply engineering science to practice [1]. Still, convincing faculties and institutional administrators of the importance of creating learning activities of this type, or convincing them into providing facilities to students for joining a design-build project is not an easy task. Therefore, special activity in promoting a project-oriented approach both among the teaching staff and the students is needed to make the achieved learning outcomes visible to the community while simultaneously spreading the spirit of design-build activities and best practices further.

The information and communication technology departments of Turku University of Applied Sciences, University of Turku and Åbo Akademi University (all located in Turku, Finland) decided to improve their collaboration in education and research by moving their activities to the same building in 2006. This created a joint campus for students, faculty members and staff of all the three departments. At the joint campus, the departments offer several project-based courses in their curriculums. The joint campus and the project courses lead to an initiative by the authors to promote student projects somehow and at the same time to get both students and faculty members to become familiar with each other and their ongoing activities. The challenge in achieving these goals was that the curriculum profiles in and within the universities differ significantly from each other. For example, there is an undergraduate program in Arts & Media as well as a graduate program in Microelectronics – and many others. Thus, the concept should

allow participation of different types of students and projects, as well as foundations for co-operation between students from different disciplines and institutions.

The decision was made to launch a joint competition between the student projects that focused not only on technical implementation details but also on the business ideas behind the project, as well as on the presentation skills of the teams. The result of the brainstorming was ICT ShowRoom – an exhibition and competition open for all student projects of the campus. The intention was to create an event with good spirit and relaxed atmosphere – but still set up a real competition with an industrial jury and considerable prizes for the winner team. The marketing of the pilot implementation was started late autumn 2007. The number of participating teams was finally almost doubled from the original goal; 42 teams presented their work at the exhibition in March 2008. Local industry decided to sponsor a significant prize for the winning team, as well as to send their representatives to a jury to assess the project groups' performances and to choose the winning team. The first event was a success [2].

In spring 2011, the event was organized for already the fourth time. It has become an integral part of the academic year gathering students, staff and industrial representatives together. The current visual image of the event is based on the 2009 event, further modified and improved annually by Media and Advertisement students of Turku University of Applied Sciences. The visual image is presented in Figure 1.

In this paper, we focus on discussing how the ICT Showroom event has evolved through the years, and on sharing our practical experiences as co-chairs of the event. Special emphasis is given to discussing the involvement of local industry and the increasing role of the event as a regional networking platform and facilitator of project-based engineering courses and entrepreneurial spirit.

Figure 1: ICT Showroom '09 and '11 visual images.

2. Background

2.1 Project-based courses

The Computer Technology and Computer Science curriculums at Åbo Akademi University have for many years had a joint project course where the participants form groups and perform a project with a larger scope than normal exercises during a standard course. The groups have been of size 3-6 persons. The project work has normally been software development, where the groups followed some software process prototype selected by the group.

The length of the course was two semesters, starting directly after the summer holidays in September, and running until mid-spring, around Easter. The course itself was started with lectures on software processes and software projects, where after the students formed teams and started to work on projects. The projects were either ideas by the teams themselves, or projects assigned by the lecturers. The teams presented the status of their projects in regular project course meetings once a month. The projects teams were supposed to finalize the projects until the end of the course, but many times the projects overrun, and the final version was delivered late.

Also the Information Technology curriculum of Turku University of Applied Sciences has a long tradition of project-oriented way of working. The second year students have a mandatory Software Engineering project in their program and, especially, the final year students work closely with different projects often based on external assignments. However, there were no common platform to present the results and learn from the other student's project ideas and implementations.

Similarly, the Computer Science and Information Technology curriculums at the University of Turku include several courses containing project work. Currently such courses are found for example in the areas of Mobile Communication and Software Engineering. Also, Master's projects are often viable for inclusion to the ICT ShowRoom event. Before the event, there was no forum for student teams or research groups to present their projects or research results on campus.

2.2 Challenges with student motivation

One fundamental problem with the courses has been the lack of motivation for doing project work on a regular basis and delivering a final deliverable at the assigned time. Another problem was that the general curriculums did not include education on project skills. For instance, the normal Computer Science curriculum at Åbo Akademi University includes theoretical knowledge on Mathematics, Data structures, Programming languages, Databases etc., but when it comes to running live projects, the students were basically on their own. To tackle this problem, lectures with project management basics where introduced in the course, and checkpoints such as kick-off meetings, milestones and definite deadlines where strongly emphasized in the course. However, lack of motivation was still a problem. As nobody did check or need the results of the projects, the groups were not motivated to keep up the pace during the project.

2.3 Internal exhibition

To deal with the lack of motivation, the teams participating the project course of Åbo Akademi University during the academic year 2006-2007 were asked to produce posters on their projects and present them during a course internal exhibition, to which personnel of the department was invited. This was a definitive spark for the project work, and all teams were much more motivated to deliver a good project on time. The exhibition was open for two hours in a normal lecture room. In addition to the posters, the teams produced live demos of their projects. The rather simple possibility to demonstrate the projects to an audience, proved to be a very strong

motivator for performing and finalizing the work in time. Immediately following the success of the internal exhibition, the idea of having an even larger audience and larger pool of projects was born.

3. ICT ShowRoom

Different types of student competitions have been arranged in very many universities. For example, the *Innomaraton* [3] is a joint event of University of Lapland, Rovaniemi University of Applied Sciences and Kemi-Tornio University of Applied Sciences in Finland. The main idea of the marathon is that the local companies provide assignments to student groups which then create innovative solutions to the given problems. The best solutions participate in a final evaluation round, and a winner is selected by a jury that consists of entrepreneurs, regional developers and university teachers. Another example is the *Lahti Science Day* [4], an annual event organized by the Lahti University Consortium and the Universities of Applied Sciences of the Päijät-Häme region in Finland. The goal of the event is to present ongoing research and development activities and other state-of-the-art topics to the local companies and other stakeholders, as well as to serve as a networking platform.

These examples represent only a brief snapshot of the student project events, but they contain many elements common to the vision behind the ICT ShowRoom concept. However, in this case the challenge was to tailor a concept which enables participation of students from different disciplines and degree program profiles. Moreover, the rules and assessment criteria should be such that even teams in the beginning of their studies could have a fair game against those already close to their graduation.

3.1 The concept

The institutions participating in the event are the Information and Communication Technology related departments of Turku University of Applied Sciences, University of Turku and Åbo Akademi University. All three departments have been physically located in the same campus and in fact in the same building, the Turku ICT House, since autumn 2006.

The event accepts two kinds of contributions: student projects made during the past year as a part of coursework in one of the departments, and research project presentations. For both types of contributions, the organizers provide a poster stand and a table for demonstrations. For the student projects, the organizers print the posters and cover the poster expenses. The student projects participate in the competition part of the event, where a jury evaluates each participating student project and selects a winning team.

In order to have a non-biased jury, it was decided to invite a group of local industry professionals to both act as members in the jury and to sponsor the prizes given to the winning team. The jury assesses the technical contribution and quality, commercialization potential and presentation of the student projects. However, there are no exact criteria for the evaluations, allowing for different annual emphasis based on the jury composition. The jury spends two hours in the event familiarizing themselves with the student projects, discussing the ideas and solutions used in the projects with each student team. The jury members give immediate feedback to the students about their views on the operability and implementation of the project. After the evaluation round the jury members have a meeting to discuss the student projects as well as to select a winner and one or more other projects that in their view deserve a certificate of appreciation. To motivate the student teams to really do their best, the organizers have each year made sure that the prize received by the winning team is something substantial and makes the effort in the event worthwhile. In 2008, the price was an Internet tablet device, in 2009 a mini-laptop, in 2010 a network-attached storage station, and in 2011 a high-end smartphone for each team member.

Figure 2: Teams setting up their stands and presenting their projects at the ICT Showroom ’09 exhibition.

In addition to the student project competition, the event also includes a public voting in which visitors of the event may vote their favourite presentation and technical content. A certificate of appreciation is given to the winning team of each category. One of the voters is randomly picked to win a prize; typically a high quality digital audio player.

Even though the research projects are not included in the competition, the research groups benefit from the event in the sense that they can practice their presentation skills and use the event as a test bed for their demonstrations in preparation for scientific conference exhibitions. Research projects are allowed to bring their own presentation equipment and material to the event if they so wish. Another advantage for the research projects is that they have the opportunity to provide such presentation material that is normally not presented on scientific conferences. On scientific conferences, the emphasis is on new contributions, normally on deep technical details that the project is providing. The ICT ShowRoom gives a more practical overview of the project; information that you typically provide to a broader audience focusing on the problems the projects will solve.

3.2 Schedule and arrangements

The overall schedules and other key figures of the first and the latest ICT ShowRooms are shown in Table 1. In the Kick-off event the ICT ShowRoom concept is presented to potential participants. The idea of the Kick-off is to make things moving and to check the initial interest in the competition. The registrations to the event are done using a web based system, where the participants in the first stage register the project name, members, abstract and contact information. Later on, the posters are submitted via the system, and then collectively printed at a print house by the organizers. In addition, a program leaflet and other documentation (team and jury instructions) are prepared in advance.

Table 1: Key figures of the first and latest ICT ShowRoom events.

Academic year	*2007-2008*	*2010-2011*
Announcement / Kick-off	Nov 30 / Nov 30	Nov 15 / (not organized)
1st registration deadline	Dec 15	-
Registration deadline	Jan 31	Jan 31
Poster deadline	Feb 29	Mar 2
Exhibition date	Mar 7 (Fri)	Mar 10 (Thu)
Exhibition open for public	11:00-15:00	11:00-14:00
Number of student projects	27	30
Number of research projects	15	12
Number of participants	163	187
Number of public votes	150	170
Jury size	5	6

In general, already the first ICT ShowRoom event was considered successful and the event was decided to be repeated the next academic year. The first time all practical issues had to be figured out by the organizers; during the following rounds experiences and material from the previous events were taken advantage of, which effectively reduced the workload of the organizing committee both beforehand and during the event. The main concept was found to be working; hence only some smaller changes were done.

Figure 3: The winning team the of ICT ShowRoom ’11 competition at the award ceremony.

3.3 Public visibility and media

The intention was to get visibility in local newspapers and other media, too. Before the first ICT Showroom invitations to the media were sent out, but none turned up at the event. Also press releases both before and after the event were sent out, but the reaction by local media was poor. Only when the winning team was found to be from the Swedish speaking Åbo Akademi University, a local Swedish speaking newspaper and radio channels contacted the winners and

interviewed them. But on the general level, the event in itself seemed not to be interesting enough. New attempts to attract media were made with a slightly different focus even during the following rounds but only some minor hits in the local media were noticed. Finally, the ICT ShowRoom ’11 got a nice news flash in the local cable-TV.

4. A platform for university-industry collaboration

4.1 Local industry recruitment

Most of the companies in the ICT sector in Turku are small or mid-size enterprises (SMEs). These SMEs often perform direct recruitment by getting into contact with potential students during trainee periods or summer jobs. However, this recruitment process, even if otherwise quite effective, is rather limited to the students they happen to be in contact with. The ICT ShowRoom provides another recruitment channel. Several companies participating in ICT ShowRoom have for several years recruited new personnel based on the inspiring results the student teams have presented during the event.

The SMEs in the ICT sector are organized in a non-profit organization called “Turun Seudun Ohjelmistoyrittäjät” (TSOY) (Turku Region Software Entrepreneurs Society). Also TSOY was cooperating with ICT ShowRoom this year, getting closer to the students. There is no information on the effects of this cooperation yet available, but results, for example, in terms of new recruitments and joint projects between the companies, universities and students are expected.

Figure 4: The jury members evaluating a project at ICT ShowRoom ’11.

4.2 Facilitating new businesses and entrepreneurial spirit

So far, at least two student projects presented in ICT ShowRoom have also been further developed into businesses. A project team developed technology for live video broadcasting from mobile phones to the internet. This technology was developed to be the technological basis for the company Bambuser (bambuser.com) that today provides both free and commercial

versions of a system for live video broadcasting. Another project team started to work on indoor information systems and indoor positioning technology for mobile phones. The basic idea is to provide the information services to smart phone users, when they are inside large inside areas like shopping malls, university campuses or cruising vessels. The technology is now further developed inside a newly founded private enterprise.

In addition, the event has clearly boosted the entrepreneurial spirit among the students of the campus. The experience has promoted the importance of applying the knowledge and skills in creating new product and service innovations. The fact that the teams must face an industrial jury and pitch their idea and solutions in front of experienced business people has had an effect, too. The projects and presentations are getting more and more professional and creative each year. Furthermore, the ICT ShowRoom 2011 co-operated with Boost Turku, a student-based network for young entrepreneurs and entrepreneur-minded people sharing knowledge among the universities of Turku. Boost Turku organized a post-competition event for the participants providing information on their activities and presenting encouraging start-up examples for the students.

5. Discussion

In this paper we discussed the ICT ShowRoom event and how it has evolved through the years. The presented practical experiences in running an annual exhibition and competition across institutional boundaries were discussed from the point-of-view of event co-chairs. The involvement of local industry and the increasing role of the event as a regional networking platform and facilitator of project-based engineering courses and entrepreneurial spirit has been recognized and appreciated by all actors coming together in the event: students, faculty members and local industry.

The ICT ShowRoom event has now been organized four times and the experiences have been very positive. However, the concept will be further improved in future rounds; the tradition is just becoming established. Acquiring participants to the event has been identified as a task that still requires a great effort – concerning both the student and research projects. Despite the fact that this seems to get easier with time, further actions should be planned. Getting student teams to participate requires effort from all the instructors of courses that include practical project work.

The ICT ShowRoom event has clearly grown into a multi-institutional and interdisciplinary workspace that “supports and encourages hands-on learning of product and system building, disciplinary knowledge, and social learning” [1]. The event has already now proven to be a successful and easy way to facilitate project-oriented teaching and learning activities and, moreover, it has served as a networking platform for the students, university faculty and staff, and local companies.

References

1. E. Crawley, J. Malmqvist, S. Östlund S., & D. Brodeur, *Rethinking Engineering Education – The CDIO Approach*, Springer, 2007.

2. J. Björkqvist, J. Roslöf, & S. Virtanen S., “ICT Showroom - a joint student project exhibition and competition of three universities”, *Proceedings of the 5th International CDIO Conference*, Singapore, 2009.

3. Lapin Innomaraton, Finland, event website (link checked 2011/04/27): http://www.innomaraton.fi/index.html

4. Lahti Science Day, Finland, event website (link checked 2011/04/27) (information mainly in Finnish): http://www.lahdenyliopistokeskus.fi/lahdentiedepaiva/