

Enhancing interpersonal skills in Information Technology Projects.

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ABSTRACT

Many project courses emphasise technical issues and neglect the interpersonal and human issues involved in software development projects. Employers value graduates who have good communication, negotiation and conflict resolution skills and are able to function well in a team environment. This paper describes a highly successful and innovative final year Information Technology Project course which is focussed on the people and the clients involved in projects. The large project team (approximately 14 to 18 students) is highly structured and team members take on all of the roles likely to be encountered in the workplace.

Keywords: Project, Team, Interpersonal, Client, Role.

INTRODUCTION

Surveys of employers have shown that the qualities they consistently rate most highly in graduates relate to their communication skills, their ability to work together in teams and their technical writing skills, besides their basic technical knowledge [1]. Working in teams has been shown to develop positive intergroup relations and enhancement of the understanding of a subject [7]. In the School of Information Systems, education and training in professional skills and knowledge has been introduced at all undergraduate and honours levels.

It is considered highly desirable that all undergraduate students have some form of large project experience before graduating [5]. However, it is virtually impossible to replicate the workplace within a university course. Time, experience, adequate equipment, and an authentic work environment are lacking, and knowledgeable project managers are not available to lead project teams. Further, the cost to create such an environment for most university departments would be prohibitive in

the provision of equipment, office space and in the hiring of suitable personnel.

In the final year project course therefore it is appropriate that the project structure, coordination and training focus on the professional and interpersonal issues associated with systems development.

BACKGROUND

The Business/Higher Education Round Table survey [1] asked both businesses and universities to rank the desired characteristics of university graduates. The survey indicates that business and universities differ in their ranking of the importance of characteristics in the graduates in two major areas:

1. Communication skills, a capacity to learn new skills and procedures, and a capacity for cooperation and teamwork. In each of these cases the universities' rankings are well below those of business, particularly in the area of communication skills.
2. Theoretical knowledge in a professional field and a capacity to use computer technology. In these cases universities have rated these characteristics much higher than has business.

This trend towards increasing importance of non-technical attributes is also supported by a survey of IS job advertisements that appeared in the Australian newspaper over the past 20 years [6].

Clearly there are significant short-comings in the traditional approach of exposing students to large software projects as part of their undergraduate experience. If we are to produce students who have the appropriate attitude to accept readily the nature of the workplace into which they are graduating, then we need to emphasise communication, teamwork and cooperation in their undergraduate projects.

SYSTEMS DEVELOPMENT ISSUES

Lai has distinguished the mechanical aspects of systems development from the human aspects. She

lists the mechanical aspects as: time control/scheduling; cost control/budgeting/variance analysis, and performance control/quality assurance process [3].

However, the adoption of best practice with respect to the above three areas does not ensure successful systems development. A number of other human-oriented characteristics are essential for good systems development. Lai [3] identifies these as: project managers as team builders; complementarity; communication, and commitment.

A major challenge for software engineering and information systems educators is to transfer the wisdom associated with these human-oriented characteristics of systems development, while also teaching students the technical, mechanical and managerial aspects of systems development and project management. Because of time and resource constraints, all of this has to be done within a very short period of time, typically 10-14 weeks, and in the highly artificial environment of the university teaching and research laboratories.

COURSE STRUCTURE

The Information Technology Project ('IT Project') course at the University of Tasmania has two prerequisites:

1. A second year Information Systems course which includes a topic on systems development methodologies.
2. A first semester, third year course on IT Project Management. This course covers the essentials of IT project management, including the human aspects of team building and working in teams.

All students taking the current IT Project course have completed two and half years (5 semesters) of professional development. This education and training in professional skills and knowledge is a core part of the IS program [4]. The compulsory workshops cover a wide range of issues, including study skills, cross-cultural communication, interpersonal communication, information gathering, interviewing, formation of teams, working in teams, team leadership, group problem solving techniques, presentation skills, conflict resolution, and negotiation.

The IT Project course is an intensive practical project course in which the final grade for each student is entirely based on continuing assessment. The assessment of each student is determined by a combination of individual, subteam and team-based achievements and peer evaluations.

PROJECT TOPICS

Each year the IT Project course has been taught, a different project topic has been used. These project topics and objectives are chosen to be relatively open

ended, challenging and aimed at the production of proof of concept systems rather than fully developed solutions.

The topics chosen for projects were:

- 1994 WWW display system for Department foyer
- 1995 SGML DTD design and markup of sections of the University Handbook
- 1996 SGML DTD design and markup of
 - a. Journals for the Centre for Youth Studies
 - b. Sections of the University Handbook
- 1997 Database of University course information
- 1998
 - a. IVR System for a local school
 - b. School of IS book-lending database
- 1999
 - a. Timetable database for School of IS
 - b. IVR System for School of IS

Each project has a specific, real client, to whom the project results are to be delivered. This client is chosen by the course coordinator as part of the project design, and may be from an external organisation or from within the University.

At the commencement of the course students receive a one sentence outline of the project topic from the course coordinator. All subsequent project and requirements definition is obtained directly from the project client.

COMPOSITION OF TEAMS

The IT Project course is based on a total team size of approximately 16 students, although it would be feasible to run this approach with 12-20 students per team.

Each team consists of a group of Project Managers, a group of Experts and 3 Project subteams. Each team has the same overall structure, although the actual numbers assigned to each subteam may vary with the problem area and number of enrolled students.

The group of 2-3 Project Managers has the primary tasks of overseeing the conduct of the entire project and managing the mechanical aspects of the project, such as resource allocation, task assignment and scheduling, and maintenance of project monitoring documentation.

The group of 2-3 Experts is required to study the appropriate technology and tools required for the execution of the project. These students need to master the technical material very early in the project life cycle, so that they can act as consultants to the project subteams later, during the design, implementation and testing phases.

The remaining team members are split into Project subteams, with 3-4 students per subteam. These students will perform the bulk of the project definition, analysis, design, implementation, testing and documentation.

Students are assigned to teams and subteams by the course coordinator. The Experts and Project Managers are selected from students with better track records in technical or interpersonal skills. Other key students are identified who have good academic records, and these students are distributed evenly across the various subteams. As much as possible the teams and subteams are structured to be comparable in gender, ethnic background and academic ability. In particular, friends and close relatives are split across subteams.

PROJECT PROCESS

The composition of the teams and subteams is established in the first session of the course. The clients contact details and the project description are distributed, together with an outline of the roles of the subteams.

The Project subteams then commence the work of developing the project definition or brief, and progressing to the preliminary design of the project. Each Project subteam completes this exercise in parallel.

The Project Managers act as the quality controllers in this phase, by giving the Project subteams feedback on their project briefs and preliminary designs.

The Experts are meanwhile becoming familiar with the relevant technical material, reading manuals and associated documentation, and using software tools. During this initial phase the subteam members learn to work closely with one another, and also to share information and resources with other subteams. The subteams are not encouraged to be competitive.

The whole team then meets to discuss the various preliminary designs, and select what they consider to be the most appropriate design.

The second phase of the project has the Project subteams working on the variety of tasks needed for the project. The Project Managers determine the tasks required to complete the project, assign tasks to the Project subteams and develop a task schedule. They may wish to restructure the Project subteams, depending on the complexity of the various tasks.

The Experts act as technical consultants to the other Project subteams. Some years they have chosen to present a seminar to the other Project subteams on the technical issues involved.

Students are strongly encouraged to be client focussed throughout the project. Further, the project subteams are expected to resolve their own interpersonal problems through conflict resolution and negotiation techniques. They may not pass these problems on to the client. The course coordinator only intervenes in matters of an interpersonal or team-work nature when absolutely necessary.

COURSE EVALUATION

The IT Project course is evaluated by the students at the completion of the semester, using the University of Tasmania's standard Student Evaluation of Teaching and Learning (SETL) questionnaire. The IT Project course has consistently achieved very favourable SETL average scores. Some of the comments received from students as part of this SETL evaluation are:

'Educationally, we achieved a lot; ... The experience of communicating at a professional level with peers and superiors, across many actual or perceived barriers is not one that can be taught; this and many other types of 'incidental' learning make up at least half of the benefit gained from doing this course.'

'The course was really good in making us use the skills and theory we had learnt and forgotten over the past three years. There is a great difference between knowing how to do something and actually doing it. I would recommend the course to any other student, even though it required hard work and was at times frustrating, overall it was a worthwhile course and I am glad I did it. It will be very valuable in my future working environment.'

'This has been the most enjoyable and useful course I have done in my three years as an undergraduate.'

CONCLUSIONS

The focus on interpersonal as well as on technical issues is highly regarded by the students.

The relatively large teams of 16 students and the team-of-teams approach adopted in this IT Project course has proven to be a very useful structure through which students have learned a great deal about teamwork, practical project management, and sharing information, as well as completing the technical requirements of the project.

It has been evident from the comments received and output achieved in these projects that students have gained a very real appreciation of the interpersonal and human issues involved in software development projects.

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