Group Projects are needed in the Information System Classes

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Abstract

Two of the top fortune 100 companies located in central Illinois tell students that their interviews are performance based, the questions will go something like this "Tell me about a time when you ….". One of the many competency areas that employers are looking for is that students can work effectively in teams and collaborate effectively among team members. Many of the competencies the employers are looking for will be achieved if the students are active members in a group project.

This paper is about how to find and implement semester long 'real' group projects in your classroom and also how to select team members. The author has found that students in group projects take them much more seriously when they are 'real' world situations. You do not have to look very far to find 'real' projects that your community would love the university's help to develop.

Introduction

In order to be successful in the corporate Information Systems world an employee must be a team player. IT professionals who possess the following qualifications also are highly marketable: certifications, soft skills and business acumen. [7] Focusing on the soft skills hiring managers are seeking technology professionals with well developed communication abilities. According to Lee the job seeker needs to be able to clearly explain technical concepts to a variety of people in an organization[7]. They also need to be able to work collaboratively in a group and know how to handle group challenges tactfully and diplomatically.

Two of the top fortune 100 companies located in central Illinois will tell students that their interviews are performance based. For five years the author of this paper interviewed applicants for one of the fortune 100 companies in Bloomington, Illinois and the questions went something like this "Tell me about a time when you ….". Companies want to know what our students have done and it doesn't matter if they are interviewing for a job or a summer internship. One of the many competency areas that employers are looking for is that students can work effectively in teams and collaborate effectively among team members. How can your students get the type of experience the major companies are looking for at graduation? If they have had no previous work experience they may be left behind unless we give them similar opportunities in the classroom. Many of these competencies the employers are looking for will be achieved if the students are active members in a group project.

Our MIS/CS graduates need to not only know how to draw technical diagrams and write program code, but also need to know how to develop and work in teams. Team projects are often relegated to the capstone course in a discipline, unfortunately this would be the last course taken before graduation. Universities that have capstone courses, usually require all students to participate in this culminating and integrative educational experience [4]. Students are better prepared for their career path when they can understand and apply concepts taught in the classroom [2]. But with the budget deficits of today we are seeing the capstone course as one of the first courses to be eliminated from the curriculum requirements.

As MIS educators, we all agree that our students need to learn to work effectively in teams. Whether the capstone course is eliminated or not, the team project concept needs to be incorporated in several of the MIS courses. Semester long group projects can be appropriate for a Systems Analysis and Design Course, System Implementation Course, Database Design and Implementation Course and even a Programming Course. Yet many professors in both computing science and information systems still feel that group projects are not worth the hassle and complications [1].

At Millikin University our goal is to integrate both theory and practice in each course. I believe that team projects need to be an integrated part of the MIS/CS curriculum. I have applied team projects in the following courses I have taught: Programming Language course, Organizational Information Systems course (survey course), Systems Analysis

and Design course, System Design and Implementation course and a Database Application Development course.

Preparation

Courses that have a semester long group project will require a significant amount of instructor preparation prior to the course starting. Two of the issues addressed in this paper will be choosing a project and forming teams.

Choosing a Project

A major concern is that of project selection. If a project is too large then it cannot be finished and team dedication and focus suffers [11]. It has been my experience and others that finishing the project will motivate the team to a higher level of academic performance [8, 10, 11]. The project must have just enough complexity to be challenging but doable in the time frame of a semester. Projects can come from a variety of locations: departmental needs, university IT needs that are a low priority, student organizations, other faculty members, students themselves and alumni will often have projects they would welcome some help completing. I have found it is easier to work with clients on campus or alumni because they have a very good sense of educational requirements for the programs.

Another excellent source of projects is the non-for-profit organization clients, they can not afford to pay for software development and often have very specialized needs. Charitable sponsors can provide excellent publicity for the department [4]. I have found the non profit organization to understand exactly what data requirements they need to store for database projects and reports they will need to generate. In the Tabor School of Business we have a Center for Entrepreneurship where a wealth of projects are waiting for any system class to step in and help them out. Once you have selected the client based project for your course and word spreads you will find that you will continue to receive more projects from which to choose.

You must keep in mind that the project that is chosen must be a project that is not critical to the client; your best students may not be able to deliver for one reason or another [4]. It is important that the instructor understands the project as well as the students to be able to act as mentor to the team. The amount of instructor effort required to support and evaluate individual projects may seem overwhelming, you may elect to choose one project for the class. You still can have 5 or 6 teams working on the same project. The client then will have a choice of which final project they will select for implementation. If you elect to implement this methodology it will take more time on the client's behalf to meet individually with each group.

Forming teams

Team selection is one of the most important issues each instructor must consider [3, 4]. Team selection is usually conducted by one of the following ways [3, 4, 5]:

- Students choose their own teams
- Instructor forms teams based on student's performance abilities e.g. GPA
- Instructor forms teams based on random selection
- Instructor chooses a team leader who then selects the team members
- Instructor forms teams based on student's technical skills

When students choose their own team one of the potential problems that may arise is that the higher potential students will cluster together leaving the less capable students to compose a single team. If teams are chosen early in the semester, before students get to know one another, the team composition usually mirrors the seating configuration or previous acquaintances of the students in the room.

When the instructor forms a team it is usually based on a balance of the team composition. A typical team formation would be to select the highest potential student and pair them with the lowest potential student. Continuing with this selection technique until all students have been selected to a team. If the students are new to an instructor this information can be obtained by having the students complete an autobiography in the first week of the semester. In the autobiography you would want the students to list past computing/business courses and grades they have received, this may not tell the whole story but gives you some basis.

Random assignment to teams should insure a more equal distribution of talent to each team as opposed to the student self-selected option. A combination of random and instructor chosen approach might be to pick the highest and lowest potential students to a team and then use random selection for the remaining students in the course.

The fourth option for team selection would be for the instructor to select team leaders and then the team leaders will select the members for their team. In class the instructor asks for volunteers to be team project leaders. Then all of the students in the class are required to prepare two one-page resumes, one with their name and local information and the other with no name. The team leaders are then given all the resumes with no names which were collected in class. The following day the team leaders and the instructor meet to "hire" their team members. This methodology of team selection works reasonable well giving an even distribution of talents among the teams. One potential problem is that some of the team leaders might be able to tell by the resumes who the individual students are in the pool.

At one time or another I have used all of the above methods of team selection in my classes, I have found the one which mirrors industries seems to work best. The assignment of roles and responsibilities in a group is one of the factors found in business

environments. Mennecke & Bradley [6] found the assignment of roles and responsibilities resulted in significant increase in group cohesion and added to the quality of their deliverables. The role assignments are an important positive impact on the students; they gain ownership of the project which changes their perception of the outcome. The students will take more pride in the accomplishment and completion of the project which will then have more meaning to them than the grade for the project.

Clear, et al, found anecdotal evidence that the maximum number of six members in a team seems to work best [4, 10] and the minimum number for a team should be four members [10]. If a team has more than six members they do not seem to know how to disperse the workload evenly and one or more members seems to be able to free load. Students will then complain that not all members are doing their "fair" share of the work load. When a team has less than four members there seems to be too much work for the members and they become overwhelmed and discouraged.

Team Assessment

Assessment is an important tool to measure the success of the group project, yet Sharp states it is one of the reasons some instructors shy away from group projects [9]. The problem arises giving an individual grade for a collective group of work. What to do with the "slacker" in the group; is it fair that he/she get the same grade as all the others in the group?

It is important to stress the regular group meeting and to have a reporting mechanism, Project Quality Assurance Report, PQAR in Appendix A, helps the students evenly distribute the work load among the team members. I have found this document distributes the work evenly and also identifies each member's responsibilities and holds the members more responsible for their individual tasks. I collect the documents twice, once at the mid point of a timeframe to see the progression of progress and at the end of the timeframe. The PQAR should correlate to the time table you or the students have established for the due dates of the project. I have found it works best to break the project up into milestones instead of one due date at the end of the semester.

Each team member prepares a peer evaluation that evaluates the other team members on their performance. Sharp found that student peer evaluation fall into 3 categories [9]:

1. Peer evaluations are either to be completed in private to be turned into the instructor or in open discussion.
2. Whether the rating should be taken as a single holistic figure or derived from a number of criterion based ratings.
3. Whether each student should rate all others (including themselves) or only the other students in the group.

After many years of group projects in the Tabor School of Business, we have designed a peer evaluation form found in Appendix B. The form is to be completed in private by each team member and must be turned in the last week of the project completion date.

The form uses a series of criteria questions based on their group participation and each member is to include themselves in the evaluation process. I have observed if a group gets along well in a project the distribution of points will be equally distributed. If a group does have a "slacker" it has been easy to identify who that individual is by the distribution of the points.

Conclusion

Team projects can be a most gratifying experience a student has had in their college experience or one of their worst college experiences. Employers are definitely looking for students who have had groups experiences and know how to handle the many situations that occur when working in groups. This paper has pointed out a number of ways the author has had success in team selection, implementing group experiences, acquiring projects and useful peer evaluation tools. I hope you will try a group project in your classroom.

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Appendix A (PQAR)

Project Quality Assurance Report

Milestone:	Date Submitted:	Team Name:
Team Members:		

Project Component Review Log: Each subsection/item listed in the Milestone's Table of Contents must be listed

Project Task	Status % Completed	Who created/assigned 1st draft Name(s) and date	Who reviewed component Name(s) and dates

Signature of each team member is required:

_____ _____

_____ _____

_____ _____

Appendix B

Group Member Evaluation Form (Rubric)

Complete this form privately and return to the instructor when the project is finished. This information will be used to help determine each individual's contribution to the project (can affect individual project grade) and will not be available to other students.

Group Name: _____ Your name: _____
Date: _____

1. **Rate each person in your group (including yourself) on the criteria indicated, using a scale of 0-10.** (0 = unsatisfactory, 10 = superior)

	Team Member (Name)				
Criteria					
Participation, attendance at team meetings					
Quality of assigned work, carefulness, depth of thinking					
Completion of assigned work within schedule					
Amount of work and effort contributed					
Leadership in organizing and motivating group members					
Cooperation, willingness to help the group					
Resourcefulness, innovation, imagination, creativity					
Group maintenance – concern for other members					
Dependability					
Communication of thoughts, ideas, and concepts					
Knowledge/understanding of the task/processes, etc.					
Individual's overall value and contribution to the group					
Team member rating					

2. Rank all members of your group by placing them in the categories below. You must place at least one person in each of the categories! (Include yourself)

Top performers	_____
Average performers (This may still be very good performance)	_____
Lower performers (This may still be acceptable or good work)	_____

3. Briefly list your own contributions to the project

4. Provide any other comments which will help in evaluation of the group and its members. Provide specific details regarding what each group member did or did not do to justify your ratings and rankings.