# PROJECT BASED LEARNING IN AN OPEN SOURCE DISTRIBUTED ENVIRONMENT

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## Abstract

*A research study has reviewed and analyzed a course using a project based approach to learning and open source project management technology. Key objectives in the study are the development and evaluation of educational tools to support project based, student centered, learning in a distributed environment.*

*The research project, witch this study is one part of, has two objectives: 1) Create an environment for flexible project based learning and 2) Describe learning strategies, arenas, schedules and success criteria found among the students. All methods, tools and approaches used in (1) are meant to be available for the students for later implementation in own practices. This implies use of open source tools for project management and collaboration.*

*The review and analysis is based on the course Innovation Techniques run autumn 2003. This is a 12 credits (European Credit Transfer System) course with 14 students from 5 different university colleges and related institutions. Each group work together with a local company and evaluates the research and development activities in that specific company using standardized approaches and methods. The final assessment of the course is based on a report diagnosing the research and development activities with suggestions for changes based on the analysis done*

*Since the study is part of the research project funded by the The Norwegian University Agency for Flexible Learning the students are monitored closely. This is done using surveys, survey feedback discussions, student work logs, student work photos, and research interviews. Results from these methods are presented in this paper with focus on the project-based approach to learning and open source project management technology.*

## Keywords
Innovation techniques, open source, project based learning, project management

## 1. INTRODUCTION

This study is part of a research project funded by The Norwegian University Agency for Flexible Learning (NUV) [1]. NUVs main task is to stimulate the development of lifelong and flexible learning in Norwegian higher education, generating and sharing knowledge as well as being a policy advisor for the Ministry in this field. The main field of activity for NUV is higher education.

The research project is based on two courses in the Innovation and Enterprise development course program. The program is part of the work to increase the understanding, knowledge and skills on innovation and enterprise

development in higher education and is organized as a project facilitated and run by a team of 20 university colleges (Innovation Net) [2].

The research project (and this study) has two objectives: 1) Create an environment for flexible project based learning and 2) Describe learning strategies, arenas, schedules and success criteria found among the students. All methods, tools and approaches used in (1) are meant to be available for the students for later implementation in own practices. This implies use of open source [3] tools for project management and collaboration.

The review and analysis is based on the course Innovation Techniques run autumn 2003. This is a 12 credits (European Credit Transfer System) course with 14 students from 5 different university colleges and related institutions. Each group work together with a local company and evaluates the research and development activities in that specific company using standardized approaches and methods. The final assessment of the course is based on a report diagnosing the research and development activities with suggestions for changes based on the analysis done. The companies analyzed are Viknes Boats (Leisure crafts), Kunstnerdalen AS (Business garden and incubator), Itum (Internet solution provider), Brynild Produksjon (production of confectionery) and ResQ (Health, safety and environment provider).

The course is organized as a combination of meetings and work in distributed groups. Project management, document flow and information search is essential success criteria and are made possible with an open source flexible project management tool (PHPCollab) that include the most important aspects of project management, such as task planning and document sharing, support tracking and content management [4].

We begin with a short overview of the methods used. Next we present some results from the methods used. We use a wide approach with both quantitative and qualitative results to best understand interpret the activity. Last we discuss the findings with focus on the project-based approach to learning and open source project management technology.

## 2. METHODS

There is no one formal definition of project based learning. However, as a working definition we may think of it as a systematic approach to learning knowledge and skills through a process structured around projects with complex and authentic tasks, objectives, questions and problems [5]. This definition is used throughout the paper.

Since the study is part of the research project outlined, the students are monitored closely. This is done using server statistics, surveys, survey feedback discussions, student work logs, student work photos, and research interviews. All students participate in the surveys and discussions, while 5 students have agreed on writing a work log, taking photos illustrating the learning activities and take part in a research interview.

The single most important method is the research interview. The interviews were conducted during the second meeting. To better understand and interpret the interviews, they were complemented with several other quantitative and qualitative methods.

At the first meeting the students were presented two online surveys: one about their expectations to the specific course and one evaluating the first meeting. After returning home they were presented the results from these surveys for discussion and comments using e-mail. The third survey was given between the first and second meeting focusing on working project based in a distributed environment managing the different roles and schedules. The above surveys and discussions were repeated to a total of six surveys and four survey discussions.

## 3. RESULTS

In this study we present some results from the methods used in the review and analyze. The findings are preliminary and will be supplemented in part two of the research project to take place autumn 2004. The material is nevertheless interesting due to the amount of data and diversity in methods.

### 3.1 Server statistics

We used a combination of Webalizer [6], an open source server log file analysis program and the statistics services included in the project management software for collecting and analyzing data.

Table 1. Usage statistics tangens.hiof.no

| | October | November | December |
|---|---|---|---|
| Hits | 12826 | 4207 | 1831 |
| Visits | 134 | 98 | 86 |
| IP addresses | 179 | 148 | 151 |
| KBytes | 73084 | 23892 | 12347 |

The total usage activity is relative high for the course period (October – December). Note also the many different IP addresses registered. This indicates visits from different locations (networks) and thereby workplaces.

The decrease in activity is significant during the course period. From 12826 hits in October to 1831 hits in December. The course ended December 12.

The activity peaks at and around the three meetings and assignments due dates. Maximum activity is during lunch hours (11:00 – 12:00). This is true also during meetings. Next daily maximum is during the evening (20:00 – 22:00).

Table 2. Group activity

| Group: | HiB | HiBu1 | HiBu2 | HiØ | HSH | Sum |
|---|---|---|---|---|---|---|
| Group members | 2 | 3 | 3 | 3 | 2 | 13 |
| Tasks defined | 16 | 7 | 6 | 7 | 17 | 53 |
| Tasks with end date | 14 | 7 | 6 | 7 | 14 | 48 |
| Discussion entries | 0 | 6 | 0 | 1 | 1 | 8 |
| Reports | 3 | 6 | 0 | 5 | 11 | 25 |

A full set of main tasks was defined (53) in all groups. Two groups also implemented sub tasks (16, 17) making the work schedule more detailed. With one exception all groups delivered their reports online (25) by publishing the reports on the project site. There were little use of discussion boards (8) and no communication between the groups except during meetings.

### 3.2 Surveys

We used the open source survey and test tool Quizcomposer for all surveys. Quizcomposer is a simple web based tool for creating and manage online surveys and tests [7]. The surveys used a combination of open and closed questions. The three meeting surveys were identical.

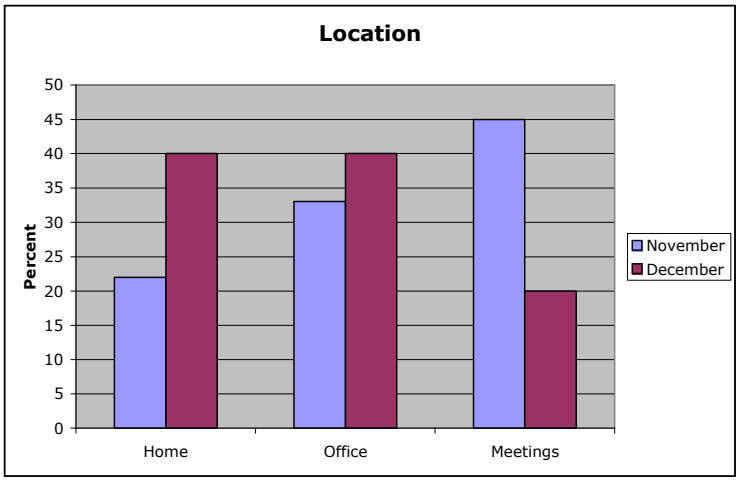
Table 3. Survey statistics

| | Expectations | Meeting 1 | Period 1 | Meeting 2 | Period 2 | Meeting 3 |
|---|---|---|---|---|---|---|
| Date | Oct. 3 | Oct. 3 | Nov. 2 | Nov. 20 | Dec. 9 | Dec. 19 |
| Responses | 10 | 8 | 9 | 7 | 5 | 5 |
| Questions | 4 | 3 | 4 | 3 | 7 | 3 |
| Open | 1 | 3 | 3 | 3 | 6 | 3 |

There were a total of four survey summary discussions; one after each of the four first surveys. This was done using group e-mail. A summary of the survey was presented the students for corrections and errors. These e-mails resulted in very few corrections and comments.

The students rated their knowledge about and skills in working project based as “Very good” or “Good” (80%), but the course was taken along side other tasks and responsibilities and not the top priority. The different employers facilitated for taking the course very different both organizational and economical.

Fig. 1. Primary learning activities location




The students want a shift in location for the learning activities from home to office and meetings shown in Fig. 1.

Online project management tools were rated as an important component making it easier to plan and conduct the project tasks and documents. At the same time the tools are complex and require time and practice to be used effective. Less complex tools with course management services are asked for.

### 3.3 Work logs and photos

Five students agreed on writing a work log and taking photos illustrating the learning activities. Each student was given a digital still camera to keep. The responses were different among the participants; from detailed work logs and a lot of pictures describing and illustrating the life of a web student, to small notes and few pictures. There was no specific format required; we wanted the participants decide how to best document the learning activities.

> "… I hear its theirs turn to play the Pinchcliffe Grand Prix computer game." (Female 40 year)

## 3.4 Research interviews

The research interviews were conducted during the second meeting. Each interview took about one hour and was based on information from the work logs and surveys.

Table 4. Interview statistics

| Interview | #1 | #2 | #3 | #4 | #5 |
|---|---|---|---|---|---|
| Gender | Male | Male | Female | Male | Female |
| Age | 58 | 55 | 40 | 40 | ? |
| Position | Management | Professor | Professor (PhD) | Professor (PhD) | Management |
| Word count | 670 | 423 | 264 | - | - |

All participants take the course motivated by own interest.

> "You evolve and change when given new knowledge and skills. You get more critical towards theories – important to see ideas in real life. At online discussions different views are presented that I have to … This kind of course give me the inspiration and also confirmation on my own knowledge and skills. I feel I contribute in the online group discussions – and also learn a lot myself." (Male 58 year)

The students define their role and responsibilities very different:

> "Continuous bad conscience when doing course related work at home. I will not sacrifice my time with the children. I choose to work on the assignments after bedtime. Very often tired at this point and not at the top for critical thinking and work." (Female 40 year)

She prefers to work outside the home to finish assignments and avoid the above conflicts. She places the responsibilities for managing the role as student, professor and mother on the individual.

In contrast we have a male colleague with many of the same personal responsibilities but with a very different approach to the role. He places the responsibilities on the employer.

> ”It is vital the employer stimulates taking courses - and they must arrange for this with as little studying at home as possible.” (Male 40 year)

The interviews also addressed the question about learning environment and learning activities used in the course.

## 4. DISCUSSION

In this paper we have reviewed a course using a project-based approach to learning. The project has implemented an environment for project management online to better serve the students attending the course in the work on the group projects. In earlier courses all the project management were done manually and required a lot of resources and time better used elsewhere. We used PHPCollab that include the most important aspects of project management, such as task planning and document sharing, support tracking and content management. The project management environment was used for the groups project management only. All course related information and communication was outside the environment. This missing link proved to be a challenge and an environment with both LMS services and simple project management were spoken for. The complexity in a pure project management environment was also questioned in a course running over only three months. Since this course is part of a program with a total of five courses all using a project based approach to learning, we could use the same environment in all the courses and use the synergy effect given. This is not the case today.

The participants on this course all had full work schedules. We can see this clear in the maximum activity during lunch hours and late evenings; the only free hours available. The work intensive project based approach to learning was a challenge and required flexible learning strategies and tools. The many different IP addresses registered in the server statistics indicates visits from different workplaces both at home, office and others. We hope this also mean an increased availability and flexibility in learning arenas making it easier to do the work required. But we also know from the interviews the students reluctance to study at home where it creates conflicts between the different roles, for instance the roles as parent and student. From this dilemma we see the necessity of a more binding involvement from the employer to ensure success.

## References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