

# Introducing an Innovative Project Management Framework for First Year Students – Project Work in a PBL Environment

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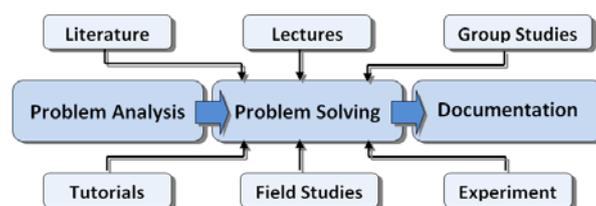
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**Abstract** – Students at Aalborg University (AAU) in Denmark are educated according to the Aalborg Problem Based Learning (PBL) approach which entails working in groups and completing a project each semester. In accordance with this approach students are offered a course – Co-operation, Learning and Project management (CLP) – which among other aspects teaches students how to organize and manage their studies in connection with project work. A major challenge at the University is to teach project management and especially project time management comprising proper planning and scheduling. Although the students in general acknowledge the benefits of thorough project plans and schedules, they often experience difficulties developing them and abiding by them. These experienced difficulties are caused by lack of motivation and competence within this particular area of project management. This paper describes how a new project time management framework, specifically directed towards the interdisciplinary study of Medialogy at Aalborg University, has been developed to counteract said tendency. Results show that the framework is considered to be highly relevant by both the students as well as the faculty. Although the framework was adopted and successfully applied by the students, it must be subjected to further adjustments in order to for the students to benefit optimally from the presented tools and techniques.

**Index Terms** – project time management, project work, Medialogy, Aalborg University, Problem Based Learning

## INTRODUCTION

The interdisciplinary IT- and Media education Medialogy is a novel education established in 2002 at the Faculty of Engineering, Science and Health at Aalborg University in Denmark. The education is organized in six semesters at the Bachelor level followed by additional four at the Master level. Medialogy, like any other AAU education, applies the Aalborg Project/Problem Based Learning Model (The Aalborg PBL Model) as a methodical approach to teaching and learning [4]. The Aalborg PBL Model thereby entails problem oriented and project organized group work. One might say, that already at the beginning of the education, the Aalborg PBL Model helps Medialogy students become more or less autodidactic project managers without being introduced to project management from an academic point of view.



**Figure 1** - The three overall steps of problem-solving project work (the figure is adapted from [2]).

As a way of reflecting upon their learning, each student group has to make a process analysis that describes and analyzes their project process. The process analysis, being a part of the project, is also evaluated together with the project.

In correspondence with the Aalborg PBL Model, students are already at an early state educated within the area of CLP (Co-operation, Learning and Project management) – which is a course that includes fundamental theory and practice when working in groups on a problem based project.

Although Medialogy students are encouraged, through the CLP course, to acknowledge the importance of proper project time schedules, there is no special emphasis on project time management. Furthermore, the course evidently lacks the introduction of a scheduling tool which the students actually embrace and successfully utilize throughout the project. The

Aalborg PBL model does not use “literature, which advises finished solutions to how projects are planned and managed. The argument in favour of this is that a specific project planning tool can be seen as an integrated part of the project group’s way of co-operation, principles of organization, and communication [...] much importance is attached to demonstrate multitude and creativity instead of finished models[...]” [2]. From this standpoint, each member of the project group has to adapt to an organizational structure which is jointly agreed upon. An important principle of the CLP course is that the students, through reflective experiments, develop their own personal approach to completing a project. The basis for this approach is the personal contribution of each group member as well as the overall unique composition of the group [2].

A study performed by Møller (2009) underlines that the Medialogy students in general do not consider project management to be important and they tend to neglect the schedule once it has been completed. Unless the supervisor eagerly encourages the group to constantly update the schedule, nothing happens [1]. Thereby saying, that there is not necessarily anything wrong with the organization/structuralization tools presented during the CLP course, but instead it is the students’ motivation to follow a detailed schedule that needs to be increased.

We suggest introducing professional project management, more specifically project time management tools and techniques, on the early semesters of the Medialogy study to fill in a missing gap in the CLP course. By doing so, the students will not only obtain knowledge within project time management, but also acquire practical tools on how to construct schedules and abide by them and thereby keeping the project within the proposed timeframe. The students will furthermore at an early stage become acquainted with professional project management tools and techniques applied in the corporate world outside the perimeter of the University.

## METHOD

Through interviews with first year students, it became evident that there was a great demand for more sufficient project management tools. Based on this, the 2<sup>nd</sup> semester’s CLP course was expanded with an extra small course consisting of two extra lectures exclusively focussing on project time management i.e. planning, scheduling and controlling project activities. In connection with the curriculum expansion, a written guide was prepared to form the basis for the lectures. The guide, “*The Medialogist’s Guide to Project Time Management*” [3], is for practical reasons referred to as the Guide (with capital G) throughout the remaining part of this paper.

At the end of the semester a questionnaire was sent to the students followed by interviews with their supervisors. Finally, the students’ process analyses were evaluated to see how the students themselves described their project management process and abilities.

### The Medialogist’s Guide to Project Time Management

The Guide consists of a set of concrete and concise professional tools and guidelines to be followed one by one by the students at the beginning of each semester project to ensure proper planning and scheduling. It is based on the six processes included in the project time management knowledge area (see Figure 2) as defined by the PMBOK – A Guide to the Project Management Body of Knowledge 4<sup>th</sup> edition [5].



## **Figure 2 - Overview of the six processes included in the Project Time Management knowledge area.**

The processes included in the project time management knowledge area are the ones required to successfully manage timely completion of a project. The PMBOK includes various inputs and outputs which are directly irrelevant in the context of a Medialogy project e.g. various enterprise environmental factors, irrelevant change requests, organizational process assets- and updates etc. Consequently, the six project time management processes in the Guide are outlined and discussed solely with respect to what is relevant in relation to a Medialogy semester project and everything that is irrelevant is simply disregarded. Parallels are drawn between the outlined project time management processes and standard Medialogy projects; and relevant examples are presented to connect the two areas.

The Guide is thereby a tailored step-by-step student reference on how to properly plan and schedule activities related to a Medialogy project. It introduces the students to various concepts within project time management including Work Breakdown Structure (the decomposition of project deliverables into smaller amenable low level work packages with a series of activities), activity lists- and attributes, milestones, schedule network diagrams, activity resources, estimation techniques (analogous estimating, parametric estimating and tree-point-estimates), critical path method (incl. manual calculation of critical path and contingency reserves), Gantt charts, schedule baseline management etc.

### **The Lectures**

Two lectures, each with the duration of four hours, were given to the 2<sup>nd</sup> semester students. The lectures were based on the course curriculum, the Guide, introducing them to project time management not only on a theoretical basis, but also on a more practical level.

Not only did the lectures further elaborate on the theories and tools included in the Guide, but also incorporated occasional practical exercises and introduced the project management software Microsoft Office Project (MS Project). The lectures consisted of three main parts. The first part entailed traditional teaching in the project time management terms and theories included in the Guide while emphasizing why they are so crucial to project work. The second part included practical group work based on the theory gained during the first part. This part was all about gathering in small groups doing practical project time management exercises on a piece of paper. Finally, when the exercises had been done manually, the students had obtained an in depth understanding of how the calculations (activity duration estimates, contingency reserves etc.) are carried out in praxis. The final part of the teaching entailed the introduction of a project management software program. Now that the students were familiar with the theories and tools and the schedule calculations etc., they had an easier time applying them to specific project examples using the project management software MS Project.

The first lecture encompassed:

- A brief outline of the planning and scheduling principles normally applied at the Medialogy study.
- An introduction to project management on a general basis.
- An introduction to the first four project time management processes: Define activities, Sequence activities, Estimate activity resources and Estimate activity durations.
- Group exercises.

During the first lecture, a handwritten group exercise would for instance include the development of a simple project schedule network diagram, the calculation of earliest and latest start and completion for each activity, the calculation of contingency reserves, the indication of the critical path in the diagram and the calculation of the total project duration.

The second lecture encompassed:

- A quick recap of the first lecture with focus on the first four project time management processes.
- An introduction to the last two project time management processes: Develop schedule and control schedule.
- An introduction the MS Project.
- Development of project schedule in MS Project.
- During the second lecture, the students were asked to develop a new (or revised) schedule for their current projects in MS Project. The schedule was presented to their supervisors at the following supervisor meeting.

### **Evaluation**

In order to evaluate the success of the course, questionnaires were filled out by the students who either attended the lectures or read and applied the tool and techniques presented in the Guide.

The overall areas of investigation included:

- The degree to which such course was considered being relevant for a Medialogy project.
- The degree to which the students had applied the tools/knowledge to their own projects.
- The degree to which the written material (the Guide) provided a clear and sufficient overview of the presented tools and techniques.
- The degree to which the students felt that the knowledge provided by the course would be relevant for them in the future.

With the exception of a few questions, all items featured in the questionnaire would require the participants to rate their level of agreement on six point Likert-scales, where '1' would signify strong disagreement and '6', strong agreement.

Strongly disagree  1  2  3  4  5  6 Strongly agree

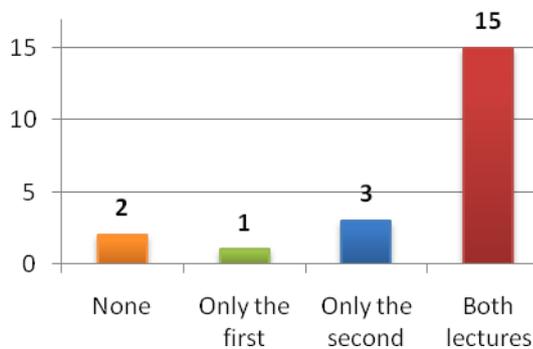
**Figure 3** – The adapted Likert-scale was used for the majority of the questions in the questionnaire.

By employing a six point Likert-scale as opposed to a traditional five point Likert-scale, the participants were not able to display indifference. In addition to the six point scale, a few questions could be answered with a 'yes' or a 'no' assisted by a concise elaboration or comment.

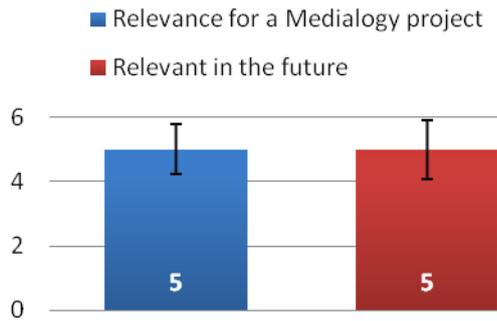
## RESULTS

The questionnaire provided primarily quantitative data but also qualitative data. A total of 21 students participated in the evaluation of the course.

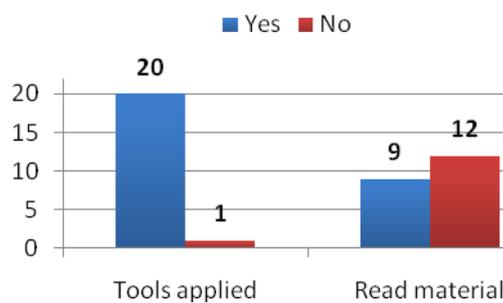
The quantitative results of the evaluation based on the students' answers are presented in the following graphs:



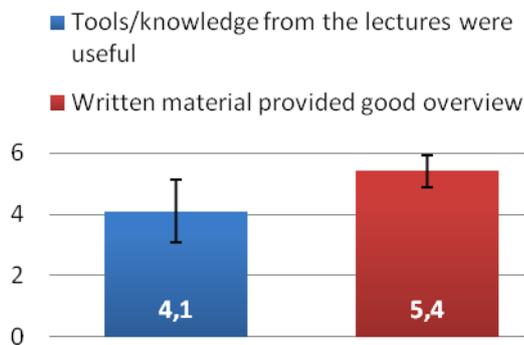
**Diagram 1** – The amount of students present at the lectures.



**Diagram 2** – Left: The degree to which such course was considered being relevant for a Medialogy project. Right: The degree to which the students felt that the knowledge provided by the course would be relevant for them in the future. Error bars indicate  $\pm$  one standard deviation from the mean.



**Diagram 3** – Left: The degree to which the students had applied the tools/knowledge to their own projects. Right: The degree to which the students had read the written curriculum (the Guide).



**Diagram 4** – Left: The degree to which the tools/knowledge provided by the lectures were useful when managing the project. Please note that this result is based on the 20 students who had applied them to their projects (see Diagram 3). Right: The degree to which the written material (the Guide) provided a clear and sufficient overview of the presented tools and techniques. Please note that this result is only based on the 9 students who read the material (see Diagram 3). Error bars indicate  $\pm$  one standard deviation from the mean.

Moreover, the qualitative data collected from the questionnaires indicated a general high level of satisfaction with the Guide and the lectures in regards to structure, content and preparation. It also indicated that working with Gantt charts in MS Project was very useful for the students. Nevertheless, there seemed to be a general consensus that the software was too complicated to work with based on the introduction given in the second lecture.

According to the supervisors, the process analyses prepared by each group were very satisfactory in terms of displaying management abilities and documenting proper project plans and schedules. It was clear for the supervisors that all project groups were rather serious about using ideas from project management. Some groups followed the exact guidelines

provided by the new course. Others claimed to be very inspired by the Guide and using it as a supplement to the tools they were acquainted with on beforehand.

## **DISCUSSION**

Even though there were only 16-18 students participating in each of the two lectures, the results are still considered useful in terms of providing an indication of the degree to which such course would be relevant for first year students in the future.

Judging from the results displayed in Diagram 2, the students clearly feel that the course is relevant for a Medialogy project as well as for future purposes.

Although 20 out of 21 students had actually applied the tools/knowledge provided by the course to their projects, they were given a rating of 4,1 out of 6 in terms of usefulness which is, despite being a positive result, not entirely satisfying. The reason for this rating can be found when looking at the qualitative results, since there was, as stated, a general consensus among the students that the software MS Project was too complicated to work with based on the introduction given in the second lecture. This indicates the need for a more thorough introduction to MS Project, if the students are to successfully apply the software for project scheduling in the future.

The reason why only 9 out of 21 read the written material for the lectures can also to some extent be explained by looking at the qualitative results. The students who did not read the Guide claimed that they either forgot or they did not have time due to other highly prioritized homework. This generally indicates that the course, although deemed relevant, does not have a high priority in comparison with the other mandatory courses offered. Therefore it is evident that the teacher must stress the importance of the course for the students to prioritize the planning, scheduling and controlling of project activities and resources. Furthermore, for optimal student motivation, the course will also need back-up by ongoing encouragement from the group supervisors. The supervisor can for instance at each meeting require a presentation of an updated project schedule and the progress according to the schedule baseline.

## **CONCLUSION**

To counteract the tendency of deficient project time management in Medialogy projects at Aalborg University Copenhagen, the CLP course for first year students was expanded with two lectures exclusively focussing on tools and techniques for planning, scheduling and controlling of project activities.

The results of the evaluation of these lectures, and the constituent written curriculum, indicates that the lectures – focussing on project time management – are considered to be highly relevant by both students as well as the faculty. This, in turn, is regarded as a success. Although the tools and techniques presented in the lectures are deemed relevant, students still tend to somewhat neglect the presented material in a project situation because the lectures have too low priority compared with others.

In order for the first year students to benefit optimally from the lectures in the future, a more comprehensive introduction must be given to the project management software in question. Furthermore, the student supervisors must additionally encourage the students by requiring project schedule updates and progress in accordance with schedule baseline.

## **ACKNOWLEDGEMENTS**

This paper has been written in prolongation of the findings proposed by Møller (2009) and we therefore refer to said source for more elaborate information about the lectures, the Guide and the behind lying pedagogical thoughts.

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