INTRODUCING VISUAL PLANNING IN PROJECT-BASED LEARNING- A CDIO PROJECT IN PROGRESS

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ABSTRACT

The ability to work efficiently in projects is one of the most important attributes for engineers to possess. In recent years, planning methods from Lean Product Development has attracted positive attention also for Design- build projects. The new methods come from different industries such as Software and mechanical design but they all use visual means for planning project activities. To prepare the students for a future working life, knowledge of these industrially used methods is important, but there is a lack of descriptions of how to apply them. Therefore, a round table discussion can be a way to create a better understanding of Visual Planning in design- implement projects.

KEYWORDS: Design-build Project. Visual Planning. Lean Product Development. SCRUM.

INTRODUCTION

CDIO emphasizes active and experiential learning. CDIO Standard #5 states that a true CDIO engineering programme contains two or more design- implement projects [1]. These projects can be described by [2]:

“A design-build-test experience is a learning event where the learning takes place through the creation of a product or system.”

In any realistic design-implement project, project planning is needed. Knowledge of project planning can also be one of the learning outcomes in project based courses, as it is an important skill in an industrial career. An example of planning in traditional CDIO projects can be found in [3].

In recent years, alternative project planning and execution methods have been introduced in industry that are different from methods traditionally taught in academia. These methods can be exemplified by SCRUM [4] for software development and Lean Product Development (LPD) [5,6] for general engineering development. To prepare the students for a future working life, knowledge of these industrially used methods is important. One common feature is that these methodologies all use visual means for planning project activities. In theory, this enables collaborative problem solving for short term planning issues as well as creating an awareness of future deliveries and priorities.

At the department of Mechanical Design at Jönköping University, implementations of Visual Planning have been tested in shorter projects as well as in a 2-year project. The experiences are that in real life, it can be hard to set up a working system. This is true not only for our university.
projects but also for implementations in industry. Currently, there is a lack of literature and examples of how to use Visual Planning in education and this is the reason for holding this round table discussion.

PURPOSE AND OBJECTIVES

The purpose of the round table session is to better understand how Visual Planning and Pulse meeting methodology can be introduced in design-build projects. The objective is to share experiences and discuss the challenges facing the tutors and students in setting up and maintaining a Visual Planning system. The set-up of a Visual Planning system differs substantially from traditional textbook project methodology, and there are many approaches to set up Visual Planning tools.

A BRIEF DESCRIPTION OF VISUAL PLANNING

The term Visual Planning was pioneered by the Toyota Motor Company. Visual Planning is used to create a pulse and a common understanding of the project deliveries. It also improves the efficiency of communication within a project team as well as laterally in an organisation [7]. The method is derived from behavioural science and focuses on the human side of management. One novel feature of this approach is that the teams are allowed to independently level the workload and prioritizing tasks, as opposed to the traditional Scientific Management where managers are doing the detailed planning.

Briefly, Visual Planning is to post important activities and deliveries visible in a structured way, see figure 1. Whiteboards are commonly used together with Post-it notes and coloured magnets. At a glance it is possible to find out the status of each task, and when it has to be finished.

![Visual Planning Diagram](image)

Figure 1: Schematic team planning board.

At the board, short (approximately 15 minutes) and frequent stand-up meetings are held. The meetings are held to inform colleagues about project status and to collectively plan deliveries that matches the overall project plan and to resolve planning issues. Often, the teams working hours are also accumulated weekly to track the adherence to the project plan.
CHALLENGES FOR THE INTRODUCTION OF VISUAL PLANNING IN ACADEMIA

The implementation of Visual Planning in Academia is not straightforward and it can be hard to set up a working system. A team planning board at the department of Mechanical Design at Jönköping University is seen in figure 2.

Figure 2: A Visual team planning board

In the present example, the collaborative planning mechanism failed and the students postponed some deliveries by moving their Post-it note to the next week. The effects can be seen in the next graph, figure 3, where the students have to work very hard the last week to be able to complete the final deliveries.

Figure 3: Average weekly working hour per person in different teams. The workload is increased before delivery.
From the planned 15 hours of project work per week, some teams spent between 40 and 50 hours to finish the project. The conclusion is that in some set-ups, the benefits of Visual Planning in the form of a uniform workload and a steady pulse cannot be seen. This leads to the following outline of questions:

- General Visual Planning setup, project design and assignment. Project size, duration and intensity, student group size.
- Commonly encountered problems and countermeasures.

REFERENCES


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