PROJECT MANAGEMENT - AN ENVIRONMENT FOR INCREASED PERSONAL AND INTERPERSONAL SKILLS

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ABSTRACT

This case study illustrates how changes in course structure and study program increase students' personal and interpersonal skills. The didactic methods used are based on CDIO and project management and the purpose of the implemented changes has been to increase the employability of the students, giving them a professional identity and increase their self-confidence.

To follow the CDIO approach (CDIO, 2010) by integrating project management as a recurring element throughout the program, give students the opportunity to practice generic skills on several occasions and in different contexts. To provide this, the program was restricted in 2011, one of the changes was to let students take a project management course in the first semester of their education. During this course, the students receive professional knowledge and skills that is meant to be further used in following project-based courses. To ensure progression, two strategic courses: *Web and Multimedia Production* and *News Production for Television* were revised in the autumn of 2013.

The result shows that the well-implemented changes to the program and courses has led to an environment of increased personal and interpersonal skills for the students. Lecturers within the program highlight that students at a higher degree work more independently, execute projects more successfully and deliver better presentations in subsequent project-based subject-related courses. Moreover, it is also shown that the student group has taken more responsibility in projects and for their own role in the learning process. Analyzing the results, it is clear that the students have grown as individuals since they obtained a clearer identity as production manager and feel more confident before the final degree project and future career.

KEYWORDS

Project management, generic skills, personal skills, interpersonal skills, CDIO, Standards: 3, 4, 7, 8, 9, 11

INTRODUCTION

At Umeå University, several study programs in technology strive to follow the CDIO approach. Each year a program analysis for each program is completed and the guidelines for this work are based on CDIO's 12 standards. The analysis is then the basis for the further work to develop and improve the programs.

One of this programs, the two-year University Program in Media, educates future production managers for the media industry. The program is broad and relatively practical, and it is linked to the subject media technology. During a program analysis conducted in 2010, it was found that the program lacked a "main thread". The analysis also showed limited employability, and interviews with graduate students revealed that they lacked both the confidence and professional identity for future employment.

In the fall of 2010, Umeå Institute of Technology initiated a project regarding professional development in project management for the lecturers (Byström & Berglund, 2013). During this project some of the program's lecturers realized that the skills and competencies that come with project management are subject independent knowledge that could usefully be applied in principle all fields of education. After contacts with the industry it was also found that project management skills are important for professional media producers. Thereby, it was considered that project management could usefully serve as the main thread the program lacked.

This case study illustrates how changes in the structure of courses and study program increase students' personal and interpersonal skills. The didactic methods used are based on CDIO and project management. The purpose of the implemented changes has been to increase the employability of the students, give them a professional identity and increase their self-confidence. To verify the results of the implemented changes, student surveys, course evaluations, interviews with students and interviews with lecturers were carried out in spring 2014. The surveys were answered by 62 students at the end of the two courses *Web and Multimedia Production* and *News Production for Television.* In-depth interviews were carried out with two students in each course and three lecturers.

PROJECT MANAGEMENT

Group assignments and individual work are performed under more structured forms commonly called projects. Swedish Standards Institute, SIS, (2005) defines a project as a unique process consisting a number of coordinated and controlled activities with predefined start and end dates, initiated to achieve goals that meet specific requirement, including constraints of time, costs and resources. There are several different models that specify how projects can be implemented and these models can be divided into two general approaches: traditional models and agile.
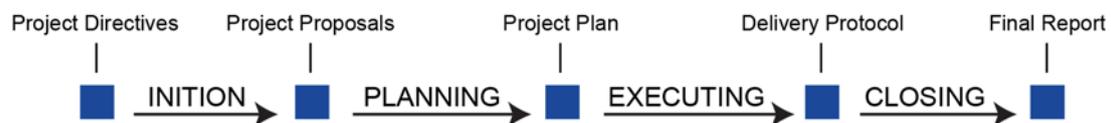
Figure 1. A common way to describe the life cycle of a traditional project.

Traditional projects can be divided in to several phases (Figure 1) beginning with an initiation phase. The information about the task, which can be a problem to be solved or needs to be satisfied, is here collected and organized. In the planning phase, the work is planned and organized, and during the execution phase, the project team works together with the task. Throughout the project, team members communicate orally and in writing, with steering committee, reference group and other stakeholders involved, and decisions are continuously made throughout the entire process. The time and costs are estimated in the initiation and planning phase, and these figures are followed up during the closing phase (Tonnquist, 2014).

As an alternative to the traditional project approach, a number of more light weighted models have been collected under the name agile. Common to these models are the priority given as below (Agile Alliance, 2001):

- Individuals and interactions over processes and tools
- Working software over comprehensive documentation
- Customer collaboration over contract negotiation
- Responding to change over following a plan

In agile methods, project details are not planned from start to finish, as in traditional project, because this often results in unnecessary work and reduced flexibility. For the same reason, extensive documentation is not produced. Instead, the focus is on more group meetings as well as more partial deliveries and meetings with clients. An important element of agile methods is to continuously evaluate and improve the working process (Gustavsson, 2013).

Required skills

Generic skills are a central part of project management. Meredith and Mantel (2009) categorize the skills needed for a project manager into six skill areas:

- Communication (listening and persuading)
- Organizational (planning, goal-setting and analyzing)
- Team building (empathy and motivation)
- Leadership (sets a positive example, energetic, vision and delegates)
- Coping (flexibility, creativity, patience and persistence)
- Technological skills (experience and project knowledge)

Meredith and Mantel's (2009) categorization is similar to Mayer's definition (Dawe, 2002), which points out seven generic skills as especially important to bring into a professional career. Communicating ideas and information, prioritizing and planning, working in teams, using mathematical in practical purposes, problem solving and having the capacity to apply technology.

A study conducted by Curry and Sherry (2004) examined which generic skills considered as most important for recent graduates' career. This by allowing employers, students and lecturers rank 23 different generic skills. The most valued skills are also matching well with Meredith and Mantel's (2009) characterization. The top ten skills are: oral communication, time management, team work, presentation skills, coping with multiple tasks, managing one's own learning, written communication, planning, IT-skills and problem solving.

In the CDIO Syllabus 2.0 (2010) several important generic skills are listed. Based on the previously mentioned program analysis and presented theory, the following eleven skills in Syllabus 2.0 consider extra relevant in the context for this case study:

- Forming effective teams
- Team Operation
- Team growth and evaluation
- Team leadership
- Negotiation, compromise and conflict resolution

- Communication strategy and structure
- Written communication
- Oral presentation
- Professional behavior
- Attitude, thought and learning
- Proactive vision and intention of life

IMPLEMENTATION

The CDIO Initiative highlights the importance of engineering students to be prepared for the challenges that await them after graduation, in both subject knowledge and in generic skills (Crawley, Malmqvist, Östlund and Brodeur, 2010). Generic skills can be acquired in various ways; one may be to let the students practice professional skills by implementing occupational role play, another to let them work on real cases and third to let them work in projects (Elmgren and Henriksson, 2011).

According to Crawley, Malmqvist, Östlund and Brodeur (2010), there are good opportunities for integrated learning, for example by connecting communication and group work with concrete tasks. Furthermore, to provide students with in-depth generic skills, it is important that this training is offered throughout the program. Elmgren and Henriksson (2010) also believe that it is desirable to provide an integrated learning, but they believe that theory and practice, knowledge and understanding, skills and conversance, values and attitudes together give something more than the individual parts. They consider that learning lead to personal growth.

To provide a main thread to the students, the program was restricted in 2011-2013. During these years the program developed from completely lack of a main thread to a program that today continuously work with project management. The development was based on CDIO Standard 3 and 7 (2010), which highlights the importance of personal and interpersonal skills interwoven with the learning of disciplinary knowledge. An integrated curriculum and integrated learning experiences are an important issue and in this case, project management is used as a tool to fulfill this. Today, students get their basic skills in project management during the first term, according to the CDIO Standard 4 (2010). This allows them to use these skills repeatedly which open up for progression throughout the program.

According to Bränberg, Gulliksson and Holmgren (2013), the first to think about when a course is planned and realized is Why? What is the context? and What is the meaning? Thereafter, the expected learning outcomes can be treated and the work with develop the teaching and learning should proceed. According to Standard 8, active learning is a good way to engage students directly into thinking and problem solving activities (2010). To provide this opportunity to the students, and to let them practice project management in its right context, the project management course is studied parallel with the project part of the subject-related course *Digital Images and Graphic Production.* In the subsequent course *Audio and Video Production* students get another opportunity to use their skills in a traditional project, this time in another context. During the course *Prototype Development and Interface Design* students receive progression in project management by working with an agile project management model.

To ensure further progression, two strategic courses: *Web and Multimedia Production* and *News Production for Television* were revised in the autumn 2013. Lecturers participating in the professional development project (Byström & Berglund, 2013) has subsequently been trusted

to develop these courses so that students now may apply different project models and methods, and practicing various project roles common in the industry according to CDIO Standard 8 (2010). A professional project manager from the Swedish Public Service Television Company (SVT) has participated in the course *News Production for Television* as a lecturer which has resulted in a more realistic project design. In both of these two courses, students work freely within certain limits. According to the CDIO Standard 8 (2010) the student's do not only learn more, they also recognize for themselves what and how they learn (2010). The underlying idea of the changes is to let the students take more responsibility over their own studies, learning and performance. The goal is to encourage the students to become more driven and responsible at the same time they receive an increased professional identity.

Web and Multimedia Production

According to Crawley, Malmqvist, Östlund and Brodeur (2010) learning makes more active when students are entering a simulated professional role, which also is described in CDIO Standard 8 (2010). In the industry there is a variety of professional roles in web production. Beside the project leader there can also be web designers, graphic designers, art directors, journalists, photographers and programmers. In smaller projects several professional roles are often combined, to just include project managers, web designers and programmers. Previously the students conducted a project where they combined these three roles in the same project. Higher demands on the project management part in the course, resulted in a revised course.
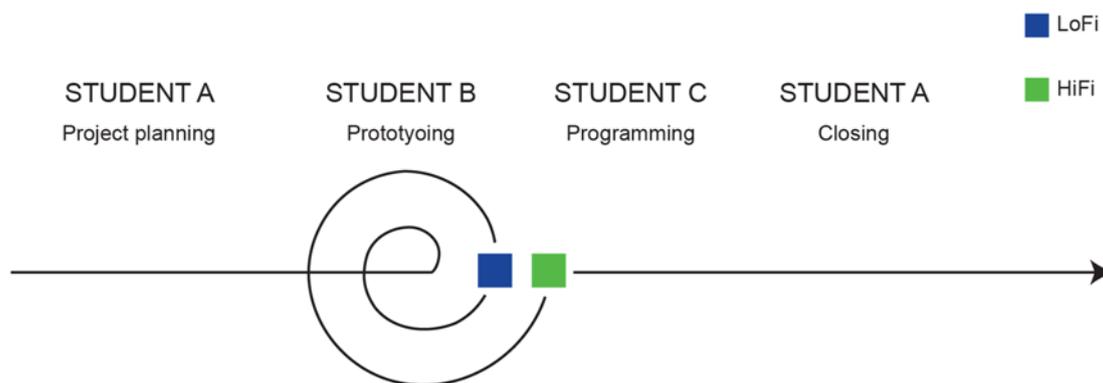
Figure 2. Project life-cycle and the included professional roles.

Now each student works as a project manager in one project, web designer in another and programmer in a third, as shown in Figure 2. Throughout the course, we now ensure that all students have the opportunity to lead a project with several project participants. The students also get an opportunity working with multiple projects at the same time, a skill that is important according of Curry and Sherry (2004).

The CDIO Standard 11 (2010) points out the importance of effective learning assessment through matching methods appropriately to learning outcomes that address disciplinary knowledge, as well as personal and interpersonal skills. According to this the projects are not examined in its entirety, instead the examination takes place on each role performed by the student. The project leader writes a requirement specification, project plan, delivery report, final report and also summons, conducts and makes the documentation for project meetings. The web designer designs and produces content, prototypes, performs interviews, user tests and presents their part of the work. The programmer communicates with other project

members about design and how it is implemented and manages the communication with customers around the technology for publishing and maintenance.

During the course one teacher is acting client and another steering committee. Through these roles they obtain good insight in how the project progress and how well they are conducted. A number of scenarios are designed to provide more realistic projects for the students and to support the teacher in the role as a purchaser. These scenarios include target groups that differ from their own, such as seniors, ornithologists and preschool teachers, which in turn forces the students to communicate with different audiences.

Aside from the deadline for delivery and project reporting and planning, the students lead their projects entirely under their own responsibility.

News Production for Television

An important part is to extend the students' perspectives, improve their employability and create a professional identity during the education. Elmgren and Henriksson (2011) believe that teaching should also help students gain insight into the future labor market and the relevance of the education. Like the CDIO Standard 9 (2010), they point out the importance of collaborations with individuals and companies outside the university. According to the CDIO Standard 9 (2010), such cooperation may also give a relevant course structure and content based on a professional context and simultaneously serve as individual role models. The basic idea of the new course *News Production for Television* is to create a course where students have the opportunity to feel the pulse in the Television industry and the feeling of working with news production for real. As previously mentioned Elmgren and Henriksson (2010) point out that cooperation with industry should already have begun when the teacher formulates the goals of the course. The program has previously worked closely with SVT, which now became a natural partner during this course development. To maximize the influence of the business community, they have been involved throughout the development of the course.

To get a strong reality connection to the course context the students make a project divided into two parts - broadcast news and broadcast a 24 minutes magazine program. The editorial work in television is largely based on the agile project management model, in which the production is carried out in short cycles, which are continuously evaluated and improved. According to Gustavsson (2013), the agile approach implies that the project team themselves have mandate to carry out daily improvements, make mistakes, learn and revise their work throughout the project. This approach is a good starting point to provide students with a progression in there learning process and to grow into their profession during the course. The agile approach also responds well to what Bränberg, Gulliksson and Holmgren (2013) emphasize namely, the importance of that students get the opportunity to reflect on their own role and development but also the group's work and development. In order to create a good learning environment from a didactic point of view, but also give students a broader perspective, they work with two different production methods; several newscasts and a multi-camera production, both in studio environment.
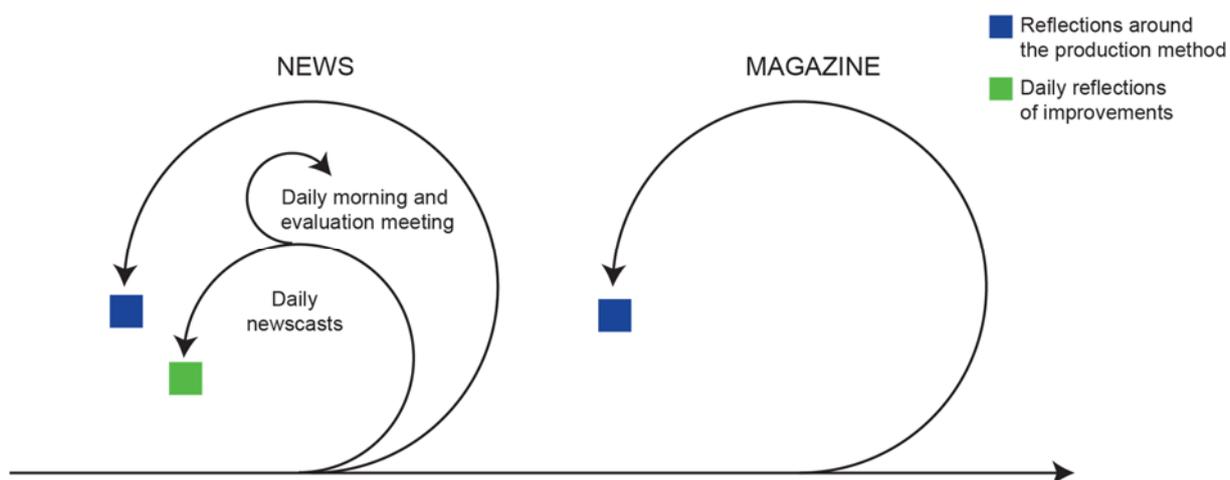
Figure 3. The project is divided into two different parts,
several newscasts and one magazine program.

The newscasts involve the students to plan and carry out newscasts each day for a limited period of time. An important aspect is that they are obliged to deliver results on time every day. Each broadcast day consists of a morning meeting where an editor group, consisting of 3-4 students, distributes the current work to the teams, which consists of a producer, photographer and editor. Then they all work towards the broadcast at 14.45 where today's stories appears. The day ends with an evaluation meeting, where the whole class goes through positive and negative experiences during the day as well as changes to implement the next broadcast day. This process is shown in Figure 3. According to the CDIO Standard 8 (2010) the students try different professional roles between the different broadcasts to obtain a greater understanding of the multi-competence needed to perform the work.

During the multi-camera production the students produce a 24 minutes magazine program, also shown in Figure 3. Here the students are responsible for the entire chain, from building a larger studio, create reports and manage the technology. To get the students to reflect on their own development they are now given the opportunity to choose the professional role, in order to allow further deepening of generic skills. To get a stronger reality connection, according to CDIO Standard 9 (2010), a project manager from SVT is involved as lecturer on the course. With her deep professional knowledge and experience she works well as both lecturer and mentor to the students. To give further insight into the various professional roles, the students also participate in workshops with both a technical director and a lighting director from SVT.

RESULTS

The result shows that the well-implemented changes to the program and courses, according to the CDIO Standard 2.0 (2010) have led to an environment of increased personal and interpersonal skills. The personal skills appear as increased self-confidence and increased professional identity of the program students. To confirm the results a student survey were conducted at the end of the courses *Web and Multimedia Production* and *News Production for Television*.

Question 6 (n=61) | 5% | 10% | 25% | 40% | 20%
Question 5 (n=59) | 5% | 15% | 27% | 33% | 20%
Question 4 (n=61) | 8% | 26% | 66%
Question 3 (n=60) | 2% | 8% | 20% | 43% | 27%
Question 2 (n=59) | 2% | 14% | 25% | 37% | 22%
Question 1 (n=62) | 9% | 37% | 54%

Legend: Low, Relatively low, Partially, Relatively high, High

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%
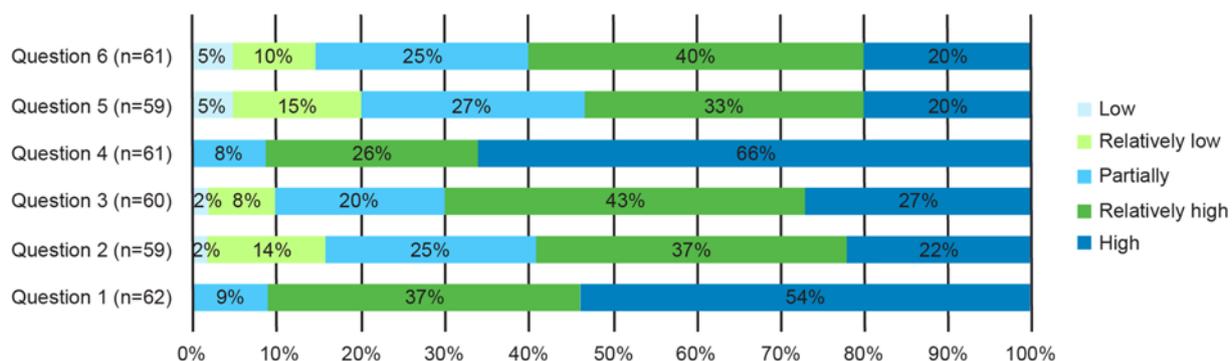
Figure 4. The diagram above shows the responses from the student survey.

Question 1: Do you think that professional skills will strengthen your professional identity?

Question 2: Has the course given you opportunities to further obtain and practice professional skills?

Question 3: Have you been practicing professional roles during the course?

Question 4: Have you been taken own responsibility during the course?

Question 5: Do you feel better prepared for the final degree work?

Question 6: Have the lecturers' project management skills contributed to a better course?

Enhanced interpersonal skills

Since the students now study project management during their first term, the lecturers consider this have led to a higher level of independent work, better implemented projects and oral presentations on the following subject-related courses. One of these lecturers notes that "it is obvious that these students have done it before, they know how to use the project tools immediately and how to document. The students feel driven and more prepared for the task."

The project management is a recurring element throughout the education and provides students with the opportunity to, as Crawley, Malmqvist, Östlund and Brodeur (2010) point out, train generic skills on several occasions and in different contexts. The survey, Figure 4, and interviews with students show that the two revised and specialized courses, *Web and Multimedia Production* and *News Production for Television*, has resulted in further progression of students' generic skills. According to one of the lecturers at the course *Web and Multimedia Production*, the student has evolved in traditional project management: "During the project management course, students need a lot of support during the project implementation. When they come to specialized course in web production they plan and implement the project entirely on their own." Another teacher on the other course highlights the progression during the course "With the agile approach, I as a teacher, can see a clear progression during the course. The students have developed through reflection and continuous change."

It is still too early to read the effects in terms of graduate work and employability in the current position. However, in the survey, Figure 4, the students clearly signaled that they feel better prepared for graduate work, because they through the education got a variety of useful skills. During one of the interviews one student confirmed this in the following statement: "I have worked with project management before. But my classmates have found out it has been useful to learn. One classmate noticed very clearly when he came to the company where he did his graduate work that he had a lot of useful skills."

Enhanced personal skills

Course coordinators have received indications from students that during the final specialized courses, they have grown as individuals, obtained a clearer identity and feel more confident facing the graduate work and professional life. One student said during an interview: "So I think it has been really good and simply helped me to go out with a higher level of self-esteem. Everyone have grown, really." Lecturers have also observed that the student group has taken greater responsibility in the project and their own role in learning, which the students also confirmed according to the survey, Figure 4.

According to the survey, Figure 4, the students believe that increased generic skills results in increased professional identity. The survey also shows that the elements of role-playing, where students tested different professional roles, further contributed. One student noted that "When you are in place and manage your role every day it feels right away more like a real workplace". This is in line with what Elmgren and Henriksson (2011) describe about the professional identity.

In the course evaluations for the two final courses, students have shown appreciation for the contact with companies and that the courses were vocationally oriented with an arrangement that resembles reality. They have also realized that multi-competence and collaboration are two important components. This is confirmed by a student "We have called each other colleagues. Then you notice that most of them have improved at many levels."

Analyzing the results, it is clear that the students have grown as individuals since they obtained a clearer identity as production manager and feel more confident before the final degree work and future career.

CONCLUSIONS

The changes discussed in this article, are performed on an education where the students want to and will become production manager. Since the changes match large parts of the CDIO Standard 2.0, they are also suitable to most engineering programs.

Today we have lecturers with professional skills in project management at strategically selected courses. Students have through progression obtained good generic skills in project management and are, hence, well prepared for their degree work. However, to meet students' increased knowledge, there are higher demands on supervisors, because there are still many lecturers with limited experience of project management. In accordance with the CDIO Standard 10 (2010), we should conduct further professional development for the lecturers to achieve progression through the education that also includes the degree work.

Increased cooperation with the industry and a professional context are regarded as positive by the students. It increases their confidence and motivate them in their studies. Here we can see great potential for further development with courses within the program, like *Audio and Video Production* and *Prototype Development and Interface Design*.

In conclusion, with relatively small changes in program structure and course development, we have been able to raise both students and program to a higher level. We are confident that more education programs could implement similar changes and achieve the same good results.

ACKNOWLEDGEMENT

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BIOGRAPHICAL INFORMATION

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