INDUSTRY BACHELOR PROGRAMME:
AN EXPERIENCE REPORT

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ABSTRACT
Students within many disciplines, information technology being one, face challenges of getting their first job, such as lack of work experience and outsourcing. This paper describes a variant of a Bachelor education degree, which is called the Industry Bachelor Programme. The motivation behind the Industry Bachelor Programme is to introduce the students to working in a company as consultants so that they may enter directly into a work environment when they finish their studies. Guided by Action Research as the main approach, we report from three years of collected data from interviews, grade reports and documentation. Our contribution is twofold. First, we contribute to academic literature by extending an existing framework for university and company collaboration. Second, we offer a roadmap with detailed tasks, responsibilities and timespan for universities that want to start an Industry Bachelor Programme.

Key words: Bachelor Students, Study Programme, Industry, Internship, Education, Action Research

1. INTRODUCTION
“You cannot get employment without work experience and you cannot get work experience without employment” says the proverb. According to Norton recent challenges in universities are to prepare the students for employment and to be entrepreneurial on a global scale (Norton 2009). In today’s competitive market, especially within information technology, students face challenges of outsourcing from low-cost countries, which makes it important for them to have hands-on experience in their field of study that makes them able to enter a work place and deliver from day one. The motivation behind the Industry Bachelor Programme is to introduce the students to working in a real company as real consultants so that they may enter directly into a work environment when they finish their studies. This means they will learn how the techniques they learn at school are used in practice, and apply both theory and skills in live projects.

While research is abundant within pedagogy with the aim on how to motivate the student and tailor teaching, as well as the benefits of internships in the industry, we found less research on how to plan, conduct and evaluate an extended student internship over several years. We aim to contribute to closing this gap by sharing our experiences from an ongoing programme called Industry Bachelor at a Norwegian university college. The Industry Bachelor Programme is a continuous collaboration between the university college and two large consulting companies, where bachelor students are employed as consultants during parts of their studies. They receive all benefits as regular employees, including salary. Students may apply for Industry Bachelor in their third semester. The applicants are selected by the companies based on interviews and grades achieved up to that point. If the applicant is accepted, the student signs a contract and starts working in the chosen company in their fourth semester. Due to this workload, Industry Bachelor is expanded to four years instead of the normal three years bachelor.

Our research question reads: what can we learn from our experience when introducing an Industry Bachelor Programme in higher education? The rest of the paper has the following elements: first, we review related literature on internships and similar arrangements between universities and the industry. Then we present our overall method and describe our case. We discuss our findings before presenting our contribution to theory as well as a roadmap for universities and companies who may want to engage in an Industry Bachelor Programme. Finally, we point to limitations of the study and present our conclusion.
2. RELATED LITERATURE

In this section, we describe related research. We start by presenting the employers’ requirements, followed by the benefits of work placements or internships.

What do employers want?

Employers want to employ, ideally, people that have both hard and soft skills and already have had a certain amount of work experience (Franz 2008; Hagan 2004; Robin 2011). This puts pressure on the universities in higher education in order to improve the employability of the students by developing the students’ hard and soft skills that are applicable to the industry. A survey done by Hagan (2004, p. 3), where employers of ICT graduates were asked how universities should prepare their graduates, showed that 30% of respondents thought that the universities should provide students with more work experience, industry awareness, generic skills, business skills and technical skills. Further Hagan refers to a study (ACNielsen 2000, p. 32) where students were found to be most deficient in problem solving skills, oral business communication skills and interpersonal skills with other staff, i.e. mostly soft skills (Franz 2008).

What is employability?

In relation to the deficiencies identified above amongst other in different soft skills, the concept of employability is important. Employability is referred to by (Franz 2008, p. 2, 3) first in the general sense “to a person’s ability to gain employment” then gives an account to how the government and industry refers to it being “the ability to get the most out of employment both for the employee as well as the employer”. In addition, an important part of employability skills lies in the ability to progress within an organisation to “achieve one’s potential and contribute successfully to enterprise strategic directions” which may be dependent on both hard and soft skills. Franz (2008) finds that several reports and papers differentiate between employability skills, as being the soft skills, and technical skills, also called discipline specific skills.

Work placement arrangements at universities

How does one solve the challenge of providing the students with the skills required by their employers? The literature tells us that several universities give their students some work practice, in order to improve their employability. This is done through for example Cooperative Education, Sandwich courses (Coll and Eames 2000; Pauling and Komisarczuk 2007), encouraging internships (Tvedt et al. 2001) practicum and other variants of work experience, but this varies from university to university and from course to course (Franz 2008).

An example of a university that has work placement is Victoria University of Wellington, presented by Pauling and Komisarczuk (2007). The university has an arrangement that requires the student to work minimum 150 hours at various employers, with a 300 hours minimum at one employer, and the goal is to reach 800 hours in total. The work placement may be conducted as part time or full-time. In the case of full-time, it is advised to include the summer trimester since the student may take longer than normal to complete the degree. The work placement is set as a core requirement for all students so it covers a wide breadth of areas and must provide for wide variance in students levels of maturity since knowledge, experience and confidence of students vary greatly.

To enable the work placement at Victoria University of Wellington a structure of four main actors that all are part of making the work placement are mentioned: Student, Industry, Careers Service Enablers/Educators and Department/School Administrators, Enablers & Educators, see figure 1 by (Pauling and Komisarczuk 2007, p. 126). The cooperation between the university and the Careers Service is paramount in this case to act as enablers for students and employers. The Careers Services has a key role in developing the student skills in finding employment through amongst other CV writing workshops, interviews and assessment skills workshops and information about employers. In addition, the Careers Service arranges events where companies present themselves for the students.
Benefits of work placement for employer and students
There are many benefits for the employer. Examples include that applicants have relevant experience from working life, and for the employer this is a form of try before hire (Pauling and Komisarczuk 2007). These benefits could also be obtained during summer internships, but as the authors point out, internships over the summer is usually not a peak time in productivity, and due to staff holidays fewer supervisors and other resources are available to the student.

The result of work placement is that the student are “more likely to than others to have reflected positively on their university experience and to have achieved employment within their chosen field” (Orrell 2004, p. 1). In addition, work placement provides students “with an appreciation of the IT work place, enhances their skills with a range of industry experience and tools and provides a step towards professional accreditation” (Pauling and Komisarczuk 2007, p. 125).

Summing up, we found several articles on programmes similar to our Industry Bachelor. Most of these articles are evaluations on the various benefits for the students and employers, but we found little research that provides a recipe for universities on how to initiate, conduct and evaluate an Industry Bachelor Programme. Inspired by the concept of Technology Roadmap (Garcia and Bray 1998) we will create an Industry Bachelor roadmap which can help universities to initiate, conduct and evaluate a similar programme. According to Garcia and Bray, a roadmap mainly helps formalizing processes within businesses. A roadmap is an effective tool for planning and coordination, which fits within a broader set of planning activities. It also helps develop consensus among the actors involved.

3. METHOD
We have used Action Research as our main approach for this research. Action Research is commonly used in Information Systems (Baskerville 1999; Baskerville and Myers 2004), but also in teaching and learning in universities regardless of the discipline (Norton 2009). According to Baskerville, Action Research is suitable when four criteria are fulfilled: (1) an action and change orientation, (2) a problem focus, (3) an
“organic” process involving systematic and sometimes iterative stages, and (4) collaboration among participants (Baskerville 1999, p. 9). We describe how each criterion is met in our study below.

**An action and change orientation**
The university college strives to be in close contact with the industry, and this model was initiated in order to strengthen the cooperation with the industry.

**A problem focus**
The university college wanted to provide the students with even better preconditions to get employment right after graduation.

**An “organic” process involving systematic and sometimes iterative stages**
An academic year is per nature cyclic, and the Industry Bachelor Programme spans several semesters in an iterative nature.

**Collaboration among participants**
The Industry Bachelor Programme involves and requires collaboration between four main participants (which we will refer to as actors): students, lecturers, administration, and companies.

Action Research is not without challenges (Baskerville 1999) and it is easy to fall into a consultant trap, meaning that the study mainly contributes to practice and less to theory. Norton also note that often teachers are forced to take a stance whether they want to be a “‘teacher who researches’ or a ‘researcher who teaches’.” (Norton 2009, p. 5). Being aware of these challenges, we carefully identified and planned a dual contribution to both theory (mainly based on the interviews with the students, lecturers and administrative staff) and a roadmap for practice. We were inspired by Baskerville’s model as framework for analysing the data (see figure 2).

![Figure 2: The Action Research Cycle (Baskerville 1999, p. 14)](image)

**3.1 Data collection**
Our main data material consists of semi-structured interviews with students (Industry Bachelor and regular) and lecturers. The questions for the Industry Bachelor students are found in appendix 1. In addition, we conducted a small survey with regular Bachelor students and lecturers. Finally, we had access to documentation of the study model and e-mail correspondence, typically with the companies.

In order to promote quality assurance, we started to interview Industry Bachelor students in 2012. Each interview was conducted face-to-face and lasted about 30 minutes each. The interviews were recorded and
transcribed afterwards. The students were informed that they would be anonymous and that the results should be used in a research context only, meaning, for example, that the employer would not see the transcripts. In addition, we conducted a survey with six regular bachelor students and four lecturers. Table 1 below sums up the data sources.

<table>
<thead>
<tr>
<th>Data source</th>
<th>Actor</th>
<th>Collected (year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 interviews, face-to-face</td>
<td>Industry Bachelor Students</td>
<td>2012: 6 students</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2013: 4 students</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2014: 10 students</td>
</tr>
<tr>
<td>2 interviews</td>
<td>Dean and senior administrator</td>
<td>2015</td>
</tr>
<tr>
<td>1 survey</td>
<td>Lecturers and regular students</td>
<td>2013: 10 respondents in total</td>
</tr>
<tr>
<td>Transcripts of grades</td>
<td>Regular and Industry Bachelor students</td>
<td>2015</td>
</tr>
<tr>
<td>E-mail correspondence</td>
<td>Companies</td>
<td>2015</td>
</tr>
</tbody>
</table>

Table 1: Overview of collected data for this study

3.2 Data analysis

We have made six and a half iterations in the Action Research Cycle, one iteration per calendar year (January – December). We use calendar year as opposed to an academic year because the students started their Industry Bachelor in their fourth semester, which begins in January. According to Baskerville, Action Research is typically cyclical, and “Action failures (in terms of the immediate problem situation) are as important as, perhaps more important than, action successes. Action should continue until the immediate problem situation is relieved” (p. 19). Based on Baskerville’s article we based our analysis in accordance with the respective phases. Since we had a rich data material with mainly text, we also drew on techniques by Miles and Huberman, especially identifying themes and trends from the collected data.

4. THE BACKGROUND STORY (CASE DESCRIPTION)

This action research case takes place in a university college – faculty of technology, that specialises in computer science and information systems. Students typically specialise within programming, E-business, and design. In 2008, the university college was contacted by a large consulting company, who were familiar with the students through hiring several of them. The company’s motivation for contacting the school was to increase the students’ workplace experience during the bachelor education.

The student’s tasks at the company varies but they are all relevant to their studies within Information Technology. Usually, all students have an introduction period where they learn about the routines and project development methods (for example the agile method called SCRUM) of the company. They also perform internal tasks such as testing, documentation, and prototyping. After the introduction period that may last between two and three months the students are usually placed on consultant assignments as regular project members. The types of assignments have varied greatly, ranging from working with mobile applications, developing web pages/applications to working with new experimental technology. The types vary because the company receives many different assignments from their clients.

In regards to communication between the school, work place and the students, it is the responsibility of the Industry Bachelor coordinator to ensure that the communication flows well. The Industry Bachelor coordinator communicates with the students throughout the semester by, for example, checking that they have been registered correctly on courses and have received the information that they need.

Usually the communication between the school and work place is limited to the planning of information meetings. The exception is for example when a student has decided to drop out of the Industry Bachelor Programme.

First iteration: 2009

Initial and informal conversations between the company and the university college took place during the spring semester of 2009. The discussions included feasibility issues of such a collaboration project, which eventually resulted in “Yes”. In February 2009, a formal group was established at the university college to discuss various programme models. Three models were suggested: one where the company was responsible for lecturing while the student was working, the second model placed the lecturing responsibility solemnly
at the university college. The third was a hybrid of the first two models. The second model was chosen and refined, making all lecturing to be the school’s responsibility. During six months, from March to August, the university college’s faculty, administration, and company worked together in finalising the study model, administrative decisions, and marketing material. From August, promotion of the Industry Bachelor Programme began. Several information meetings were held, culminating in an application deadline on November 1st 2009. The company conducted interviews with applicant students. One student (Student 1) was enrolled. The study model spans four years and is structured as follows:

- First, second and third semester: at university
- Fourth semester: work at company, self-study for two courses at university
- Fifth semester: at university
- Sixth semester: work at company, self-study for two courses at university
- Seventh semester: work at company, no courses
- Eighth semester: at university

**Second iteration: 2010**
The first student started in January 2010, and the Industry Bachelor Programme was officially initiated. From January to June, Student 1 worked at the company. At the same time, the university college evaluated and improved upon the initial version of the Industry Bachelor Programme. For example, it turned out the students were not registered for exams, and this practical issue was resolved. From August to December, the second round of recruiting students to the Industry Bachelor Programme was conducted. This included new information meetings, along with advertisement and application deadline of Nov 1st 2010. As last year, the company interviewed students during December. Four students were enrolled.

**Third iteration: 2011**
A new evaluation was made, which resulted in two actions. First, continuance of the following actions for each time period:

- January – June: the previous cohort started, assessments of previous year
- August – November: Advertisements and information meetings for potential students
- December: Interview and recruitment organised by the company

Second, because the university college now had three classes in various stages of the Industry Bachelor Programme, a need for more control emerged. This resulted in one person being assigned as coordinator for the Industry Bachelor Programme. The coordinator’s role was to follow-up the students, and to be a bridge between the students and the administration, and between the student and the company. Another responsibility was to examine and assess the Industry Bachelor Programme, such as how it affected the university college, the students, the lecturers and fellow students who were following the regular bachelor programme of three years. This evaluation was conducted through interviews and surveys. The role also included arranging the information meetings given by the university, and meetings where the companies visited the university and presented themselves to the students. The program coordinator reported to the dean.

**Fourth iteration: 2012**
As a part of the assessment, we now conducted interviews with the students, including Student 1 who had started in 2010. In addition, a second company joined the Industry Bachelor Programme.

**Fifth iteration: 2013**
By company request, E-business students were eligible for applying to the programme.

**Sixth iteration 2014 and half of the seventh (2015):**
Recruitment continued as previous years. Table 2 sums up the cohorts and the current number of enrolled students.
5. FINDINGS

In this chapter, we present our findings from analysing the various sources from table 1. First, we summarise (shown in table 3) and describe the findings from the interviews with the students. The themes and trends are based on the semi-structured interview as found in appendix 1. Then we present the findings from documentation, e-mail correspondence and surveys.

### Table 2: The various cohorts and corresponding number of students

<table>
<thead>
<tr>
<th>Cohort</th>
<th>Start of Bachelor (August)</th>
<th>Start of Industry Bachelor (January)</th>
<th>Graduating Bachelor (June)</th>
<th>Number of students enrolled</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2008</td>
<td>2010</td>
<td>2012</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>2009</td>
<td>2011</td>
<td>2013</td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>2010</td>
<td>2012</td>
<td>2014</td>
<td>2</td>
</tr>
<tr>
<td>4</td>
<td>2011</td>
<td>2013</td>
<td>2015</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>2012</td>
<td>2014</td>
<td>2016 (Planned)</td>
<td>7</td>
</tr>
<tr>
<td>6</td>
<td>2013</td>
<td>2015</td>
<td>2017 (Planned)</td>
<td>5</td>
</tr>
<tr>
<td>7</td>
<td>2014</td>
<td>2016 (Planned)</td>
<td>2018 (Planned)</td>
<td>N/A</td>
</tr>
</tbody>
</table>

### Table 3: Summing up themes and trends from the interviews with the students

**Themes 2012**

We had our first interviews in spring of 2012 where we interviewed six Industry Bachelor students that were in three different academic years of their Industry Bachelor. We found the students to be overall satisfied with their work environment although there were some administrative challenges, in regards to the university college, which they gave negative feedback on. However, the students had in the end a high degree of job satisfaction and they appreciated being regarded as regular employees, i.e. they did not get different treatment for being students.
The students were also very satisfied with how much they were learning although the learning curve was very steep in the beginning. Workload varied, sometimes they had to work overtime, but this was OK for them as long as the projects they were working on were relevant to what they expected to work with after finishing their studies. Some of the students said that they felt a responsibility in notifying the company both when they had too much or too little to do; in other words, they acknowledged that it was their own responsibility to make sure they had the right amount of tasks.

Some of the students thought that not all of the assignments were relevant, one example being different types of testing when the students were rather expecting more programming related tasks. However, when the students expressed to the company that they would like a different type of tasks the company was very flexible in assigning the students new tasks or projects.

Regarding learning it was clear that the students felt they learned both soft and hard skills in the company, amongst other how to participate in projects and handling different technologies. The students had to learn the project methods and routines of the company. Although they had learned about the same project methods at the university college, they now acted out these in real life. In addition, the students said that they gained knowledge beyond the curriculum, for example, how to work in a more structured way and managing their time.

An important part of the Industry Bachelor Programme is the counselling the students receive at the company. The students get a career counsellor who gives advice on their progression at work. The students were satisfied with the career counsellor that they all received. They also appreciated that this counsellor did not monitor them, but if they asked for help, they would get this quickly. We identified through the interviews that the career counsellor’s other roles varied, for example, some of the students had a career counsellor that also was their project leader.

In regards to the administrative challenges mentioned above in the first paragraph, there was a clear discontent. The reasons was amongst other (i) due to errors in the registration of students to courses that they were taking besides the Industry Bachelor, and (ii) problems with registration to exams and some errors concerning the financial assistance due to how much the students were earning and how many study points/credits (ECTS) they were obtaining each semester.

In addition, the students were somewhat dissatisfied with the amount of communication with the university college. They requested the university college to follow-up the Industry Bachelor students more frequently. A few of the students also were somewhat worried about falling out of the system, such as not being able to find co-students to work with in projects when they returned to the lectures. A couple of students went as far as saying that the marketing of Industry Bachelor was a bit misleading in the sense that they had gotten the impression that they would earn much money. Our data material does not reveal the salary that students were receiving, nor did we have access to the employment contract, therefore we could not pursue this finding further.

**Themes 2013**

In spring of 2013, we did the second round of interviews and spoke with four students. They were highly content both in the sense of being included in social arrangements, and working in projects which included communicating, planning, and conducting research on new and unfamiliar technologies. The students felt that they were equal to the regular employees.

Like the previous year, the students informed that they experienced a steep learning curve when beginning in the company. However, they were overall content with the amount of hours they worked although how much they worked varied from student to student. Regardless of the workload being high or low, the students realized that it was their responsibility to notify the company if they had too many or too few tasks.

Regarding their learning process, they learned to be more structured and disciplined and have more than one thought in the head at the time. The fact that the students were working on something which had consequences and an actual impact made an impression on the students. In addition, they received good counselling from both their career counsellor and their co project members, i.e. staff that they worked with.
On the negative side, the students remarked that it took some time to get a relevant assignment. They also, as last year, mentioned that they fell somewhat out of the academic environment. They required more information from the university college about what to do with both their courses and regarding the financial aid system.

**Themes 2014**

In the third round of interviews in spring 2014, we interviewed ten Industry Bachelor students. Again, the students reported that they were very satisfied with both the work environment and the social arrangements. They seemed to be emotionally attached to their colleagues, who they saw as very competent people that they could ask for help at any time. Their career counsellor functioned as mentor but also they had many other people in the company that could serve the same function. They reported that they were given a career counsellor a bit late this year; however, this was less problematic since they had so many other people to ask for guidance.

The learning curve was still steep in the beginning, but it eventually stabilized. They were able to handle the workload (which they saw as moderate) and, at the same time, they felt they learned very much. In addition, they were very content with flexible work hours. Their workload at the company seemed to have either none or slightly negative effect on their academic work, although it had a positive effect on their student projects. Some of the students informed about receiving non-relevant tasks, and once again testing was mentioned, however they understood that they could express their concerns and that the company would listen. Overall, the majority perceived the tasks assigned to them to be relevant.

**Trends 2012-2014**

From table 3 we see that most of the trends remain stable. We find that the student’s satisfaction with the career counsellor, appointed by the company, is overall good, with a slight dip in 2014 because many students had to wait before appointed one. Regarding getting relevant tasks, most students are also satisfied, however they also experience that it takes some time. The workload remains stable over the three years (eight hours) of which students find acceptable. Related to this theme and trend it is important to note that the students have to read and prepare for a reduced number of subjects in addition to their workload.

What we find (positively) surprising is the work satisfaction. The majority of the students reply “very satisfied” during all three years, and in 2014, some students even added that they “feel like a family” in regards to their colleagues. As such, we sense a slight increase in the students’ work satisfaction.

The students were asked to suggest improvements from the university college’s part. In 2012, some students complained about practical problems such as not being registered for the regular subjects that they had to study for on their own. This problem was mainly due to the administration’s IT system, which did not have a category for Industry Bachelor. However, these practical problems were solved before the next year and there is a slight decrease in such problems.

When it comes to how the Industry Bachelor Programme influences their studies (remember that the students have to follow some subjects in parallel and that they come back as full time students after half a year) the majority of the students inform that they learn how to be more structured, both when they work and when they study. However, they state that they miss being present in the lectures. This trend remains stable, just as their learning process in the company. The learning curve remains equally steep.

Finally, when we asked the students if they had any additional comments, the reoccurring answer was that they did not regret having joined the Industry Bachelor Programme, and this trend remains stable.

**Findings from documentation, e-mail correspondence and survey with lecturers and regular students**

We also analysed the transcripts of grades because we were curious whether the Industry Bachelor were obtaining better grades better than the regular students were. We compared the Industry Bachelor students’ grades with the regular bachelor students in two subjects: programming (first and second semester) and advanced programming (third and fourth semester). Our findings were that the Industry Bachelor students
did indeed have better grades, typically A or B, in these two courses. However, we believe this is because good grades (A or B) are crucial for getting a contract in the first place. In this regard, we drew on e-mail correspondence with the companies, who informed that they did not perceive grade C to be good enough when some students applied. From the interviews, we noted that only one student said that joining the programme had lowered her/his average grade by one whole grade. The other students did not think it influenced their grades. We also sent a survey with three simple questions (see appendix 2) to the lectures of programming and the regular students in the classroom. The response rate was rather poor, only six regular students and four lecturers chose to answer. The findings from the survey was that all of the six students had heard of the Industry Bachelor Programme, but only half of the lecturers (2 of 4) even knew it was an option. The answers to whether the Industry Bachelor students excelled or contributed to learning in the classroom or during exercises was a unison negative.

6. DISCUSSION
One of the main goals of introducing the Industry Bachelor was to give students the possibility of getting practical experience in their fields of study through working in a company. The expected outcome was to improve the student’s employability and to provide a closer link between academia and industry. The interviews with the students show an overall high degree of satisfaction in regards to what they learn through working on real live projects in a company. In particular, the majority is satisfied with the assigned tasks, workload, and social environment. The overall impression is that they do not regret choosing Industry Bachelor, rather they see it as a place where they have acquired knowledge outside the curriculum, and that it prepares them for working life.

In comparison to the infrastructure presented and Pauling and Komisarczuk (2007, p. 126) we have a similar structure with the student, company and schools administration and actors. Where we differ is on the fourth actor where they have identified Careers Service that consists of resources to help develop student skills in finding employment. In our case, the school already has an agreement with a company. Instead, we have another role that is the Industry Bachelor coordinator, which has as his primary role to ensure the information between the student and school administration and between the school and company. The Industry Bachelor coordinator is in that sense the glue between the other actors. Moreover, it is important that this role remains dedicated to ensure that Industry Bachelor runs smoothly.

The company with which we have the Industry Bachelor agreement is large with many resources. We believe this contributes to good routines in regards to both training and how they follow-up the newly employed students. Pauling and Komisarczuk (2006, p. 132) write in their article that roughly half of the students indicated a preference to work within a single large organization, although the other half indicated a preference to work in a number of smaller companies during the internship period. While the majority of the students informed that they “feel like a family”, a few indicated that the large size of the company made the workplace feel impersonal.

The career counsellor is one of the roles that help the students, and the regular employees, to discuss and plan what they want to work with and what courses may be relevant to take to improve different skills. It is interesting to compare the satisfaction of the Industry Bachelor students to the students’ responses in the research of Pauling and Komisarczuk (2007) where there was an expressed dissatisfaction amongst a number of students on how they felt that the employer organization was unprepared. This was especially true in terms of training and work structures. The students in Pauling and Komisarczuk’s study had to find companies themselves, which we suspect it the reason for the dissatisfaction.

In our study, we have identified another important cause of satisfaction, which is the highly competent staff the students work with in a team. The students also see them as counsellors, at least until they are able to work more independently. When the student faces a problem that he or she does cannot solve on their own, the staff will provide tutoring to overcome the challenge.

We found it interesting that many of the students did not perceive some of the assignments, especially testing, as relevant. Many of the students seem to expect to program from day one, which they seem to think is the most relevant task. This is an important discovery of the interviews since testing is actually an
essential part of software development. Consequently, the school should focus more on teaching the students the importance of testing. This is an example of how we can obtain closer ties between academia and industry. For example, this experience report from the Industry Bachelor Programme may influence how and when the school teaches the students the different topics such as testing.

7. CONTRIBUTIONS AND SUGGESTED FURTHER RESEARCH

Our contribution is twofold. First, we try to narrow the gap of missing research from the literature review section.

7.1 Contribution to research

Existing literature focus on employability and our data indicates that the students who embark on the Industry Bachelor Programme are likely to be offered a permanent position in the company. Literature also showed that work practice is beneficial to both students and employers, which our study confirms. However, we found less literature which put the main focus on the student, and in this study we have included the students view as one of the main sources. The same literature also points to the fact that many students only work during summertime, which can be unfortunate due to slower production and staff holiday. Our study proposes a new programme which we call the Industry Bachelor, and, in particular, we have described our experiences based on data from three years in this paper.

7.2 Contribution to practice

Our second contribution is an Industry Bachelor Programme Roadmap, which can be seen as an extension of the framework by Pauling and Komisarczuk (2007), shown in figure 1. The key roles from figure 1 are visualized in figure 3 (the roadmap) and key responsibilities and tasks are indicated. The roadmap can useful to all parties involved in Industry Bachelor Programme or similar, as it visualises their responsibilities and time-span.

Below follows our proposed roadmap with a set of pre-actions. When contemplating the roadmap we note that the presence of each actor (Industry Bachelor coordinator (“IB-coordinator”), Student, Administration, and Organisation) is almost equal during the school year or one iteration, with a somewhat stronger presence of the Industry Bachelor coordinator as discussed in Chapter 6. Moreover, the roadmap excludes aspects or actors such as financial issues (for example, in Norway there is a state educational loan fund called Lånekassen). We chose to exclude this actor because not all students have loans from this loan fund, and because financial issues will differ from country to country. It should be noted that the roadmap illustrates one normal iteration, meaning that the roadmap does not cover unplanned events such as student drop-out, or the company being forced to dismiss students for various reasons.

The roadmap in figure 3 below illustrates the four main actors with boxes, and the arrows between them show the connections and sequence. For example, in September, the Industry Bachelor coordinator is the one who initiates contact with the company. If a school wants to engage in a programme similar to the Industry Bachelor Programme this roadmap hopefully provides the main activities and actors involved, however the roadmap should be customised for each school and incremented after each iteration.
Pre-actions:

- The university has decided to implement Industry Bachelor as part of study programmes
- A dedicated coordinator has been appointed
- Agreement with at least one organisation
- Industry Bachelor as study programme must be implemented in the university's IT systems

Figure 3: Our proposed roadmap for the Industry Bachelor Programme
7. 3 Limitations and suggested further research
We acknowledge that our study comes with limitations. While we would have liked to know more about the companies’ experiences and assessments of the students, we do not have enough data material to investigate this. Further research can include interviews with this actor (the companies). However, since the companies continue to engage students we can assume that they are satisfied. Our data material does not include insights in the student’s work conditions. We would have liked to know more about the contract, salary, types of technologies used in the companies, and whether or not the students gets benefits such as certifications. Finally, we feel obligated to point to the fact that the companies are allowed to choose the students they want, mainly based on the student’s grades. The companies may even refrain from engaging any new students; they are not obligated to accept a given number of students at any time. This means that mainly the A- and B-students have the possibility to join the Industry Bachelor Programme. We hope that future research can investigate this in more detail.

8. CONCLUSION
This paper has investigated: what can we learn from our experience when introducing an Industry Bachelor Programme in higher education? Based on data collected over three years we propose a roadmap that builds on existing research. In particular, we find that our study confirms the study by Pauling and Komisarczuk (2007) with four actors and a mutual cooperation and dependency between them, especially between the industry partner and academic educators. Further to this we hope that this study can be useful to universities and companies who are interested in starting a similar programme in order to better prepare the students for working life.

REFERENCES
APPENDIX 1
Semi-structured interview for the Industry Bachelor students

1) Supervision at <Company Name>
What do you think of the follow-up from your career counsellor at <Company Name>?

2) Tasks
Do you think that your assignments are relevant to your studies and curriculum?

3) Workload
How do you perceive your workload (too large/too small/adequate)?

4) Studies
How do you think being an Industry Bachelor student affects your studies?

5) Learning
What do you think about your learning process as an Industry Bachelor student – do you learn a lot (which is relevant)?

6) Job satisfaction (welfare)
How do you like it as an Industry Bachelor student when you are at Company 1/2?

7) Improvements
Do you think of anything that the university college could have been organised better to improve the Industry Bachelor students?

8) Miscellaneous
Do you want to add anything?

APPENDIX 2
Survey for lecturers (of the Industry Bachelor students), and regular students

1) Are you aware of the Industry Bachelor Programme? (Yes/No)

2) Have you noticed whom (some of) the Industry Bachelor students are? (Yes/No)

3) Do you think that the Industry Bachelor students have contributed in the lecture, exercises, or in other ways, with the knowledge that they have obtained in the organisation? (Yes/No + optional comments)