

Students' Experiences of their 2nd, 3rd and 4th Years in an Engineering Program: Results Based on Questionnaires

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In the 1st Annual CDIO conference in 2005, we presented a paper about the expectations and first year experiences of four cohorts of engineering students in Applied Physics and Electrical Engineering at Linköping University. A comparison between the four cohorts showed a changing approach to studying between the first cohorts (starting in 1998 and 1999) and the latter (starting in 2000 and 2002). The first approach was categorised as “achievement and future oriented”, while the other was categorised “as gratifying here- and now oriented”. This paper will draw on the same longitudinal study, and will be based on results from questionnaires. In the presentation, the focus will be on discussing students' experiences of their 2nd, 3rd and 4th years as students. In 1999 the implementation of the CDIO curriculum started and in 2002 the first CDIO-project course was introduced during the 1st and 3rd study year. The implementation of the CDIO curriculum has continued. Results are based on 664 questionnaire responses from three questionnaires given to all registered students, in all four cohorts, in the beginning of their 3rd, 4th and 5th year. Comparisons are made within cohorts over time and between cohorts with regard to the students' self reported experiences in a number of areas: (1) estimated work hours/week and perceived work load; (2) achievement, study results and satisfaction with their achievement; (3) influence on their study situation, cooperation and feed back from faculty and peers; (4) study related health and social isolation; (5) engagement in and identification with the study program; (6) thoughts about withdrawing/dropping out and study breaks; (7) the courses, in terms of most and least instructive courses. The results will be discussed in relation to other research on student approaches to studying and learning, with focus on studies made within engineering study contexts. As the cohorts starting in 1998 and 1999 have not followed the CDIO curriculum whereas the cohorts starting in 2000 and 2002 to different extents followed the CDIO curriculum, differences between the cohorts in various areas can be related to the implementation of the CDIO curriculum.

INTRODUCTION

This study draws on data from a larger ongoing longitudinal cohort-study initiated in 1998 with an overall purpose of comparing the expectations and experiences of four cohorts of students in Applied Physics and Electrical Engineering (Edvardsson Stiwne, 2005). The focus is on self-reported aspects of the four cohorts' working hours and perceived work load, achievement, study results and satisfaction with achievement, influence on their study situation and cooperation and feed-back from teachers and students, study related health and social isolation, engagement in and identification with the study program as well as thoughts about study leaves. Throughout the years of this study, a number of changes have been made in the curriculum, involving new prerequisites of the four cohorts.

- In 2000 an international language class was introduced.
- In 2002 a new approach to education was introduced in the programme. The students would from the start work in project groups – something that differs quite a lot from

the previously more traditional form of education that was based very much on individual achievement and big lectures. Starting in 2002, a new pedagogy based on project work was introduced in the programme. The project-based approach involves more scheduled time working together with other students in small groups.

The results are based on a total of 664 questionnaire answers from a total of three questionnaires (Q4-Q6) from four cohorts that started the programme in 1998, 1999, 2000 and 2002. The response rate was largest for Q4 and then dropped for the following questionnaires (see Table 1). The results are divided into the following parts – *Satisfaction with studies, Average working hours and perceived work load, Health, Influence and Cooperation, Study break, and Courses.*

The collection of Q4 was made by researchers who visited a popular lecture during the autumn of the fourth semester of the programme. Students answered the questionnaires, which immediately were collected by the researchers. The fifth and sixth questionnaire were distributed to students via mail with stamped envelopes, since there were no compulsory lectures including all students of the cohort in the third and fourth year of the programme. The response rate is based on all answered questionnaires in relation to registered students. For the whole material, there is a selection already after the first year in the programme, when many students drop out. In a former report (Edvardsson Stiwne, 2004), the reduction was calculated to about 20 % after the first year in the programme.

Table 1: Response rates for Questionnaires 4, 5, and 6 for cohorts 1998, 1999, 2000 and 2002. Within parenthesis, the number of the total number of first registered students and the response rate in percent are noted.

	Questionnaire 4	Questionnaire 5	Questionnaire 6
Cohort 1998	77 (135, 57%)	76 (117, 64%)	62 (120, 52%)
Cohort 1999	75 (150, 50%)	65 (139, 47%)	43 (131, 33%)
Cohort 2000	82 (129, 64%)	47 (117, 40%)	39 (114, 34%)
Cohort 2002	56 (123, 46%)	42 (104, 40%)	-
Total	290 (537, 54%)	230 (479, 48%)	144 (365, 40%)

In table 1, it is clear that the response rate is reduced in the fifth and sixth questionnaire. For Q4, the average reduction of responses was 46 %, for Q5, the average reduction of responses was 52 %, and for Q6, the average reduction of responses was 60 %. There may be two reasons for the decreased response rate: (i) the lecture the researchers visited when collecting Q4 was not as well attended as the lectures that the researchers visited when collecting the questionnaires Q2 and Q3, and (ii) students who had the questionnaires distributed to their homes were not as inclined to return completed questionnaires. Therefore, there is a risk that the reduction of responses is systematic and may result in a bias in the results (Qvist, 2000). One hypothesis is that students who have decided to answer the questionnaires differ from students who chose not to do this. The heterogeneity among the cohorts, which was evident in the beginning of the study, will therefore decrease over time. Thus, over time, the group of students who answered the questionnaires will be more homogenous, and the results of this paper will to a great extent refer to 'the successful', the ones who have managed their studies. None of the questionnaires were coded and the students were anonymous. This means that individualised reminders could not be sent to students who did not return their questionnaires. It is also only possible to discuss changes over the years on a cohort level as it is not possible to know anything about changes on an individual level. Neither is it possible to compare students' answers with student files of the university. This is done in the interview material where individual students in every cohort are interviewed every year.

All questionnaires (Q4, Q5, Q6) are to a great extent identical. The same fields of questions are in all of them. The only important difference is that there are questions about experiences from the second year in Q4, of experiences of the third year in Q5, and of experiences of the fourth year in Q6. Most of the questions are of Likert-scale type.

Changes in the programme

The questionnaires that have been introduced in the programme between 1998 and 2002 resulted in cohort 2002 being the first cohort to have a CDIO-course, a project course, already the first year. Cohorts 1998 and 1999 did not do any CDIO-course and cohort 2000 did its first CDIO-course in the third year, the Project Course in Electronics. The CDIO-courses have two main purposes. The first one is that students shall learn a project management model called LIPS (Lightly Interactive Project Management Model). LIPS is a project model that has been developed at Linköping University and indicates how a project should be structured and managed. The model specifies that the phases of the project contain a number of *tollgates* and *milestones* the project group must pass before, during and after the project has been carried out. The second main purpose is that students shall be part of and learn how to cooperate in a project group during a limited amount of time. Project based learning generally means that the students and the supervisor, within certain frames, chose how they manage the project and take positions on various issues in the project, such as content, process and organisation (Kolmos, 2002; Krogh, 2002). The students are supposed to be responsible and actively manage their own learning and work according to the LIPS project model. Furthermore, the project group is a social dimension that according to Kolmos (2002) and Krogh (2002) can have a decisive influence on students' decisions to continue in the programme. Research has also shown that project based learning can facilitate study motivation in many ways, e.g. by the experience of being able to make important choices (Ryan & Deci, 2000), student engagement in investigating authentic problems (Blumenfeld et al., 1991), and if correctly organised it creates a high degree of teamwork (Kolmos, 2002).

When the results are interpreted, the following hypothesis will be the starting point.

- There has been a self-selection over time, which means that the students who stay in the programme and choose to answer the questionnaires become more homogenous as a group. Therefore, the differences between the cohorts will decrease over time.
- The CDIO-project courses give the students opportunities to cooperate with teachers and peer-students, thus those students are given more feedback on their work.

RESULTS AND DISCUSSIONS

In this section, results from the parts of the study – *Satisfaction with studies, Average working hours and perceived work load, Health, Influence and Cooperation, Study break, and Courses*, will be presented and discussed.

Satisfaction with studies

In the questionnaires, students were asked if they were satisfied with their study results. In Table 4, the percentage of students who reported that they were very satisfied and students who reported that they were very dissatisfied with their study results are presented.

Over time, more students were satisfied with their studies. One explanation could be that students in year 3 choose a study profile containing a number of 'profile courses'. It is possible that these courses were perceived as more relevant and interesting which made students more satisfied. Some differences appeared in these results, but it is difficult to interpret them as there is no pattern. Here, the hypothesis that there has been a self selection among students who have replied the questionnaires may be the explanation. If you are successful, you are satisfied.

Table 2: Percentage of students who state that they are very satisfied and very dissatisfied with their studies after year 2 (Q4), year 3 (Q5) and year 4 (Q6)

	Very Satisfied %			Very Dissatisfied %		
	Q4	Q5	Q6	Q4	Q5	Q6
Cohort 1998	62	71	71	6	9	10
Cohort 1999	61	58	81	9	15	5
Cohort 2000	52	53	68	13	9	8
Cohort 2002	64	66	-	11	6	-
Total	60	63	73	10	10	8

Average working hours and perceived work load

Students' estimated personal average working hours per week are presented in Table 5.

Table 3: Students' estimations of their real, average working hours per week during year 2 (Q4), year 3 (Q5) and year 4 (Q6) for the four cohorts.

	< 40 hours %			40 hours %			> 40 hours %		
	Q4	Q5	Q6	Q4	Q5	Q6	Q4	Q5	Q6
Cohort 1998	11	9	28	42	25	33	47	66	39
Cohort 1999	14	19	26	42	14	56	45	67	19
Cohort 2000	20	20	45	41	29	32	39	51	24
Cohort 2002	11	13	-	53	43	-	36	45	-
Total	14	15	32	44	26	40	42	60	28

There are more students from cohorts 1998 and 1999 who study more than 40 hours per week during the second, third, and fourth year, the percentage is largest for cohort 1998. Cohort 2002, who were the ones who spent most time studying of all cohorts during the autumn semester of their first year (see Edvardsson Stiwne, 2005), were the ones who spent the least time on their studies during the second and third year. The percentage of students who studied less than 40 hours per week was at the same time larger than the other cohorts. It is obvious that it is the third year that most students estimate that they work more than 40 hours per week, and the percentage is larger for the cohorts 1998 and 1999 than for the cohorts 2000 and 2002. One possible explanation is that the latter cohorts studied CDIO-project courses during that year, which may have had an effect. In cohort 2000, 51 % estimated that they studied more than 40 hours per week while in cohort 2002; only 43 % had the same estimated working hours. The explanation for this difference may be that it was the first time cohort 2000 studied a CDIO-project course, while cohort 2002 did their second CDIO-project, and therefore they were more used to that kind of course and learning

In the questionnaires, the students were also asked about their subjective perception of their work load, i.e. how they have experienced their work load regardless of how much time they actually have spent studying. Students have indicated how they perceived their work load on a 5-grade Likert scale, from small to overwhelming. In Table 7, the percentage of students who answered that they experienced a very big or an overwhelming work load is presented.

Table 4: Percentage of students who perceived their work load to be very heavy and overwhelming during year 2 (Q4), year 3 (Q5) and year 4 (Q6) for the four cohorts.

	Q4 %	Q5 %	Q6 %
Cohort 1998	20	46	11
Cohort 1999	17	63*	2
Cohort 2000	12	47	11
Cohort 2002	22	18*	-

The third year, the largest percentage of students perceived the work load as very heavy or overwhelming in cohorts 1998, 1999 and 2000. For cohort 2002, a different pattern

developed, where a smaller percentage of students perceived the work load in year three as very heavy or overwhelming than in year two. For year three (Q5), there are significant differences. Significantly more students from cohort 1999 and significantly fewer students from cohort 2002 perceived the work load as very heavy or overwhelming than expected, $\chi^2(6, N = 228) = 22.14, p < .005$. Both cohort 2000 and 2002 had CDIO-project courses in that year, but they differ regarding how they perceived their work load. In cohort 2000, 47 % of the students experienced a very high or overwhelming work load, but only 18 % of the students in cohort 2002 did the same. One explanation can be that students in cohort 2000 had their first CDIO-project, and therefore they were not used to dealing with deadlines, cooperation etc., which may have led to an extra strain. Cohort 2002, on the other hand, were used to studying in projects as they already had done a CDIO-course during their first year, and had experiences from such a project that they could use, which may explain why the percentage of students who perceived the work load as very high was much smaller. It is possible that students in cohort 2002, through their first CDIO-project, learned how to treat the frames and learned the project model LIPS.

Health

Highly demanding studies can have affects on students' psychological and physical health. Ill-health can be a subjective experience, such as feelings of inadequacy, but it can also be related to physical complaints such as infections. In the questionnaires, there are general questions about health and illness as well as more specific questions about complaints that may be related to the study situation. For the general questions of health, a factor analysis resulted in a bipolar scale (explaining 39 % of the variance) which covers the following poles:

- My health is good
- I enjoy the place of study

and

- The studies have affected my health in a negative way
- I have felt that I do not really fit in the programme
- I have experienced feelings of social isolation

The factor can be called *Health and ill-health*. In Figure 1, the mean values of the factor are presented. The scale can assume values between 1 and 5, where 1 means good health and 5 means ill-health. In general, students showed good health, but slightly poorer health than they did during their first year of the programme (Edvardsson Stiwne, 2005).

The mean values are below the centre for all cohorts, which means that students experienced more health than ill-health. No significant differences between the cohorts were found.

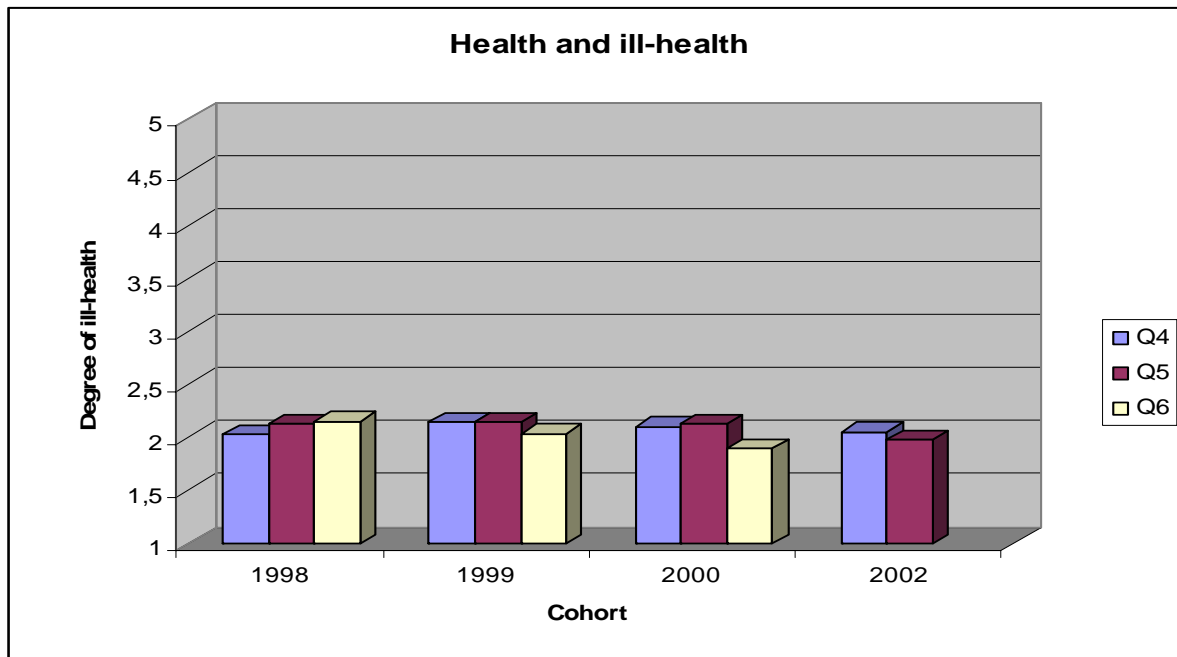


Figure 1: Experiences of health and ill-health of students. In the figure, mean values for each cohort are presented (*the spread was between .54 and .67 for all means*).

Students were also asked to estimate their experiences of their specific, study related troubles. In Table 5, study related feelings of inadequacy are presented and in Table 6, study related depressions during their second, third, and fourth year are presented.

Table 5: Percentage of students who have experienced feelings of inadequacy to some extent during year 2 (Q4), year 3 (Q5) and year 4 (Q6) for the four cohorts.

	Q4 %	Q5 %	Q6 %
Cohort 1998	54	70	59
Cohort 1999	61	68	51
Cohort 2000	68	63	46
Cohort 2002	43	55	-

The percentages of students who have experienced feelings of inadequacy to some extent are alarmingly high for certain cohorts and years. This is especially valid for cohort 2000 in the second year (Q4) when 68 % experienced feelings of inadequacy, and for cohorts 1998 and 1999 for Q5, when 70 % and 68 % experienced such feelings.

Table 6: Percentage of students who have experienced depressions to some extent during year 2 (Q4), year 3 (Q5) and year 4 (Q6) for the four cohorts.

	Q4 %	Q5 %	Q6 %
Cohort 1998	42	66	47
Cohort 1999	46	56	47
Cohort 2000	61	70	56
Cohort 2002	41	38	-

The percentage of depressed students is also relatively high (between 38 and 70 %), with variations between cohorts and study years. A great increase in the percentage of depressed students has been shown compared to their first year in the programme (see Edvardsson Stiwne, 2005). However, there is one cohort that has a significantly smaller percentage of depressed students. Cohort 2002 have a significantly smaller percentage of depressed students in Q5 $\chi^2(3, N = 227) = 10.08, p > .05$.

Thus, even if the students did not experience their health as particularly bad (the mean value was 2.10, where 5 is the highest possible degree of ill-health), the percentage of students who experienced more specific study related ill-health was relatively high. This was especially apparent in Q5, which confirms the results from the interviews in this study. However, it is important to note that all students who have experienced various forms of ill-health to some degree are presented, even the ones who have such experiences to a lesser degree. If only the percentage of students who had experienced great degrees of ill-health had been presented, the percentage of students had been much smaller.

Feelings of social isolation may be related both to the situation, e.g. a student may have many relations outside the university and have problems feeling at home in the academic world, and related to relations, e.g. a students may find it difficult to establish contact with other students. In both cases, a dominant feeling may be of not really fitting in. Research has shown that social integration, which involves the structural aspects of social relations (House & Kahn, 1985), is more important for most students than academic integration and that lack of experienced or actual social support and social support networks is a significant reason for student drop outs (Wilcox et al., 2005). In the latest report (see Edvardsson Stiwne, 2005) the four cohorts experiences of social isolation were discussed. The results then showed that cohorts 1998 to 2000 to a greater extent experienced social isolation during their first semester, whereas cohort 2002 experienced a higher degree of social isolation their second semester. One hypothesis that was presented in that report was that cohort 2002, which was the first cohort to have been divided into project groups the first semester, *may* have been allotted belongingness, but that their belongingness did not last when the groups dissolved in their second semester.

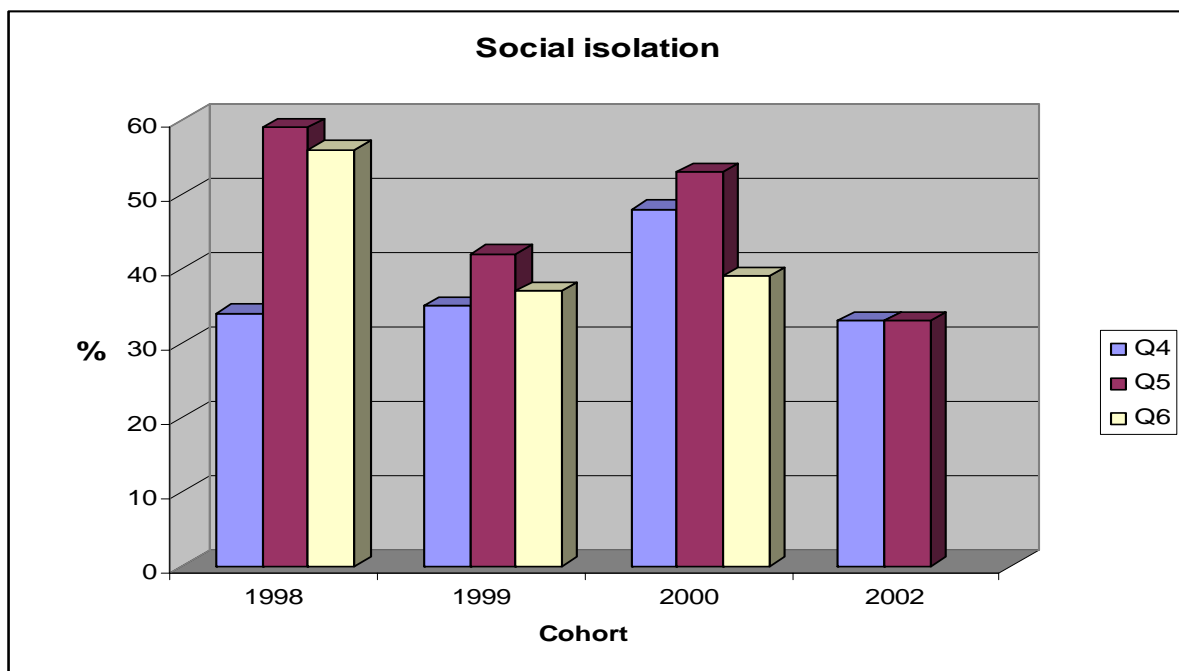


Figure 2: Percentage of students who to some extent experienced feelings of social isolation.

In Figure 2, the percentage of students who have had experiences of social isolation to some extent during their second, third and fourth year is presented. It is noticeable that students in cohort 2002 who have had such feelings has decreased slightly from 37 % to 33 %, and then has remained on that level. For the other cohorts the count of events has been different, where the percentage instead has increased from similar or higher levels to a level much higher in their third year. It is also apparent that students in cohort 1998 experienced social

isolation to a greater extent than all other cohorts during their third year and fourth year. When a χ^2 -test was carried out for each year, the results indicated a significant difference in their third year (Q5), when cohort 1998 experienced more social isolation and cohort 2002 experienced less social isolation than could be expected $\chi^2 (3, N = 227) = 9.0, p > .05$. One hypothesis is that the board's intentions to break the negative experiences that cohort 1998 and to a certain extent cohort 1999 initially manifested, has proved effective to a greater extent for cohort 2002, for whom most interventions were introduced. Notable is that the feelings of social isolation of cohort 2002 was significantly smaller than for cohort 2000 when the interventions had been introduced for both these cohorts and both had project based courses during their third year.

Influence and Cooperation

Research has shown that teacher support, friendliness and fairness are important components in study motivation (e.g. Eccles et al., 1993). Furthermore, support from teachers have been found to be necessary in order to increase students' possibilities to social integration in their courses (Wilcox et al., 2005).

With a factor analysis, the questionnaires statements of influence and cooperation were reduced to two factors. Just as in report 4 (see Edvardsson Stiwne, 2005), these two factors can be called *Influence and contacts with teachers* and *Cooperation with other students*. It was the same items that loaded in these two factors and they explain 30 respectively 54 percent of the variance for Q2, Q3, Q4, Q5 and Q6.

The following items loaded on factor *Influence and contacts with teachers*:

- I have had good opportunities to influence my study results
- I have had satisfying and inspiring contacts with lecturers
- I have had satisfying and inspiring contacts with course assistants
- I have had satisfying and inspiring contacts with laboratory assistants

The following items loaded on factor *Cooperation with other students*:

- I think the cooperation with other students has been rewarding
- In class, we have had a satisfying and inspiring exchange in our spare time

Mean values for these factors are presented in Figure 3 and Figure 4. The factors can have values between 1 and 5, where 1 indicates bad experiences of cooperation with students and bad experiences of contacts with teachers, and 5 indicates such experiences that had been satisfying and inspiring.

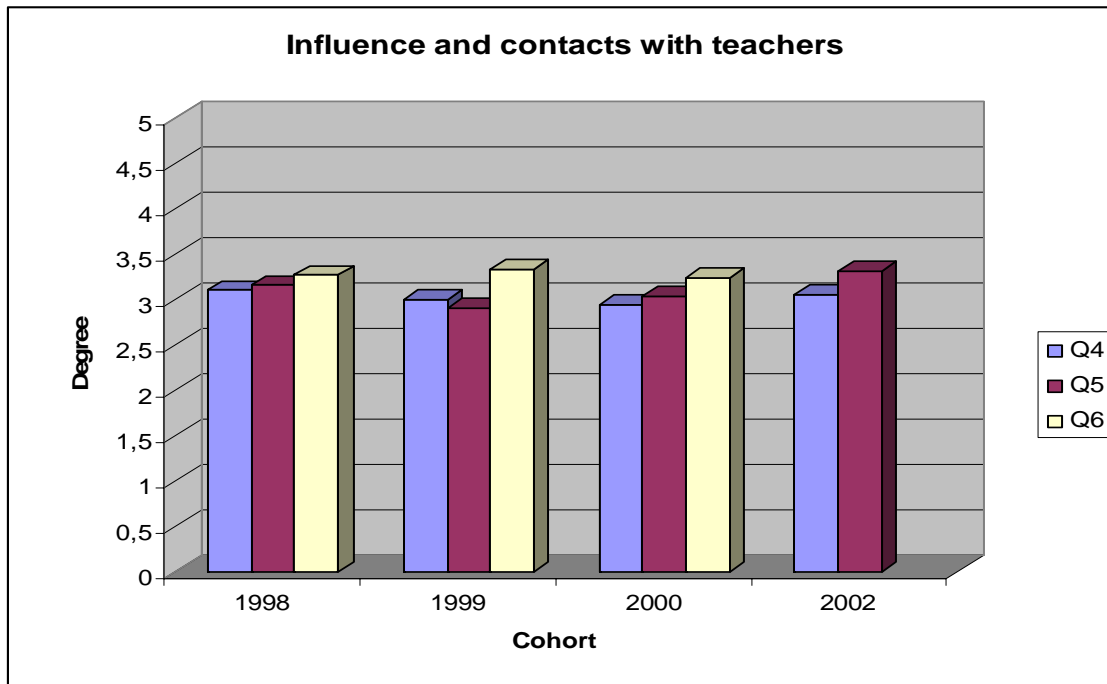


Figure 3: Students' experiences of possibilities to influence and cooperate with teachers (*the spread was between .55 and .73 for all mean values*).

Regarding students experienced possibilities to influence and cooperate with teachers, these possibilities were relatively high, ranging between 2.9 and 3.3. No significant differences were found neither between cohorts nor year in the programme.

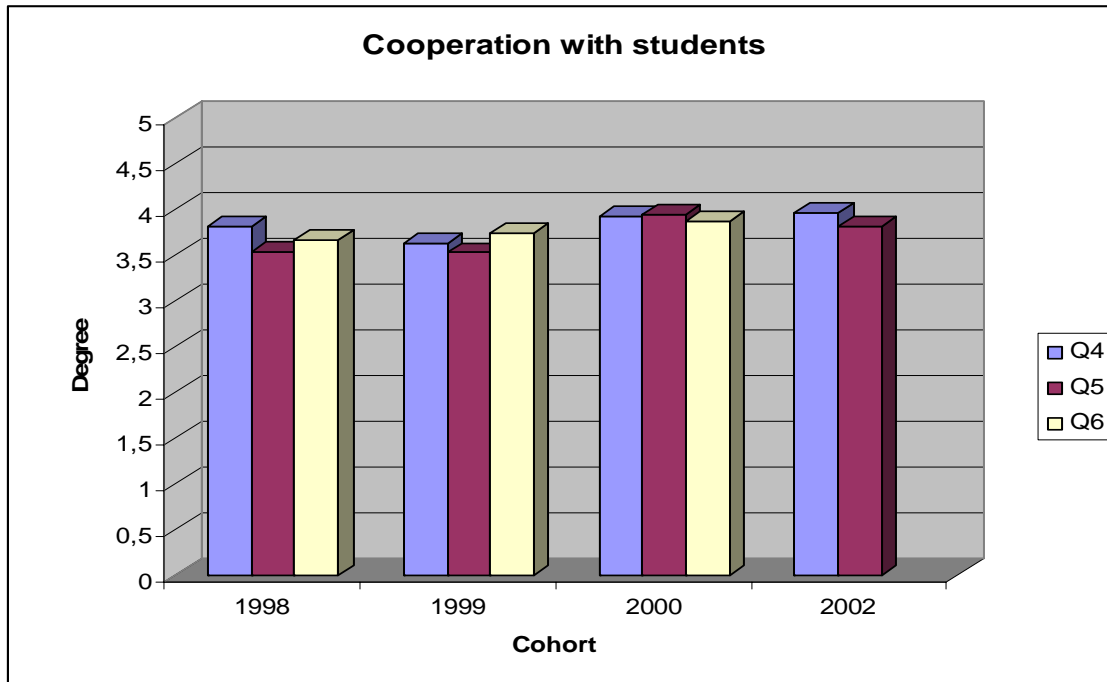


Figure 4: Students' experiences of their possibilities to cooperate with other students (*the spread was between .73 and .93 for all mean values*).

The results indicate that students in cohorts 2000 and 2002 experienced their possibilities to cooperate with other students as better than the students in cohorts 1998 and 1999 did. One hypothesis is that the CDIO-project had a positive effect on students' possibilities to cooperate with each other. When an analysis of variance was calculated for the cooperation,

there was a significant difference (see Table 7). Over all three years, cohort 2002 experienced their possibilities to cooperate with other students significantly better than cohort 1999, $F=3.821$, $p < .05$.

Table 7: Students' experiences of possibilities to cooperate with other students over the 2nd, 3rd and 4th year in the programme (the spread was between .66 and .84 for all mean values)

	Q4-Q6
Cohort 1998	3,5
Cohort 1999	3,4*
Cohort 2000	3,6
Cohort 2002	3,7*

Study break

In Table 8, the percentage of students who had thought of taking a study break sometime during the second, third and fourth year in the programme are presented.

Table 8: Percentage of students who had thoughts of taking a study break sometime during year 2 (Q4), year 3 (Q5) and year 4 (Q6) for the four cohorts.

	Q4 %	Q5 %	Q6 %
Cohort 1998	22	20**	14**
Cohort 1999	59	43	48
Cohort 2000	74**	53**	53**
Cohort 2002	57	34	

Two cohorts differ significantly from the other cohorts. Students in cohort 1998 had thoughts of taking study breaks to a significantly less extent than the other cohorts, and at the same time cohort 2000 had such thoughts to a significantly higher extent than the other cohorts. This concerns the second year $\chi^2(3, N = 288) = 43.4$, $p < .001$, the third year $\chi^2(3, N = 212) = 32.9$, $p < .001$, and the fourth year $\chi^2(3, N = 132) = 25.7$, $p < .001$. One explanation may be that students in cohort 1998 to a greater extent dropped out at the beginning of the programme. In 2000, the board tried to keep the students in the programme.

Courses

In the questionnaire, the students were asked to, for each year, name which course they had found the most as well as the least instructive. For each course they named, they were also asked to motivate why they had found the course least respectively most instructive. Entwistle (2003) claims that student perceptions of the relevance and quality of a course depend on how the programmes are organized and managed. In a study, Lizzio and Wilson (2004) found that the perceived relevance to future work was the strongest predictor for student interest in courses in higher education and determined the amount of effort they were willing to invest in learning those courses. Furthermore, if courses are believed to be relevant, intrinsic motivation can be increased (Deci & Ryan, 2000). The motives students expressed for the courses they had found most instructive support these findings, because the motives students gave may be categorised into the following three categories: (i) Useful, (ii) Applicable, and (ii) Interesting courses. In Table 9, the three courses students found the most instructive for each year are presented.

Table 9: The three courses students found most instructive during year 2 (Q4), year 3 (Q5) and year 4 (Q6) for the four cohorts.

Name of Course	Cohort 1998	Cohort 1999	Cohort 2000	Cohort 2002
Q4				
Calculus	37	30	26	16
Complex Analysis	0	5	11	1
Computer Hardware and Architecture	9	4	9	2
Q5				
Automatic Control Project Course in Electronics (CDIO)	21	7	0	7
Circuit Theories	0	0	23	15
	6	10	0	-
Q6				
Digital Signal Processing	9	4	3	-
Automatic Control - Project Course	5	5	3	-
CDIO-Project Courses	0	0-	5	-

Category 1, useful courses. The following examples may illustrate how students argued: "...is useful everywhere"; "essential for many courses to come"; "without it you couldn't pass any other course"; and "could use much knowledge from many other courses". These statements indicate that students found a course instructive if it was experienced as useful in other courses in the programme or considered to be essential in general. These kinds of motives were extra common for the courses Calculus, Complex Analysis, Circuit Theories, and Automatic Control Project Course.

Category 2, applicable courses. The following examples may illustrate how students argued: "the course contains many things that are applicable in reality"; "relevant assignments"; "the course the closest to reality"; "you could apply the knowledge practically"; "closely connected to how you work in companies today"; and "clear relevance for the future". These statements indicate that students considered a course instructive if it was applicable in a future role as an engineer. These kinds of motives were extra common for the courses Complex Analysis, Automatic Control, CDIO-Project Courses, Digital Signal Processing, and Computer Hardware and Architecture.

Category 3, instructive courses. The following examples may illustrate how students argued: "Interested in the subject"; "of general interest"; "fun"; "stimulates one's own thoughts and creativity"; "you learned a lot and it was great fun"; and "interesting contents". This implies that students believed a course should be interesting and fun in order to be instructive. These kinds of motives were extra common for the courses Computer Hardware and Architecture and CDIO-Project Courses.

It is notable that the Project Course in Electronics, which is a CDIO-Project Course, was by far the course that most students in the third year considered to be the most instructive course in cohorts 2000 and 2002. The reasons for students finding that course so instructive was especially that it was considered applicable and interesting, which supports theories about the advantages of project based learning.

CONCLUSIONS

In this paper, questionnaire results from a larger ongoing longitudinal cohort-study of four cohorts of students in Applied Physics and Electrical Engineering have been presented and discussed. Differences between the cohorts regarding the students' satisfaction with their studies, their average working hours and perceived work load, their health, their influence and cooperation opportunities with teachers and peer-students, their thoughts of taking study breaks and finally their experiences of instructive courses have been presented.

The results showed that more students were satisfied with their studies over time. One reason can be that the students who answered the questionnaire are the ones who have been successful and as a result are satisfied. Another reason can be that students choose their courses in the third and fourth year of the programme which makes them more satisfied. The results also showed that the cohorts' average working hours and their perceived work load had its peak during the third year.

Regarding differences between the cohorts, one conclusion is that the CDIO-project courses and other interventions in the programme seem to have had positive effects on especially cohort 2002. For example, there was a clear difference between the 1998- and 1999 cohorts, who more often studied more than 40 hours per week and perceived the work load as very heavy or overwhelming, and the 2000- and 2002 cohorts, who to a lesser extent studied more than 40 hours per week or perceived the work load as very heavy or overwhelming. The results also indicate that students in cohorts 2000 and 2002 experienced their possibilities to cooperate with other students as better than the students in cohorts 1998 and 1999 did. According to our hypotheses this is one effect of the CDIO curriculum. For example, the project courses may have had positive effects on working hours per week, perceived work load and on opportunities to cooperate with each other. Another difference was that more students in cohort 2000 estimated that they studied more than 40 hours per week and perceived the work load as very high or overwhelming than students in cohort 2002, despite that both cohort studied CDIO-project courses. Finally, on average, cohort 2002 experienced better possibilities to cooperate with other students.

Regarding health related findings in this paper, all cohorts have in general reported a relatively good health, but a rather large extent of students have to some extent experienced problems with more specific study related ill-health, such as depression and social isolation. Even here, cohort 2002 distinguished themselves from the other cohorts by a significantly smaller percentage of depressed students in the third year ($\chi^2(3, N = 227) = 10.08, p > .05$) and a significantly smaller percentage of students who experienced social isolation ($\chi^2(3, N = 227) = 9.0, p > .05$). The explanation for these results that are suggested in this paper are that the study board's intentions to break the negative experiences that cohort 1998 and to a certain extent cohort 1999 initially manifested, has proved effective to a greater extent for cohort 2002, for whom most interventions were introduced.

Finally, the CDIO-project courses in the third year were considered to be the most instructive courses by most of the students in cohorts 2000 and 2002. The reasons for students finding those courses instructive were especially that they were considered applicable and interesting.

One question remains, and it is whether the improvements the 2002 cohort generally has experienced will continue or not. It is probable that the percentage of students who experience the work load as very heavy or overwhelming remain lower and that the experience of possibilities to cooperate with other students will remain higher for students who study project courses. However, more research must be carried out to be sure if these improvements will continue or not.

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