# IT STUDENTS' PERCEPTIONS OF MANDATORY COURSE-WORK

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## Abstract

*A mandatory coursework is an activity a student needs to pass in order to get access to an exam. In an earlier study, we examined to what extent mandatory coursework is in use in higher Norwegian IT education. Although the use differs significantly between the institutions delivering IT studies, we concluded that mandatory coursework to a large extent is in use.*

*It is therefore interesting to investigate how IT students experience mandatory coursework. Do they believe that mandatory coursework contributes to their achievement of learning outcomes in the courses they study? If not, it might be a good idea to stop using mandatory coursework. And if the students find value in mandatory coursework, how should we use them? And what elements of mandatory coursework do the students appreciate? In this study we seek to find IT students' perceptions of mandatory coursework, through questionnaires and interviews.*

*The results of this study indicate that a large majority of Norwegian IT students want mandatory coursework. They believe it contributes to their learning, but only within certain prerequisites. Mandatory coursework is mostly needed for technical subjects, such as computer programming. And the assignments should be practical, engaging, relevant for the upcoming exam and with just the right level of difficulty. Creating engaging assignments with the appropriate level of difficulty for all students might prove a difficult task. We found that a particular coursework assignment may be highly appreciated by one group of students, and at the same time disliked by another.*

*Keywords: Mandatory coursework, Obligatory coursework, Coursework, IT education.*

# 1 INTRODUCTION

A mandatory coursework is an activity a student needs to pass in order to get access to an exam. Within Norwegian IT education, they appear in many different forms: Assignments, labs, submissions, participation criteria, projects, presentations and many others. In an earlier study (Lauvås et al. 2019), we investigated to what extent mandatory coursework are in use. In this paper we look at how students experience them.

# 2 BACKGROUND

Haugan et al. (2017, 2018) advice people to stop using mandatory coursework in engineering studies. They replaced mandatory assignments with voluntary peer-assessment sessions in five courses with great success. The students did well on the exams, and the average number of study hours increased in all the involved courses.

When students perform well and they put in more hours than before **and** the assignments no longer have to be evaluated by a teacher for a pass or fail verdict, it is easy to understand why Haugan et al. came to the conclusion that all mandatory coursework assignments should be eliminated.

Perhaps the same applies to IT studies? Maybe we should stop using mandatory coursework as well? Before such questions can be answered we need to know if mandatory coursework is in use. That was the motivation behind the study (Lauvås et al. 2019) where we investigated to what extent mandatory coursework are used in Norwegian IT studies. By analysing public course descriptions, we found that mandatory coursework to a large extent *are* in use, although there are significant variations among different institutions. We found several different types of coursework, the most common being labs, assignments and submissions. Mandatory coursework is most prominent in the first study year, but they are in use in all years of both IT Bachelor and Master studies in Norway.

When we *do* know that mandatory coursework is in use in Norwegian IT studies, it would be interesting to investigate how students experience them. Does mandatory coursework contribute to learning? If so, under what conditions? Do students want mandatory coursework?

Uiboleht et al. (2019) interviewed 33 students in three undergraduate business and administration courses to investigate student perceptions of what enhanced and hindered their learning. They found students to perceive that "compulsory learning activities" enhanced their learning. This may differ within a group of students, and students with low self-regulation skills can require more external regulation, such as mandatory/obligatory assignments (Varunki 2017).

Hellem et al. (2020) investigated the effect of mandatory assignments on students' learning outcome in introductory programming courses through a quasi-experimental research study. One group of students were exempted from the mandatory weekly assignments and followed up via biweekly sessions. A control group followed the mandatory assignment regime. The results indicated that the group of students exempt from mandatory assignments achieved the same learning outcome as the control group, and no difference was found between the two groups on exam performance.

To the best of our knowledge, there are no descriptions of student perceptions of mandatory coursework within Norwegian IT education. This leads us to our research question:

**RQ**: How do IT students experience mandatory coursework?

Kristiania University Collage (KUC) offers a Bachelor in IT (BIT) with six specializations. All specializations share a common first year. Around 430 new students signed up for the bachelor this year.

In the autumn of 2017, a change was introduced to the introductory programming course (PGR100) in the first semester for the BIT students. In earlier versions, the students received a grade based on two assignments during the course. Lauvås et al. (2016) interviewed students who failed the course. One of the main

findings of the study was that some students invested so much time in the two assignments that they did not manage to keep up with parallel learning activities. This could lead to students "falling off", and later failing the course.

The two assignments in the course were not removed, but the students no longer received a grade based on them. The assignments were transformed into mandatory coursework. The students did not have to *complete* the assignments. If they failed to complete them, they could pass the mandatory coursework by describing *how* they had worked on them, what sources they had been using, and what kind of help they needed to progress further.

The first assignment involved completing a sound player program. The completion required only a few lines of code, but it required an understanding of how to call methods in different classes. The second assignment involved reading a file with different adjectives and randomly inserting the adjectives into a story with placeholders for the adjectives. This assignment required more work than assignment one.

In order to evaluate the change that introduced mandatory coursework assignments, we started collecting data on students' perceptions of mandatory coursework. In the first year, we focused on the specific mandatory coursework assignments in the course PGR100. Later, we expanded the investigation and looked to other courses and other institutions, as explained in the next section.

# 3 METHOD

In the first round of data gathering, we used the course evaluation questionnaire for PGR100, including questions about the use of mandatory coursework. In addition, we interviewed 10 students. The semi-structured interviews were conducted in late 2017 and early 2018. All interviews were transcribed. When referring to the first round of data gathering in this paper, we refer to the year 2018. The 2018 data are presented in the next section.

In the autumn of 2018, another change was made to the common first year. In the introductory programming course, we replaced Java with JavaScript - partly due to Lauvås et al. (2017) who described JavaScript as something *the industry is looking for in a recently graduated computer programmer*. For that reason, PGR100 ceased to exist.

Although KUC is not among the Norwegian educational institutions who use mandatory coursework in IT education the most (Lauvås et al. 2019), the students starting in the autumn of 2018 experienced several mandatory coursework during their first year. We distributed a new questionnaire to all first- and second-year students regarding mandatory coursework in May 2019. We also distributed the questionnaire to a UDIT (The Norwegian Conference on Didactics in IT education) mailing list, so that students from other IT educational institutions in Norway could participate. This second questionnaire was not directed towards a single course. It had questions about students' experiences with mandatory coursework so far in their studies. This is the second round of data gathering. The amount of answers was approximately three times the size of the 2018 survey. The answers are presented in the next section and they include both information on the respondents and their experiences with mandatory coursework. In addition to the second questionnaire, we once again interviewed first year students - this time the semi-structured interviews evolved around their experiences on mandatory coursework across all courses in their first semester. We interviewed students in the beginning of 2019. All eight interviews were transcribed. When referring to this second round of data gathering in this paper, we refer to the year 2019.

# 4 FINDINGS

We report findings from the two surveys conducted in 2018 and 2019. We supplement the survey data with information gathered through the two rounds of student interviews.

## 4.1 2018 survey - Mandatory coursework within a specific course

The course PGR100 Object-oriented programming was evaluated using a questionnaire at the end of the course. The course, and its use of mandatory coursework, is described in section 3. There were 55 respondents out of 217 students (25.3 percent). We display the relevant questions and answers below.

| Statement | Avg. | SD |
|---|---|---|
| My work on coursework assignment 1 helped me achieve the course's learning outcomes. | 4.9 | 0.9 |
| The feedback I received on coursework assignment 1 helped me achieve the course's learning outcomes. | 4.1 | 1.4 |
| My work on coursework assignment 2 helped me achieve the course's learning outcomes. | 4.8 | 1.1 |
| The feedback I received on coursework assignment 2 helped me achieve the course's learning outcomes. | 4.2 | 1.5 |
| I believe you should keep using mandatory coursework assignments in this course. | 5.1 | 1.4 |

*Table 1. Student evaluation of mandatory coursework, 2018. Likert scale 1-6, n=55.*

From table 1, we see the students self-reported that both coursework assignment 1 and 2 helped them achieve the learning outcomes of the course. The students believed mandatory coursework should be kept as a part of the course. We also see that the feedback received on the two assignments helped the students achieve the learning outcomes, but not to the same degree as actually working on the assignments did.

In the questionnaire, we asked the students *Can you say a few words about how you experienced getting feedback on your mandatory coursework?* The answers were mixed. Some students describe valuable feedback, while others found it not that helpful:

*Very good to get feedback on what you do, especially when you are new to programming, so that you can remove bad habits before they stick. It is also a very positive experience to program something that someone else will actually see/use.*

*Says just "looks good" on everything... Not very constructive.*

There might be several reasons for the students to experience the feedback differently. For example, it may be easier to provide constructive feedback when the delivery is not "perfect". One student also pointed out that *who* provides feedback is important.

| The level of difficulty in coursework assignment 1 and 2: | 1 | 2 |
|---|---|---|
| Too difficult | 5.5 | 29.1 |
| Appropriate | 74.5 | 54.5 |
| Too easy | 10.9 | 5.5 |
| Don't know | 0 | 1.8 |
| *Unanswered* | 9.1 | 9.1 |

*Table 2. Students evaluating the level of difficulty of the two mandatory coursework assignments in the course. n=55.*

We see from table 2 that there was an increase in difficulty from assignment 1 to assignment 2. 29.1% of the respondents found assignment 2 to be too difficult.

In the questionnaire, we asked the students if they had any tips for us on how to use mandatory coursework in PGR100. Several answers related to the level of difficulty in the assignments. If they were too hard, students could give up on the entire course. The coursework could also create a stressful learning environment, so that learning became more difficult. Other students reported the assignments worked well. One student emphasized the importance of engaging assignments:

*Try to make assignments as interesting as possible. It will help a lot for the motivation and creativity of the students. I noticed that I liked assignment 1 [the sound player] the most because I was more interested in that topic, which also made it easier to solve.*

Another student recommended that students should be able to choose an assignment among several:

*Very good with a system that allows for feedback on your work! [...] I think it would have been better with a submission late in the semester (so you do not have to worry about time), where you could choose from a set of assignments related to the exam. Or something like that. Maybe program something that merges several important things from the syllabus? This would open for feedback on something you feel you want feedback on, or that you are unsure of.*

The *interviewed* students of 2018 were also satisfied with the use of mandatory coursework. One student describes it as "what made the class work":

*So, for me, the mandatory coursework assignments were the thing that made that class work. I really enjoyed them. There is something freeing about: "OK, here is the requirements. This is what you need to do. You got two weeks." And I was like "Hmm, how do I want to handle this? How do I want to do this?"*

Although all interviewed students of 2018 managed to complete the mandatory assignments, some provided stories about students who struggled. However, they described an environment where students helped each other, and the importance of having fellow students and teaching assistants (TAs) to ask for help when assignments became challenging. As one of the students put it:

*Yes, it went OK, but I experienced that if I had been on my own and not had any teaching assistants, or not had the opportunity to contact other classmates who I knew were good at programming, then I think I would have struggled much, much more.*

## 4.2 2019 survey - Multiple institutions

A questionnaire regarding mandatory coursework was distributed to multiple institutions through a UDIT mailing list in 2019. Table 3, 4 and 5 displays the educational institutions involved, how far the respondents were in their studies and the amount of mandatory coursework they had experienced.

| At which educational institution do you study? | Percentage |
|---|---|
| Kristiania University College | 90 |
| University of South-Eastern Norway | 5.6 |
| The Arctic University of Norway | 2.5 |
| University of Agder | 1.9 |

*Table 3. Where the respondents studies. n=160.*

| What year of your IT education are you currently attending? | Percentage |
|---|---|
| First | 51.3 |
| Second | 44.4 |
| Third | 1.3 |
| Fourth | 0.6 |
| Fifth | 1.3 |
| Sixth or higher | 0 |
| *Not sure* | 0 |
| *Not answered* | 1.3 |

*Table 4. The respondents current year of study. n=160.*

| How many mandatory coursework do you estimate you have experienced so far? | Percentage |
|---|---|
| None | 1.9 |
| 1-2 | 0.6 |
| 3-5 | 50.6 |
| 6-10 | 36.3 |
| 11 or more | 10.6 |

*Table 5. Amount of mandatory coursework experienced. n=160.*

We can see that 90% of the respondents were from Kristiania University College. 95.7% were at their first or second year in their studies. 86.9% had experienced between 3 and 10 mandatory coursework so far in their IT studies.

The questionnaire included three questions regarding mandatory coursework. Below are the three questions, followed by some selected answers.

**Question 1: For an IT course you have studied: Can you describe a specific mandatory coursework that contributed to your learning in the course? Feel free to also explain why you think the coursework contributed to your learning.**

With 160 responses, we got many different success stories regarding mandatory coursework. Several answers described coursework with *practical assignments*, where the students could apply some of the theory they had learned. These assignments could be bigger tasks than what they worked with on a weekly basis:

*In the programming courses, the mandatory coursework was slightly larger tasks we had to solve. The content was to put together more complete systems rather than just individual tasks. So, you gained a broader understanding of how everything was connected.*

The reference to programming courses, as with the quote above, is common among the answers. But we also found examples of mandatory coursework where coding was not involved. An example mentioned multiple times was an assignment in a security subject where the students wrote an essay about Stuxnet:

*Essay on Stuxnet: Helped me to reflect on the topic.*

*Writing a page or two about Stuxnet helped me understand worms and the damage they can do. My own research helped me a lot.*

The latter quote included an appreciation of doing research on their own. Multiple students mentioned coursework assignments that were open tasks, so the student could explore the topic on their own. An example:

*Mandatory task in Object-oriented Programming 2, where we would make a pinball game. We had not learned much about game design earlier, so we had to understand the topic on our own. Although the game was not complete, it was educational.*

When describing mandatory coursework, we found several reoccurring elements about what makes them contribute to learning:

- "Forcing" students to work regularly throughout the semester.
- Appropriate level of difficulty.
- Feedback on how to improve the coursework hand-in.
- Awareness of how the student is currently coping with the subject.
- Relevance towards the course exam.

Regarding appropriate level of difficulty, students describe this as assignments that are not too easy and not too hard. Some also mention a sense of achievement when they manage to solve it:

*First mandatory coursework in object-oriented programming, second semester. There I experienced that the coursework we were handed was not too difficult (but also not too easy) in regard to the knowledge we had gained during the previous lessons.*

*The mandatory coursework in java in the first year were very effective. They gave a sense of achievement early in the course.*

But if they are too easy, they provide no value:

*Mandatory coursework has not helped me in any way in learning the subject - far too easy.*

**Question 2: For an IT course you have studied: Can you describe a specific mandatory coursework that did NOT contribute to your learning in the course? Feel free to also explain why you think the coursework did not contribute to your learning.**

When students described mandatory coursework that did NOT contribute to learning, we found several examples of coursework that missed important elements we earlier described as contributing to learning:

- Does not help the student in the future. "The future" is often described as the upcoming exam in this context.
- Gives no feedback.
- Too easy or too difficult.

Some of the mandatory coursework described as NOT contributing to learning, are the same coursework earlier described as contributing to learning by other respondents. As an example, the earlier positively mentioned Stuxnet assignment is also described in negative terms:
*TK2100. The assignment consisted of writing about a specific malware (Stuxnet), but it did not contribute to learning anything about the rest of the course. I now have good knowledge of Stuxnet, but do not feel the mandatory coursework had any value beyond that.*

This quote may emphasise how important exam relevance is to some students. The student admits to gaining better knowledge about something relevant to the course, but still find the mandatory coursework to not contribute to important learning.

Another example of contradicting experiences is mandatory coursework in a Java course in the first year. Several respondents found them to contribute to learning. Below is an example:
*Mandatory coursework in Java in the first year. This helped to "force" me working practically with code before the actual exam. Especially in coding courses, I think the only way to learn is to actually write code. The mandatory coursework helped a lot there!*

But we also find the same coursework described as NOT contributing to learning:
*Possibly Java, as this was the first meeting with programming and led more to time pressure/frustration.*

The interviews of 2019 also provided more insight on the setting where students struggled with mandatory coursework they found to be difficult, or *too* difficult. The students that talked to us about mandatory coursework were all in favour of having them. But they had stories to tell regarding the environment in which they were solved. Many students joined forces when the mandatory coursework hit them, as they had to complete them to take the exam. But with all these people around helping each other (students and TAs), the students did not know exactly what kind of help they would receive:
*I sent a request to see if I was heading in the right direction. I did not want the full answer to what I was supposed to use. But maybe I formulated myself a little imprecisely. Or maybe it was easier to just answer what I was supposed to use rather than to say if I was thinking along the right lines, or what I needed to adjust? But then I somehow got to know what I did not want to know in order to manage it myself.*

Students pick up on who has done the assignment and may provide help. *How* these students help each other will vary from person to person. The interviewee below had a clear idea on how such help should be provided:
*I was done with it [the mandatory coursework] in a couple of hours. Then it's cool to sit there and... People know I'm done, so they come to me and they ask how they should do it, and then I try to, instead of*

*saying you have to do it this way, I let them get small bits at a time. Because it's easier for them to understand how it works if they do not get the full answer, but small pieces at a time.*

Even after a lot of help, there will still be situations where students really do not understand what they are handing in:
*On mandatory coursework one, there are many who don't really understand what they have written, and it's the same on mandatory coursework two as well.*

Strangely enough, that was also reported in 2018 - although the students did not have to complete the assignments at that time. Some students would rather deliver something they did not quite understand, than deliver a description of why they failed to complete the assignment. Maybe this is some sort of protection mechanism from embarrassment.

**Question 3: Do you, generally speaking, want mandatory coursework in the courses you study? Why/why not?**

The respondents replied by text, but we have grouped the answers in the categories displayed in table 6.

| Do you, generally speaking, want mandatory coursework in the courses you study? | Percentage |
|---|---|
| Yes | 53.1 |
| Yes, under certain conditions | 32.5 |
| Hmm, I guess they are ok | 3.8 |
| No | 5.6 |
| *Don't know / Unanswered* | 5.0 |

*Table 6. Do students, generally speaking, want mandatory coursework in the courses they study? n=160.*

The question was followed by a request for an explanation: *Why/Why not?* Before we go into these explanations, let us first describe the conditions, as almost one third of the students only want mandatory coursework under certain conditions:

- Only for certain courses - normally described as computer programming courses: *"In computer programming courses, mandatory coursework is good, as we need to work with the material throughout the semester to gain a good understanding of it. In other courses, it is more about memorizing the syllabus, and then mandatory coursework will not be as necessary."*
- If there are not too many, and they are coordinated with parallel courses.
- If they are relevant and motivating, not exhausting and demotivating. Relevance is often mentioned regarding the upcoming exam.
- Some students require mandatory coursework to make them see how they perform in the course. Other students disagree and say that the motivation behind mandatory coursework should not be to test, but to enhance learning.

When explaining *why* they want mandatory coursework, there are two common explanations. The first one is that mandatory coursework "forces" students to work regularly throughout the semester:
*Yes, it helps to keep your motivation up and prevent you from relaxing too much.*

The other often mentioned explanation is that they want some kind of check to see if they are on track (also mentioned as a condition, above).
*Yes, it is a good check to see if you are on track or not. If you are not, you know that you should get help/put in more effort.*

I addition to these two common explanations on why students want mandatory coursework, we also find other reasons:

- It is a nice way for students to apply theory through practical assignments.
- It creates a setting where students may cooperate and get guidance from TAs.
- The students receive feedback (in addition to the pass/fail evaluation).

The few students that do not want mandatory coursework have somewhat different explanations on the reasons for this. But in general, it forces the students to use their time on specific tasks, when they may prefer to use it on something else. And when they are students in higher education, should it really be necessary to force them like this?

The interviews of 2019 also provided insight on positive aspects of the learning environment regarding the assignments. They created a space where students learned from each other's' different solutions:
*There were certainly several conversations with various students. "Well I did it this way, how did you do it? Oh, OK! That is actually really smart." There is nothing wrong with that. That is not copying, that is evolving.*

### 4.3 Does coursework have to be mandatory?

A question not included in the questionnaires, but a topic that came up in the interviews were whether or not coursework has to be mandatory. Will students still complete assignments if they are not mandatory?

Some of the interviewed students were certain they would complete the assignments either way. But the normal reaction was uncertainty:
*I think yes, but I can imagine people who would not do so. It's a different feeling when you **have to do it** rather than when you **can do it**. If you do not do it, you are not allowed to take the exam, and everyone wants to take the exam. But it's different from person to person, how valuable they find feedback. I honestly don't know if I would have done them all.*

## 5 DISCUSSION

IT students want mandatory coursework. Not all of them, but our data suggests that the majority do. The biggest reason for most students to want mandatory coursework is the fact that it forces them to work regularly throughout the semester. The majority of students in our study would agree with Uiboleht et al. (2019), that mandatory coursework (as a compulsory learning activity) enhance their learning. This is particularly important in technical courses, such as computer programming. When analysing course descriptions in Norwegian IT subjects, this was also found as an explicitly mentioned motivation for the usage of mandatory coursework (Lauvås et al. 2019):
*Programming is a subject that requires training, and in IN1900 there are compulsory assignments every week.*

In technical courses, it is not possible to study heavily just prior to the exam and succeed. This may be partly explained by the learning edge momentum (LEM), as descried by Robins(2010): *Success in acquiring one concept makes learning other closely linked concepts easier (whereas failure makes it harder)*.

We found students who thought mandatory coursework should be unnecessary in higher education. They thought that students should be independent and mature enough to take control of their own learning process. But these students are a clear minority. This brings to mind Biggs and Tang's introductory chapter in Teaching for quality learning at university\cite{biggs2011teaching}. They use the "Robert and Susan problem" to illustrate the increased diversity in the student population. In later years there has been an increase in students (like Robert) who is *not academically inclined*.

Another reason for students to want mandatory coursework, is the need for feedback. Especially new students with a background from high school are used to getting constant feedback. When entering higher education, they become insecure on whether or not they are on track. There are two main reasons why the students want feedback.

The first reason is that they need confirmation whether they are doing OK or not. Even if a student only receives a "passed" or not on his or her coursework, it helps reduce that uncertainty:
*I think I like them a little, because most of the time I get small clues as to whether I am completely off or not - if there is something I have misunderstood about how far I should have gotten in the subject. I do not have a lot of experience yet, but as opposed to high school, where you get continuous feedback, mandatory coursework is almost the only form of feedback you get in most courses.*

The second reason is that feedback will help them in their learning process. This is completely understandable, as feedback can arguably be regarded as one *of the most powerful influences on learning and achievement* (Hattie et al. 2007).

When students in our surveys want mandatory coursework, it may be partly explained by their craving for feedback. And if the students in our study are accustomed to receiving feedback through mandatory coursework, they want mandatory coursework in their courses. Students accustomed to other forms of feedback in their studies could provide different answers.

Although the vast majority of IT students want mandatory coursework, they have certain requirements. The assignments should be fun, engaging and relevant for the upcoming exam. But even more importantly, they should have a suitable level of difficulty. If the task is too easy, it provides no learning, and If the task is too difficult, it is even worse.

And if we decide to use mandatory coursework, it is important that the use is coordinated with other, parallel learning activities. This is especially important if the coursework is a bigger task that requires attention over a larger timespan (as opposed to smaller hand-ins or other types of mandatory coursework, such as attendance).

As mentioned in section 2, Lauvås et al. (2017) investigated reasons why students failed the introductory programming course. One reason was summative evaluation throughout the semester. The introduction of mandatory coursework assignments, as opposed to graded assignments, were supposed to stop students from "dropping out". Especially as the assignments did not have to be completed. But for "normal" coursework that must be completed, it may be reasonable to think that mandatory coursework may have the same "drop out" effect on some students: If they fail the coursework, they fail the course.

Another reason for students failing the introductory programming course was the feeling that everyone else knew more than themselves. It was demotivating and made the students insecure. This could also be the case for students struggling with the mandatory coursework, and seeing others manage easily. This was also supported in the interviews:
*It can be a bit demotivating. For example, in programming, or introduction to programming, we had a couple of mandatory coursework. And for some of my friends, who did not understand programming that well, it was really demotivating. [...] a better solution would have been that if you did not get your assignment approved, you could meet in a classroom to get help solving it. Or there could have been an extra lecture to teach those who did not get their assignment approved.*

The difficult question is therefore how we create assignments that are fun, engaging and within the appropriate level of difficulty for all the students. This study made it very clear that it is difficult to define an assignment that will fit everyone.

# 6 CONCLUSION

It is not for us to decide whether or not mandatory coursework should be used in Norwegian IT education. In this study we conclude that the majority of Norwegian IT students want mandatory coursework assignments. We have discussed possible reasons for this, and we have identified several suggestions on how to use mandatory coursework assignments, based on the students' experiences with them:

- They fit best within technical topics, such as computer programming.
- They should be engaging and at an appropriate level of difficulty. Since it may be difficult, or even impossible, to find *one* assignment that fits all students, consider having multiple assignments that students can choose from.
- They must be coordinated with other activities in parallel courses.
- They must provide value. To many students, this means they must be relevant to the upcoming exam.
- Be aware of the learning environment students solve assignments in. Fellow students and TAs play an important role in the learning process, and they should have a good understanding of how to provide help.
- Provide more feedback (or rather: feed forward) to the students than simply the pass/fail verdict.

The above list of suggestions could just as well describe voluntary coursework. Does coursework have to be mandatory? The majority of student's self-report that they need the extra pressure. They need to be forced to work throughout the semester. But it could also be that their answers are influenced by their previous learning environments. If the choice is between having mandatory coursework assignments or not in a normal lecture/lab setting, the answer might be an easy yes.

# 7 LIMITATIONS

Both rounds of student interviews involved students from KUC only. Regarding mandatory coursework, it would be interesting to see if students from other institutions had other stories to tell.

An attempt was made to distribute the questionnaire of 2019 to multiple institutions. We received answers from three other universities, but they only accounted for 10% of the total answers. A more even distribution would be preferable.

The second year KUC students who participated in the 2019 survey are the same cohort involved in the survey and interviews of 2018. We chose to use both data sets. We believe they complement each other, as we collected data on mandatory coursework in a specific course in 2018 and in general in 2019.

In earlier studies, we collected information on the types of mandatory coursework in Norwegian IT educations. As most of the data material in this paper is collected from KUC, the student experiences with mandatory coursework is highly influenced by how mandatory coursework is used at KUC, especially in the first to years of the educations. Mandatory coursework at KUC are mainly *assignments* that are bigger than normal weekly tasks. Our findings on students' experiences with mandatory coursework are therefore to a high degree based on mandatory coursework *assignments*.

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