Report - SF2812 - 2022-06-22

Respondents: 1
Answer Count: 1
Answer Frequency: 100.00%

Please note that there is only one respondent to this form: the person that performs the course analysis.

Course analysis carried out by (name, e-mail):

Jan Kronqvist, jankr@kth.se

DESCRIPTION OF THE COURSE EVALUATION PROCESS
Describe the course evaluation process. Describe how all students have been given the possibility to give their opinions on the course. Describe how aspects regarding gender, and disabled students are investigated.

The main course evaluation is based on the LEQ course evaluation. During the course I also met with the course committee consisting of 3 students from different programs (electrical engineering, applied mathematics, and industrial engineering). For me it was important to have students from different programs in the committee as they have different background knowledge. I had a good discussion with the course committee about the course, and I received very positive feedback from the students. The students also gave suggestions for possible improvements for next year, for example regarding the project assignments.

During the course I have actively asked the students for feedback. For example, I have discussed the course content and difficulty level with several of the students after/before the lectures. I have told the students that it was the first time I was teaching the course and that I appreciated feedback on both the course content and teaching format. I found the informal talks with the students before/after the lectures very useful for evaluating how the students where doing in the course (I wanted to check that the lecturing format was working and that the students were keeping up). Overall, the feedback was very positive.

I have also held office hours where the students could meet with me, and we also had meeting with the student groups (3 students) to discuss the projects. During these meetings I also discussed the course with the students, and tried to identify any possible problems.

With regards to aspects on gender and students with disabilities we have followed standard KTH practice. For example, students with disabilities are given support by Funka during exams according to KTH standard practice.

In the course we have worked towards creating an inclusive atmosphere and have a good mixture of students in the projects. In the course committee we had both male and female members. From the course evolution and meetings with students we cannot identify any clear problems.

The reply frequency for the course evolution was not great (30%), but it was slightly higher than the previous year. From talking to other teachers, I have also learned that this reply frequency is typical for courses in mathematics.

To summarize, the course evaluation consisted of the following parts:
- LEQ course evaluation form
- Discussion with the course committee
- Informal discussions with students (before/after lectures)
- Discussion with students during office hour meetings and project meetings

DESCRIPTION OF MEETINGS WITH STUDENTS
Describe which meetings that has been arranged with students during the course and after its completion. (The outcomes of these meetings should be reported under 7, below.)

The students taking the course were overall very well motivated, and it was positive and friendly atmosphere in the course. In the course I want to have a low threshold for the students to ask questions, and I do believe this was the case. The students asked many questions during the course, and it was common that the students asked me questions after the lectures. The questions after the lectures could, for example, be about topics that was outside of the scope of this course but also practical questions about the course format. If there were questions that were of value to all course participants, then I posted a comment on Canvas or mentioned it during the next lecture to share the information with all students (this is to avoid that some students get an unfair advantage).

Below, I briefly summarize the meeting with the students.

- During the course I had meetings with students regularly during office hours. The purpose of these meetings was mainly to give the students extra support and guidance. However, during these meetings I also asked the students about the course (I wanted to check that they were keeping up with the course and that the teaching format was working well for the students). The office hours were held virtually over Zoom (mainly due to covid), but I believe the online meetings worked well and it was more convenient for the students then on-site meetings. Therefore, I will probably continue with having these meetings online.

- Project meetings with students. As a part of the examination of the projects, I had individual meetings with each project group (3 students). The purpose of these meetings were to discuss how they had worked on the project (division of the work), how they had solved the problems, to check that all the group members understood all parts of the project, and to discuss the self-evaluation that the students had submitted.

- I also met with the course committee consisting of 3 students. The meeting was held at the end of the course. This meeting was very useful for me as it was the first time teaching the course.

- After the exam I also talked with some students as I wanted to receive so feedback on the exam.

COURSE DESIGN

Briefly describe the course design (learning activities, examinations) and any changes that have been implemented since the last course offering.

The course covers linear and integer programming, and the course focuses on two aspects:
1) Have the students develop a deeper understanding and intuition of the fundamental theory and methods of linear and integer programming.

2) Developing the students problems solving skills by: studying classical optimization applications, having the students work on "real world" application in the projects, and giving the students experience in using state-of-the-art optimization algorithms and software.

The theory is presented during classical lectures, where I also encourage active participation by the students. The students are given preparatory questions before each lecture. The theory is also practiced during exercise sessions, where the goal is to have the students work on solving exercises and are given guidance (and some exercises are solved on the black board by the course assistant). The course had 13 "normal" lectures and 8 exercise sessions. This year the course was given in a hybrid format (about 50% of the students attended the lecture on site and the rest via Zoom), this was mainly due to covid restrictions on the number of students in the class room. For this format I used an Ipad as the blackboard. The hybrid format actually worked well, having students on-site made the lectures more interactive and more inspiring both for me and the students. During the lectures I mainly use the blackboard (or Ipad) as I believe it creates a more interactive environment, and it automatically sets an appropriate speed for the students to follow. After the lecture I also gave the students access to the handwritten lecture notes, and there are also slides for each lecture available as extra material. The course is, to some extent, based on a classical text book, which I recommend that the students get (the same book is also used in the nonlinear course). However, the book is more used as support material. During the lectures I mainly use the blackboard (Ipad), but also prepared slides for some examples and my laptop for some demonstrations in GAMS and Matlab.

The course also focuses on two larger projects that the students need to complete and that the students work on together in groups of 3. The projects are intended to replicate optimization tasks that the students might face in industry, and they are quite challenging. The projects are intended to give the students a practical hands on understanding of the theory and methods covered in the course, and also to give the students experience in: workin on a project, teamwork, problem solving, using state-of-the-art optimization software, and presenting results. The project groups were randomly assigned by me, and they worked in different groups for both projects. The reason for random assignments is that I believe it is valuable for the students to get experience from collaborating with different people on the project, and to not only work with their friends.
The examination of the projects and the project presentations consist of 4 parts.
1. Each group hands in a written report that is corrected by me and the teaching assistant. The report is also checked for plagiarism.
2. Each students hands in a self-evaluation were they declare if they have contributed equally to the projects or if they have skipped the advanced questions.
3. For each project we have a presentation session, which consists of two parts. I) The students meet with students from other groups that have worked on the same task and discuss how they have solved the problem II) They present their solution to students that worked on different tasks.
4. Each group have a meeting with me and the TA to discuss how they have solved the problem, to test how well they have understood different parts of the project, and to give them feedback.

In the beginning of the course the students are given 8 theory questions that covers different topics of the course and are a bit more challenging. The students are also told that one of these questions will be in the exam. These questions focuses on important theoretical concepts in linear optimization. We cab give the students some advice on the questions, for example, where to find some additional information, but the students are expected to solve these on their own. I also provide information on which questions are covered in different parts of the course. I think the concepts of having these theory questions work great, and it promotes self-learning for the student by giving them targeted parts to study on their own.

In the course we use the Canvas platform for distributing material, giving information about the course, and as a discussion platform.

In the course I also strive to use the exam as a learning opportunity. In the exam I typically present a new framework or interesting type of problem (that was not covered in the course), where the students need to use theory from the course in a different setting. The idea with such an exercise is to have the students learn some important properties (that we did not have time to cover in the course), and also test their ability to apply the theory from the course. This is typically in one of the more challenging exam questions.

This year the course was thought by:
- Teacher/course responsible, Jan Kronqvist (Assistant professor)
- Teaching assistant, Isabel Haasler (PhD student)

This was the first time teaching the course and, therefore, I mainly followed the same setup as the previous year.

THE STUDENTS' WORKLOAD

Does the students' workload correspond to the expected level (40 hours/1.5 credits)? If these is a significant deviation from the expected, what can be the reason?

Considering that the course is 7.5 credits the expected level should be 20h/week. In the course evaluation the most frequent reply is 15 - 17 h /week, which is slightly lower.
However, according to the replies in the course evaluation the students report that the work load was appropriate. It might also be that the students have spent more time on the projects than they realize, as they consist of interesting but quite challenging problem solving tasks.

Some students are reporting fewer hours, but two students (who reported less hours) also mention in the course evolution that they should have spent more time on the course.

In my opinion the work load seems appropriate. It could maybe be possible to include one smaller assignment for during the beginning of the course. I will investigate this possibility for the next year.

THE STUDENTS' RESULTS

How well have the students succeeded on the course? If there are significant differences compared to previous course offerings, what can be the reason?

Overall the students did well, and several students got good grades in the course. The results were quite similar to previous years.

Out of the 42 students that participated in the course, 30 passed the first exam (not all students showed up to the first exam). Only 4 students failed the first exam. Regarding the distribution of the grades, there was two peaks for the grades "B" (8 students) and "D" (9 students). Several students did great in the exam, and 6 students got an "A". From the results of the exam, I would say that most students either knew the material very well or did not prepare enough.

When evaluating the results, it is important to remember that this is a masters course that is not mandatory. Most students take the course because they are interested and want to learn optimization. I think many of the students find the course material useful and consider it to be valuable skills for their future career. During the course, I found the students to be very well motivated. Therefore, good results were expected. One reason for the low number of students failing in the exam could also be that the students are well aware of what they need to know for the exam, and they probably choose to not take the exam if they are not prepared.

In the projects the students did well, and many of the students also completed the advanced questions (needed for higher grades). My impression is that the students found the projects very interesting. Many of the students where excited to discuss the projects and how they had solved the problems.

STUDENTS´ANSWERS TO OPEN QUESTIONS

What does students say in response to the open questions?

Overall the students seem to be happy with the course. There are many positive comments by the students.
Here are a few examples of positive replies from students:
- "Thank you greatly for this course Jan! This course made me realise why I chose optimization as my master. It was very fun and I learned a lot."
- "Go to the lectures! While the slides are quite comprehensive, most math problems are best learned if someone explains and demonstrates them to you, and Jan does a great job at that. Also, try to solve the theory questions yourself after the corresponding lectures."
- "The lectures were great, and I felt that all the material covered in the lectures was relevant (unless explicitly stated otherwise). The project assignments were interesting problems to work on. I think that you definitely get a feeling what this course can be useful for, which is a great motivator to do well in it."
- "The lectures were great, and I felt that all the material covered in the lectures was relevant (unless explicitly stated otherwise). The project assignments were interesting problems to work on. I think that you definitely get a feeling what this course can be useful for, which is a great motivator to do well in it."
- "Really enjoyed discussing in groups, felt like a good practice for mathematical communication skills as well."

SUMMARY OF STUDENTS' OPINIONS

Summarize the outcome of the questionnaire, as well as opinions emerging at meetings with students.

As already mentioned, the students were overall very happy with the course and this can also be seen from the course evaluation.

The students did bring up some ideas for future improvements, and I will discuss these below:

- There were comments regarding how the projects where structured (random assignments), but it is difficult to draw any conclusions as some students were both for and against the random assignments. However, we will investigate different setups.
Here is an example of a student who appreciated the random group assignments "While I was a little confused about Jan randomly assigning groups at first, it worked out really well in the end, so please keep that up! Compared to another class I took, where finding teammates was an absolute chaos, this way was very relaxed and I got to know some new people".
The main argumentation against the random assignment of students to groups is that it could potentially be unfair if one group member is much more motivated than the other two. To make the grades fair, we do grade each students individually. If one student has done more work, that student will get a better grade. However, we will investigate alternative approaches. One option could be to group the students based on their ambition level (if they are planning to complete the advanced exercises or not). However, I am also aware of criticism against such a set up. Personally, I see a clear value in being assigned randomly and having to work with people with different ambition levels (we all need to collaborate and work with different people, and developing the skills to do so is important). But, we will investigate if there are better solutions for dividing the students into groups for the projects.

- There were also some opinions regarding the policy of no formula sheet for the exam. The reason for the policy is that we want students to have deeper understanding of the theory and methods, and the idea is not to just memorize formulas. Basically, I want students to be able to derive some of the results and algorithms. For example, it is much more valuable to be able to derive the formula for the reduced costs than only memorizing the formula. There are also some parts that I expect the students to know by heart from taking the course, for example the optimality conditions (during the course it is also mentioned that the students should know these). The comments where also made before the exam, and I wonder if there might have been some confusion about what the students are expected to remember by heart and what not (it is actually very few formulas they should remember). Next year, I plan to explain this earlier in the course (this year it was mainly mentioned at the end of the course).

OVERALL IMPRESSION

Summarize the teachers' overall impressions of the course offering in relation to students' results and their evaluation of the course, as well as in relation to the changes implemented since last course offering.

Overall, it was a pleasure to teach the course. The course covers many topics that the students find interesting and useful. The students taking the course are highly motivated. During the course I got many very good questions from the students that showed that they were clearly interested in the topics. My impression was that the students appreciated the course, and that impression is also supported by the course evaluation.

It was my first time teaching the course, and therefore I mainly followed the same concept as last year. In my opinion the course is well structured and the teaching format works well.

ANALYSIS

Is it possible to identify stronger and weaker areas in the learning environment based on the information you have gathered during the evaluation and analysis process? What can the reason for these be? Are there significant difference in experience between:
- students identifying as female and male?
- international and national students?
- students with or without disabilities?

Based on the results, I cannot see that any specific group of students would be stronger or weaker in the course. From my interactions with the students, I also got the impression that course format is working well for all the students. It would be useful to get a higher response frequency for the course evaluation, as it would improve the analysis. Next year, I will try to better encourage the students to submit the course evaluation.

PRIORITIZED COURSE DEVELOPMENT

What aspects of the course should be developed primaily? How can these aspects be developed in short and long term?

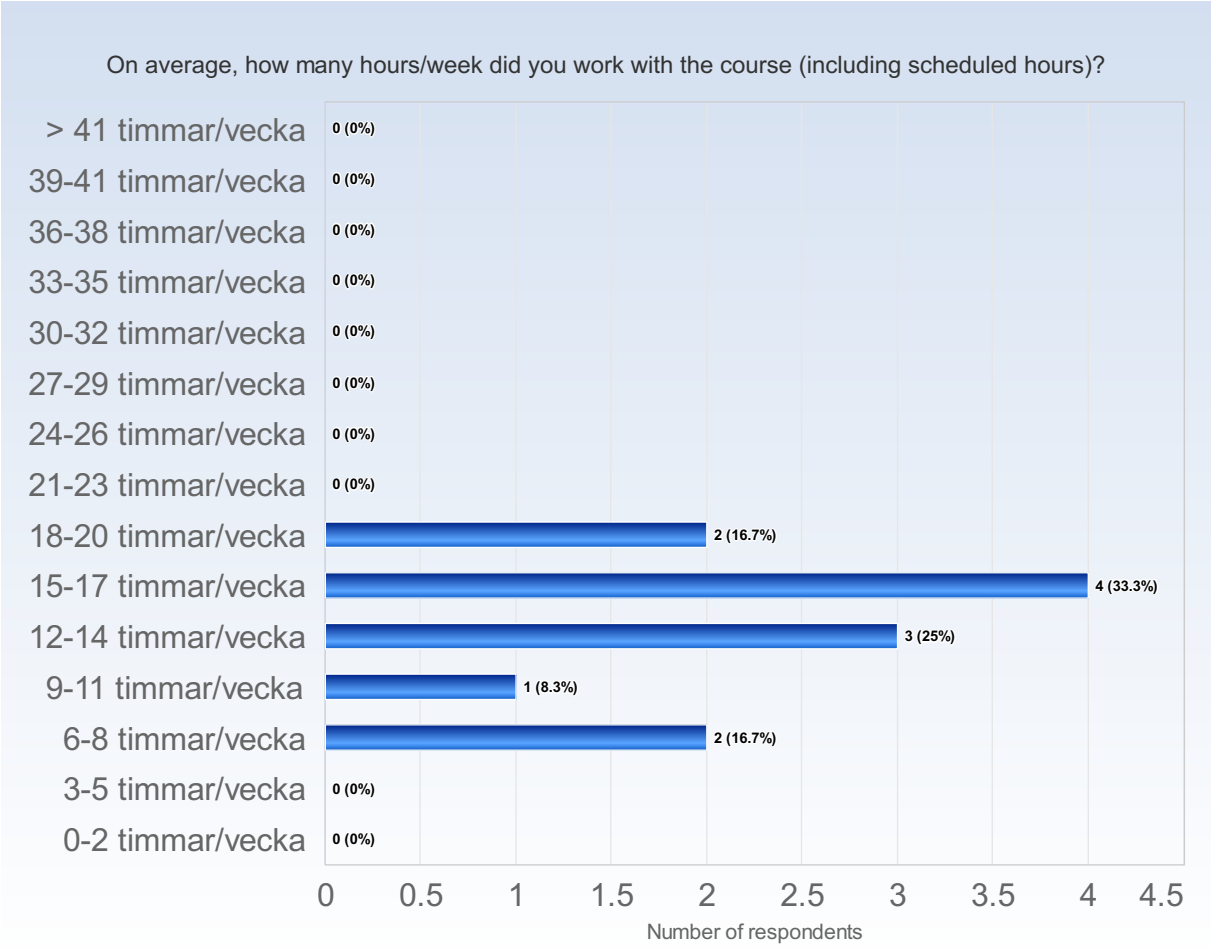
The overall teaching format has worked well and the students have been happy with the course. My main priority will be on updating the course content to make sure that it is relevant, up-to-date, and forms a good complement to other optimization courses at KTH.

Below is a list with the main development items:
- Updating the course projects. This is straightforward, but important that the students feel that the projects are up-to-date and relevant.
- Investigating how the course content could be updated to best fit the students needs and complement the other courses (avoid unnecessary overlaps). The first step in developing the course content is to properly investigate the connections and dependencies to other courses.
- Include a bit more repetition/exercises on linear programming duality.
- Develop and integrate digital teaching aids. For example, self correcting exercises.

SF2812 - 2022-03-15

Antal respondenter: 43
Antal svar: 13
Svarsfrekvens: 30,23 %

ESTIMATED WORKLOAD



Comments

Comments (I worked: 6-8 timmar/vecka)
I prioritized other courses, which meant I mostly spent time on the project assignments and Theory Questions, I believe I should have spent more time on the exercise sessions
Definitely should have spent more time on it for myself.

Comments (I worked: 12-14 timmar/vecka)
This average is increased by the workload of the projects.

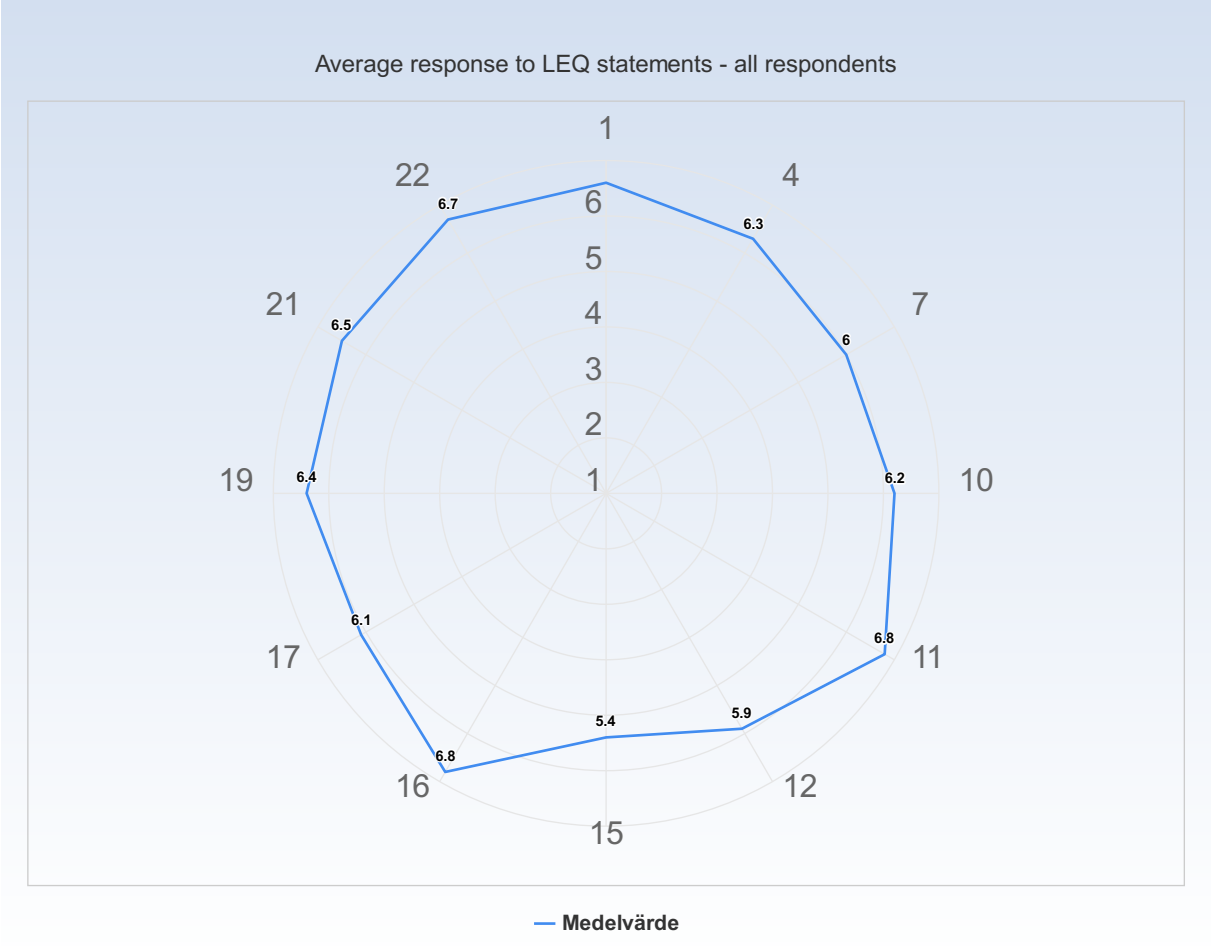
Comments (I worked: 15-17 timmar/vecka)
Just the right amount of work in my opinion.
Not really sure, but I think it is a good average. I worked more during the project than during the beginning of the course.

LEARNING EXPERIENCE

The polar diagrams below show the average response to the LEQ statements for different groups of respondents (only valid responses are included). The scale that is used in the diagrams is defined by:

1 = No, I strongly disagree with the statement
4 = I am neutral to the statement
7 = Yes, I strongly agree with the statement

Note! A group has to include at least 3 respondents in order to appear in a diagram.



KTH Learning Experience Questionnaire v3.1.4

Meaningfulness - emotional level

Stimulating tasks

1. I worked with interesting issues (a)

Exploration and own experience

2. I explored parts of the subject on my own (a)
3. I was able to learn by trying out my own ideas (b)

Challenge

4. The course was challenging in a stimulating way (c)

Belonging

5. I felt togetherness with others on the course (d)
6. The atmosphere on the course was open and inclusive (d)

Comprehensibility - cognitive level

Clear goals and organization

7. The intended learning outcomes helped me to understand what I was expected to achieve (e)
8. The course was organized in a way that supported my learning (e)

Understanding of subject matter

9. I understood what the teachers were talking about (f)
10. I was able to learn from concrete examples that I could relate to (g)
11. Understanding of key concepts had high priority (h)

Constructive alignment

12. The course activities helped me to achieve the intended learning outcomes efficiently (i)
13. I understood what I was expected to learn in order to obtain a certain grade (i)

Feedback and security

14. I received regular feedback that helped me to see my progress (j)
15. I could practice and receive feedback without being graded (j)
16. The assessment on the course was fair and honest (k)

Manageability - instrumental level

Sufficient background knowledge

17. My background knowledge was sufficient to follow the course (f)

Time to reflect

18. I regularly spent time to reflect on what I learned (l)

Variation and participation

19. The course activities enabled me to learn in different ways (m)
20. I had opportunities to influence the course activities (m)

Collaboration

21. I was able to learn by collaborating and discussing with others (n)

Support

22. I was able to get support if I needed it (c)

Learning factors from the literature that LEQ intends to examine

We tend to learn most effectively (in ways that make a sustained, substantial, and positive influence on the way we think, reflect, act or feel) when:

a) We are trying to answer questions, solve problems or acquire skills that we find interesting, exciting or important

b) We are able to speculate, test ideas (intellectually or practically) and learn from experience, even before we know much about the subject

c) We are able to do so in a challenging and at the same time supportive environment

d) We feel that we are part of a community and believe that other people have confidence in our ability to learn

e) We understand the meaning of the intended learning outcomes, how the environment is organized, and what is expected of us

f) We have adequate prior knowledge to deal with the current learning situation

g) We are able to learn inductively by moving from concrete examples and experiences to general principles, rather than the reverse

h) We are challenged to develop a true understanding of key concepts and gradually create a coherent whole from the content

i) We believe that the work we are expected to do will help us to achieve the intended learning outcomes

j) We are able to try, fail, and receive feedback before, and separate from, each summative assessment of our efforts

k) We believe that our work will be considered in an honest and fair way

l) We have sufficient time for learning and devote the time needed to do so

m) We believe that we have control over our own learning, and not that we are being manipulated

n) We are able to collaborate with other learners struggling with the same problems

Literature

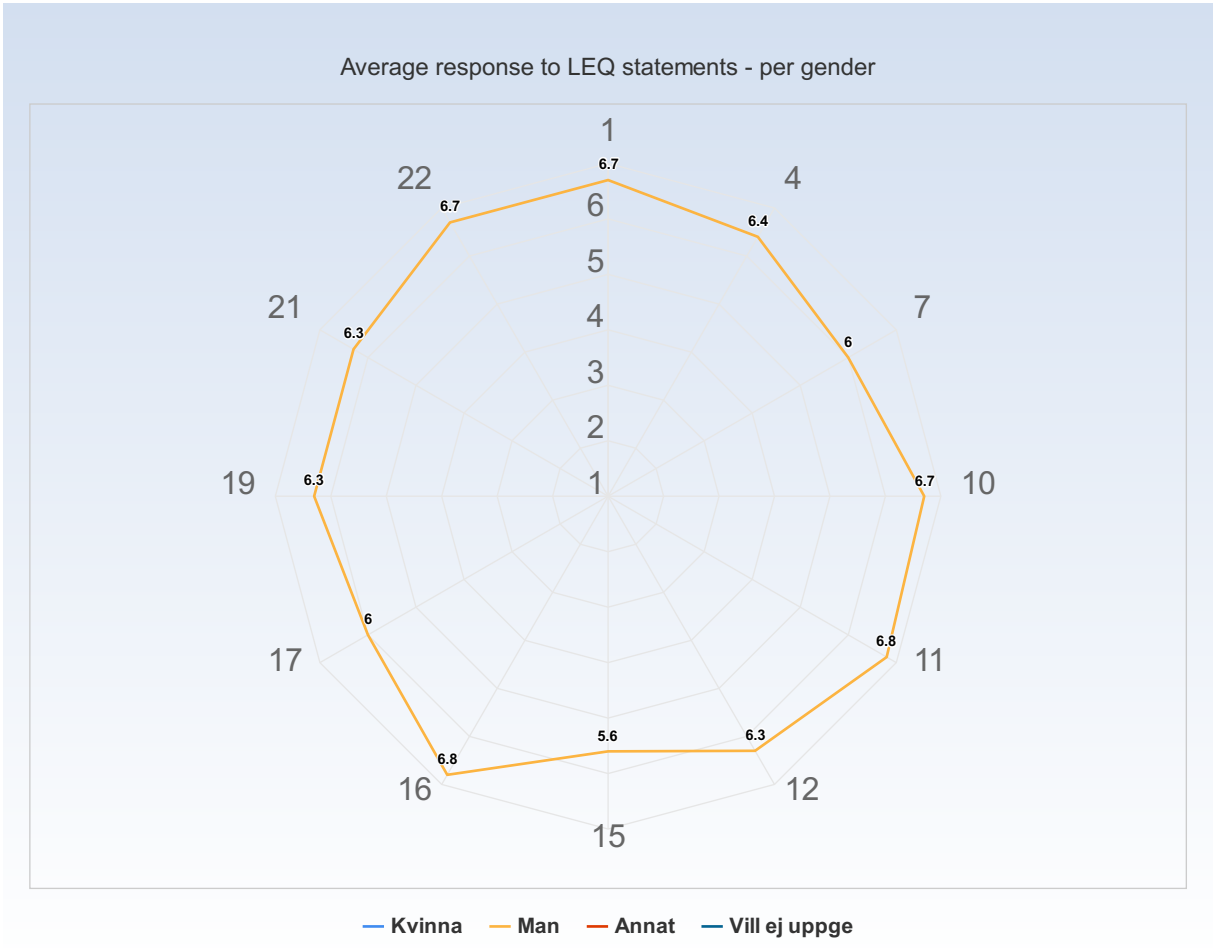
Bain, K. (2004). *What the Best College Teachers Do*, Chapter 5, pp. 98-134. Cambridge: Harvard University Press.

Biggs J. & Tang, C. (2011). *Teaching for Quality Learning at University*, Chapter 6, pp. 95-110. Maidenhead: McGraw Hill.

Elmgren, M. & Henriksson, A-S. (2014). *Academic Teaching*, Chapter 3, pp. 57-72. Lund: Studentlitteratur.

Kember, K. & McNaught, C. (2007). *Enhancing University Teaching: Lessons from Research into Award-Winning Teachers*, Chapter 5, pp. 31-40. Abingdon: Routledge.

Ramsden, P. (2003). *Learning to Teach in Higher Education*, Chapter 6, pp. 84-105. New York: RoutledgeFalmer.


Average response to LEQ statements - per gender
1
4
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1
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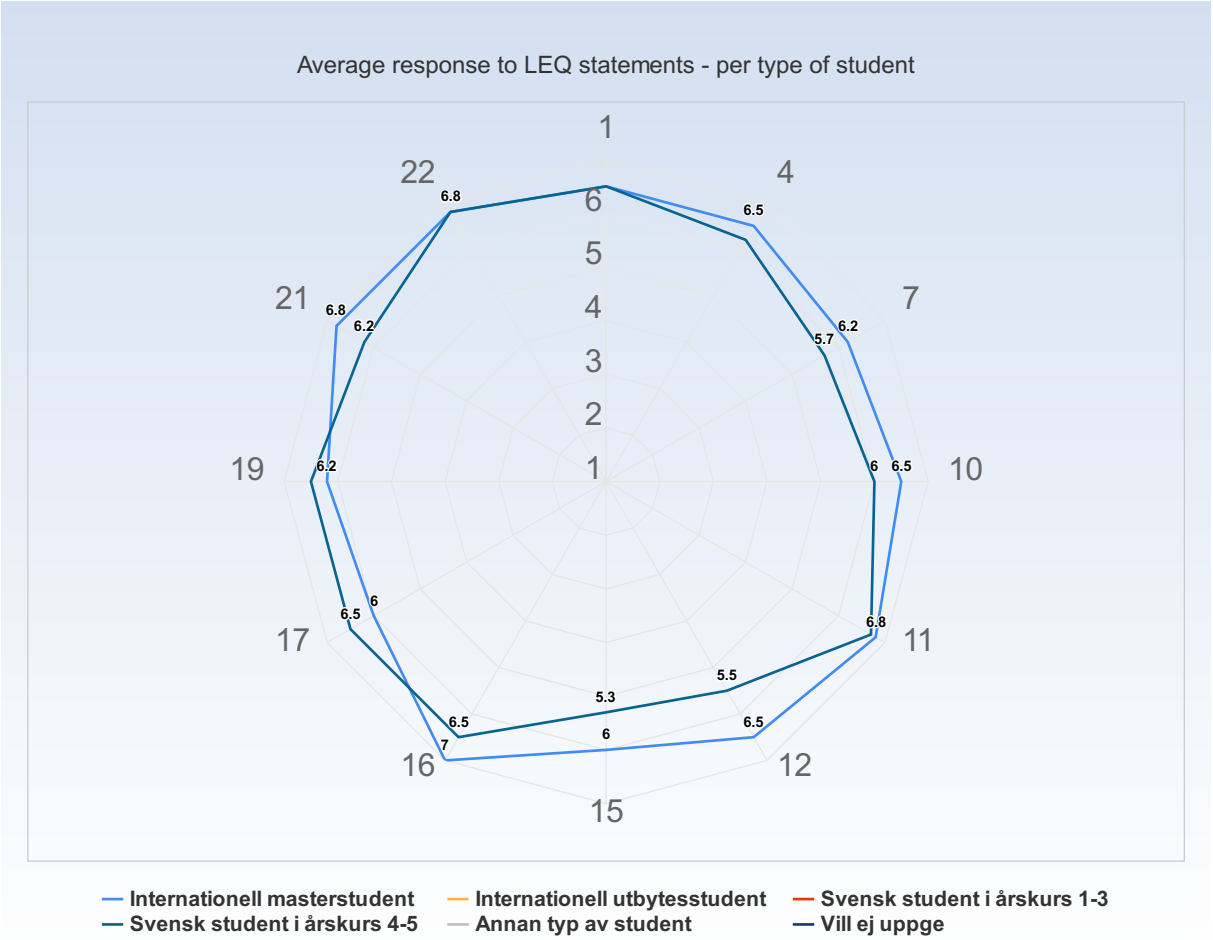
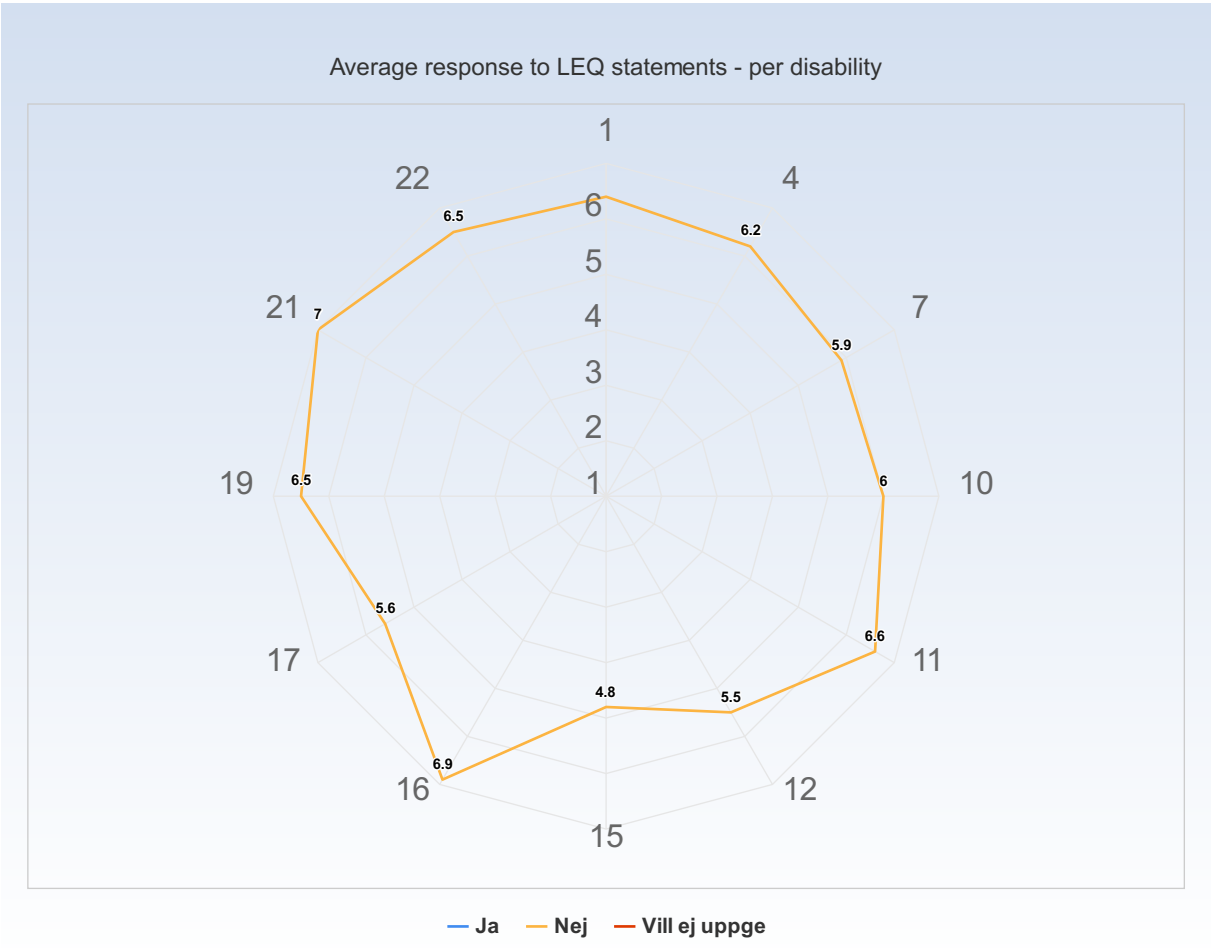


Comments

Comments (I am: Internationell masterstudent)
While Jan quite often said "You should know this from the basic course", he still explained all the details in a way that people who didn't read said course at KTH could follow well.

Comments (I am: Svensk student i årskurs 4-5)
I was thankful that I had already taken a basic course in Optimization, it helped a lot to be familiar with some of the concepts.



GENERAL QUESTIONS

What was the best aspect of the course?

What was the best aspect of the course? (I worked: 6-8 timmar/vecka)
The projects were to me the most valuable, although GAMS was a bit difficult to learn at first it helped to have some peers to discuss it with
The focus on understanding key concept more than just writing down abstract theorems during lectures. Discussion seminars, as previously stated.

What was the best aspect of the course? (I worked: 12-14 timmar/vecka)
The lectures were great, and I felt that all the material covered in the lectures was relevant (unless explicitly stated otherwise). The project assignments were interesting problems to work on. I think that you definitely get a feeling what this course can be useful for, which is a great motivator to do well in it.

What was the best aspect of the course? (I worked: 15-17 timmar/vecka)
The assignments were interesting and had challenging components, both in terms of GAMS and Theory. I loved that Jan _repeated_ important but not often used theory every now and then (e.g. extreme points or representation theorem) rather than just referring to it as in "we did that four lectures ago", because no one remembers everything from hearing it the first time.
The choice of problems in the assignments were easy to understand and gave a clear example of linear optimization problems and how to solve them.
Amazing lecturer (Jan) who had great passion for the course, great knowledge and good pedagogy.
The explanations were really great, and I really appreciate the use of extra material (excerpt from books on canvas). Your good mood was also really nice ! I also really appreciated the exercise sessions, they were really clear and useful.

What was the best aspect of the course? (I worked: 18-20 timmar/vecka)
Projects
group works

What would you suggest to improve?

What would you suggest to improve? (I worked: 6-8 timmar/vecka)
Lectures could use some focus, especially around concepts that might be new to students who only took the basic Optimization course.

What would you suggest to improve? (I worked: 12-14 timmar/vecka)
The way the projects are done is not that great in my opinion. I don't believe an assignment given to randomly selected groups of ~3 people is fair to be graded on a scale of F-A. I understand that it is near impossible to assess the motivation and competence of group members in every group individually, even if you would ask people what they were aiming for at the start of the course. My suggestion would be that they aren't graded F-A, or that the impact of the grade is changed. I, personally, had a terrible experience with my groups. I was responsible for over 90% of the workload in both cases, which significantly affected the amount of time I had to study on the rest of the course. I think that the grading of the projects should be changed so that the grade can only impact you positively on the exam. The weighing of the projects and final exam is not fair towards people that had bad groups or experiences. I talked to someone that couldn't do the advanced exercises on one of the assignments because of absent group members, that simply is not fair to that person's final grade. The current system rewards the unmotivated people that ends up with someone motivated, and punishes the motivated people that end up with someone unmotivated. I think there should be some change to how the advanced exercises are done, some sort of lessened workload but still theoretical aspect present so that they can be done on a more individual level. The self-assessment forms are useless in my opinion, anyone can claim to have spent X amount of hours on the project even if none of those hours were actually useful towards solving it.

What would you suggest to improve? (I worked: 15-17 timmar/vecka)
The theory questions were written as "preparatory work" for the very lecture that explained the corresponding theory. So either one would work on them for too long and get frustrated, or one would not need the lecture at all. I'd rather put them as practice/exercise questions after a lecture or as preparatory questions for the next instead. Having no allowed formula sheets in the exam seems a little odd to me, since most likely no one will ever need to know the algorithms and formulas by heart, even if you work in optimization. If you just use optimization, you'll use a finished solver anyway, then you won't need to know by heart how the column generation algorithm works. If you write solvers, you'll most likely look stuff up while doing so in order to prevent bugs. While it worked for this specific exam, since that had more theory than algorithms, I think in general a hand-written formula sheet should be allowed, be it just to save the students from a week of learning stuff by heart that they won't need again.
More introduction/activites with gams to give a better understanding of gams syntax. I found the gams exercises to be straight forward but when it came to the assignments I did not have a good enough understanding to tackle the problems initially.

What would you suggest to improve? (I worked: 18-20 timmar/vecka)
Formula sheet for the exam for the algorithm
diaporamas are not clear enough I think

What advice would you like to give to future participants?

What advice would you like to give to future participants? (I worked: 6-8 timmar/vecka)
Attend the exercise sessions and lectures, although the material is available and it's possible to learn from that, in hindsight I regret that I did not attend the classes very frequently, although having "caught up" by reviewing the distributed notes.
Like all math courses, practice example questions continously.

What advice would you like to give to future participants? (I worked: 12-14 timmar/vecka)
Prepare for the projects in time! I had like a week of nothing before this course started and decided to just make sure GAMS was running correctly and played around a bit with it. Look at the GAMS exercise files in advance and get a feel for what you should be able to do, it makes the projects way easier to work with. I would also suggest asking a lot of questions, this course becomes a lot easier if you make sure that you are following from the start since everything sort of ties together.

What advice would you like to give to future participants? (I worked: 15-17 timmar/vecka)
Go to the lectures! While the slides are quite comprehensive, most math problems are best learned if someone explains and demonstrates them to you, and Jan does a great job at that. Also, try to solve the theory questions yourself after the corresponding lectures.
Put a lot of effort in the beginning to understand gams efficiently.
Go to lectures and don't think you can slack in the beginning and go hard in the end. Steady pace wins the race

What advice would you like to give to future participants? (I worked: 18-20 timmar/vecka)
Work early on the theory questions
to read the suggested book from Nash and Sofer

Is there anything else you would like to add?

Is there anything else you would like to add? (I worked: 15-17 timmar/vecka)
While I was a little confused about Jan randomly assigning groups at first, it worked out really well in the end, so please keep that up! Compared to another class I took, where finding teammates was an absolute chaos, this way was very relaxed and I got to know some new people.
Thank you greatly for this course Jan! This course made me realise why I chose optimization as my master. It was very fun and I learned a lot. :)

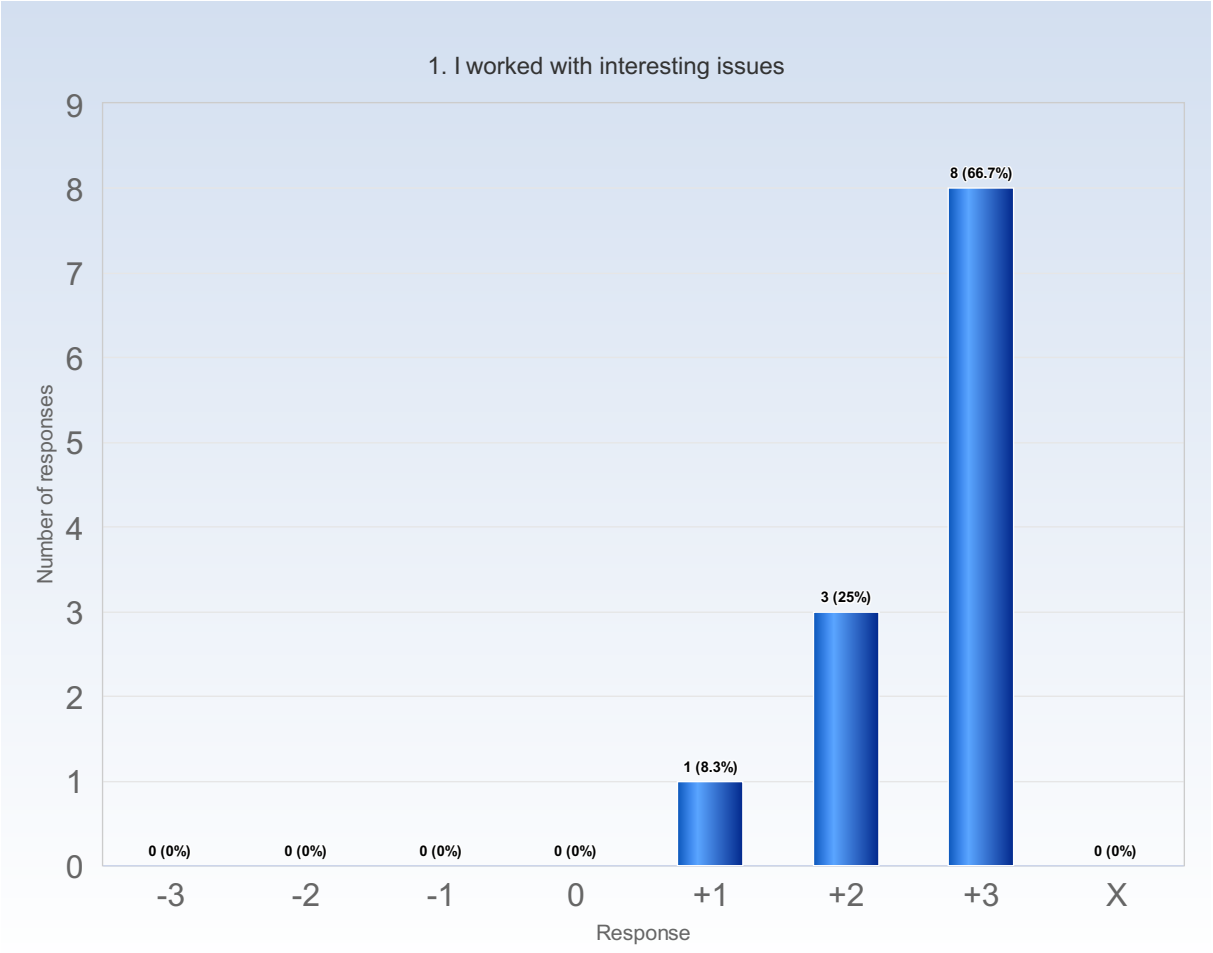
SPECIFIC QUESTIONS

RESPONSE DATA

The diagrams below show the detailed response to the LEQ statements. The response scale is defined by:

-3 = No, I strongly disagree with the statement
0 = I am neutral to the statement
+3 = Yes, I strongly agree with the statement

X = I decline to take a position on the statement



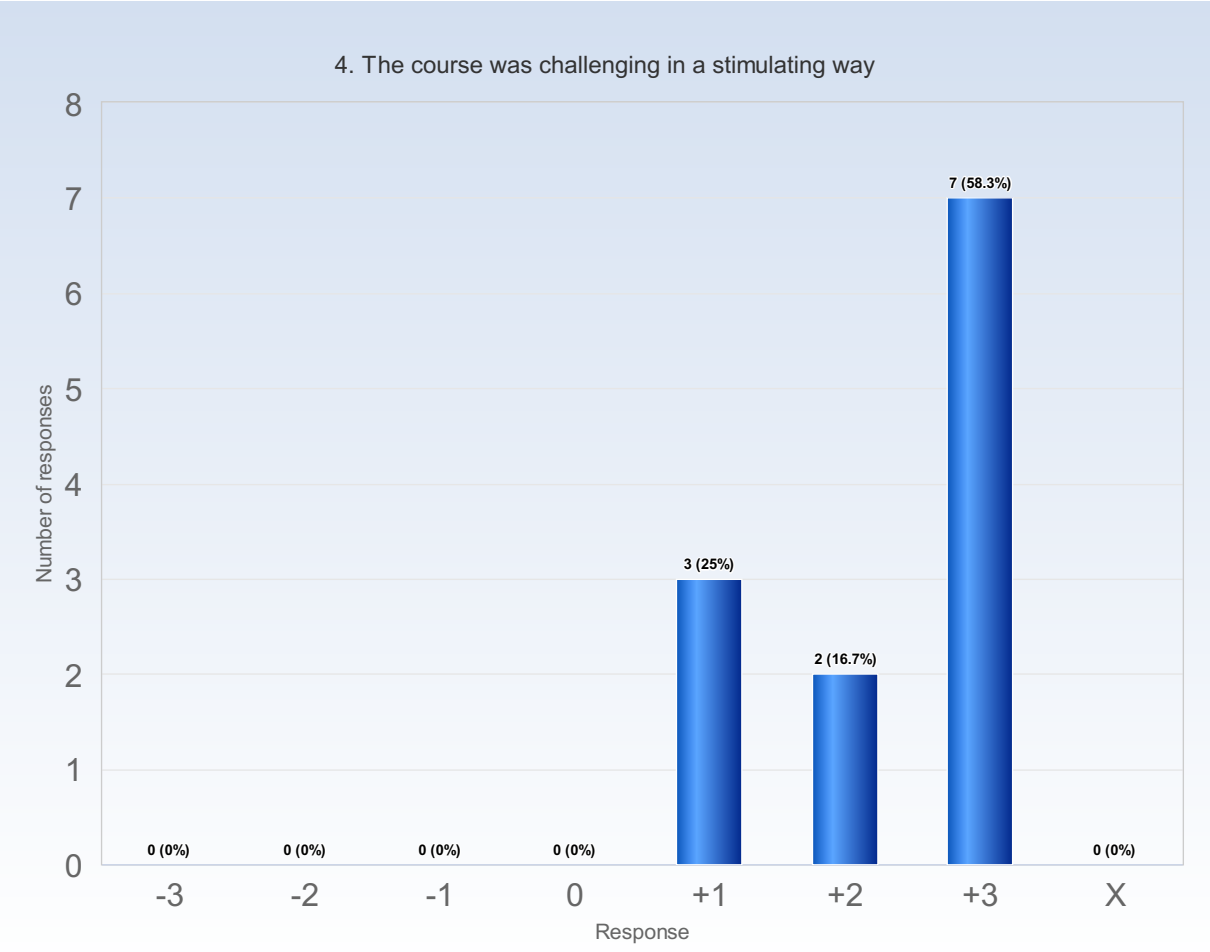
Comments

Comments (My response was: +2)

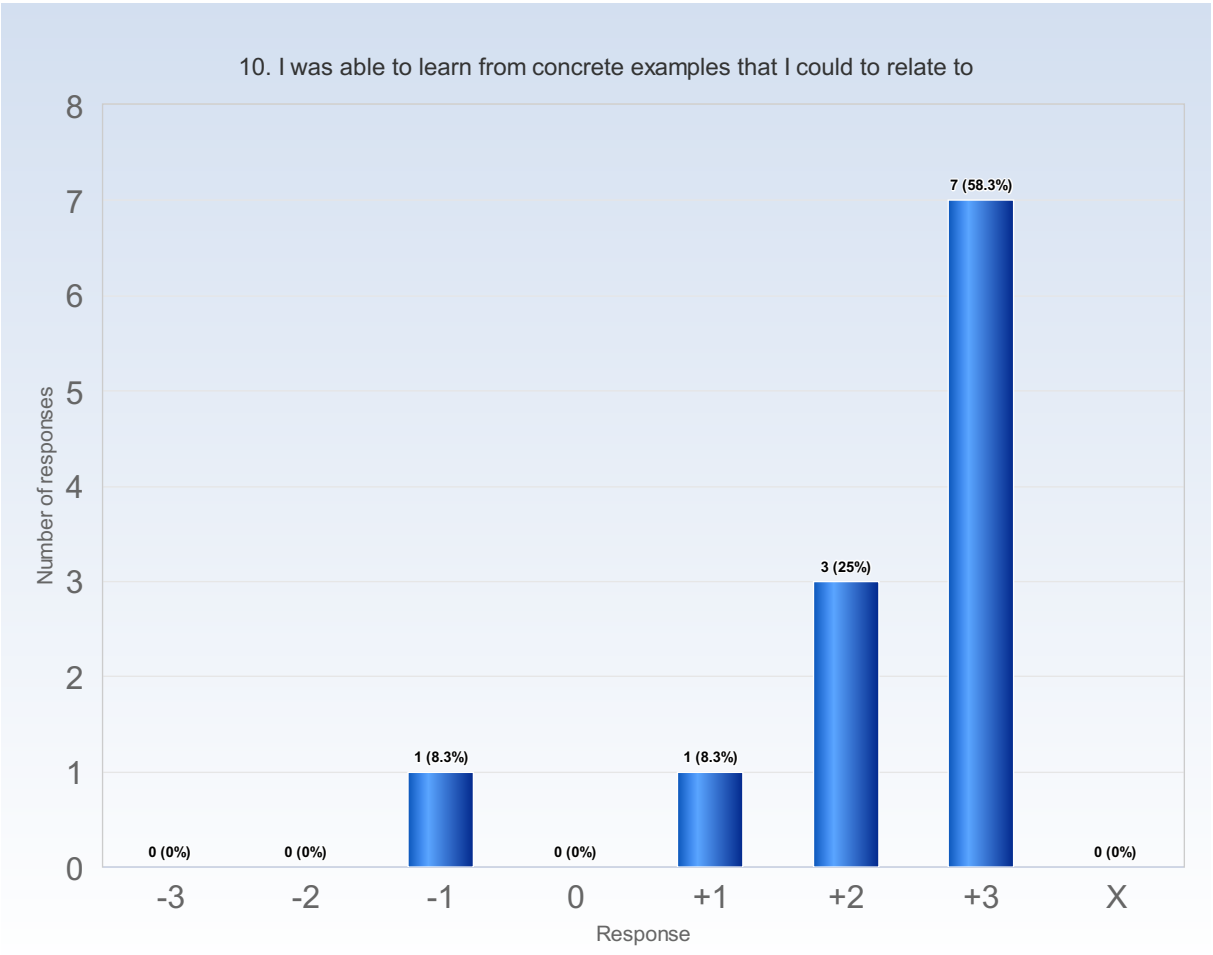
I ended up working on the same topics in the two assignments, so I was mostly exposed to varieties of one application

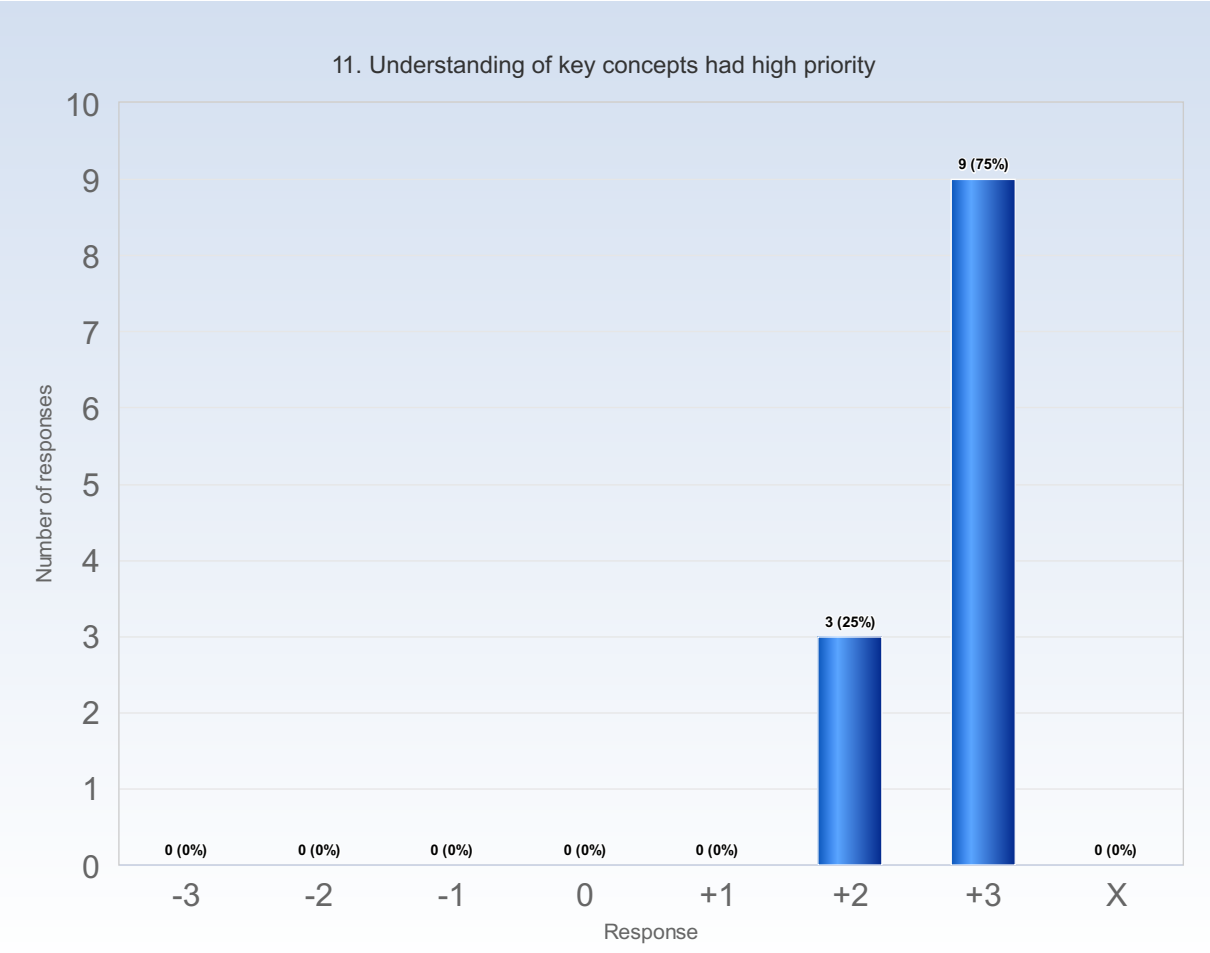
Comments (My response was: +3)

I especially liked the robot problem in the second assignment; too bad I was in a different group.



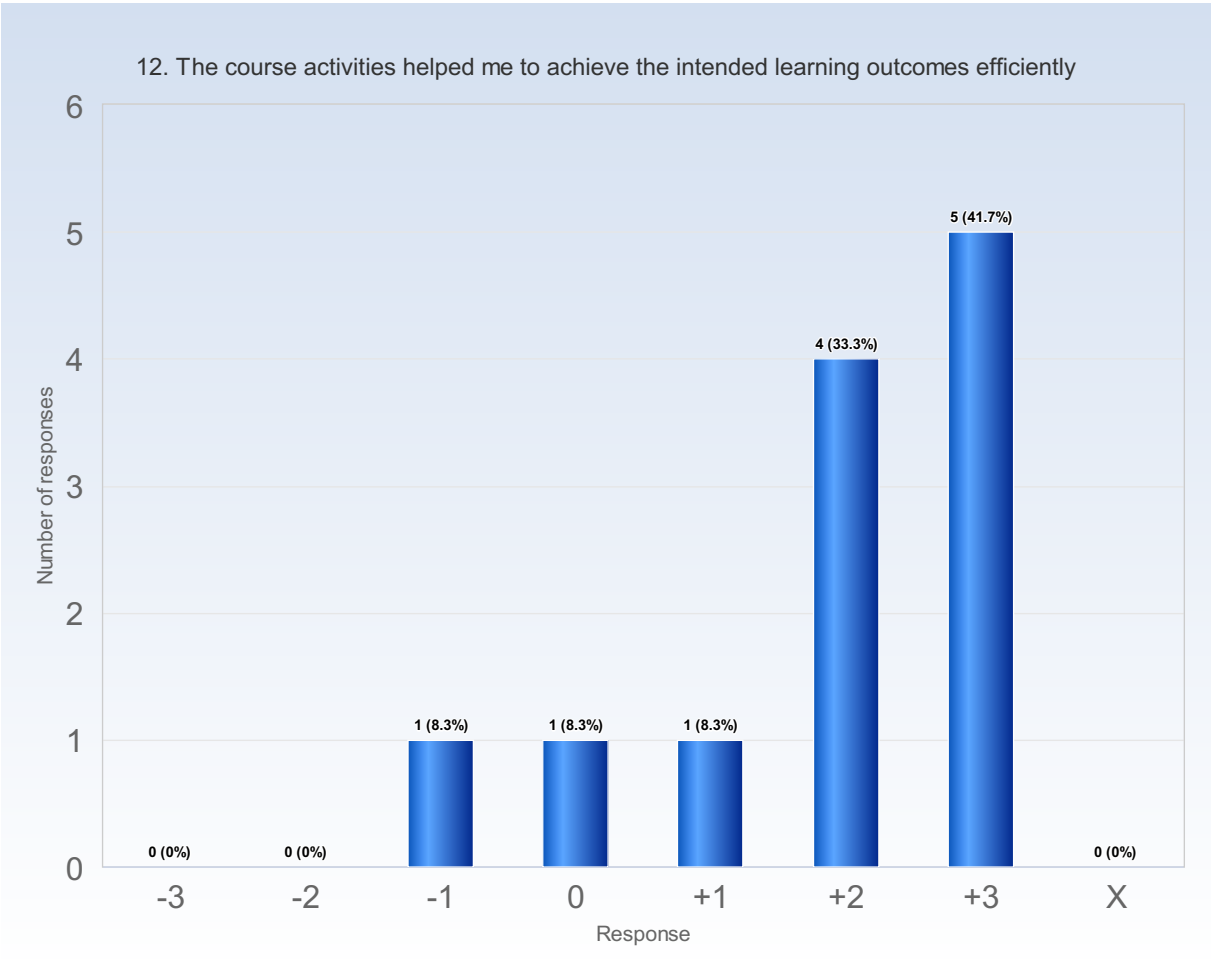

7. The intended learning outcomes helped me to understand what I was expected to achieve
Number of responses
9
8
7
6
5
4
3
2
1
0
0 (0%)
0 (0%)
0 (0%)
0 (0%)
2 (16.7%)
8 (66.7%)
2 (16.7%)
0 (0%)
-3
-2
-1
0
+1
+2
+3
X
Response


10. I was able to learn from concrete examples that I could to relate to
Number of responses
8
7
6
5
4
3
2
1
0
0 (0%)
0 (0%)
1 (8.3%)
0 (0%)
1 (8.3%)
3 (25%)
7 (58.3%)
0 (0%)
-3
-2
-1
0
+1
+2
+3
X
Response



Comments

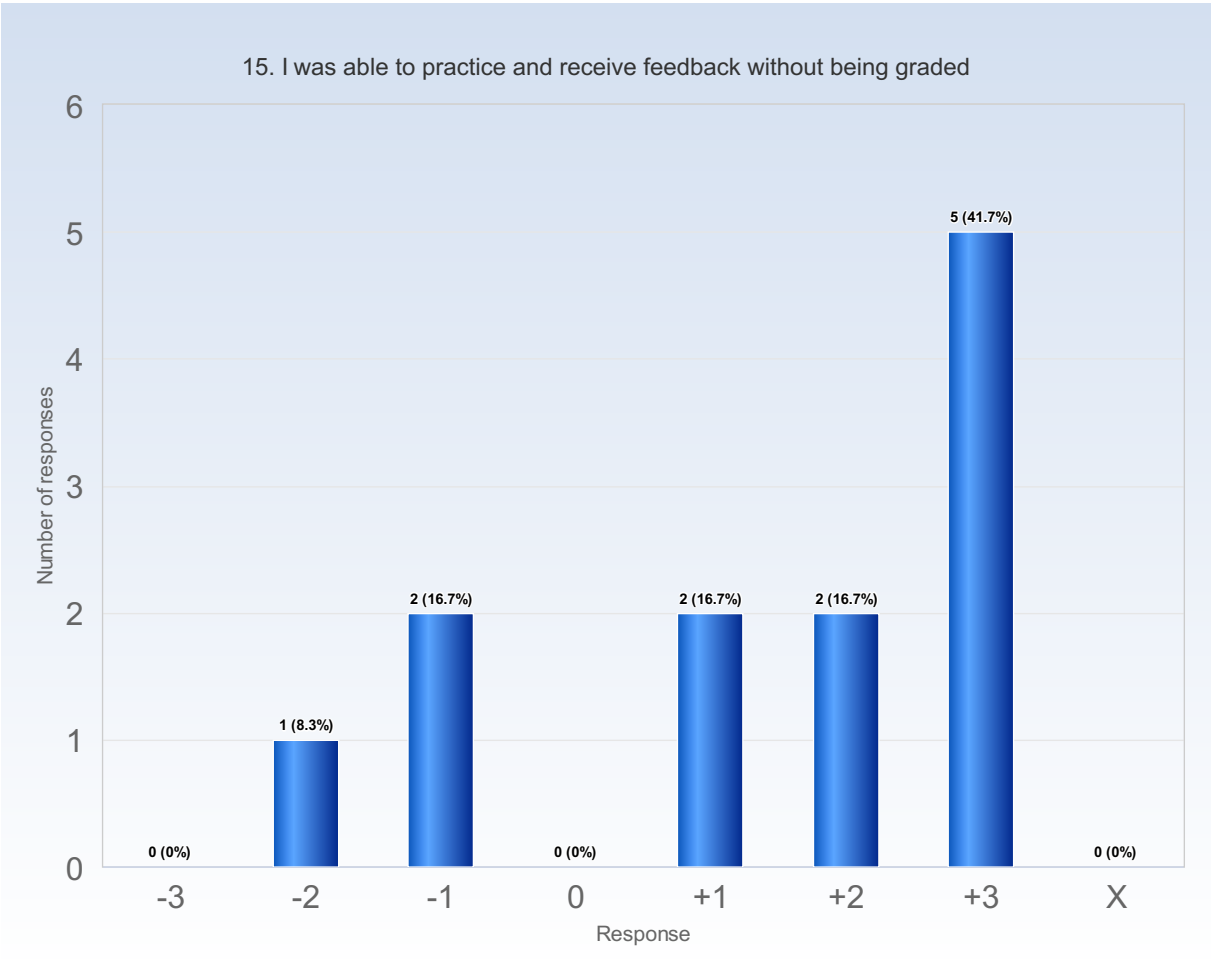
Comments (My response was: +3)
Liked the focus on understanding, just wish some concepts could have been repated/summarized for better understanding.



Comments

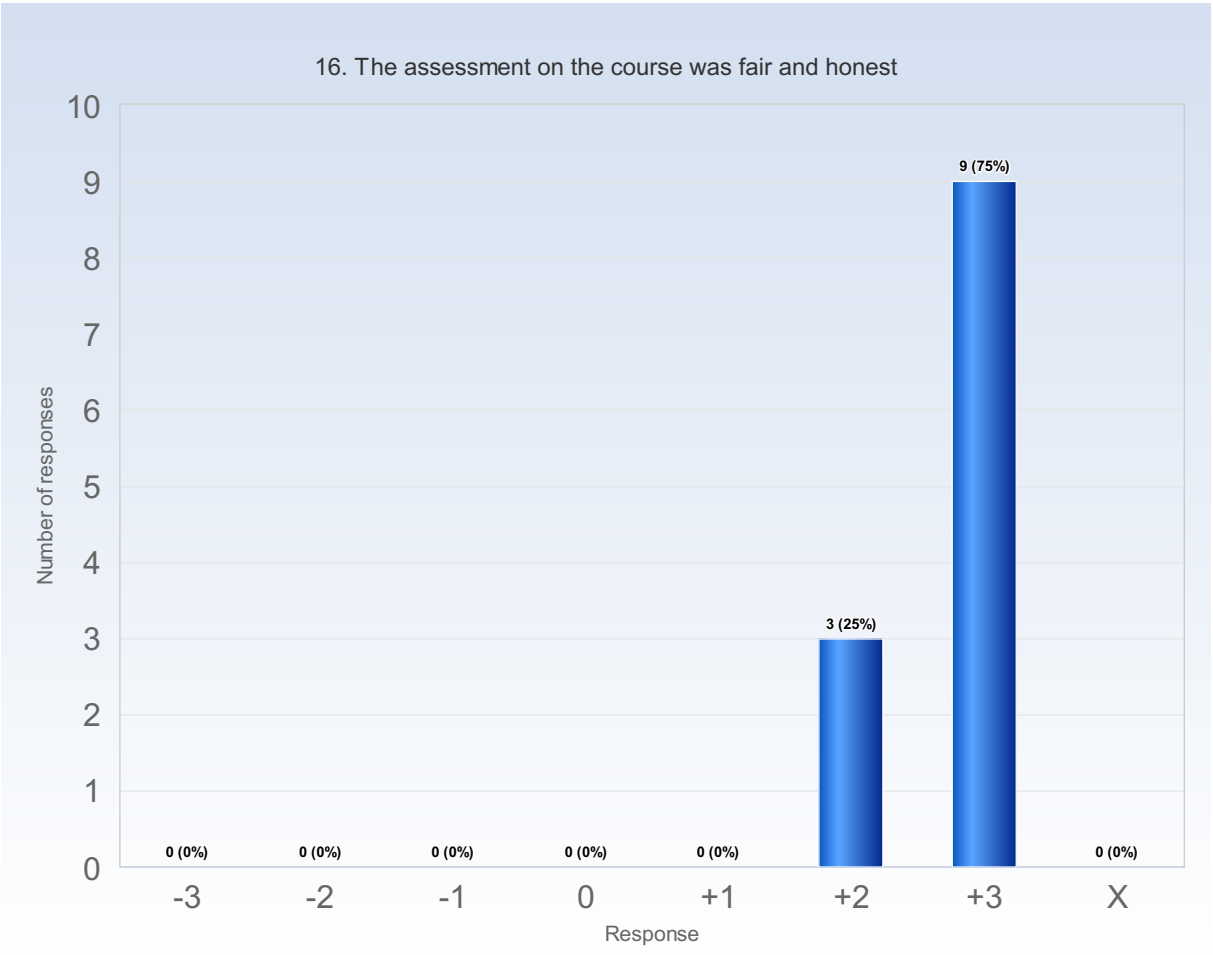
Comments (My response was: -1)

Lectures could have been more focused, but I also liked the more relaxed way of the lecturer so...



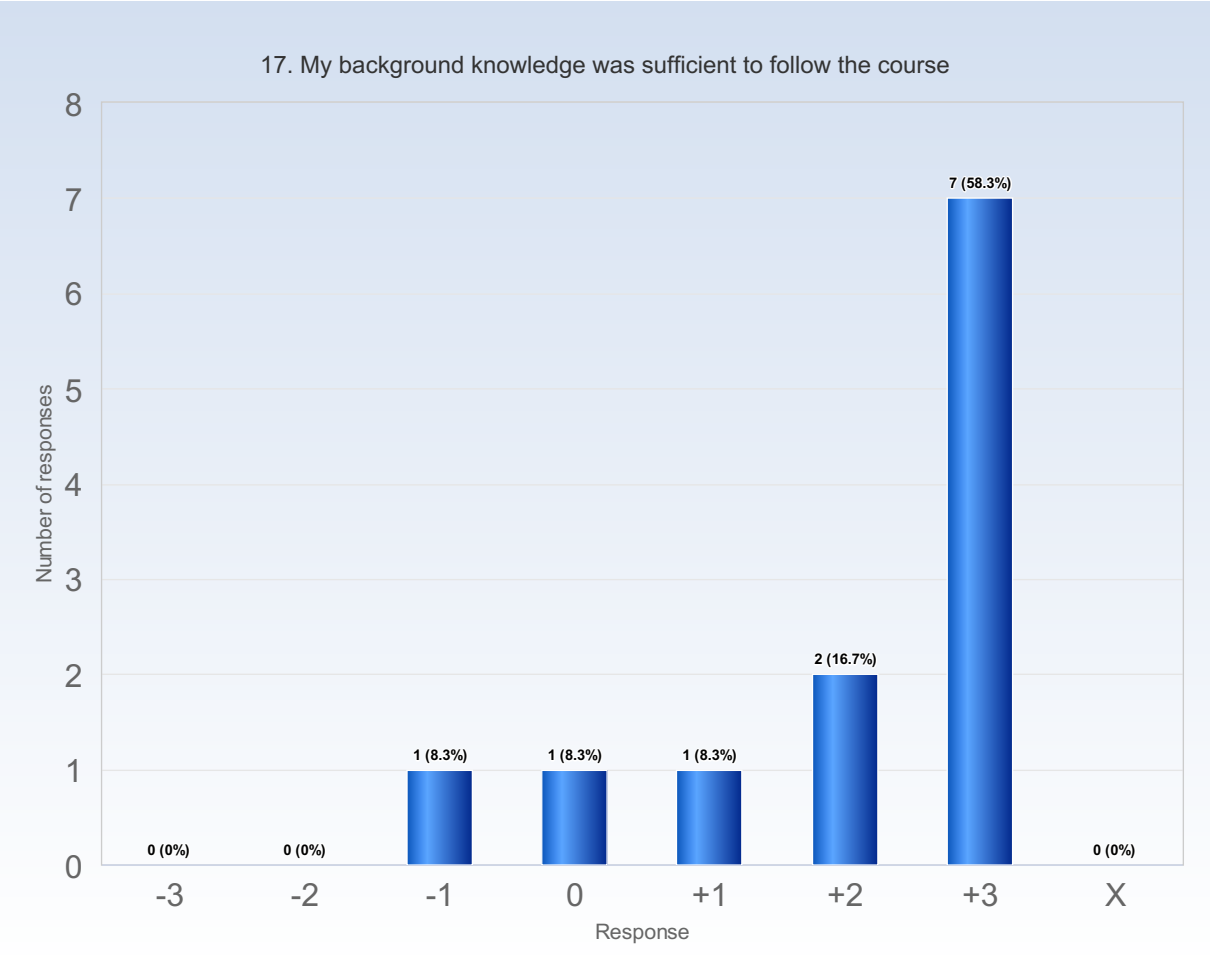
Comments

Comments (My response was: -1)
the received feedback was through the graded assignments, here, however, the meetings after submission were helpful



Comments

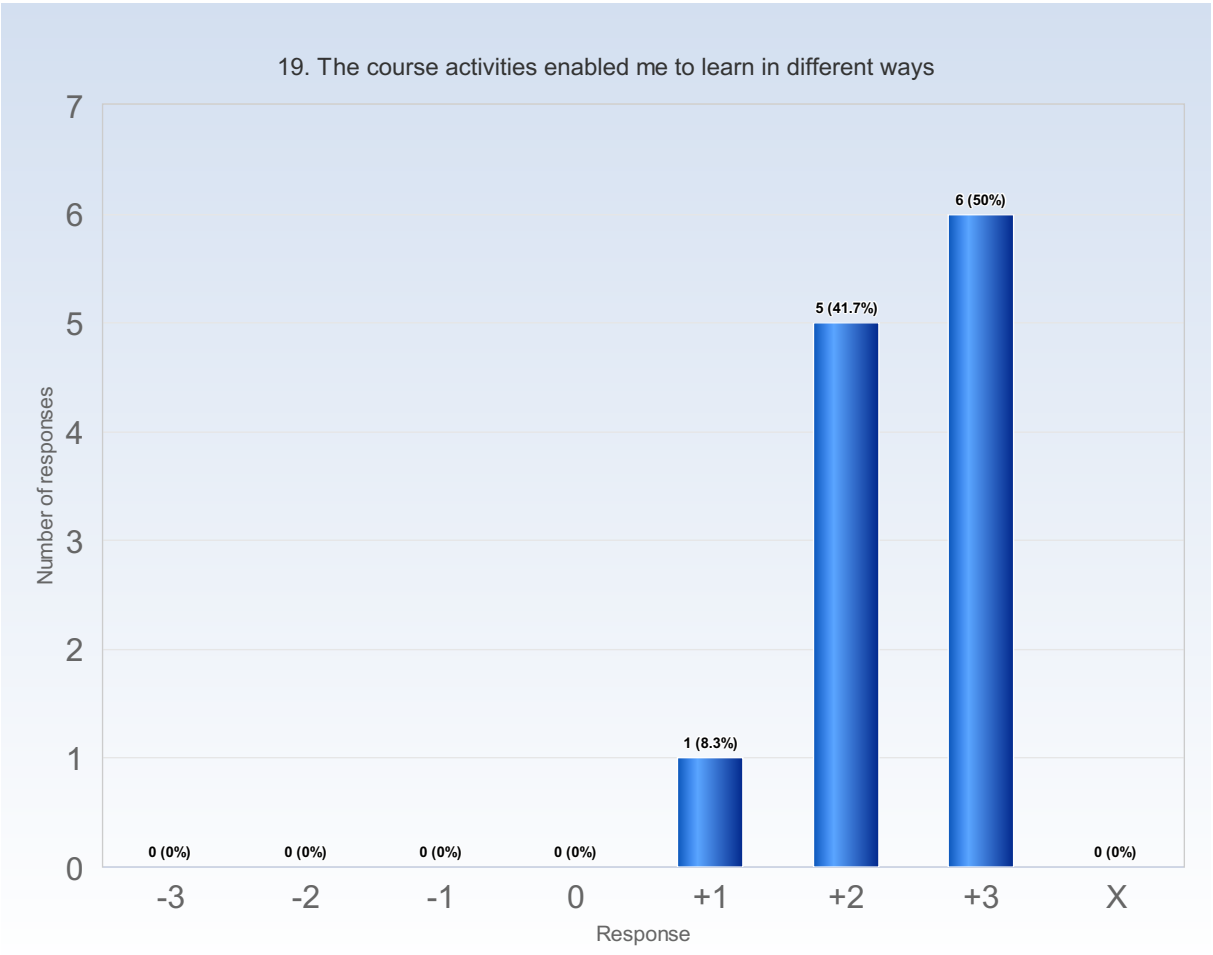
Comments (My response was: +2)
The self assessment was also a good way of letting us students express our opinion of how the projects had gone and so on, exams have not yet been graded so this survey is answered without an insight into the grading done on them

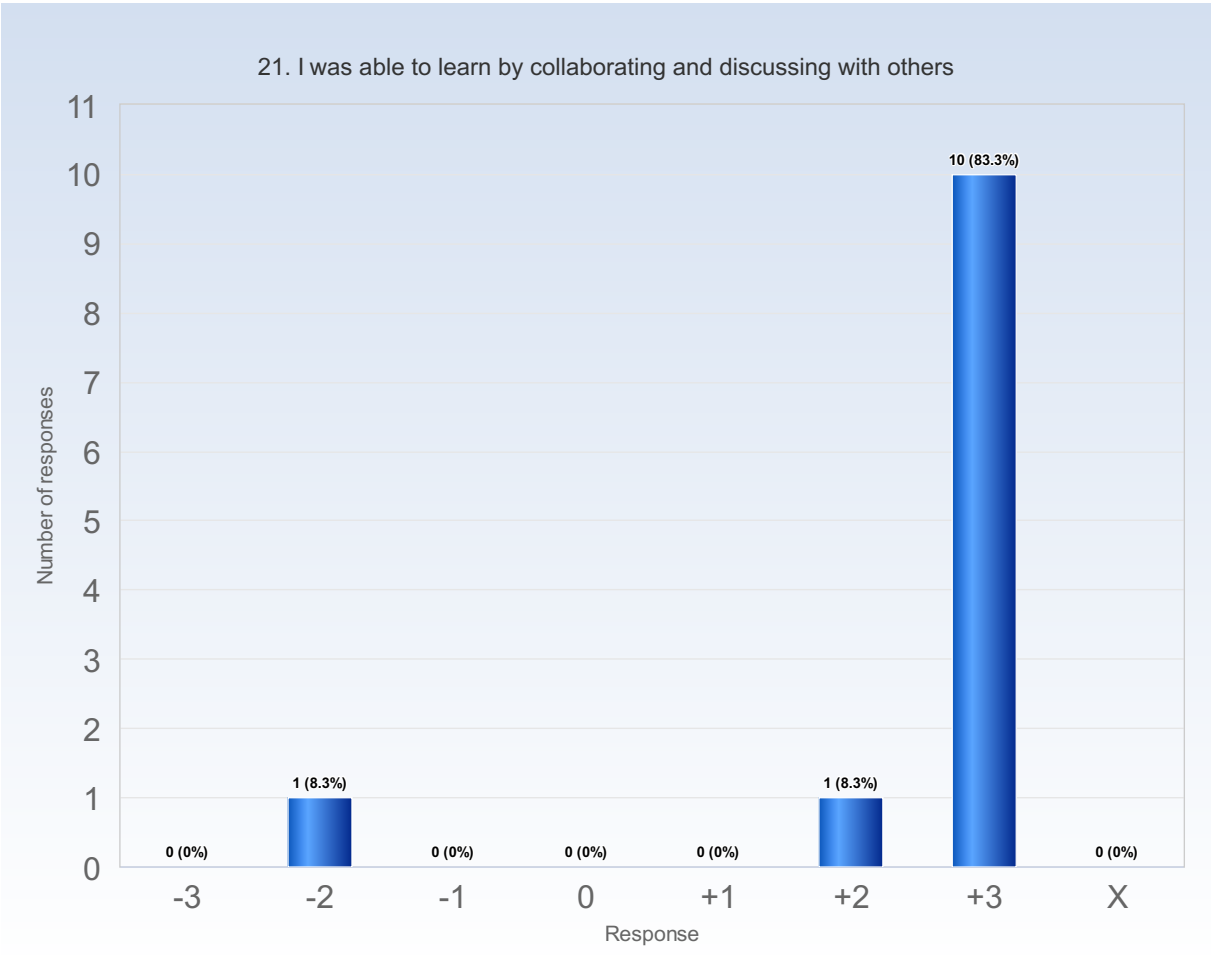


Comments

Comments (My response was: -1)
found the course harder than expected

Comments (My response was: +2)
I didn't have too much background to begin with, but it was easy to get into things.

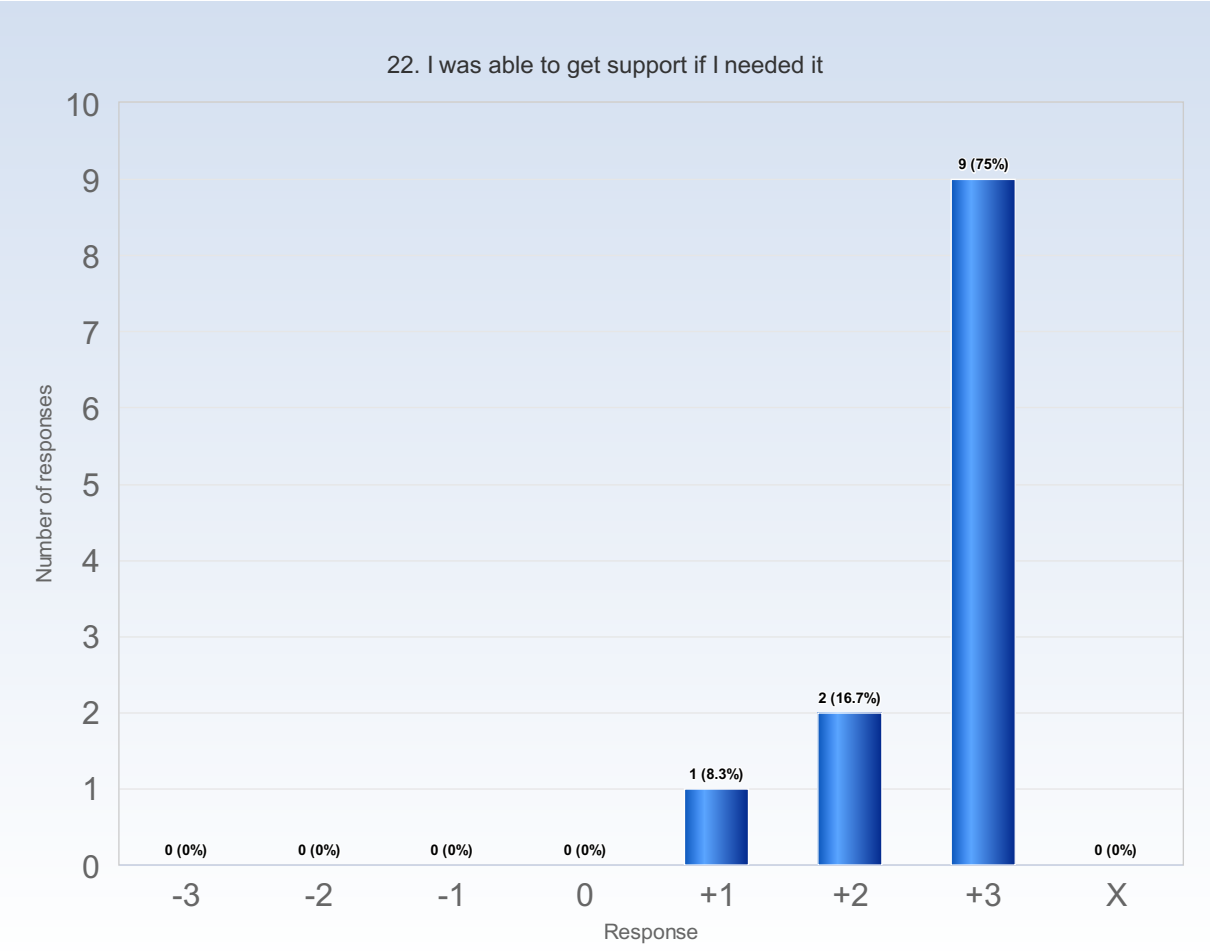

19. The course activities enabled me to learn in different ways
Number of responses
7
6
5
4
3
2
1
0
0 (0%)
0 (0%)
0 (0%)
0 (0%)
1 (8.3%)
5 (41.7%)
6 (50%)
0 (0%)
-3
-2
-1
0
+1
+2
+3
X
Response



Comments

Comments (My response was: -2)
This is highly random. I learnt more from discussing the projects with other groups than I learnt during the time I worked and discussed with my own group.

Comments (My response was: +3)
Really enjoyed discussing in groups, felt like a good practice for mathematical communication skills as well.



Comments

Comments (My response was: +3)
Received helpful replies by email when I had questions/needed guidance