Report - DD2419 - 2023-09-22

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):

Patric Jensfelt, patric@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.

* We met every group (and thus every student) for a final session that started with examination and ended in a discussion about the course.
* We use the standard course evaluation which only 3 students responded to
* We sent out a google doc to add comments into anonymously.

There is a bad gender unbalance like almost all courses at KTH. We have experimented with spreading the minority gender over all project groups or clustering them and there are pros and cons with both.

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.)

We met the project groups roughly every three weeks during the project work.

COURSE DESIGN

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

The course runs in two main phases. In the first phase the students complete individual assignments that end in an examination session. The purpose of this is to ensure that every individual has the skills and knowledge to contribute to the work in the group. We call this the "boot camp". At the end of boot camp the students have to pass an oral examination where they present their solution to a final boot camp assignment and that they have general knowledge needed to move on to the project. Passing this part is needed before entering the second phase, which is the group project.
The group work is where most of the time in the course is spent. The groups are created by the teachers. The aim is the that groups should be diverse (different skills and backgrounds) and that no one knows anyone else ideally. The latter is not possible. All teams are given the same task to solve. To support these learning activities there are initially lectures on specific topics important for the project and project meetings between project group and teaching team. Students are given a total of three milestones with specified functionality in three topics (localization, perception and planning) and overall integration. We meet the groups after each milestone to give feedback.
There were two huge changes from last time the course was given
* We provided a mobile robot to work with for each team. The robot came with an arm, a RGB-D camera and a GPU allowing the students to implement more or less everything that was introduced in the course Introduction to Robotics (DD2410).
* There was a project room to gather in. This meant much better interaction between the groups.

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?

Students are asked to make a project plan before the project starts and work with time as the resource which needs a budget. This is then followed up weekly in the progress reports. The workload is higher than in non-project courses and varied a lot from student to student. When asked at the end of the course the three students that answered the survey said 30-32h/week (1 person) and 18-20h/week (2 people). The project lasted 14 weeks (two weeks of these being exams). 18-32h/weeks corresponds to 252h-448h on the project (counting on full 14 weeks). Instead looking at what the students reported as time spent it was 285h, 290, 223, 283, 250, 180, 287, 277, 247, 192, 233, 251, 185, 208, 215, 225, 248, 292, 282, 340, 288, 303, 251h respectively. As can be seen there is a large variation (180h - 340h). This is more than most courses and a much more than when we were using small drones and no lab space. Some of the increase was caused by the lab closing for some week which meant that work was less efficient but a larger contributing factor was that the course was much more interesting. Highlighting time as a limited resource and pushing harder to prioritise tasks is a possible way to reduce the time spent at the same time as I am very happy that they found something that the like doing. The course is pass/fail which takes the grade pressure out of the equation.

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?

The students started out well but there was a battery fire a bit after half-way through the course. This resulted in the lab closing for weeks which destroyed initial plans and also meant that some ambitions had to be scaled back.

STUDENTS´ANSWERS TO OPEN QUESTIONS

What does students say in response to the open questions?

Only 3 students responded so statistically it is useless. However, the little feedback that came is very positive.

SUMMARY OF STUDENTS' OPINIONS

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

The main thing we will take with us is that we need to stimulate the integration work more. This is what makes the course very special. It is not enough not make your little “box” to work in the overall system, the system needs to work.

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.

Very happy with the new hardware and the students really liked having a lab space.

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?

No such data

PRIORITIZED COURSE DEVELOPMENT

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

Hardware: Improved battery safety to, e.g., make it (near) impossible to drain a battery too much, try to simplify the way that the arm is interfaced to get rid of the local network connecting the main computer with the RaspberryPi controlling the arm and ideally add a laser scanner.
Teaching activities: Try to come closer to making lectures a discussion with most of the course participants and not a monologue attended by only very few.

OTHER INFORMATION

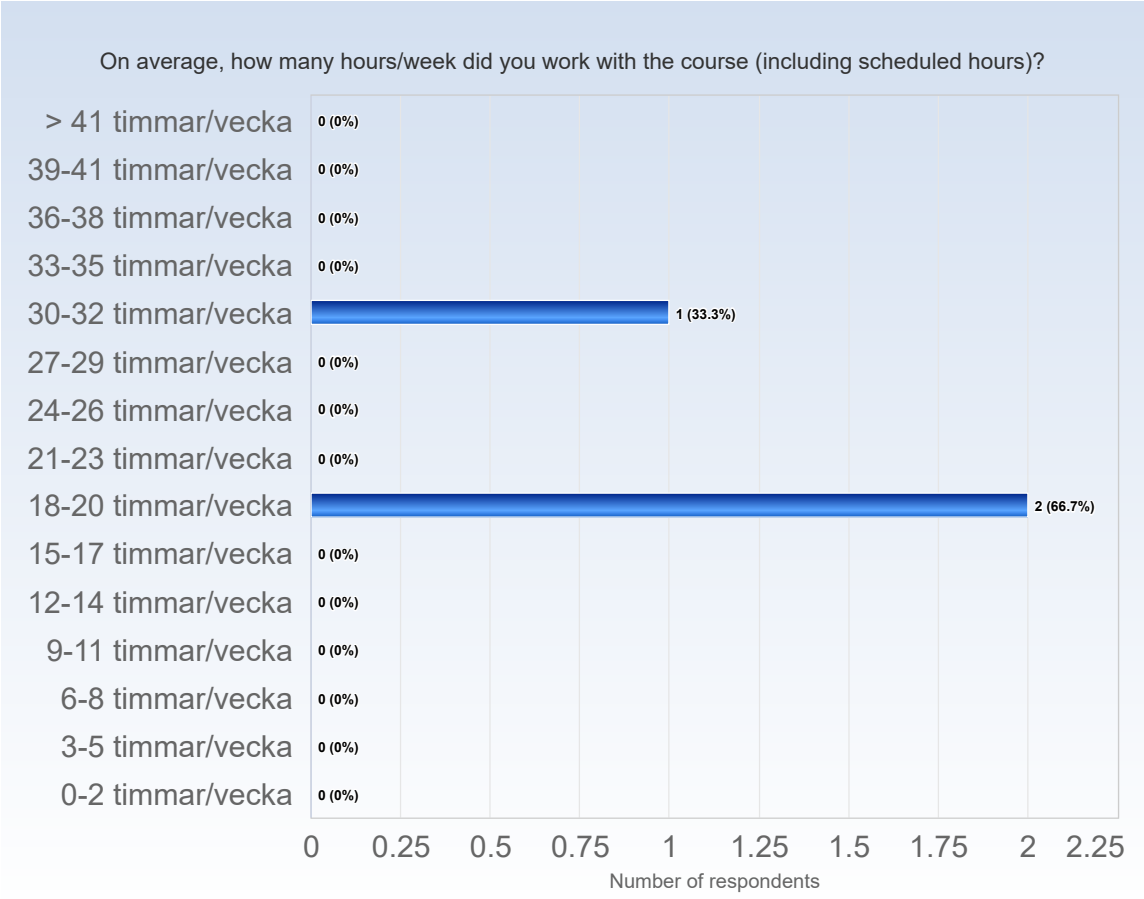
Is there anything else you would like to add?

Nope

DD2419 - 2023-06-13

Antal respondenter: 25
Antal svar: 3
Svarsfrekvens: 12,00 %

ESTIMATED WORKLOAD



Comments

Comments (I worked: 18-20 timmar/vecka)

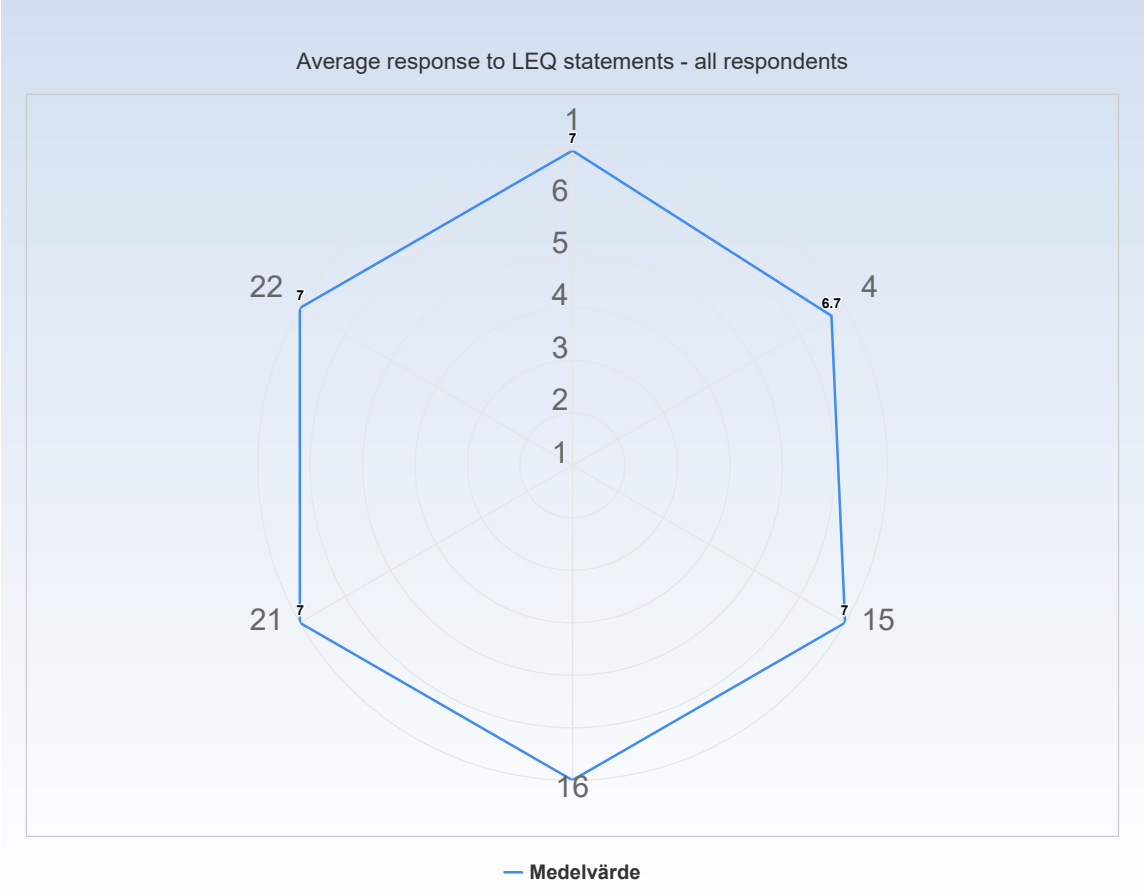
It's reasonable to take more time on project course.

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

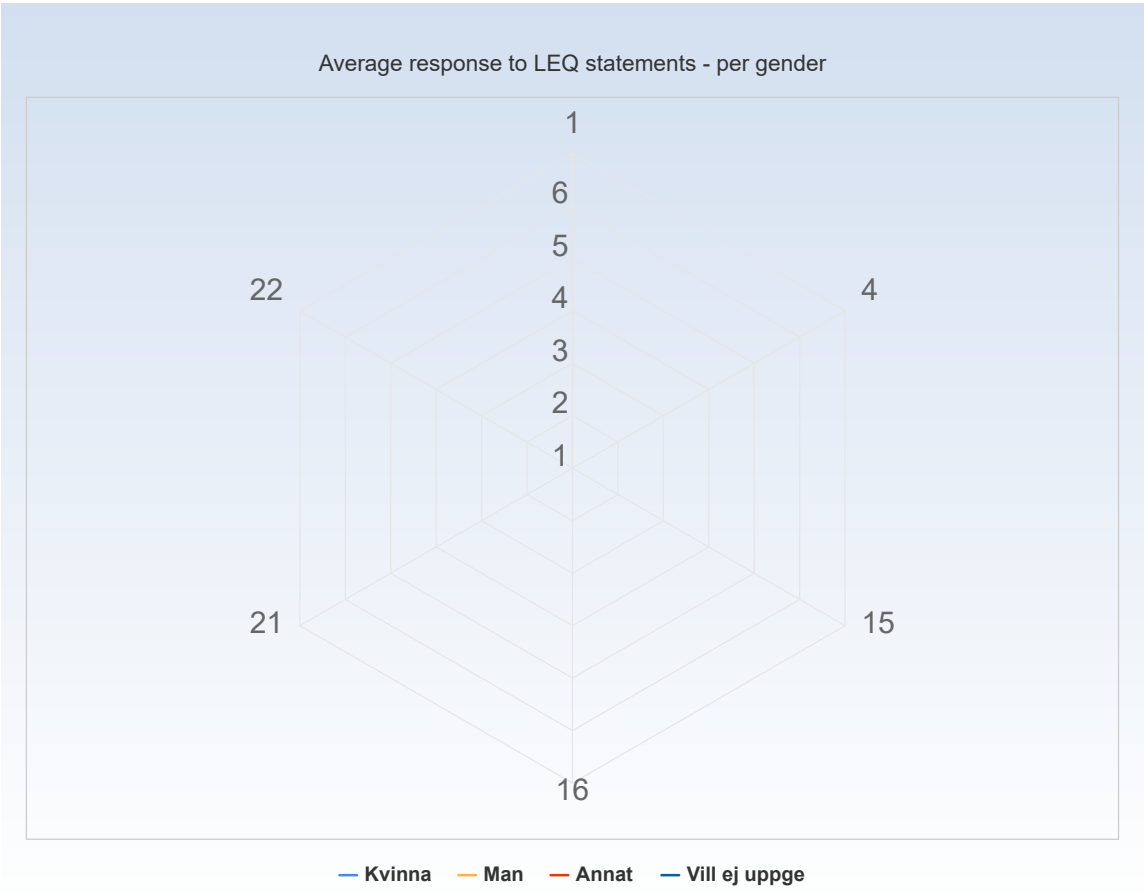
Bain, K. (2004). *What the Best College Teachers Do*, Chapter 5, pp. 98-134. Cambridge: Harvard University Press.

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.

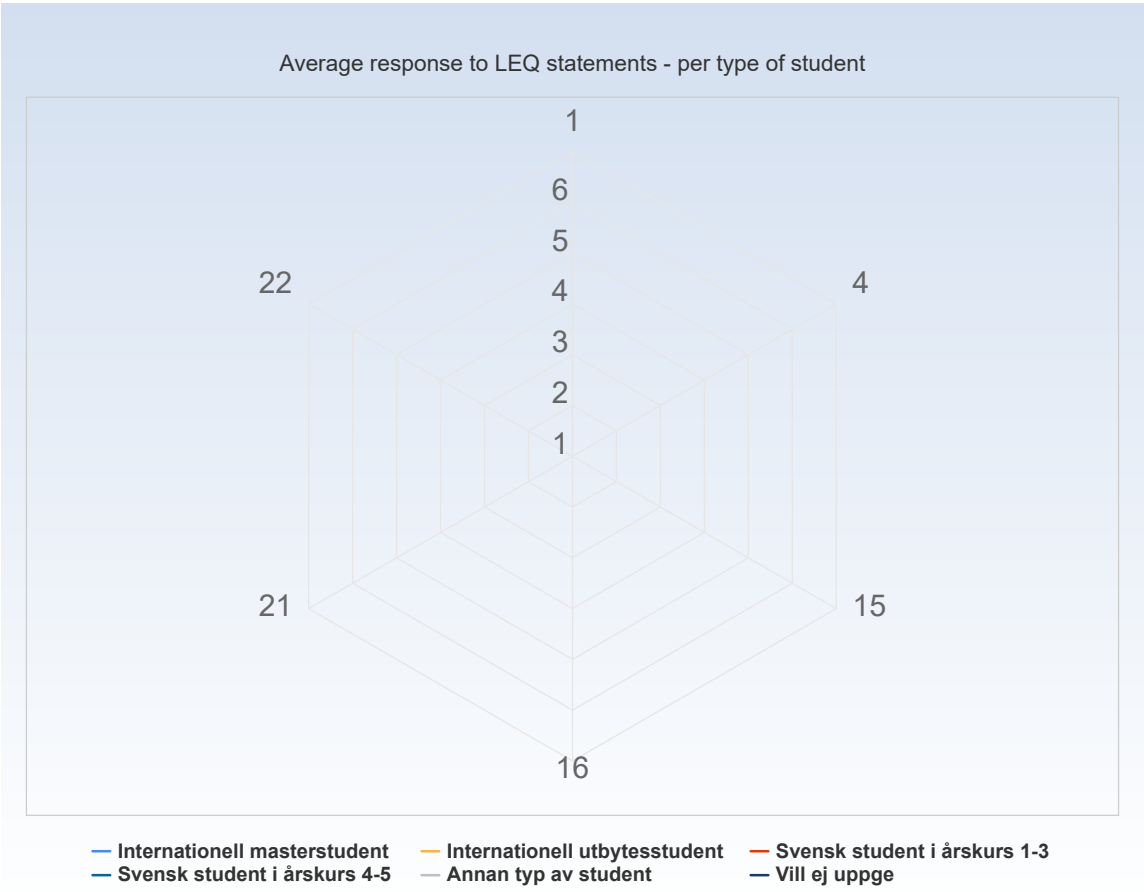
Kember, K. & McNaught, C. (2007). *Enhancing University Teaching: Lessons from Research into Award-Winning Teachers*, Chapter 5, pp. 31-40. Abingdon: Routledge.

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



Comments

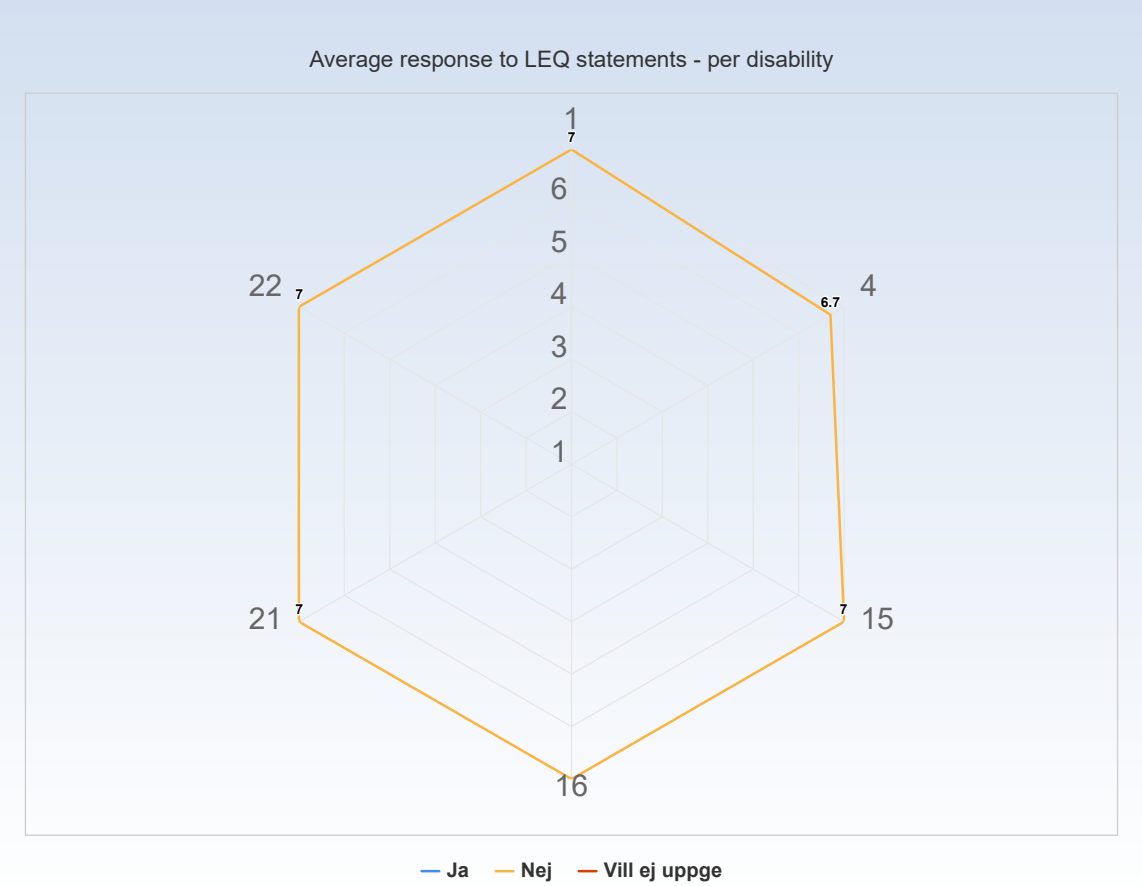
Comments (I am: Man)
Boys may like this course more.
...



Comments

Comments (I am: Internationell utbytesstudent)
Exchange student may rarely take project course like this, because some of them prefer traveling.

Comments (I am: Svensk student i årskurs 4-5)
...



GENERAL QUESTIONS

What was the best aspect of the course?

What was the best aspect of the course? (I worked: 18-20 timmar/vecka)
Everything
using actual robots, the autonomy we have, being in a group

What was the best aspect of the course? (I worked: 30-32 timmar/vecka)
Working on a real system, applying the content of our master.

What would you suggest to improve?

What would you suggest to improve? (I worked: 18-20 timmar/vecka)
security

What would you suggest to improve? (I worked: 30-32 timmar/vecka)
More HP, more relevant milestones early.

What advice would you like to give to future participants?

What advice would you like to give to future participants? (I worked: 18-20 timmar/vecka)
Learn more and talk more.
start the integration early !

What advice would you like to give to future participants? (I worked: 30-32 timmar/vecka)
Start integration early, front load and make things stupid simple. Skip SLAM, A*, PID e.t.c. and and make it simple. Upgrade after need.

Is there anything else you would like to add?

Is there anything else you would like to add? (I worked: 18-20 timmar/vecka)
The project course is far more different and far better than it is in China. And I like it very much.

Is there anything else you would like to add? (I worked: 30-32 timmar/vecka)
Best course so far.

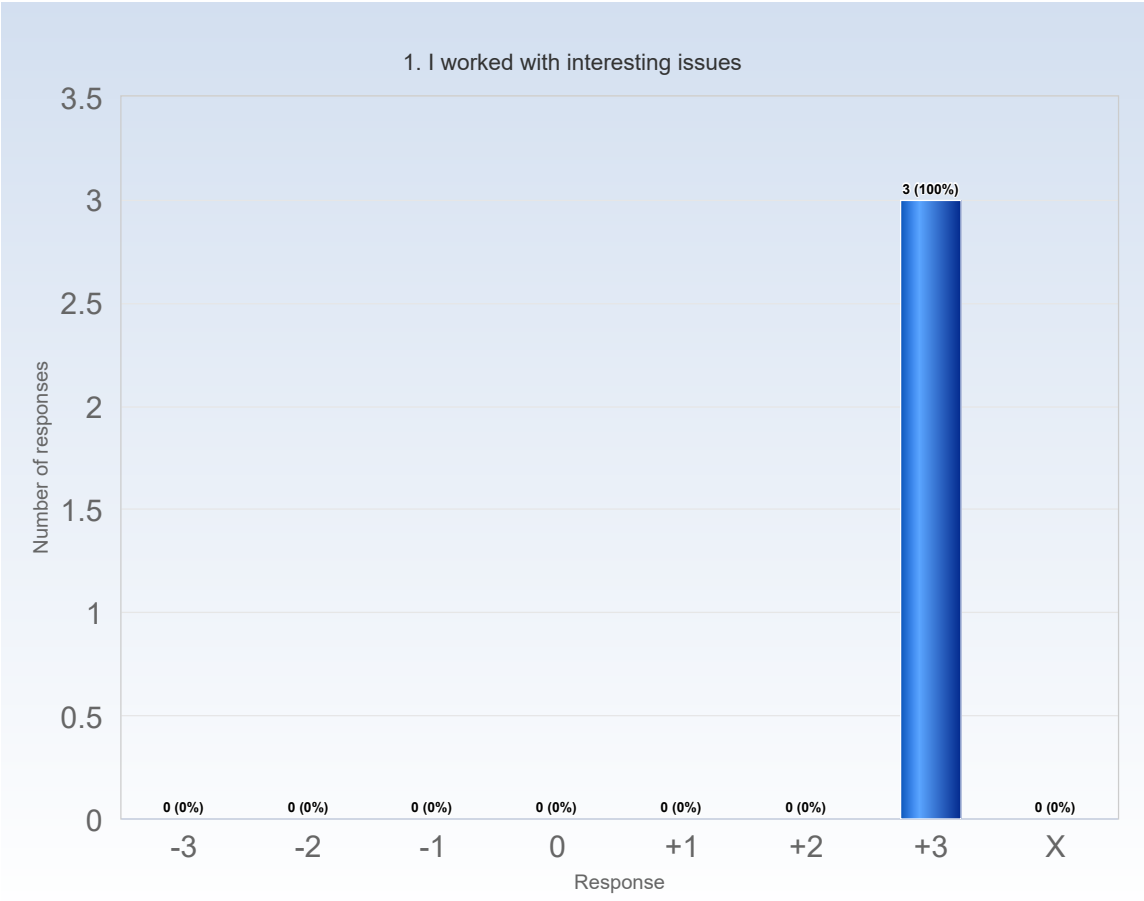
SPECIFIC QUESTIONS

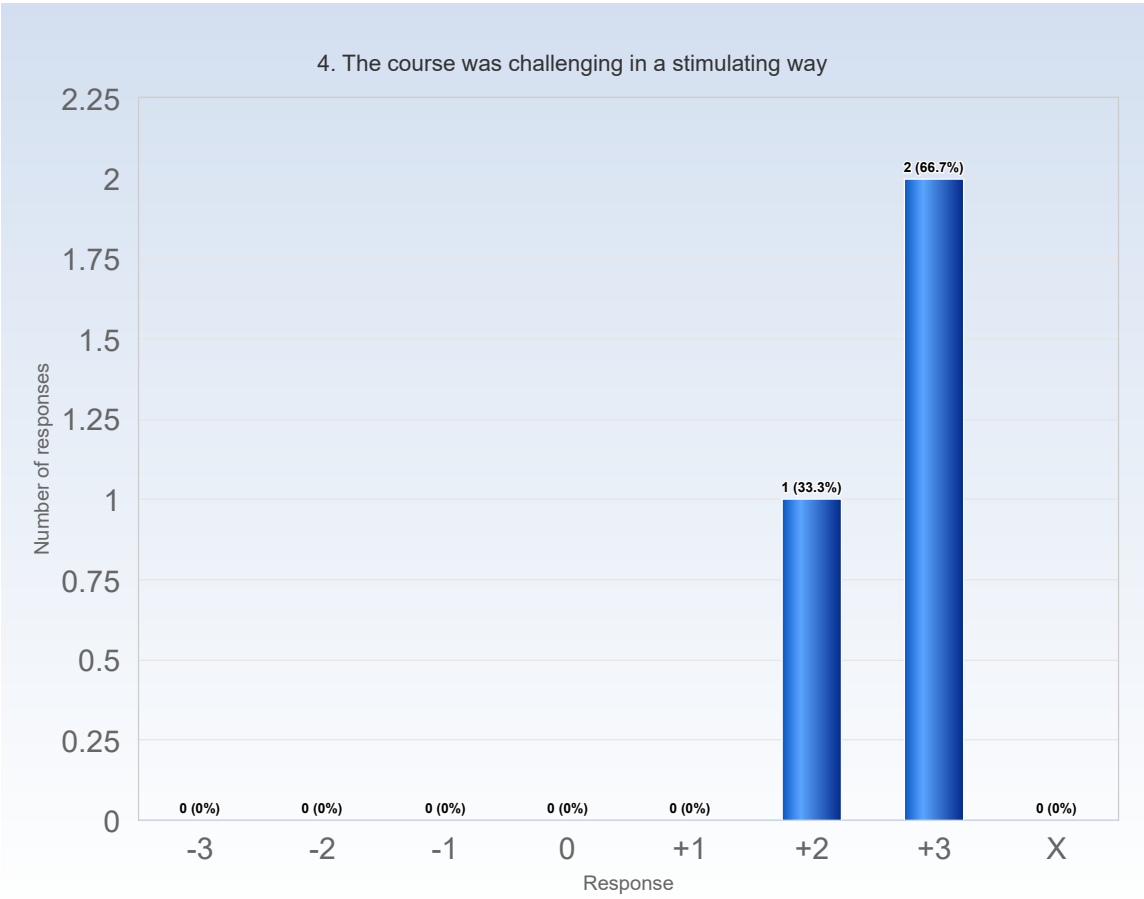
RESPONSE DATA

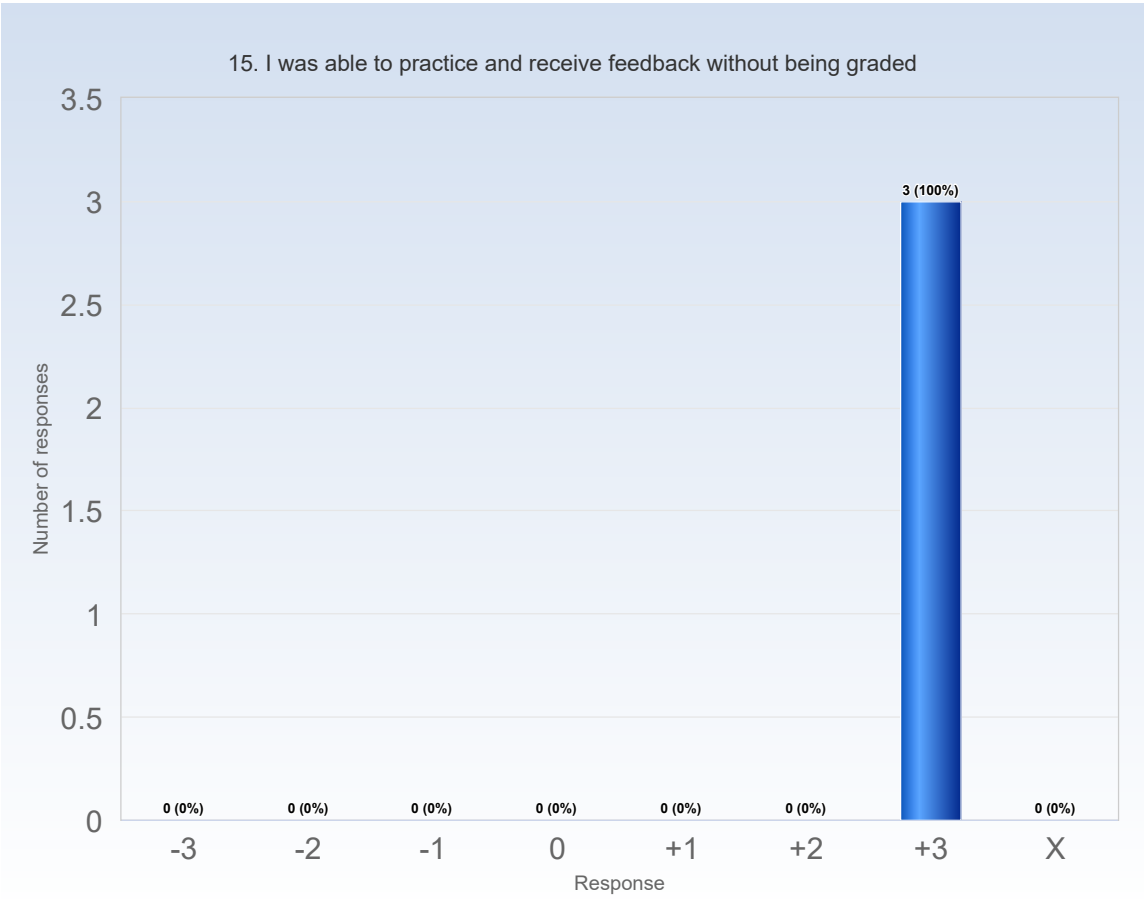
The diagrams below show the detailed response to the LEQ statements. The response scale is defined by:

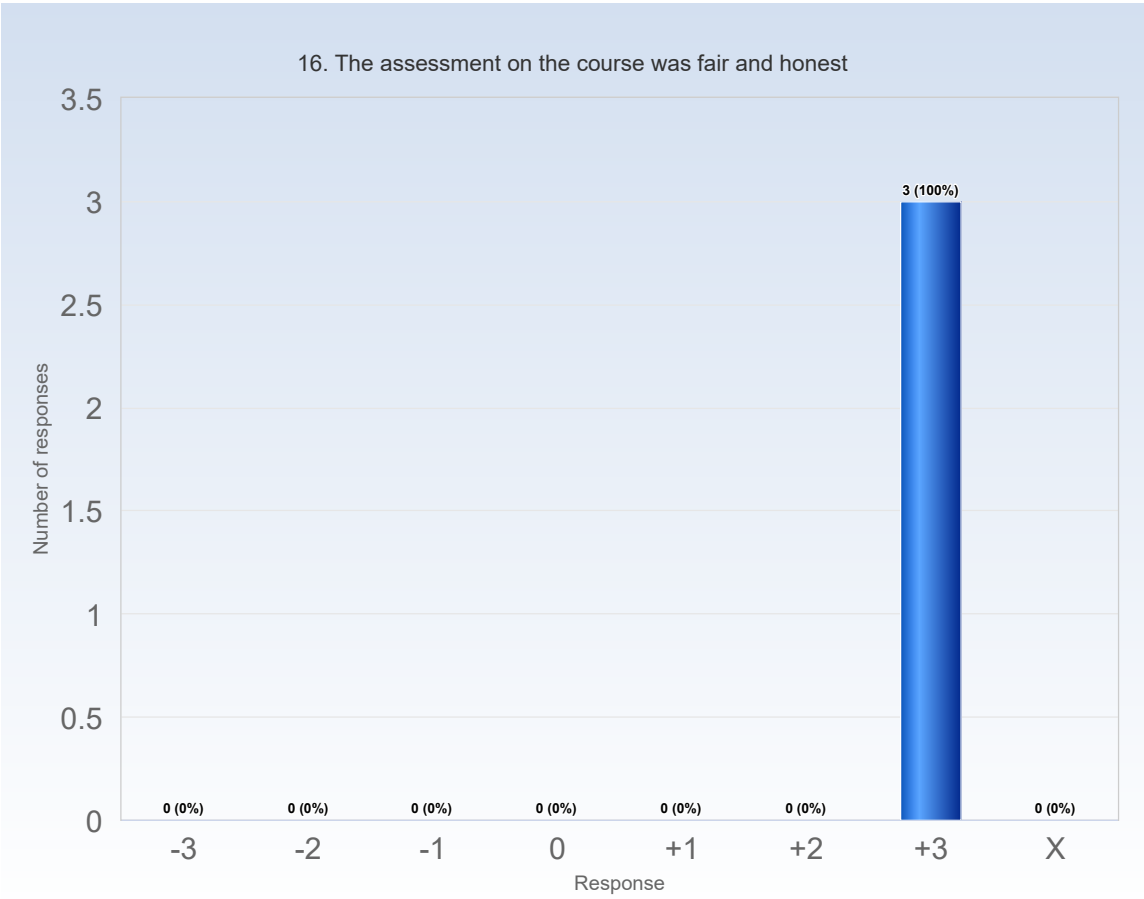
-3 = No, I strongly disagree with the statement
0 = I am neutral to the statement
+3 = Yes, I strongly agree with the statement

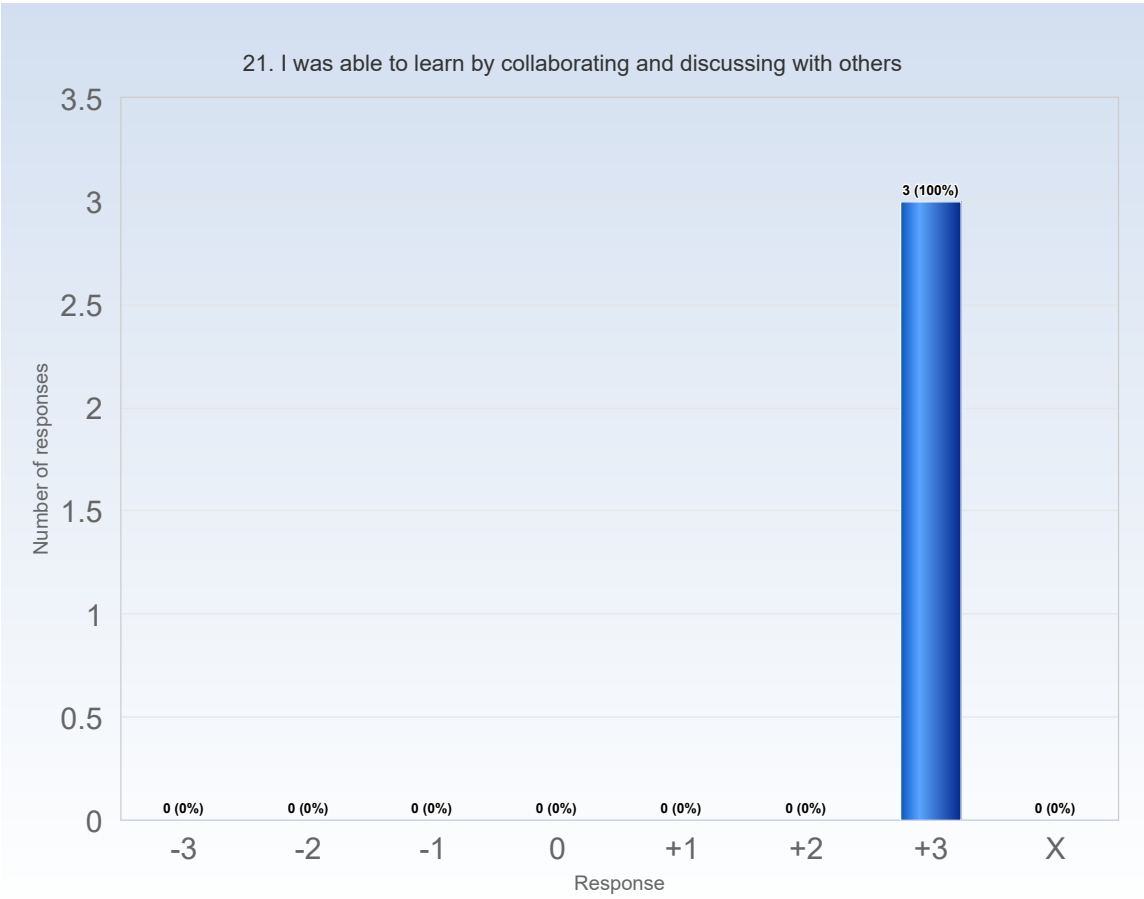
X = I decline to take a position on the statement

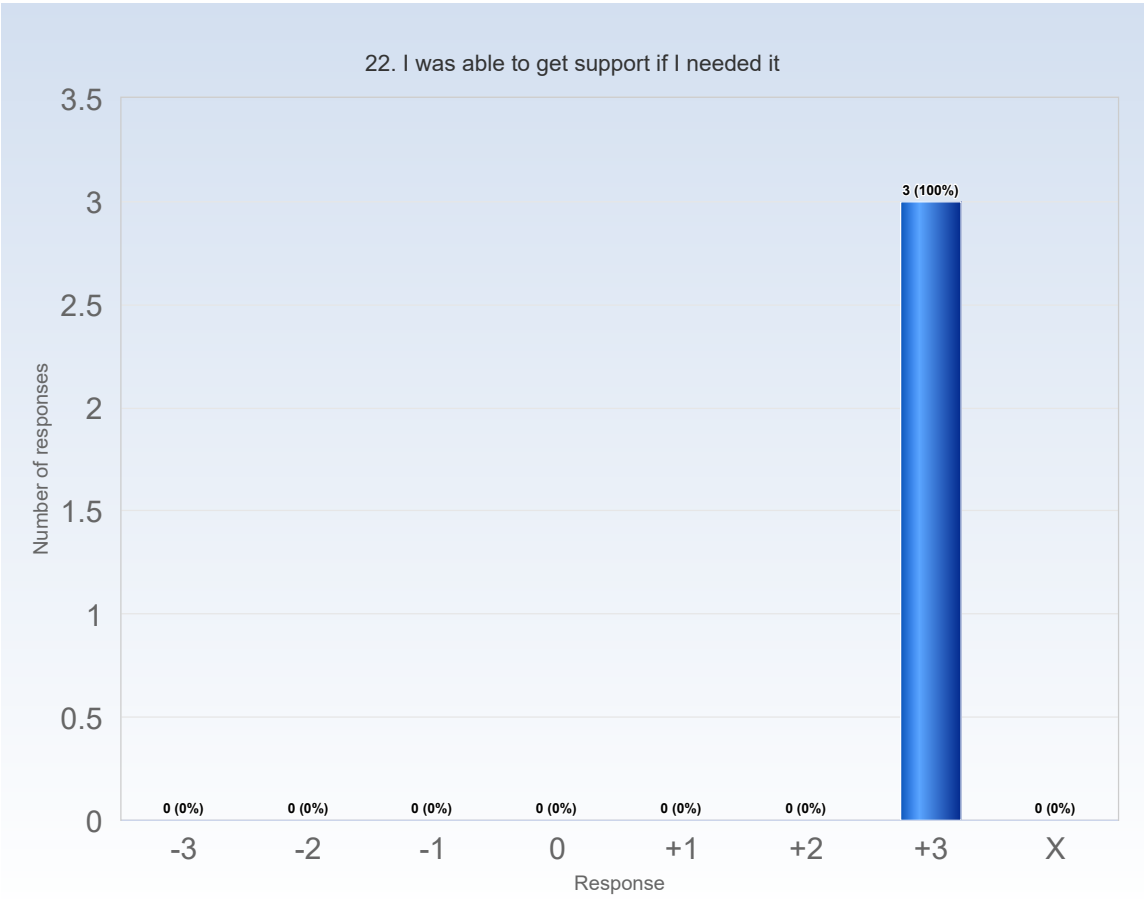



4. The course was challenging in a stimulating way
2.25
2
1.75
1.5
1.25
1
0.75
0.5
0.25
0
Number of responses
0 (0%)
0 (0%)
0 (0%)
0 (0%)
0 (0%)
1 (33.3%)
2 (66.7%)
0 (0%)
-3
-2
-1
0
+1
+2
+3
X
Response


15. I was able to practice and receive feedback without being graded
Number of responses
3.5
3
2.5
2
1.5
1
0.5
0
3 (100%)
0 (0%)
0 (0%)
0 (0%)
0 (0%)
0 (0%)
0 (0%)
0 (0%)
-3
-2
-1
0
+1
+2
+3
X
Response


16. The assessment on the course was fair and honest
Number of responses
3.5
3
2.5
2
1.5
1
0.5
0
0 (0%)
0 (0%)
0 (0%)
0 (0%)
0 (0%)
0 (0%)
3 (100%)
0 (0%)
-3
-2
-1
0
+1
+2
+3
X
Response


21. I was able to learn by collaborating and discussing with others
Number of responses
3.5
3
2.5
2
1.5
1
0.5
0
3 (100%)
0 (0%)
0 (0%)
0 (0%)
0 (0%)
0 (0%)
0 (0%)
0 (0%)
-3
-2
-1
0
+1
+2
+3
X
Response


22. I was able to get support if I needed it
Number of responses
3.5
3
2.5
2
1.5
1
0.5
0
0 (0%)
0 (0%)
0 (0%)
0 (0%)
0 (0%)
0 (0%)
3 (100%)
0 (0%)
-3
-2
-1
0
+1
+2
+3
X
Response

Feedback on DD2419 Spring 2023

Since most of you will not answer the course evaluation and also not see the feedback from others I offer an alternative way to give feedback about the course in a joint document where you can add comments anonymously but where you see the comments on others, a bit like a forum. I will attach this document to the course analysis.

I have added some headings but feel free to add more if you think something is missing.

Add text where you argue against someone rather than remove or edit some else's text.

If you want to be truly anonymous use a private/incognito browser window or at least make sure not to be logged in.

Who (if any) would you recommend to take the course?

- Robotics people
- Anyone who took Intro to Robotics and wants to learn more about ROS and some practical issues that you might face in the robotics industry.
- If you think you are good at organizing and working in group projects. You will need strong planning skills.

Advice to students next year in the course

- Start integration early!! Dito!
- Make sure to keep everyone in the team in the loop of what is happening
- Be clear with your team about what areas you have studied or tried more extensively versus the areas that are new to you. Since you need to split the work, it is easy for someone to struggle with implementing something that another team member can help out with. It might be good to learn by yourself, but in a project team it is very important to just ask when you are stuck.
- Visualization tools are extremely helpful. You might not see the use in them initially, but during integration if each component can show things in Rviz or another visual aid, you will save so much time because integration can turn into lots of little code changes. Often for each code change, you have to physically move the robot, relaunch some nodes, and potentially set up the workspace objects again, which is slow and tedious.

    - Rviz visualization markers are your friends, you can draw almost anything with them :)

Comments on the overall course setup

- Add a lecture where you go over the hardware to get a better understanding for it. We did not know that there were fuses for example.
- Skip the seminars where students discuss the core topics as students talk anyway between groups in the project room.
- Add a milestone between milestone 2 and 3
    - Maybe without a check-in, but at least encourage groups to set their own milestone between 2 and 3

Comments on the project task

- Adjust the milestones to stress the importance of integration earlier.
- Overall the project task was challenging but quite fun. I don't think any major changes are needed, but if you could maybe show a video or an example of each milestone it would be clearer.

Comments on hardware

- The GPU and especially the HDMI-port was sensitive and handling them could make the system shut down.
- If possible put the battery on top of the robot so that handling the battery is easier and cables do not interfere with the wheels.
- The servos in the arm have different rotation limits (due to the construction of the arm), so it would be great to add those (or at least a warning) to the hardware description.