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1. Description of the course evaluation process:

This course evaluation is conducted based on the input received from the students through course evaluation surveys, an interview with a group of students and based on the experiences of the course responsible/teacher gathered during running the course.

2. Description of meetings with students

A discussion meeting was held with a group of students on 23rd November in XPRES Glasburen at Brinellvägen 68.

The meeting was held to get additional insights on points of the Learning Experience Questionnaire (LEQ) and have an open discussion.

3. Course design

This is a 6 ECTS course designed to introduce the fundamentals of circular economy as well as the concept of circular manufacturing systems (CMS) and the framework for its implementation. This is a project-based course where students implement the knowledge to complete the project. Through the project, the course also stimulates the students to work with practical problems that will contribute to sustainable development as well as encourages them to bring forward solutions that have entrepreneurial value. The project work is equivalent to 4 ECTS and determines the grade in the course.

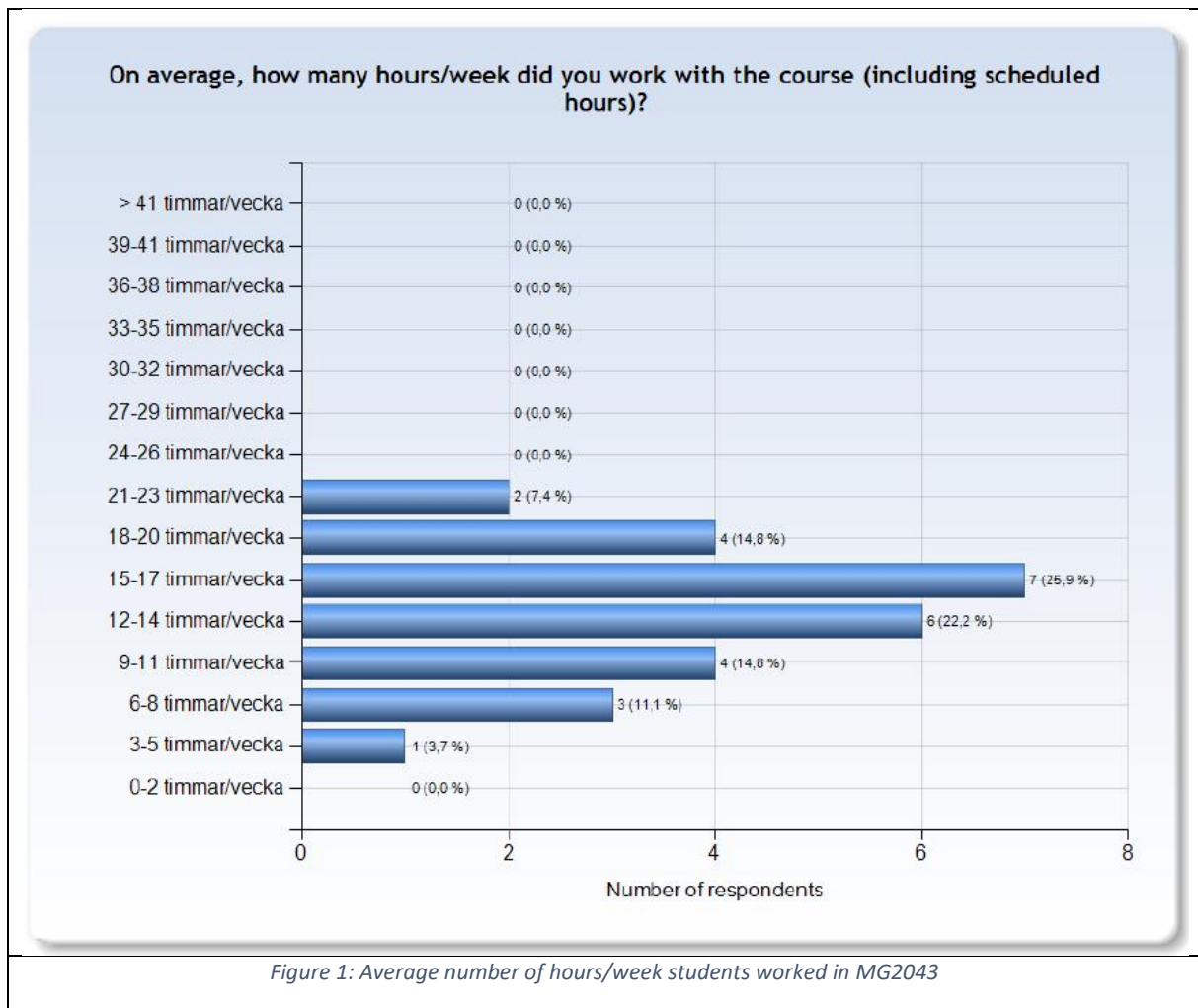
There is a quiz on the reading materials equivalent to 0.5 ECTS to ensure that the students have gone through the important literature on the topic.

Most of the lectures in the course are followed by a seminar for deep-diving in the topic and allow students to apply the theory (from the lectures) in their project work. To stimulate discussion and engagement, active participation in the seminar gives 2 ECTS.

Students' workload

As Figure 1 shows, about 15 % of the students spent 3 to 8 hours every week in the course corresponding to 24 - 64 hours against the expected 240 hours (a 6 ECTS course, spread over 8 weeks). About 37 % of the students spent 9 to 14 hours every week corresponding to 72-112 hours. About 49% of the students spent 15 to 23 hours every week corresponding to 120-184 hours. This time variation is due to the fact that the course is based on the project work where students decide the level of ambition and effort they want to put in the project work. This reflects rather proportionally on the grade as shown in Figure 2. It could be concluded that the student group that spent the highest time received grade A whereas the student groups that spent moderate to low time have received grades 'B' and 'C'.

Despite this variation, most of the students (who left comments) experienced the workload in this course is relatively higher than other 6ECTS courses that they have taken at KTH.



Students' results on the course

The grade distributions of the course in HT 21 is shown below. The ratio of grade 'A' may be perceived as relatively high. Since this is a project-based course (where the grade is based on project work, report and the final presentation), the students get formative feedback during the process and can improve their work continuously before the final grade is decided. Thus, the high ratio of grade 'A' is justified.

Grades	Count	%
A	22	67
B	9	27
C	2	6
D	0	0
E	0	0
F	0	0
Total	33	100

Figure 2: Results of MG2043 in HT21

Students' answers to open questions

Not many students have left comments in the open questions sections. Those who have left comments are listed below by categorizing them as positive and critical comments.

Positive comments:

Best course so far at KTH

"The course was very inclusive from this point of view"

"Good diversification!"

"We learned a lot with the project and with the article. It's not usual. We feel like making real reserches to create a concrete projet"

"As an international student, it was nice to experience a different approach to the course, if compared to the one I am used to it. The relationship with the professor and the other students was really nice and stimulating"

"The best aspect of the course is that we had the opportunity to experiece the theories in real life and not only write a exam which you forget the next day"

The best aspect of the course was the seamless integration of project work (reflect and discover) and lecture (learn) throughout the course by incorporations of the seminars.

"Interesting and important topic. Great! Fun that we got to learn through the project method"

"The collaborative aspect and the fact that there is a lot of discussion in the classroom."

"The project idea that pushed our limits to think of entrepreneurial idea"

"The course was very well structured and I liked the seminars. There we had time to work on our project and ask questions while we were working on it"

"I liked developing a project beacuse it gave me the possibility to practice the theoretical knowledge of topics already discussed in other course. I liked the short and dynamic lessons"

"The Course covers all the Quality management tools and statistical tools for the Production and Organizational developments through the Lectures and the Assignments"

"The course is really good and gives clear concept understanding through the Lectures and the Assignments"

"In general, the course was extremely knowledgeable, well organised and challenging in a positive way"

Critical comments:

"Maybe not related to the course directly, but people tend to talk about different segments from the male perspective, referring to customers or managers as "he" or "him""

"I felt like master students in Sweden actually dind't include exchange students very much becuase of existing groups. I would have liked to have mixed groups with more students from KTH masters"

"Maybe moving all the assignment hand in a bit further from exam week. Also clashing lectures with MG2029"

"Clearer instructions in the project, what to include in the report and in the presentation"

"Clearer grading criteria"

"Maybe it would be possible to assign each group a mentor/coach etc. to further guide us through the project work. For a while we weren't sure what our process should look like, in which order to tackle the subjects etc"

“It was hard to judge progress of the project during developments. Maybe an intermediate feedback session with the lecture team would be a worthy consideration”

“Didn’t know we could get help from the professors”

Summary of students’ opinions

As it is seen in the comments above, the course got both very positive remarks and critical remarks. The critical remarks are neither unusual for a course that is run for the first time nor difficult to take address in the second round of the course. In fact, all the critical comments are very concrete and will be very useful to improve the course further.

Overall impression:

The polar diagram in Figure 3 below shows the average response to the LEQ statements for all of the 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

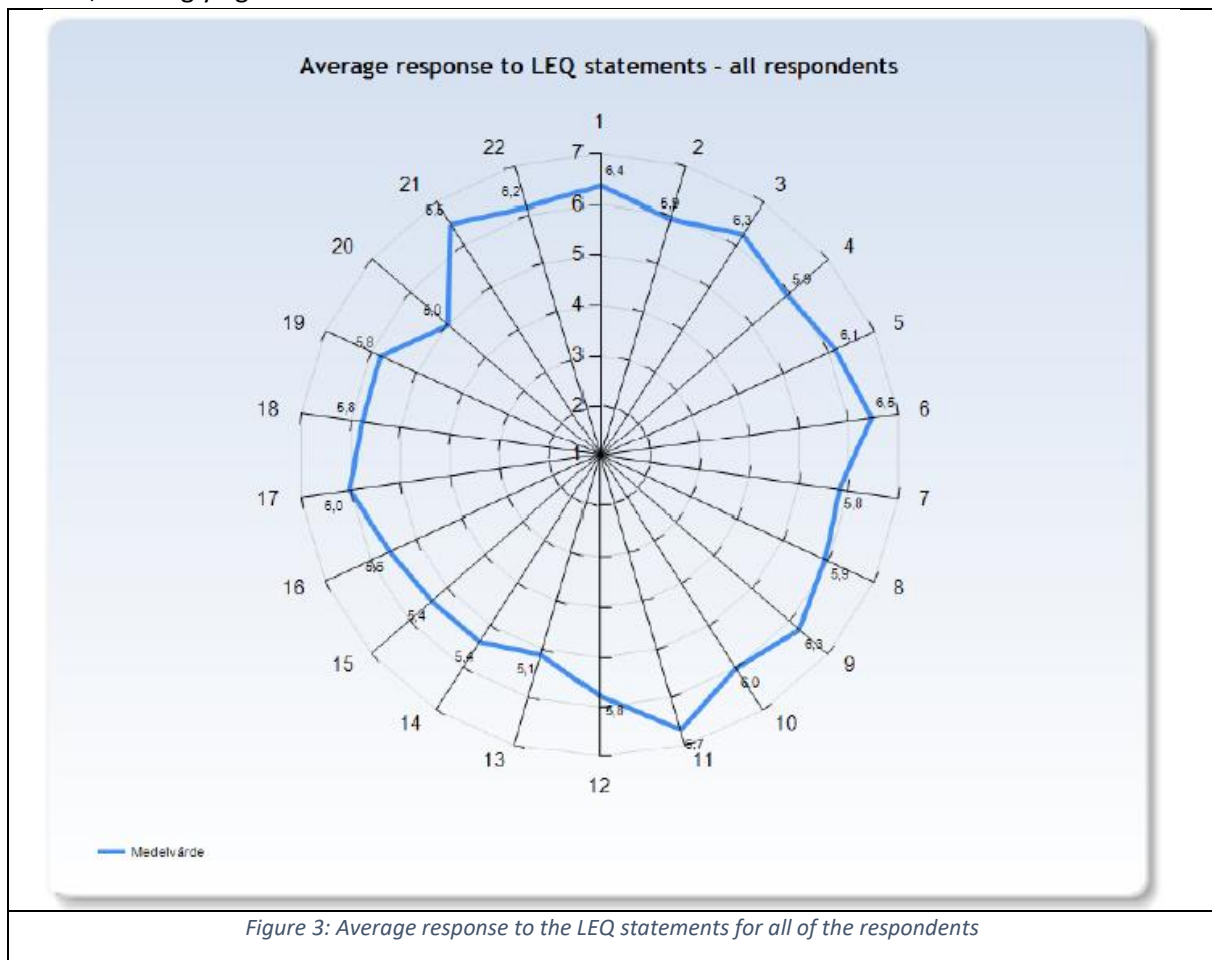


Figure 3: Average response to the LEQ statements for all of the respondents

The average score to LEQ statements in the polar diagram below 6 is considered as the potential area of improvement and below 5.6 as critical. Furthermore, there are some variations in response when the LEQ statements are seen from the perspectives of gender and type of students as shown in figure Figure 4 and Figure 5. To address this, a discussion with 4 female students representing both Swedish and international students was conducted. Note that it was not possible to have access to an exchange student representative in the discussion. The discussion revolved around all LEQ statements, with extra emphasis on statements that received a score below 6.

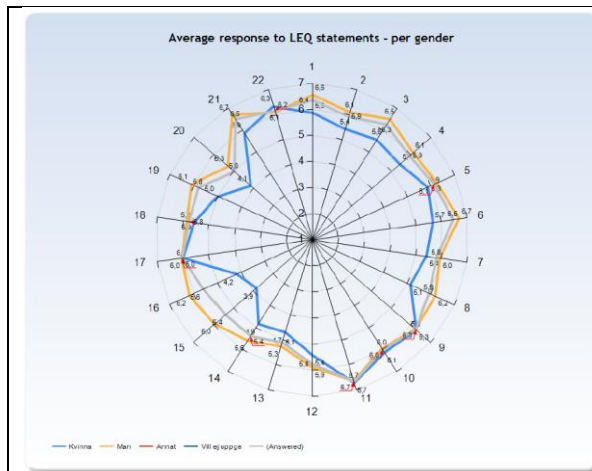


Figure 4: Average response to the LEQ statements per gender

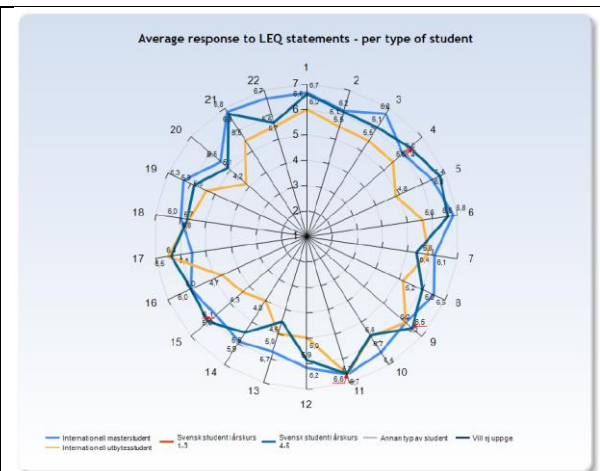


Figure 5: Average response to the LEQ statements per type of students

Analysis:

Based on the input from students both through the survey and the discussion and my own experience it is safe to say that students perceive the course as a good course. The course contents cover important aspects of CMS and the course activities are well aligned to meet all ILOs. LEQ statements 13, 14, 15 and 16 (score between 5.0 and 5.5) deals with a lack of clarity on what was expected from students to obtain a certain grade and feedback, which have already been pointed out as a critical issue through the comments from the students mentioned above. Statement 16 is about the fairness of grading, which is invalid as the survey was conducted before grading. However, the discussion (which was held after the grading) with the students confirmed that they were satisfied with the grade. However, there was a bit of concern about the title of the 'Best Project Award' (a method to motivate students and has no/less significance to the grading).

Prioritized course development:

Based on the input and analyses made above, the following activities are prioritized for the course development for the next intake:

1. Alter the points for Exam (KON1) and Seminar (SEM1) to 1.5 and 0.5 hp/ECTS.
2. Clarify further and elaborate what is expected and needed to get certain grades
3. Clarify further and elaborate the scope of the project work
4. Add additional seminars to monitor projects progress and provide feedback