

Reflections on student opinions before and after the final exam – The variability of questionnaires

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Abstract — Student course evaluations are important tools for direct evaluation of student appreciation of courses. At Chalmers they are traditionally executed in terms of mid meeting with students and teachers followed by a written student questionnaire and the follow up meeting with students, student centre representatives and teachers where recommendations for future development can/will be suggested. The written questionnaire is considered as the hard and true facts about the perception of the course quality from a student point of view. The year 2010 we tried to take a footprint on the questionnaire responses before the examination and compare that with the responses after the examination. Preliminary results indicate that the response for the course questionnaire show significant differences indicating that the examination for somewhat reason has changed the perception of the teacher's pedagogic ability and general perception of the course. This paper will show the interesting results on this but also show how to use repeated questions to check if the student opinion also changes during the filling of the questionnaire. Chalmers has in many ways a very good way of evaluating courses and programs but here will suggestions for further improvement and quality assurance of the courses be suggested. The aim of this paper is not to provide solutions but to discuss problems and opportunities with written questionnaires as one important source for quality assurance of courses.

I. INTRODUCTION

High quality in the world of University Education is desirable but can be ambiguous when used in measuring teaching and learning. The definition and interpretation on how to measure quality of courses, programs and other related objects varies between subjects, aims, and persons and so on differs a lot. In every Universities the quality of a specific course is measured or valued by a number of factors such as, teaching capability, aims and goals coupled to assessment, administrative quality, how well the course fits in to a special program and so on. In engineering Universities such as Chalmers the main part of the courses are directly connected and integrated into a specific program structure (Högskoleingenjörer, Civilingenjörer, Arkitekter ...) which means that the courses also have to be evaluated in terms of progression aspects within the program. In many Universities

the direct and annual measurement of the quality (student perspective) of a course is measured by student evaluations in different forms. Other forms of evaluation of courses might include the use of visiting committees, self evaluations and or external evaluators' which is the tradition in many Asian and Anglo-American countries. Evaluation and revision of programs are very often only executed on a more long term structure in for example 5 to 10 years. The use of written student questionnaires can be questioned and discussed as a control measurement of course quality but it is definitely one important input for direct improvement of courses. The written questionnaire as the tool is discussed in this paper especially in view of how to develop and design them, time when answering them and also on how to evaluate the results.

In the course Experimental design (KBT120, KKR031), which is compulsory in the biotechnology program on the bachelor level (3d year) and semi compulsory in the Master program Innovative and Sustainable Chemical Engineering in the first semester, written questionnaire has been used in the quality assurance process. The course has over the years been appreciated by the students both in terms of the problem based learning project, learning environment and also for that the course content is considered as very useful for the student's future career. However the opinion that the results from the questionnaire might change during the course and especially before and after the examination is flourishing among teachers. For this reason the questionnaire always has been delivered before the examination date and the additional evaluation on how the examination been done separately thereafter. For the last couple of years when the questionnaire process is centralized the questionnaire answering time is covering the full period 1 week before and 1 week after the examination. This means that the results will be the average over the full period. Usually 50% of the students answer the questionnaire before and 50% after the examination.

II. RESULTS

The year 2010 we tried to take a footprint on the questionnaire responses before the examination and compare that with the

responses after the examination. The course is attended by about 100 students annually and the response before the examination was based on 21 students and after the examination additionally about 32 students. The questionnaire used in this paper is developed in cooperation with professionals concerning design and formulation of questions and answer alternatives. The full questionnaire can be seen in appendix. One recommendation we got was that we should always repeat the fundamental question about the course quality which means that this question was both first and last in the questionnaire. The idea behind this was to see if the responses were different comparing the first impression and the response after the more specific questions about different parts of the course and aim fulfillment. The figure 1 shows clearly that this is the case. The student's first impression (Question 1 = Q1) is very good but when they answer the same question again in the same questionnaire (Question 33 = Q33) the response is more moderate (but still good). Fig 1 shows only the responses before the examination and this clear difference is not visible if you compare the questions for the student group answering after the examination (not shown).

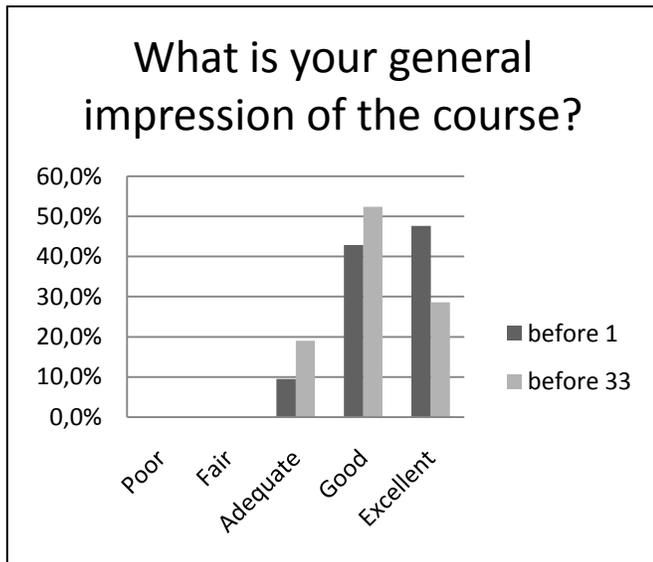


Figure 1: Student response before date of examination; questions nr 1 and 33.

Figure 2 and 3 shows the results of the same question as in fig 1 but compares the results before and after examination. The difference for question 1 is clear but for question 33 the difference is not that pronounced. For Q1 the change from 48 % answering excellent has changed to only 15 % after the examination.

Can the clear difference between the responses be explained by an effect of that different “types” of student answer before and after the examination? To find out this we also can compare other questions not concerning the quality of teaching but also on other subjects. Question 25 and 26 concerns the cooperation between students and also how the student estimates the workload for the course.

Here you can see only minor differences between the two response groups. This might be an indication of that the students opinion change more in questions about the quality of teaching and course content than on other issues. This implies no major differences between the two student groups answering before and after examination. We could also compare the student appreciation of different teachers. Figure 6 and 7 shows the student opinion about the teaching quality before and after examination for the examiner and another teacher not involved in the examination. In these figures the negative change for the examiner is much more drastic than for the other teacher.

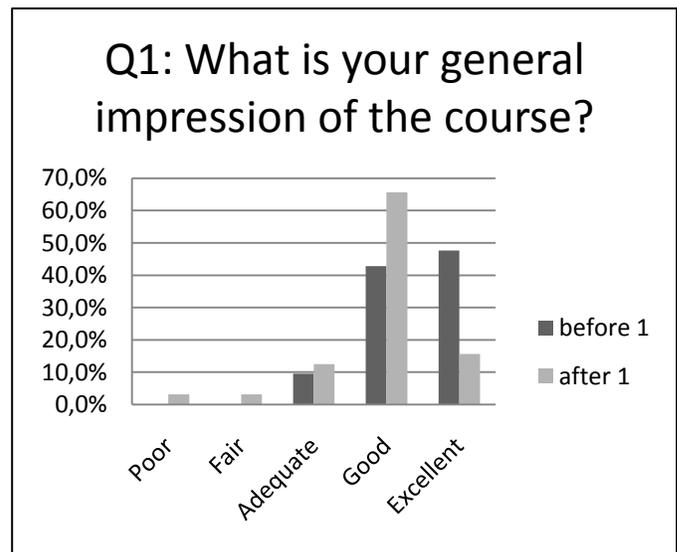


Figure 2: Student response after and before examination Q1

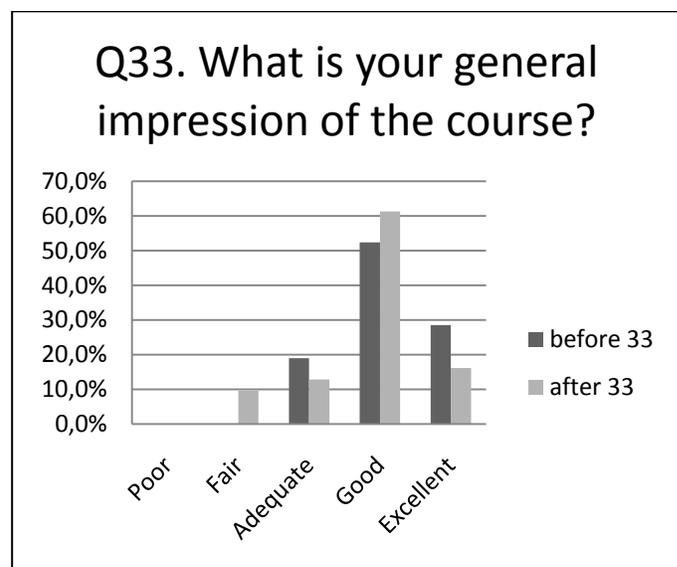
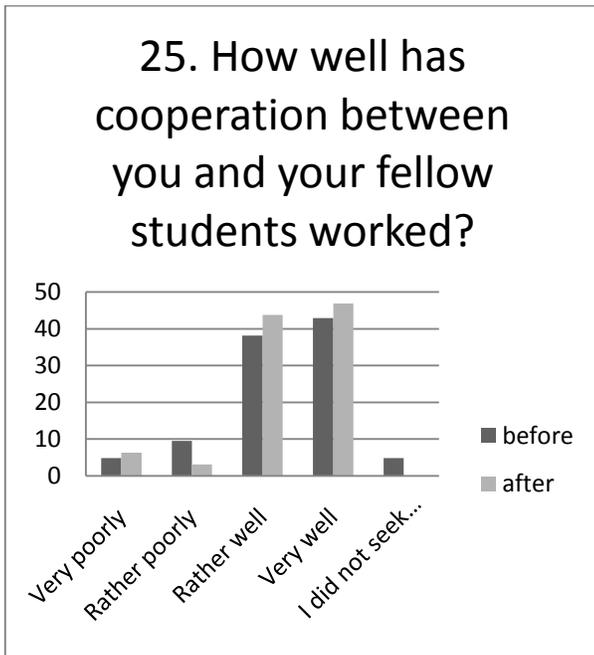
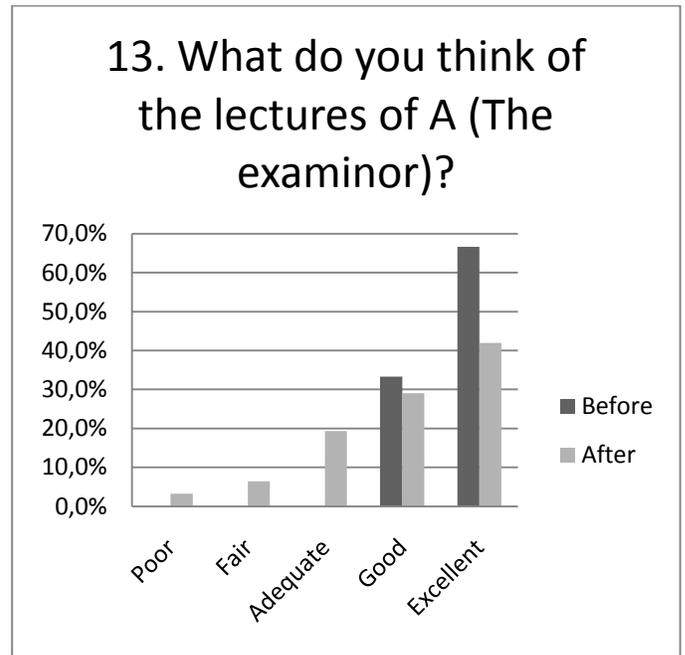


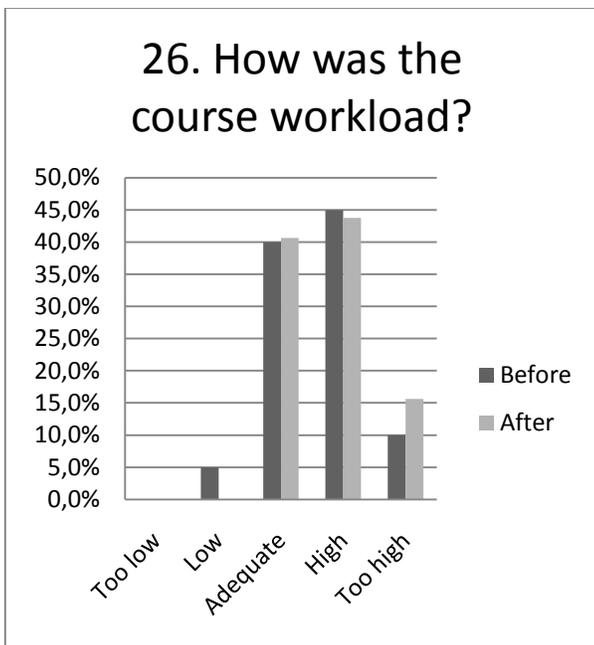
Figure 3: Student response after and before examination Q33



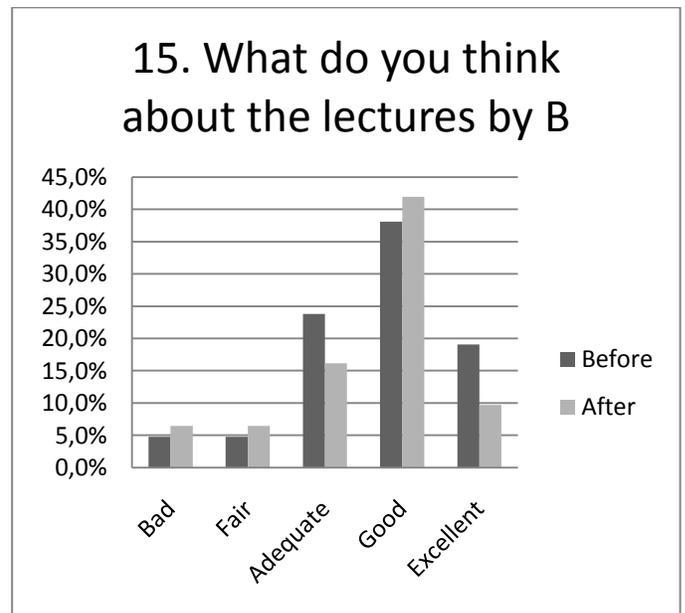
Figur 4: How well has cooperation between you and your fellow students worked?



Figur 6: What do you think of teacher A (examiner).



Figur 5: How was the workload - Question 26.



Figur 7: What do you think about the teacher B (not examiner).

III. DISCUSSION

The results clearly show how the student opinion changes if questions are in the beginning of a questionnaire instead of last. Why is this so? Well the first impression of the course might change when going through the questions about what is good and what can be improved in a course. Whether the negative change in this course is general must be examined further and more explored. The more important question probably is which opinion is the correct one. Should we use the average or? Of course the questionnaires are guidance for improvement and should not be used as the only true evaluation of a course quality. The difference in responses before and after the examination is somewhat difficult to understand. Some differences might be explained by the fact that the students answering before the examination are different from the ones answering after. The use of calibrating questions as described in this work can be used to separate these effects. The different trends in answers before and after examination for different teachers indicate that there is an effect of the examination on the responses on teaching abilities. In this paper this is negative but can probably in other cases be positive depending on the structure of the examination. The important thing is not which way but that there can be a change.

IV. CONCLUSION

The questionnaire responses for questions relating to quality (teachers/course, and so on) depends largely on how/where the questions are put and if the questionnaire is answered before or after the examination. Especially is this result obvious in deciding the quality assurance of teachers, examiner, course quality and so on. The assessment/examination is an important part of the course and must be included in the evaluation of a course. The question is then should it be in the questionnaire or evaluated in another manner.

This work is based on a limited number of student responses on one questionnaire 2010 and should/must be repeated and further examined in larger student groups.

V. RECOMMENDATION

If you want “better” or more accurate results the suggestion is to do the questionnaire before the examination. This is probably even more important if you do not have a standard examination with the aim of measuring capabilities and deep understanding of a subject (not standardized). Always put the summarizing question first before the more detailed questions about the course and maybe repeat it again in the end. To avoid the effect of examination on the questionnaire results always do a separate questionnaire (or evaluate it differently) concerning the examination/assessment quality in terms of course goals, pedagogic methods and so on and separate this from grading of the teaching quality.

APPENDIX

1. What is your general impression of the course?

Poor
Fair
Adequate
Good
Excellent

2. What type of student are you?

Master student MPISC
Biotechnology student
Master student (not MPISC)
PhD student
Other

3. If you are a Master student - are you?

Swedish
International

4. Gender?

5. How many hours per week did you spend on this course?
We mean total time, that is, it comprises the time you spent in class and the time you spent on your own work.
Try to estimate the average time over the entire study period.

At most 15 hours/week
Around 20 hours/week
Around 25 hours/week
Around 30 hours/week
At least 35 hours/week

6. How large part of the teaching offered did you attend?

0%
25%
50%
75%
100%

The course syllabus states the course goals in terms of learning outcomes, i.e., knowledge, skills and attitudes to be acquired by the student during the course.	11. How large part of the lectures offered did you attend?
	0%
	25%
	50%
7. How understandable are the course goals?	75%
Course goals:	100%
<i>After the course the students must be able to:</i>	
<i>Plan experiments according to a proper experimental design</i>	
<i>Choose the appropriate experimental design for different circumstances.</i>	12. To what extent did the lectures help you learning?
<i>Analyse and evaluate experimental results properly according to different methods (ANOVA, regression ...)</i>	Small extent
<i>Describe and apply fundamentals (in statistics and exp design) such as hypothesis testing, degrees of freedom, factorial design, and regression and so on according to course material.</i>	Some extent
	Large extent
	Great extent
I have not seen/read the goals	13. What do you think of the lectures of A?
The goals are difficult to understand	Poor
The goals give some guidance, but could be clearer	Fair
The goals clearly describe what I am supposed to learn	Adequate
8. Are the goals reasonable considering your background and the number of credits?	Good
Answer this question and the succeeding one, only if you do know the course goals.	Excellent
	Did not attend
No, the goals are set too low	14. What do you think of the lectures by B?
Yes, the goals seem reasonable	Poor
No, the goals are set too high	Fair
9. Did the examination assess whether you have reached the goals?	Adequate
	Good
No, not at all	Excellent
Quite OK	Did not attend.
Definitely	
I don't know/have not been examined yet	15. What do you think about the lectures by C?
10. How was the subject coverage of the lectures ?	Bad
	Fair
They covered too little material	Adequate
About right	Good
They covered somewhat too much material	Excellent
They covered much too much material	Did not attend
Don't know/did not attend	

16. This course was taught in English. How would you grade the teachers (lecture) ability to teach in English.

Very low
Low
Adequate
Good
Excellent

17. To what extent has the teaching been of help for your learning?

Small extent
Some extent
Large extent
Great extent

18. To what extent has the course literature and other material been of help for your learning?

Small extent
Some extent
Large extent
Great extent

19. What do you think about the tutorials/calculations?

Poor
Fair
Adequate
Good
Excellent

20. How well did the course administration, web page, handouts etc work?

Poor
Fair
Adequate
Good
Excellent

21. What do you think about the optimization project?

22. How well do you think that the optimization project supports your learning about the course content?

Poor
Fair
Adequate
Good
Excellent

23. How well do you think that the MVA (Multi Variate Analysis) project supports your learning about this subject?

Poor
Fair
Adequate
Good
Excellent
I have not done the MVA part

24. How were the opportunities for asking questions and getting help?

Very poor
Rather poor
Rather good
Very good
I did not seek help

25. How well has cooperation between you and your fellow students worked?

Very poorly
Rather poorly
Rather well
Very well
I did not seek cooperation

26. How was the course workload?

Too low
Low
Adequate
High
Too high

27. How was the total workload this study period?

Too low
Low
Adequate
High
Too high

THE AUTHOR

28. Level of course content presented in the course was:

too low
Reasonable
too high

Claes Niklasson is Professor in Chemical Reaction Engineering at Chalmers since 2000. The main research area is bioreaction engineering with more than 60 published research papers in well known international journals. The great interest in teaching and pedagogical projects is indicated by more than 20 pedagogic publications and over 50 pedagogic presentations internationally and 25 pedagogic projects including teacher exchange with Indonesia and Malaysia for over 10 years. He has also been the project leader for the Chalmers project IMPACT concerning development of new Master Programs at Chalmers 2007. Claes is presently the Vice Head of Department in the Chemical and Biological Engineering Department responsible for undergraduate teaching and also the external examiner for University of Malaya, Kuala Lumpur, Malaysia in the Chemical Engineering Department. The largest courses Claes teach and examine in Chalmers are the courses in Experimental Design and Analysis and Bioreaction Engineering.

29. Do you think the course should cover more or fewer topics?

more
reasonable
fewer

30. Do you think the course content will be useful in your future career?

Not at all
Some of it
Probably
Definitely

31. What should definitely be preserved to next year?

32. What should definitely be changed to next year?

33. What is your general impression of the course?

Poor
Fair
Adequate
Good
Excellent