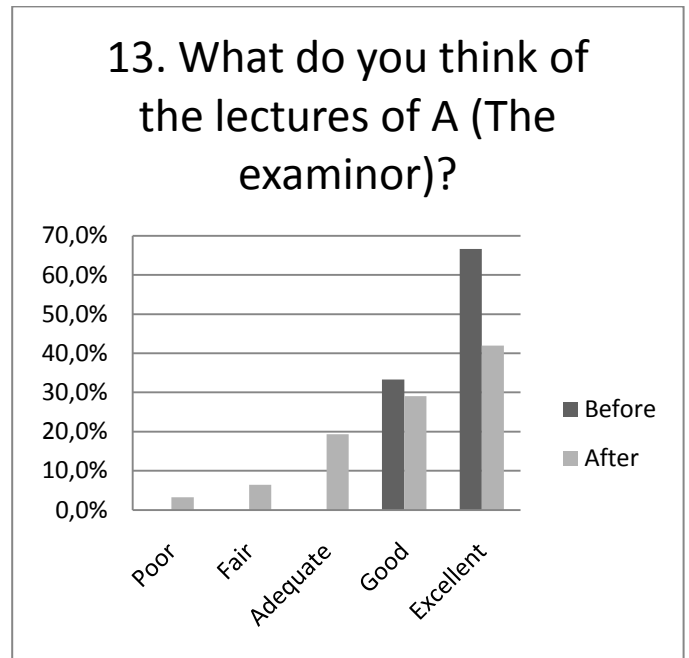
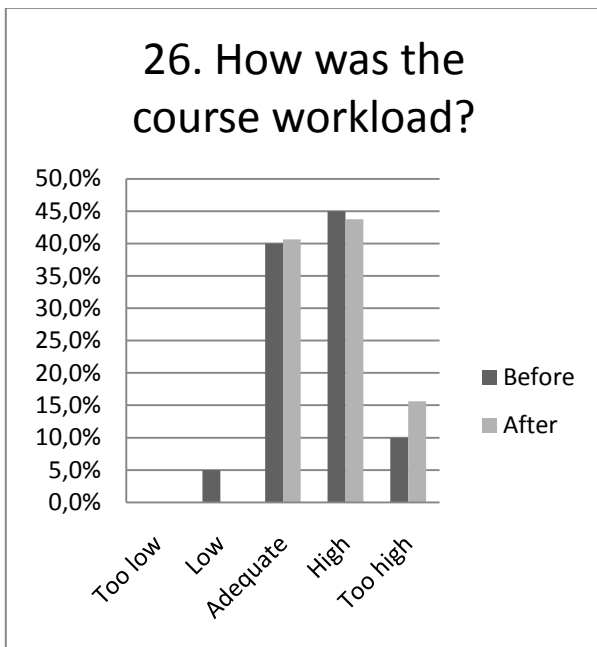


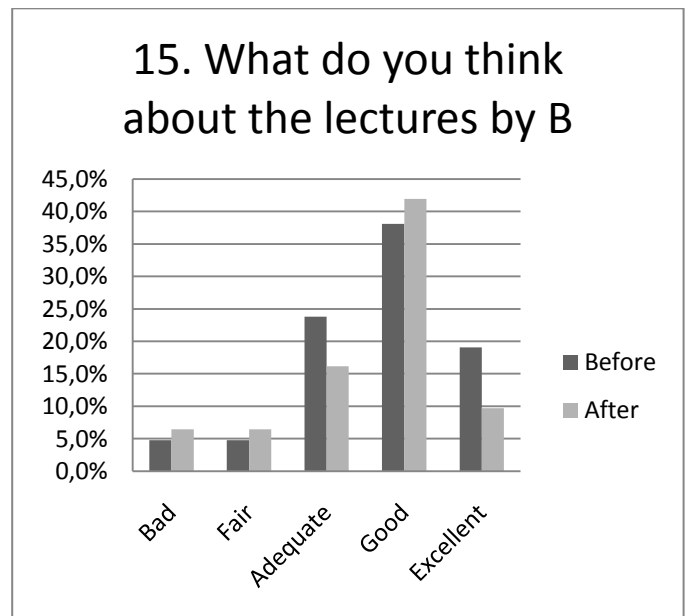
Figur 4: How well has cooperation between you and your fellow students worked?



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%
After the course the students must be able to:	
Plan experiments according to a proper experimental design	
Choose the appropriate experimental design for different circumstances.	12. To what extent did the lectures help you learning?
Analyse and evaluate experimental results properly according to different methods (ANOVA, regression ...)	Small extent
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.	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
	Good
8. Are the goals reasonable considering your background and the number of credits?	Excellent
Answer this question and the succeeding one, only if you do know the course goals.	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
	Adequate
9. Did the examination assess whether you have reached the goals?	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?
	Bad
10. How was the subject coverage of the lectures ?	Fair
	Adequate
They covered too little material	Good
About right	Excellent
They covered somewhat too much material	Did not attend
They covered much too much material	
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