Examination Board Survey 2013

Survey among examination board members in relation to thesis defence for PhD degree at Karolinska Institutet

Dnr 1-448/2013

Karolinska Institutet

REPORT

Examination Board Survey 2013 –

Survey among examination board members in relation to thesis defences for PhD degree at Karolinska Institutet

Commissioned by:	**Board of Doctoral Education**
Project Leader:	**Ingeborg van der Ploeg**
Dnr:	1-448/2013

Contents

Person responsible for document Ingeborg van der Ploeg		*Last saved* 2013-11-04
Version 4	*Last updated by* Ingeborg van der Ploeg	*DNR* 1-448/2013

1 Summary

In recent years the focus within assessment and quality assurance in higher education has moved from process oriented to result oriented. Doctoral education has still not been subject to result oriented assessment, partly because no satisfactory and cost effective evaluation methods have been available up till now. In the spring term of 2013 a survey was conducted among the members of the Karolinska Institutet (KI) PhD defence examination boards. The aim was to assess the quality of KI's examinations at doctoral level, including to what extent graduate students achieved the general learning objectives for the PhD examination. Of the 213 examination board members who received the survey (73 defences in total), 161 (75 %) responded, half of those being affiliated to KI and half to other universities. The results, based on the examination board members' level of certainty of a "pass" grade being awarded, the scientific standard of the thesis, the actual contribution made by the PhD student, the scientific environment, the educational environment and whether all the learning objectives were met to great extent or a fair extent by the majority of doctoral students, indicate that the objectives for the doctoral examinations at KI are being achieved in a satisfactory way. There is, however, potential for improvement regarding the writing of the thesis frame, and in the area of appropriate learning objectives and ways of ensuring these are met.

The conclusion is that this examination board survey both shows that objectives are being met to a large extent in doctoral education at KI and opens the way for improvements and even higher quality doctoral education.

2 Background

Doctoral education at KI shall be of a high quality. The Board of Doctoral Education has been working for many years to assure the quality of the processes of doctoral education with the aim of fostering the best possible conditions and results.

Every doctoral student taking the examination must be aware of the expectations for the examination and must have achieved the objectives. The general learning objectives for the doctoral examination are laid down in the Swedish Higher Education Ordinance and apply to all doctoral education in Sweden. KI only has one doctoral education subject, medical science, and the learning objectives for this subject do not differ from the general learning objectives for the PhD degree in Sweden. That the objectives for doctoral education have been achieved is shown by a successful defence of a doctoral thesis consisting of original data.

In the medical faculties in Sweden the compilation thesis with scientific publications and manuscripts, with a reflective summary where the results are placed in a context , the "kappa" or thesis frame, is the overwhelmingly prevalent form of doctoral thesis. The examination board, consisting of three members, perform a pre-review ("*förhandsgranskning*") which means thoroughly reviewing the work including the contribution of the student and assesses whether the work is of such a scientific standard as may be expected from a leading international university and is of such a scope as to correspond to four years full time doctoral education. Note that the "kappa", is not reviewed at this time. The examination board then recommends or advises against the thesis defence. The thesis is defended in public. During the thesis defence the opponent highlights the strengths and the weaknesses of the thesis in a discussion with the respondent, who is also to be given an opportunity to demonstrate his/her knowledge. The chairman then invites questions from the examination board and after that also questions from the auditorium. After the thesis defence the examination board meets and decides whether the doctoral student can receive

a pass grade. It is very rare for a doctoral student who received the decision "defence recommended" not to receive a pass grade from the examination board on the day of the defence.

In 2012 the Board of Doctoral Education wrote "*Guidelines for writing a compilation thesis summary chapter*" which is available on the KI website.[1] A support document to aid in the writing of the "kappa" was recently published on the KI website.[2]

To help to ensure the quality of doctoral education the Board of Doctoral Education decided to evaluate KI examinations by means of an anonymous survey of examination board members.[3] The Board and the project leader were aware that there were certain methodological limitations but nevertheless felt that a well conducted survey can give a good understanding of the quality of doctoral education achieved under the current examination process.

3 Purpose and objective

The purpose of conducting a survey was to evaluate the quality of the examinations at doctoral level at KI, including to what extent the doctoral students, in the eyes of the examiners, have reached the general learning objectives for the doctoral examination. The objective has been to gain knowledge about what measures need to be put in place to ensure that doctoral students achieve the best possible results from both their and KI's perspective.

4 Set-up and execution

The survey was conducted in the form of an anonymous questionnaire, which was sent to each member of the examination board less than a month after the defence. The original plan was also to send out a questionnaire to opponents, but this was changed as the opponents' email addresses were not readily available (not requested upon application for defence). One other minor diversion from the original plan was that details of the doctoral student's department were not requested on the questionnaire for the sake of anonymity (some smaller departments only have one or two PhD defences each year).

The questionnaire [4] was sent out in three batches via Websurvey (Textalk AB, Mölndal, Sweden), i.e. electronically. All 73 PhD defences during January, February and March 2013 were included, which meant 219 examination board members (some repeats, see below). This means there could be up to three survey responses per doctoral student and PhD defence.

The names and email addresses of the examination board members were taken from the defence application. A check was made to see if a member had been replaced at a later date, in which case the correct name was inserted.

Three names were missing due to the member being changed at a too late stage for the list to be updated. In each case the other two examiners from the same PhD defence responded to the survey.

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[1] Guidelines for writing a compilation thesis summary chapter:
http://internwebben.ki.se/sites/default/files/riktlinjer_ramberattelse_eng_2012.pdf
[2] Support for writing the thesis:
http://internwebben.ki.se/sites/default/files/support_for_writing_the_thesis_final.pdf
[3] Minutes of the Board of Doctoral Education meeting 2012:8; 2012-09-05 §14.
[4] See appendix 1 for survey questions.

Person responsible for document Ingeborg van der Ploeg		*Last saved* 2013-11-04
Version 4	*Last updated by* Ingeborg van der Ploeg	*DNR* 1-448/2013

When emails bounced back the correct email was found and a new questionnaire was sent out. Three people's emails bounced back without any apparent problem with the email address. These were soft bounces, where the domain exists but not the person. These people are not part of the survey sample.

The questionnaire was sent out during the first days of each month. Three rounds in total, with a maximum of two reminders. The last reminder was sent on 17/4, and the last response arrived on 24/4. The survey ended on May 2.

213 of 219 possible recipients received the questionnaire (3 late changes of examiner, 3 emails bounced back and a right address was never found).
In total 161 responded (94 immediately, 49 after the first reminder,18 after the second reminder.)

From one defence none of the examiners responded, from 14 defences only one of the examiners responded, from 27 two, from 31 defences all the examiners responded (*A total of 73 PhD defences).*

9 respondents were on two examination boards during the relevant period. 7 of these sent two responses, one did not reply at all, and one only sent one reply.

One person was on three examination boards during the relevant period. This person sent three replies.

The survey was conducted in English and the results and analyses were reported in English.

Methodological limitations:

- the questions were asked post thesis defence, introducing a bias from the side of the examiners, because all doctoral students had already passed and received the doctoral degree
- most examiners did not know about the survey until they received it, introducing a recall bias for up to one month
- had the questions been known by the examiners from the moment they received the documents for pre-review they could have had the questions in mind when examining the students, in particular concerning the intended learning outcomes (for example by posing questions concerning research ethics)
- some examiners were examiners for more than one thesis defence, which allowed them to give their opinion more than once
- it is not possible to know whether the answers from two or three respondents belong to the same thesis or to different theses (this because of the anonymity). For example if there are two people who were doubtful concerning a thesis they might have been either doubtful concerning the same thesis or concerning two theses.
- the opponent is the person who usually is best prepared to question on the day of thesis defence, but his or her opinion could not be asked for in this survey (access to all email addresses not being available)
- although the sample is likely to be representative, more information could have been obtained in a larger study, for example over more than one year, allowing then to include names of the departments, not jeopardizing the anonymity of the examiners and doctoral students

The methodological limitations above must be taken into account when drawing conclusions from the results.

Person responsible for document Ingeborg van der Ploeg		*Last saved* 2013-11-04
Version 4	*Last updated by* Ingeborg van der Ploeg	*DNR* 1-448/2013

5 Results of the Survey

Response rate and respondents

One hundred and sixty one (161) of 213 examiners responded. This makes the response rate 75%. Of those examiners who answered the questionnaire half (50.3%) were employed by or affiliated to Karolinska Institutet and half (49.7%) had another affiliation. A little more than one third (36.7%) of the respondents had participated in the half-time review of the doctoral student examined.

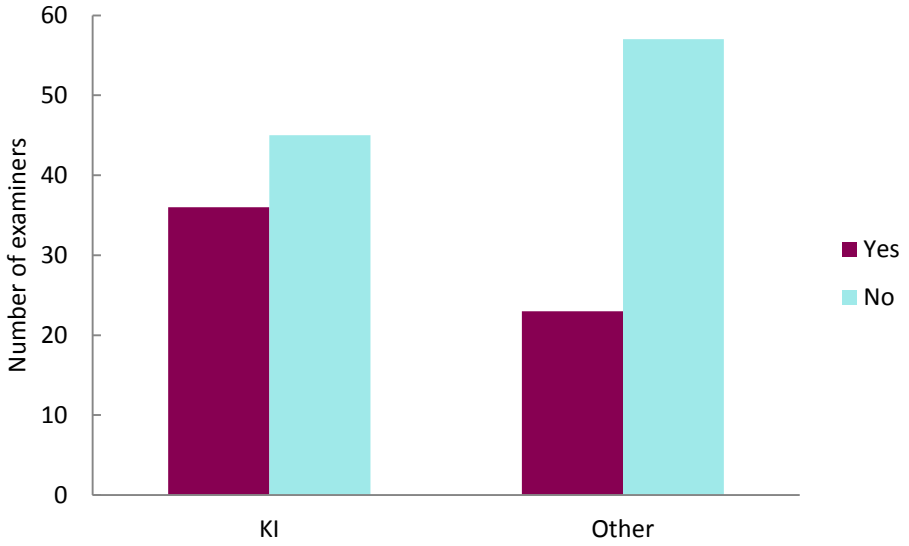

Figure 1. Participation or not in the half-time review of the doctoral student.

Certainty of the examiners as to whether the candidate would pass and obtain a doctorate degree from KI at different time points

At the end of the examiners' meeting after the thesis defence (all candidates had obtained a pass) the majority of the respondents (70.2 %, half of them employed by or affiliated to KI and the other half not) were *very sure* that the candidate would obtain a doctorate degree from KI, whereas less than one third (26.7 %) were *sure* that this would be the case. In total 96.9% answered that they were *sure* or *very sure* after their meeting. This compares to 82.6 % before the thesis defence and 91.9 % during the thesis defence. Only 1.9 % (three examiners) were *rather sure*, and one examiner *very doubtful* after the examiners' meeting. One examiner who had expressed being *very sure* before and during the thesis defence did not answer about his certainty at the end of the examiners meeting.

Six examiners were *slightly doubtful* at the time between the Examination Board's pre-review and the thesis defence itself (50% were affiliated to KI). All of them were *sure* or *very sure* at the end of the examiners meeting after the thesis defence. One of the examiners was *slightly doubtful* during the thesis defence but was *rather sure* before the thesis defence and after the meeting with the Board.

All four examiners (meaning that at least 2 PhD candidates were concerned) who were *very doubtful* before the thesis defence were not affiliated to KI. None of them had participated in the

Person responsible for document		Last saved
Ingeborg van der Ploeg		2013-11-04
Version	Last updated by	DNR
4	Ingeborg van der Ploeg	1-448/2013

half-time review of the doctoral candidate. One of them stayed *very doubtful* and the others changed to *rather sure* or *sure* along the way.

The reasons for being *doubtful* or *very doubtful* before the thesis defence were mainly related to the quality of the publications and manuscripts (the opinion of four examiners) or poor quality of the thesis summary ("kappa"; the opinion of three examiners). In one instance the rumour of a rather poor half-time review made the examiner slightly doubtful. In the case where the examiner stayed very doubtful until the end there were methodological problems according to the examiner and the candidate gave a poor thesis defence. Delays in the process and change of examiners were other reasons for doubt.

Generally speaking there was a shift to a higher certainty the more information the examiners obtained during the process.

Opinions about the overall scientific standard of the doctoral thesis work

Less than 10 % of the respondents perceived that the overall scientific standard of the doctoral thesis work was of outstanding or very high quality, but more than half (54 %) of the examiners were of the opinion that the doctoral thesis work was of high quality. About one third of the respondents (29.8 %) were of the opinion that the scientific standard of the candidates was of medium but still sufficient quality. A small percentage (6.8 %; corresponding to 11 examiners) thought that the quality of the thesis work was very variable. Only one examiner (0.6 % of the respondents) judged that the quality was low.

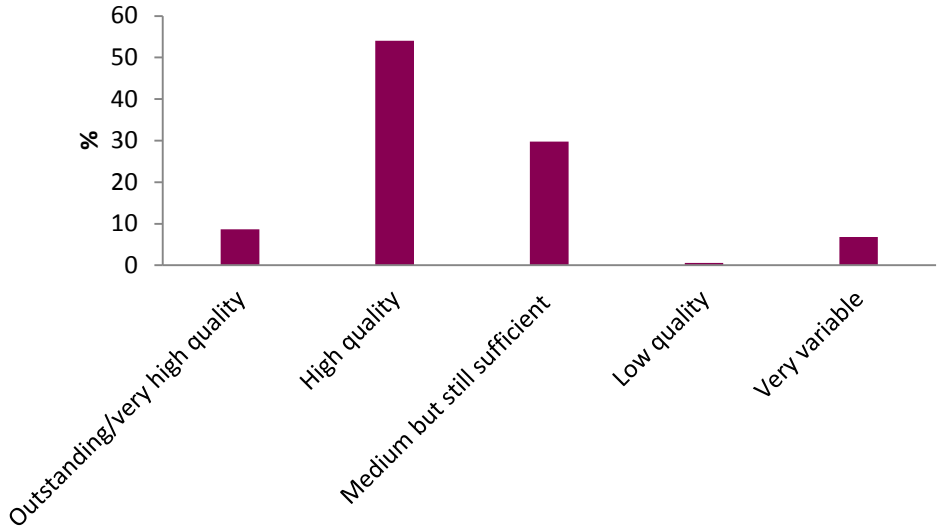

Figure 2. Assessment of the overall scientific standard of the doctoral thesis work.

Summary of comments from respondents:

- *Outstanding/very high quality*: quality of the publications in a highly needed and relevant field (1 comment)
- *High quality*: in relation to the study population, the quality of the data, the methods used, the skills needed to perform the studies, in relation to the field of study, the conclusions drawn, the contribution of the candidate, the quality including the comprehensiveness of the thesis frame and the papers/publications, the quality of the thesis defence including the knowledge of the research area, the overall standard (summary of 13 comments)

Person responsible for document Ingeborg van der Ploeg		*Last saved* 2013-11-04
Version 4	*Last updated by* Ingeborg van der Ploeg	*DNR* 1-448/2013

- *Medium but still sufficient*: mediocre candidate implies mediocre research; a mix of low and high quality papers; in 2/4 articles the student seemed to have a not so prominent role. The remaining papers with the student as first author were promising but not at a final stage; deficiencies in the scientific presentations were counterbalanced by the fact that the student was very familiar with the background data, and that she also gave a very good presentation; the novelty was rather limited and there were some minor flaws regarding methodology; Generally I think the *kappa* is weak. Judging the *kappa* would increase the quality. The *kappa* should really be something more than just "cutting out pieces from the papers"...; Light on the quantitative elements; The impact of the publications was limited and some of the techniques were a bit out of date compared to when the study was published; Generally high quality in the accomplishment of the project, but some odd things and a certain over-interpreting of the results. Some problems in the discussion of the limitations of the project (10 comments)
- *Low quality*: 1 published paper (short communication); 1 accepted paper (pilot study) and 2 manuscripts (with low chances of being published) is the minimum for passing the exam (1 comment)
- *Variable quality*: the ability to critically evaluate the results was a weak point; this thesis was at the lower end, but acceptable; it is often difficult to evaluate the contribution from the student relative to others in teams of researchers, particularly in clinically oriented fields; an important clinical project was transposed into a research project; This project started as a school project on the student's own initiative which one must admire. Her burning interest for the study population and her knowledge of the relevant literature was impressive. She would have benefitted from more strict supervision of her work particularly with regard to planning and designing the studies on which the thesis was based. The same goes for planning the time between finishing the *kappa* and the defence with ample time allowed for proof-reading; two of the four studies were very underpowered, one was of high quality. The thesis frame was thin, several times referring to text books. The rationale of the thesis was not clearly described, lacked problematizing. (6 comments, 5 of the 11 examiners who thought that the overall scientific standard was very variable had been either slightly (2) or very (3) doubtful that the doctoral candidate would obtain the doctorate from KI).

Opinions about the quality of the thesis frame also called "kappa"

The majority of the examiners thought that the quality of the "kappa" was very good and a third was of the opinion that the quality of the "kappa" was acceptable. Six examiners (6) thought it was outstanding and two examiners were of the opinion that the quality was unacceptable.

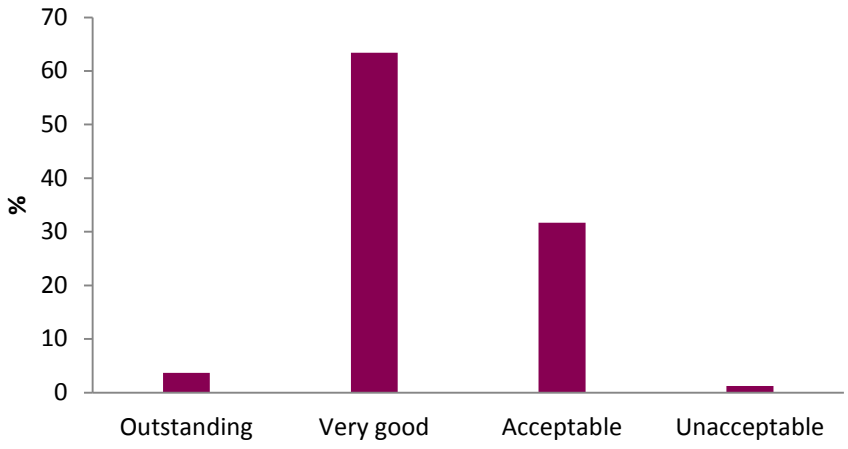

Figure 3. Opinions about the quality of the thesis frame

Person responsible for document Ingeborg van der Ploeg		*Last saved* 2013-11-04
Version 4	*Last updated by* Ingeborg van der Ploeg	*DNR* 1-448/2013

Comments from the respondents:

- *Outstanding* (3.7 %): No comments given. One of the 6 examiners in this category was affiliated to KI, the other five were not.
- *Very good* (63.4 %): Easy to grasp; The frame was well written and structured; The quality of the thesis frame and the oral presentation was counterbalanced by the shortcomings of manuscripts; Clearly written by the student. Authoritative but also to the point. Very well balanced; The quality of the thesis frame and the oral presentation was counterbalanced by the shortcomings of manuscripts; Well written and clearly also written by the student herself. It was an extra bonus to see the well written frame of the thesis; Meaningful (both from a clinical and a more basic point of view) problems studied with advanced molecular-biological methods producing interesting results and also new questions. It was an excellent "kappa", but I became truly concerned when I learned during the discussion afterwards that the supervisor had helped quite a lot with the writing; This is again a judgment based on my own experiences. The “Kappa” was well written, up to date with current neuropsychology, and somewhat innovative; One of the best thesis frames I have read. The foundation in medicine and the public health relevance less thoroughly explained which was a little disappointing. (9 comments; 7 from examiners affiliated to KI, 2 from others)
- *Acceptable* (31.7 %): Lack of depth: I did feel that the frame lacked a little indepth information in the introduction; The thesis contained many different aspects that made it hard for the student to go deep enough into all aspects; Somewhat descriptive and lacking in-depth discussion; Could have taken the discussion and interpretation much further; Did not add much to the papers on which the thesis was based; No extra analyses were added; Too short. Important issues were left out; The thesis frame was rather weak. It did not really add anything to the published papers; Too much repetition of results rather than a discussion of the results; The “kappa” mostly only repeated what was said in the constituent papers. There was no new thinking or attempt to give an overall summary of the four papers. Narrow: Narrow epidemiology. Not well written, including “copy-paste”: Reasonable content, but a lot of typos making it harder to read; Also the student had been rather careless in the writing, which gave the thesis a less good impression; ... and the English was of low quality; I think the frame focused too much in the first two papers, less on the third, and hardly at all on the 4th paper; The first version had shortcomings that required a re-print which is very unusual. The final version had benefitted from language check and further revision of the text; The student had copied much of the discussion from the papers into the "kappa". This was pointed out by the opponent and the thesis was rewritten and reprinted; The PhD student managed to improve it in accordance with the examiners’ comments one month (approximately) before dissertation. I am not used to the PhD student getting this opportunity (?!). What step in the thesis process is supposed to be examined? Now the assessment committee contributed as supervisors; General comments: Overall, it seems that in Sweden not so much emphasis is given to the “kappa”; the institution and supervisors had not been active enough in guiding the student. (17 comments; 9 from examiners affiliated to KI, 8 from others)
- *Unacceptable* (1.2%): The thesis frame was thin, several times referring to the same text book. The rationale of the thesis was not clearly described, lacked problematizing; The "kappa" was just copy paste from the papers/manuscripts. This is unacceptable. In my University it is very clear in the guidelines that you cannot do that. Unfortunately I did not read the thesis frame until just a few days before the defence. When I contacted the other board members about it, they had felt unsure how to act. I consulted two senior professors. One had had exactly the same experience at KI and after long discussions they had passed the student but writing a strong comment in the minutes. In our board we decided to wait to see how the student defended. As the defence was acceptable as well as the papers we finally passed the student. It was clear that the supervisors did not think it was that serious but rather something which happens at times when there are time constraints. They even argued that

Person responsible for document Ingeborg van der Ploeg		*Last saved* 2013-11-04
Version 4	*Last updated by* Ingeborg van der Ploeg	*DNR* 1-448/2013

there are no clear guidelines at KI. It seems very disturbing if that is the case, ruining the whole idea of the "kappa". We wrote a long comment in the minutes, but we are not sure anyone reads those comments? (2 comments)

Opinions about the overall contribution of the doctoral student

The majority of the examiners thought that the contribution of the doctoral student was very good and one third was of the opinion that the contribution of the doctoral student was good. One out eight of the examiners thought it was excellent, three examiners were of the opinion that the contribution was doubtful and three found it difficult to know what the overall contribution of the doctoral students was.

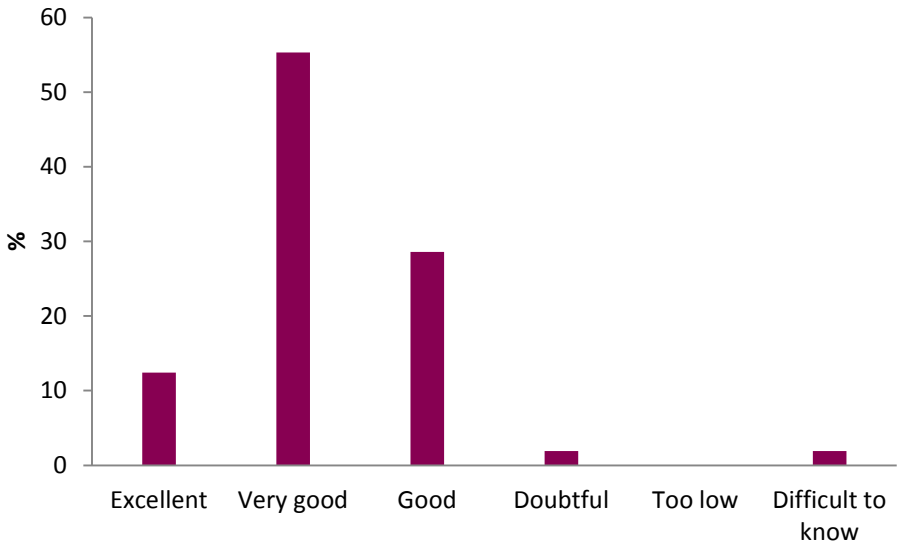

Figure 4. Opinions about the overall contribution of the doctoral student

Comments from the respondents:

- *Excellent* (12.4 %): She had carried out some very difficult and technically challenging techniques; The student had performed almost all experimental work in the dissertation. (2 comments)
- *Very good* (55.3 %): Very good presentation and dialogue in the defence; The student knew exactly what she had done and could defend her work and also be self-critical when needed; The discussion with the opponent was "better" than the papers; This was a good student in a mediocre project; Lively discussion; Many investigators working on each of the four papers making it difficult to understand exactly how much the PhD candidate himself had produced. However, his defence and the discussions with his mentors made me sure he had himself produced sufficient work; It was clear that the student had done much of the work and also knew the field. The writing part, however, was less clear; She herself did a good job given her background but one had a feeling that she had been too much left on her own; Good oral presentation. Very good discussion with the opponent. A bit exhausted when the questions from committee came. (10 comments)
- *Good* (28.6%): the comments that we gave when we as examination board went through the papers - i.e. when we decided whether to approve public defence - indicated that the student only

passed with slight marginal and had to present a good frame and strong defence, the supervisors then decided to postpone the defence for 3 months, AND the frame was well written and the defence was good; Sometimes it is more a problem of finding the right opponent who can pose good questions; The student was the third author on two of the published papers, which had been part of other theses; Good command at the defence, could answer and discuss the findings and the conclusions; Variable. But from what I heard during the defence she had sufficient knowledge for a scientific discussion. (5 comments)

- *Doubtful* (1.9 %; n=3): no comment
- *Difficult to know* (1.9 %; n=3): The thesis frame was OK, the defence during dissertation acceptable but not very good. (one comment)

Perceived scientific and educational environment

The majority of the examiners thought that both the scientific and the educational environment were very good to excellent. About one fifth of the examiners did not have enough knowledge to comment on the educational environment, this is double the percentage of examiners who were of the opinion that they did not have enough knowledge to comment on the scientific environment. 10 % (16 people; 10 of them affiliated to KI and 6 others) answered that they did not have enough knowledge to comment on either of the two questions.

Table 1. Perceived overall scientific/educational environment for the doctoral student

% (n)	Excellent	Very good	Good	Doubtful	Poor	No answer	I do not have enough knowledge to comment
Scientific environment	18.6 (30)	42.9 (69)	24.2 (39)	0.6 (1)	0.6 (1)	1.2 (2)	11.8 (19)
Educational environment	14.3 (23)	36.0 (58)	28.0 (45)	0 (0)	0 (0)		21.7 (35)

n: number of respondents to the question

Comments of the respondents concerning the perception of the overall research environment:

- *Excellent*: My evaluation is the same as the opponent expressed: the scientific group in which this thesis was produced is one of the best in the world within this field; The student had the chance to work in 3 different top labs at KI; Student in X group at Department Y.
- *Very good*: The unit offers a highly competitive and successful research environment which is at the forefront of its field internationally- Access to excellent supervision; Very supportive, specialist knowledge available, diversity in competence; Excellent in terms of science, less so in terms of genuine training to become independent.
- *Good*: Many of the shortcomings in the manuscripts should have been avoided by better help from the supervisors; Very good from the KI side, doubtful from the side of the collaborators in the home country; I believe the papers could have been more interesting if the student had had the possibility of discussing with other scientists and not only clinicians; Too little basic science. Too few methods; Medium-level, good enough group of researchers;
- *Doubtful*: Some supervision aspects could have better.
- *Poor*: Poor supervision and poor administrative support for the student (twice advised against thesis defence)

- *Not enough knowledge to comment*: She herself did a good job given her background but one had a feeling that she had been too much left on her own.

Comments of the respondents concerning the perception of the overall educational environment:

- *Excellent*: My evaluation is the same as the opponent expressed: the scientific group in which this thesis was produced is one of the best in the world within this field (see above); As above: Student in X group at Department Y; I believe that KI offers a very high quality education to PhD students (comment from someone not affiliated to KI).
- *Good*: See above: very good from KI side, doubtful from the side of the collaborators in the home country; see above: I believe that the papers could have been more interesting if the student had had the possibility of discussing with other scientists and not only clinicians (for me the questions about the research environment and about the educational environment are the same); At the defence the student seemed to have a greater capacity than was obvious from the publications and summary; see above: excellent in terms of science, less so in terms of genuine training to become independent; This was a student from the X program and she has been a bit "stuck in between" the US and Stockholm in terms of the overall education environment; Some deficiencies in the capacity – one has to see the big picture and to be able to put the work in perspective.

Correlation between the answers about the perception of the scientific and of the educational environment

Not surprisingly there was a correlation between the answers about the perception of the scientific and of the educational environment. The Spearman rank-order correlation coefficient (r_s) for the two parameters examined was 0.769 ($p < 0.001$; n=122).

Person responsible for document Ingeborg van der Ploeg		*Last saved* 2013-11-04
Version 4	*Last updated by* Ingeborg van der Ploeg	*DNR* 1-448/2013

Extent of achievement of the objectives for the doctoral education

Table 2. Evaluation of the extent of achievement of the objectives for the doctoral education formulated by the Swedish Higher Education Authority ("Universitetskanslersämbetet")

% (n)	To a high degree	To quite a high degree	To quite a small degree	To a very small degree	I do not know	No answer
Knowledge and understanding						
1. a broad knowledge and a systematic understanding of the research area	33.5 (54)	55.3 (89)	9.9 (16)	0.6 (1)	0.6 (1)	
2. an in-depth and up-to-date specialist knowledge of the specific research area	39.8 (64)	51.6 (83)	6.8 (11)	0.6 (1)	0.6 (1)	0.6 (1)
3. a familiarity with scientific methodology in general and with the methods of the specific research area in particular	32.9 (53)	57.8 (93)	8.7 (14)		0.6 (1)	
Proficiency and aptitude						
4. the ability to carry out scientific analysis and synthesis, as well as independent critical examination and assessment of new and complex phenomena, issues and situations	24.8 (40)	54.0 (87)	17.4 (28)	0.6 (1)	3.1 (5)	
5. the ability to critically, independently and creatively and with scientific accuracy identify and formulate hypotheses/important research questions, to plan and through the use of adequate methods carry out research work and other qualified tasks within given time periods	22.4 (36)	50.3 (81)	13.7 (22)	1.2 (2)	12.4 (20)	
6. to plan and through the use of adequate methods carry out research work and other qualified tasks within given time periods	23.0 (37)	55.3 (89)	9.3 (15)	0.6 (1)	10.6 (17)	1.2 (2)
7. through a thesis demonstrate their ability to contribute significantly to the development of knowledge through their own research	30.4 (49)	55.9 (90)	10.6 (17)		3.1 (5)	
8. The ability in national and international contexts in written and spoken form with authority to present and discuss research and research results in dialogue with the scientific community and society in general	26.7 (43)	52.8 (85)	9.9 (16)	1.9 (3)	8.7 (14)	
9. The ability to identify needs for further knowledge	15.5 (25)	58.4 (94)	14.9 (24)	1.2 (2)	9.9 (16)	
10. the ability to contribute to the development of society and support others learning in research and development and in other qualified professional contexts	14.3 (23)	42.9 (69)	11.8 (19)	1.2 (2)	29.8 (48)	

Person responsible for document Ingeborg van der Ploeg		*Last saved* 2013-11-04
Version 4	*Last updated by* Ingeborg van der Ploeg	*DNR* 1-448/2013

Ability to assess and approach					
11. intellectual independence and scientific conscientiousness	23.6 (38)	52.2 (84)	14.9 (24)	1.9 (3)	7.5 (12)
12. the ability to make assessments of research ethics	19.9 (32)	43.5 (70)	5.0 (8)	1.2 (2)	30.4 (49)
13. an in-depth insight into scientific possibilities and limitations, their role in society and public responsibility for how they are used.	11.8 (19)	50.9 (82)	13.7 (22)	1.2 (2)	22.4 (36)

Comments concerning the extent of reaching the objectives of the doctoral education:

Comment to question 5: From the dissertation it is difficult to judge to what extent the PhD student has the ability to critically, independently and creatively and with scientific accuracy identify and formulate hypotheses/important research questions

Comment to questions 5-6: Overall the learning objectives ideally reflect a very high level of scientific maturity and independence that may not realistically be achieved within the current format.

Comment to questions 5-6 and 8-13: these are questions for the supervisors. A committee member has no possibility to see through these important questions via a short seminar and by reading a written book on small detailed research. If KI wants these questions to be addressed by the candidate, then the written thesis should include these questions and the candidate can respond or the committee may ask directly the candidate during the examination to receive direct answers from the candidate.

Comment to question 8: Would be good to split between written and oral. This student was clearly excellent at oral communication, but more average at written communication.

Comment to questions 10, 12, 13: these questions cannot be evaluated for this thesis work based on the information at hand. Mainly cell biology work, and no ethical or societal implications were discussed; these items were not specifically examined, but I estimate the candidate to be at least as good as any doctoral student about to defend his/her thesis.

General comments: An overall comment: it is very difficult, let’s say impossible, as a member of the examination board (reading the thesis, listening to the defence) to be sure of all the requirements in many of the questions above. In the system that we have in Sweden, the member of the examination board must rely upon reports from the supervisors; Extremely difficult to have an opinion about the learning outcomes and objective. Seem to be just words...; Some of these "learning objectives" seem quite far removed from reality!

Other comments: The thesis was an outstanding thesis, the best I have read for a long time. A knowledgeable student (X) and a very good research group (Y), then no problems; The PhD candidate was young and rather inexperienced within this field especially since he was not a doctor but a molecular biologist, however, he still had good answers and knowledge of his limitations.

Person responsible for document Ingeborg van der Ploeg		*Last saved* 2013-11-04
Version 4	*Last updated by* Ingeborg van der Ploeg	*DNR* 1-448/2013

Suggestions from the respondents how the dissertation process at KI could be improved

- *Role of the Examination Board*:
    - Let the Examination Board approve a public defence of the thesis after frame/"kappa" is finalised; The kappa should be sent to the committee members and be included when judging if the student is ready or not; The examination board should read the "kappa" before approval of the public defence of the thesis (pre-review); I come to think of trying the Danish system where the dissertation board have to write a several page long critique and summary of the thesis; If pre-evaluations by the board in the future are to continue, all papers should be in a state ready to be submitted, and the frame should be available for the pre-evaluation; I have made the observation that the "kappa" of a thesis is given different "weights"/importance at different departments at KI. I regard the "kappa" as an important display of the PhD-student's independent scientific knowledge, since the student's independent contribution to the articles included in the thesis can be difficult to judge. Thus, I think that the "kappa" should be given considerable weight and be made available to the examination board at an earlier stage (6 similar comments)
    - I find it peculiar with the principle that the committee is expected to beforehand approve that the thesis is ready for defence, because after such a clear sign, it is difficult to criticize the work (as if the committee is withdrawing from their previous statement). I would prefer a procedure where pre-approval is performed by the faculty or department, but not by the committee; I suggest to skip the energy and time consuming preview of the included papers. Approval of the public defence taking place makes it very hard indeed for the committee members to fail the doctoral student if the kappa and the defence is weak
    - A short written judgment of the articles/manuscripts when approving the public defence by each member of the committee
    - Examination board could be more carefully chosen; I think the optimal would be if the board was not suggested by the supervisors. Sometimes there are "invisible" strains. Look into how many times the same people have served as board members at each other's defences. There are no conflicts of interest but when serving as examiner at each other's PhD students repeatedly then one can suspect something is not totally objective anymore. Cross check board members and supervisors and interesting high correlations will probably be found.
    - More time for the pre-review, which should be presented in a written report put together by all members of the examination board
    - The examination board should be given more time at the defence to explore areas not covered by the opponent
- *The chairperson at the thesis defence*: Could be good to always have a chairperson at the thesis defence who does not belong to the research group; May be the supervisor should not be the chairman of the dissertation act.
- *Impact and independence of the student:* Some guideline from KI on whether the studies included can be part of two or more theses, and if so what are the limitations? Sometimes no paper is shared, which is reassuring. Sometimes all papers are shared which causes some concern; To know better the impact of the doctorate student in each paper - describe per cent work load for each co-author; Students should be more independent; I believe it works reasonably well but still too much emphasis on independence at the expense of capacity to collaborate;
- *Graded evaluation:* should be implemented; I believe a grading system instead of only pass and seldom not pass should be considered; The thesis and the defence should be graded - because today the quality of the theses varies considerably and grading would be one way to improve quality and a good tool for the examination committee to acknowledge excellence or not. Today the written comments are not of any relevance and often nothing is written except the *pass* (or very seldom *fail*).
- *Kappan*: It should again be stressed that "kappan" is not just a summary - I would like to see more reflection and evidence of scientific maturity and independence here; Provide proper guidelines for the

"kappa" which is known to all students and supervisors; I regard the "kappa" as an important display of the PhD-student's independent scientific knowledge, since the student's independent contribution to the articles included in the thesis can be difficult to judge; Somehow there always seems to be too little time for writing the framework. There should be at least one month set aside for the student to write the frame without any other duties during that period. Perhaps there should be better guidelines or seminars for the PhD students on how to write a good frame.

- *Learning objectives/outcomes*: If all the learning outcomes and objectives mentioned above are supposed to be included in the final examination then that must be clarified for the examination board members and the procedure must change; The format of the current research program formally stresses the educational aspect. The learning objectives are ambitious but are not usually assessed in a structured way. During the procedure it is mostly an examination of the papers and sometimes it is not so clear who did what.
- *Half-time seminar*: More possibilities to change the direction of the study plan at half time. Now we had some comments of what needed to be done in order to have a little bit more interesting studies, but if the student continues as planned (does not take into account these suggestions due to the lack of finances), the committee has no possibility to stop the student. Although a relative weak thesis, the student has reached the goals very well; Perhaps the mid seminar should have been more critical and constructive (my guess); The assessment at half time is very important. I think it is extremely difficult to judge about the supervision and about independence as the student is reluctant to tell about their supervisors and supervisors are reluctant to tell they have "failed" with supervision.
- *Miscellaneous*:
    - I was surprised that none of the co-supervisors attended the half-time seminar or the defence;
    - Important to have a pre-defence seminar well in advance before the actual defence. During this pre-defence the "kappa" should be discussed and there should be time for adjusting and changing according to comments;
    - It should be made simpler and clearer. A return to the simple requirement of having at least 4 publications and at least 2 first-author publications would be a good first step. "Shared" first authorship ("contributed equally") should be counted as 0.5; I understand the reluctance to have exact rules on the number of papers, but the current situation also makes it very unclear what the more formal demands are regarding publications.
    - It should be possible to stop students who clearly lack the ability to perform an adequate PhD thesis, earlier stop-go checks (every year?)
    - Less focus on administrative processes;
    - Limit the defence of the thesis to maximum 2.5 hours. No one is able to concentrate longer;
    - Maybe more widespread announcement of dissertation details might be beneficial for students/public working outside KI to participate during dissertation, if they are interested in the subject;
    - Consider a small fee for the work done by the examination board;
    - The first seminar given by the student should be after one year, like it is now, but with a full committee, and this should be a really tough and difficult seminar, because here there is still a possibility for major changes in the project setup. At halftime, which is often done late as well, it is often too late to change things;
    - The key question is what is the overall goal - a) to provide a basic scientific education to many b) to educate and support top students in accomplishing cutting edge research Difficult question;
    - The student did not participate in scientific seminars during the process (!). Obligatory regular scientific seminars is my suggestion.
- *Satisfied or very satisfied as it is now*: 15 comments.

Person responsible for document Ingeborg van der Ploeg		*Last saved* 2013-11-04
Version 4	*Last updated by* Ingeborg van der Ploeg	*DNR* 1-448/2013

Other comments or suggestions from the respondents

- *Broader recruitment of doctoral students*: Improve the PhD program. Look at why Copenhagen University proceeds in excellence. I strongly suggest KI broadens recruitment of PhD students from which some PhD students may mature to excellence. Many PhD students will not reach this level but are we guaranteed that all the new bright doctoral students selected for Dr Med Sci for example continue to develop after their thesis to become the future leaders of excellence KI requests?; PhD positions should be funded and announced centrally. Start PhD training with lab-rotations. Candidate PhD students should apply and be tested thoroughly. Only the very best candidates should be accepted.
- *Courses*: A radical change with few courses, more research time; A better organization of PhD courses is needed; The students take too many courses, the courses interfere too much with the research. Many of the courses are not very good, many are a waste of time.
- Too much emphasis is put on the ethical permission review by the central thesis committee, showing a great lack of trust in the researchers at KI.
- Since I am retired as a doctor except for certain clinical studies going on, I have very limited funds at the Institute and they are predisposed to other purposes than to pay the cost for KS mail and library. I have no salary or other payment from the Institute. I think that the expert knowledge with which I contribute without payment might be more appreciated, at least affording the cost for KS mail and library.
- I was very impressed
- It is a pleasure to be in the examination board of PhD work. I have been opponent in Denmark and Norway with harder pre-dissertation acceptance - It is good, but is not that great difference as the time devoted are. I prefer the Swedish system.

6 Discussion

The fact that

- 97% of the 161 responding examiners (half from KI and half from outside KI) answered that they were *sure* or *very sure* of their decision to pass the student ,
- the majority of the examiners were of the opinion that the overall scientific standard of the thesis work was high (only one examiner thought it was low, see Fig.2),
- two thirds thought that the quality of the thesis frame was very good (two examiners thought it was unacceptable, see Fig. 3),
- nearly all examiners (96.3%) were of the opinion that the overall contribution of the doctoral student examined was good to excellent (see Fig. 4) ,
- nearly all who were of the opinion that they had enough knowledge to answer the question about the scientific and educational environment for the doctoral student answered it had been good to excellent (see Table 1; 12% resp. 22% did not have enough knowledge to comment on the scientific environment resp. educational environment).
- each of the objectives/ intended learning outcomes formulated by the Swedish Higher Education Authorities were thought to have been reached to a high or very high degree according to the vast majority (from 57.2 % up to 91.4 % and median for all questions 78.3 %) of the examiners and no more than a maximum of three examiners per question thought that any of the learning objectives had been accomplished to a very small degree (see Table 2),
- there was no apparent difference between the answers of examiners from KI and those from outside KI

allows to draw the conclusion (despite the methodological limitations) that the objectives related to the doctoral examination at KI are very satisfactorily met by the vast majority of the doctoral students in this sample.

However, the fact that

- four examiners commented that they were *doubtful* or *very doubtful* before the thesis defence because of poor quality of the publications and manuscripts (*at least two of the three examiners have to agree that the quality is sufficient in order to recommend the thesis defence. The fact that four examiners commented that they were doubtful might mean that up to four theses were concerned.*),
- three examiners were *doubtful* or *very doubtful* because of poor quality of the thesis frame (the “kappa”), and that of the fifty-one examiners who thought that the “kappa” was acceptable, ten (six from KI and four others) thought it was acceptable despite lack of depth, or it not being well written, including “copy-paste” (a number of examiners were of the opinion that more emphasis should be given to the “kappa”).
- more than 10% of the examiners responded that the following intended learning outcomes were reached to quite a small degree (see Table 2):
    - the ability to carry out scientific analysis and synthesis, as well as independent critical examination and assessment of new and complex phenomena, issues and situations (17.4%)
    - the ability to critically, independently and creatively and with scientific accuracy identify and formulate hypotheses/important research questions, to plan and through the use of adequate methods carry out research work and other qualified tasks within given time periods (13.7%)

Person responsible for document Ingeborg van der Ploeg		*Last saved* 2013-11-04
Version 4	*Last updated by* Ingeborg van der Ploeg	*DNR* 1-448/2013

  - through a thesis demonstrate their ability to contribute significantly to the development of knowledge through their own research (10.6%)
  - the ability to identify needs for further knowledge (14.9%)
  - the ability to contribute to the development of society and support others learning in research and development and in other qualified professional contexts (11.8%)
  - intellectual independence and scientific conscientiousness (14.9%)
  - an in-depth insight into scientific possibilities and limitations, their role in society and public responsibility for how they are used (13.7%)
- more than 10% of the examiners responded that they did not know whether the following intended learning outcomes were reached (see Table 2):
  - the ability to carry out scientific analysis and synthesis, as well as independent critical examination and assessment of new and complex phenomena, issues and situations (12.4%)
  - the ability to critically, independently and creatively and with scientific accuracy identify and formulate hypotheses/important research questions, to plan and through the use of adequate methods carry out research work and other qualified tasks within given time periods (10.6%)
  - the ability to contribute to the development of society and support others learning in research and development and in other qualified professional contexts (29.8%)
  - the ability to make assessments of research ethics (30.4%)
  - an in-depth insight into scientific possibilities and limitations, their role in society and public responsibility for how they are used (22.4%)

show that there are still needs for improvement in order to ensure a high quality to be reached at the time of examination.

Some measures that can stimulate better outcomes have recently been implemented at KI.

- The Board of Doctoral Education has started to disseminate "Guidelines for writing a compilation thesis summary chapter" [5] and more recently a document that supports the writing of a compilation thesis, especially of the "kappa" [6]. It is expected that this will stimulate to a higher quality of the "kappa".
- The Board of Doctoral Education has during recent years focused on giving emphasis on spreading information on intended learning outcomes on the KI-home page[7] and at courses and seminars for supervisors: how to individualize learning outcomes for doctoral students, how to review learning outcomes at the time of the half-time review seminar, and more recently how to examine learning outcomes.

It might, however, take time until the positive effects of the above measures will be evident. This might be due to the fact that the importance of a high quality "kappa" and the learning objectives as formulated by the Swedish Higher Education Authority ("Universitetskanslersämbetet") for a doctoral education up to now are either not communicated adequately yet or are not appreciated to a great extent.

[5] Guidelines for writing a compilation thesis summary chapter. 2012. Board of Doctoral Education at Karolinska Institutet, Stockholm.
[6] Support for writing the thesis. See http://internwebben.ki.se/en/forms-and-documents-doctoral-education.
[7] http://internwebben.ki.se/sv/formulera-och-examinera-larandemal/ http://internwebben.ki.se/en/formulate-and-examine-intended-learning-outcomes

Person responsible for document Ingeborg van der Ploeg		*Last saved* 2013-11-04
Version 4	*Last updated by* Ingeborg van der Ploeg	*DNR* 1-448/2013

Recommendations from the examiners that are already implemented by the Board of Doctoral Education:

a. A recommendation to appoint someone else other than the supervisors to be chairperson at the public defence (in effect from July 1, 2013)
b. Studies can be shared across two or more theses. The contribution from each student must be clear.
c. Guidelines for writing "the kappa"
d. Ideas concerning how learning outcomes can be examined are given in an online webinar [8]
e. Possibility of pre-defence seminar.
f. Announcement of dissertation details on the KI calendar
g. Broader recruitment of doctoral students (All doctoral positions with KI as the main employer must be advertised from January 2014)
h. There is always enough time for Examination Board members to ask questions at the defence.
i. A more extensive first annual follow up (in effect from July 1 2013)

Possible actions for the Board of Doctoral Education:

a. To carefully study the results of the examiners' survey and the comments and opinions given by the examiners and decide on what improvements should be made to increase the quality of the doctoral education at KI
b. To give the working group for quality issues in doctoral education QUAFUS the task of studying how to increase the incentives for the doctoral students to write a high quality "kappa" /thesis frame (eg. to consider a graded evaluation of the thesis and not only a *pass* or *fail*).
c. To give QUAFUS the task of studying and giving recommendations concerning 1) how to ensure that the general objectives in the Higher Education Ordinance are reached to a greater extent by our doctoral students and 2) how to make examination board members and the opponent more aware of the importance to formulate suitable questions that facilitate and ensure the assessment of all objectives for PhD degree, including the ones in the domain of assessing and approaching [6]
d. To make it possible for doctoral students to write a summarizing self-reflection concerning the objectives for the doctoral degree that can be added to the application for thesis defence or be included in the thesis itself. (Writing self-reflections concerning progression and objectives reached, e.g. as part of portfolio writing during the doctoral education, might make the students more conscious about their own progress towards the objectives for the degree [9].)

[8] http://my.brainshark.com/Examining-ILOs-Webinar-446773935
[9] Tochel C, Haig A, Hesketh A, et al. The effectiveness of portfolios for post-graduate assessment and education: BEME guide no 12. Med Teach. 2009;31(4):299–318.

Person responsible for document		Last saved
Ingeborg van der Ploeg		2013-11-04
Version	Last updated by	DNR
4	Ingeborg van der Ploeg	1-448/2013

7 Contributors

Initiated by, online questionnaire questions, result gathering and analysis: Ingeborg van der Ploeg (Central Director of Doctoral Education/Coordinator, Faculty Office and International Relations, University Administration)

Conducting of survey and critical audit: Karin Vågstrand, coordinator of Board of Doctoral Education

Commissioned and received by: Board of Doctoral Education (Dean Anders Gustafsson)

8 Signatures

Stockholm November 5, 2013

Project Leader

Commissioned by/Received by

Karolinska Institutet

Survey for examiners of doctoral students from Karolinska Institutet - post PhD thesis defence

Karolinska Institutet aims to ensure that the research training of doctoral (third level, Ph.D., research) students meets the highest international standards and that those students who obtain the doctoral degree fulfill the objectives of a doctoral education. This survey is conducted in order to enhance the quality assurance of the outcome of the doctoral students' doctoral education and to increase the possibilities to further develop the recruitment, research training and the examination process. It is very appreciated that you fill in this questionnaire and send it in within two weeks. The answers will be treated anonymously and strictly confidentially.

1. Which university are you employed by / affiliated to?

- ● Karolinska Institutet
- ● Other

2. Did you participate in the mid-term review of the candidate as a board member?

- ● Yes
- ● No

3. Did the PhD candidate pass and obtain the doctorate degree?

- ● Yes
- ● No

4. Indicate at each timepoint how certain you have been that the candidate should pass and obtain a doctorate degree from Karolinska Institutet.

	Very sure	Sure	Rather sure	I was slightly doubtful	I was very doubtful
The time period between approval of a public defense of the thesis by the Examination Board (preliminary review) and the thesis defense itself	●	●	●	●	●
During the thesis defense	●	●	●	●	●
At the end of the examiners meeting following the thesis defense	●	●	●	●	●

5. In case you have been doubtful: what was the reason?

6. How do you judge the overall scientific standard of the doctoral thesis work?

- ● Outstanding/very high quality
- ● High quality
- ● Medium but still sufficient quality
- ● Low quality
- ● Very variable

7. Comments concerning the previous question

8. How do you judge the quality of the thesis frame (Sv: ramberättelsen, "kappa")?

● Outstanding ● Very good ● Acceptable ● Unacceptable

9. Comments concerning the previous question

10. How do you judge the overall contribution of the doctoral student?

● Excellent ● Very good ● Good ● Doubtful

● Too low ● Difficult to know

11. Comments concerning the previous question

12. How do you judge the perceived overall scientific environment for the doctoral student?

● Excellent ● Very good ● Good ● Doubtful

● Poor ● I do not have enough knowledge to comment

13. Comments concerning the previous question

14. How do you judge the perceived overall educational environment for the doctoral student?

● Excellent ● Very good ● Good ● Doubtful

● Poor ● I do not have enough knowledge to comment

15. Comments concerning the previous question

Learning outcomes and objectives

The objectives in the question below relate to a doctorate in accordance with the Higher Education Ordinance in Sweden (see http://ki.se/ki/jsp/polopoly.jsp?a=91589&d=270&l=en).

16. For each of the objectives, please, indicate to what extent you consider the objective was achieved by the doctoral student.

	To a high degree	To quite a high degree	To quite a small degree	To a very small degree	I do not know

1. a broad knowledge and a systematic understanding of the research area	●	●	●	●	●
2. an in-depth and up-to-date specialist knowledge of the specific research area	●	●	●	●	●
3. a familiarity with scientific methodology in general and with the methods of the specific research area in particular.	●	●	●	●	●
4. the ability to carry out scientific analysis and synthesis, as well as independent critical examination and assessment of new and complex phenomena, issues and situations	●	●	●	●	●
5. the ability to critically, independently and creatively and with scientific accuracy identify and formulate hypotheses/important research questions	●	●	●	●	●
6. to plan and through the use of adequate methods carry out research work and other qualified tasks within given time periods	●	●	●	●	●
7. through a thesis demonstrate the ability to contribute significantly to the development of knowledge through own research	●	●	●	●	●
8. the ability in national and international contexts in written and spoken form with authority to present and discuss research and research results in dialogue with the scientific community and society in general	●	●	●	●	●
9. the ability to identify needs for further knowledge	●	●	●	●	●
10. the ability to contribute to the development of society and support others' learning in research and development and in other qualified professional contexts.	●	●	●	●	●
11. intellectual independence and scientific conscientiousness	●	●	●	●	●
12. the ability to make assessments of research ethics	●	●	●	●	●
13. an in-depth insight into scientific possibilities and limitations, their role in society and public responsibility for how they are used.	●	●	●	●	●

17. Comments concerning the previous question

Please, indicate the numbers of the items (1-13) in case you comment your answers above.

18. Do you have suggestions on how the dissertation process at KI should be improved?

19. Other comments or suggestions