Self-evaluation of the quality of Karolinska Institutet's doctoral education

The Committee of Doctoral Education

31 July 2025

Ref.no. 1-847/2024

Karolinska Institutet

Content

Introduction

This report has been written to provide a basis for a review of Karolinska Institutet's (KI's) doctoral education in 2025. The review is initiated by KI and is carried out within the framework of KI's quality assurance system. In addition to this written report, an external review panel will conduct interviews during a site visit.

The external review covers the entire doctoral education subject *Medical Science,* which means that all departments, all research areas and all doctoral students and supervisors are included.

The Committee of Doctoral Education at KI has decided on the criteria and evaluation questions on which KI will be evaluated.[1] However, to ensure objectivity and enable national comparisons, KI has chosen to use the same criteria and questions that the Swedish Higher Education Authority (UKÄ) uses in its evaluations of doctoral education.

The report provides an overview of KI's doctoral education, focusing on the structures and functions that are relevant to all doctoral students while also highlighting specific areas. Internal follow-ups provide information on the views and best practices of the individual departments', which are also reflected in the report.

It is structured as follows: Part 1 is a general description of KI and its doctoral education. Part 2 is structured around the assessment criteria and evaluation questions[2] and contains KI's reflections on the conditions and results. Each section concludes with a summary of strengths and challenges. The report ends with a concluding summary.

[1] Steering document for external review of KI's doctoral education (ref.no. 1-760/2024).

[2] The assessment criteria and evaluation questions are presented in their original wording in Appendix I.

Part 1 – Description of the doctoral education at Karolinska Institutet

Karolinska Institutet's doctoral education offers a structured yet individual research training. The organisation, structure and routines are described below to provide the necessary understanding of the reflections in Part 2. Each section is complemented by a link to further information.

Karolinska Institutet

At Karolinska Institutet (KI) there is only one faculty, the medical faculty.

KI distinguishes itself by being one of the largest contributors to medical and health research in the country. Research and doctoral education constitute 85% of KI's total revenue.

Like other medical faculties, KI collaborates closely with the healthcare sector, especially Region Stockholm. This partnership is essential for much of KI's education and research.

The faculty is divided into 21 departments (see Table 2 for the number of doctoral students per department), which are grouped into three geographical departmental groups. Some departments are concentrated in one location, while others have activities and staff spread across various buildings and campuses throughout Stockholm.

Explore further KI's overall organisation: Organisation and management | Karolinska Institutet.

Education

KI provides education in medicine and health at all levels: 13 first-cycle programmes, 32 second-cycle programmes, and one large doctoral education.

In 2024, the number of full-time equivalent students at the first and second cycle levels was 6,483. This can be compared with 1,651 full-time equivalent doctoral students, meaning one in five KI students are doctoral students.

Research

KI's research encompasses a broad spectrum of the entire medical field, from basic experimental research to patient-oriented sciences and to global health. Table 2, which can be found at the end of Part 1, illustrates the predominant research fields among doctoral students.

KI's research has made a significant impact. In 2024, the average field-normalised citation rate (cf) for all articles from KI was approximately 1.8. This is notably higher than the corresponding average value for the EU's 27 member countries plus the United Kingdom, which is just over 1.0. KI ranks in many international rankings as one of the highest in Europe. Explore further: Ranking and Karolinska Institutet | Karolinska Institutet.

The scale of research at KI results in a high number of doctoral students. In fact, one-third of all doctoral students in Sweden within medicine and health are enrolled at KI.

Doctoral education

Doctoral education, also known as PhD education or third-cycle education, can be described as supervised research complemented by courses and other learning activities, with the aim of achieving the learning outcomes set out in the Higher Education Ordinance[3].

Each doctoral student (PhD student) undertakes a unique research project, initially conceptualised by the prospective supervisor, which is subsequently refined and developed in collaboration with the doctoral student.

A doctoral education in Sweden can lead to two different degrees: (i) a doctoral degree or (ii) a licentiate degree, see Figure 1. A doctoral degree requires the equivalent of 4 years of full-time doctoral studies (240 HEC[4]), while a licentiate degree requires the equivalent of 2 years (120 HEC). At KI, licentiate degrees are only awarded to a small number of candidates (around one to five per year). Consequently, this report focuses on education leading to a doctoral degree.

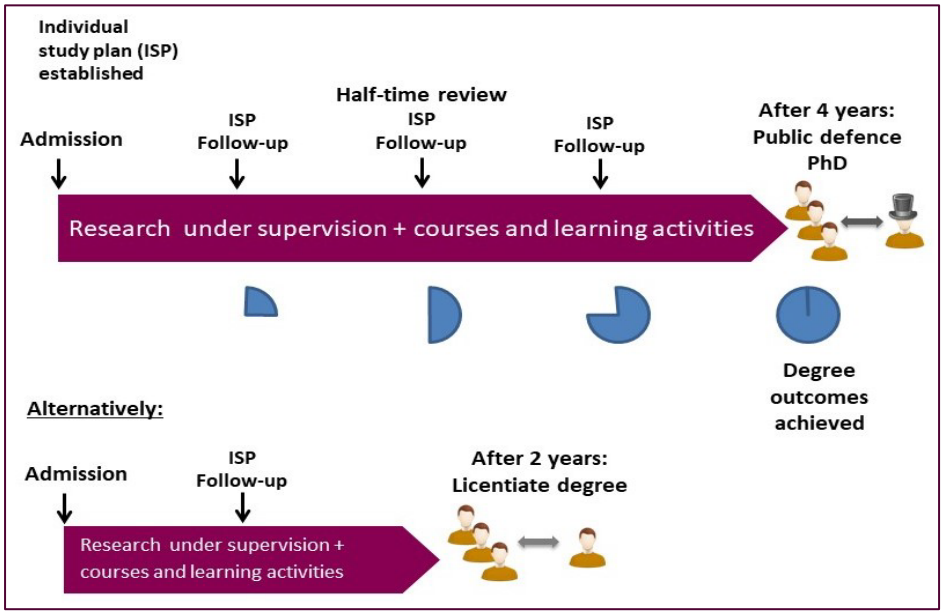

Figure 1. A comprehensive picture of a doctoral education.

[4] HEC: Higher Education Credits (högskolepoäng). 1.5 HEC = 1 week of study, 60 HEC = one year

Organisation and responsibilities

Presented below is an outline of KI's organisational structure, delineating the areas of responsibility for doctoral education.

Faculty

Committee for Doctoral Education

An overarching responsibility for KI's doctoral education process resides in the Committee for Doctoral Education (*Kommittén för utbildning på forskarnivå*, KFU), delegated by the Faculty Board. The primary mandate is to ensure that doctoral education at KI is conducted with the highest quality. This entails monitoring various aspects and components of doctoral education to identify areas for development, establishing regulations and frameworks for the implementation of activities, and allocating funds for courses and the co-financing of doctoral students.

The committee has established three sub-bodies, the Course and Programme Committee, the Dissertation Committee and the KID steering group, see below.

Academic Vice-President and Deputy Chairperson

The Academic Vice-President for doctoral education is the chair of the Committee for Doctoral Education but also has a general responsibility to oversee matters within doctoral education at KI and to represent KI's doctoral education nationally and internationally.

The committee also has a deputy chairperson who assists the vice-president. The vice-president and the deputy chairperson divide responsibility for different areas of doctoral education between themselves.

Course and Programme Committee

The Course and Programme Committee (*Kommittén för kurser och program på forskarnivå*, KPK) coordinates KI's doctoral courses and other learning activities for doctoral students. This includes:

- Establishing syllabi for all doctoral courses.
- Allocating funds for courses arranged outside the thematic doctoral programmes and the research schools, mainly general science and mandatory courses.
- Allocating funds for other doctoral education activities.
- Coordinating the thematic doctoral programmes (the thematic programmes are explained under *'Doctoral courses*' below) including ensuring compliance with assigned mandates, regulations, instructions, and budgetary constraints.
- Preparing matters concerning courses, other learning activities, and doctoral programmes for decisions by the Committee for Doctoral Education.

Dissertation Committee

The Dissertation Committee ensures adherence to the regulations governing thesis defence and examination. This includes:

- Reviewing and verifying incoming applications for thesis defence in accordance with prevailing regulations.
- Checking that the theses do not contain studies lacking ethical approval.
- Appointing members of the examination board and the opponent for the defence.

KID steering group

This steering group organises the assessment of applications for KID funding. KID is explained below under '*Sources of funding*'.

Departments

Head of Department ('Prefekt')

Each department is led by a head who holds ultimate responsibility for all departmental activities. The head makes decisions delegated by the University President and in accordance with the rules established by the Committee for Doctoral Education regarding:

- Establishment of doctoral positions.
- Admission to doctoral education.
- Appointment of supervisors for doctoral students.
- Approval of individual study plans for doctoral students (further delegated to the Director of Doctoral Studies).
- Credit transfer for doctoral students (further delegated to the Director of Doctoral Studies).
- Appointment of examiners for doctoral education courses.

Directors of Doctoral Studies

Each department has at least one Director of Doctoral Studies, who is appointed by the Head of Department following consultation with the Academic Vice-President. The departments receive earmarked funds from the Committee for Doctoral Education for the administration of doctoral education.

The responsibilities of the Director of Doctoral Studies include to:

- inform and advise doctoral students and supervisors,
- assess the suitability of doctoral education environments, supervisors and prospective doctoral students,
- review and establish individual study plans of doctoral students,
- monitor the students' progress,
- manage any problems regarding the department's doctoral students.

- review and decide on applications for credit transfer

Explore further here: Description of duties of study director (document).

To support the departmental study directors, there is also a central director of doctoral studies employed by the Faculty Office. The central director provides an additional layer of support and can, for example, assist in the case of complex doctoral student issues.

Departmental board of doctoral education

Each department has a board that deals with matters relating to doctoral education. The board comprises of the departmental Director of Doctoral Studies, at least two other researchers/teachers and at least one student representative. The purpose is:

- To assess the scientific potential of a project when the doctoral position is first established.
- To assist the Director of Doctoral Studies and the Head of Department in making a decision on the admission of a prospective student.
- To assist with other matters relating to doctoral education.

Supervisors

All doctoral students in Sweden have a principal supervisor and at least one co-supervisor. At KI, most doctoral students have 2 or 3 co-supervisors. The supervisors share joint responsibility for supervising and designing the individual education of doctoral students, as well as monitoring their development. They are responsible for ensuring that the doctoral education, and the research carried out within that framework, is of good quality and of a realistic scope.

Explore requirements, duties and training for doctoral supervisors here: Supervisor to doctoral student.

Rules, procedures and structures

Within the framework of national regulations (the Higher Education Ordinance[5] and the Higher Education Act[6]), KI has established its own set of regulations, governing documents, and supporting structures based on the following principles and objectives:

- Rules and regulations should be easily accessible and clearly communicated to doctoral students, supervisors, the study directors, administrators and others involved in doctoral education.
- The purpose of each rule and process must be explicitly stated.
- While some flexibility is permissible based on departmental and situational contexts, assessments should remain consistent across departments.

[5] The Higher Education Ordinance (1993:100) (Högskoleförordningen)
[6] The Swedish Higher Education Act (1992:1434) (Högskolelagen):

- Regulations should primarily aim to raise the minimum standards ('raise the floor') to prevent low-quality doctoral education but also facilitate the promotion of excellence by setting high standards ('raise the ceiling').

The regulations governing doctoral education are compiled in the document Rules for doctoral education at Karolinska Institutet, which serves as a comprehensive guide and handbook for students, supervisors and administrative staff.

The rules are further elaborated on webpages, accessible from the portal site Doctoral education. In addition to these central web pages, each department provides department-specific information with links to the common pages.

The general syllabus

Since 2006, all doctoral students have been admitted to the same doctoral education subject, Medical Science, and consequently adhere to the general syllabus in Medical Science. The general syllabus provides a comprehensive description of the education and the subject, including eligibility criteria, course requirements, and descriptions of other credit-bearing activities.

Given that there is only one general syllabus intended to accommodate all doctoral students, it cannot be excessively detailed.

This syllabus has undergone several updates, with each doctoral student following the version that was current at the time of their admission. The most recent version, applicable to those admitted from 2018 onwards, can be found in Appendix II.

The individual study plan

All doctoral students conduct an individualised education comprising a unique project and an individually chosen combination of courses and learning activities. An individual study plan (ISP) is established for each doctoral student, specifying the commitments of both the university and the student. It specifies how the student intends to achieve the outcomes of their doctoral education through research, coursework, and other activities. This plan is regularly reviewed and updated to ensure the student is on track. More under '*Monitoring progress*'.

All ISPs at KI are digital which means that they are drawn up, revised, approved and established digitally within the ISP system, see Figure 2.

Two examples of ISPs can be found in Appendix III.
Explore further: About Individual Study Plans.

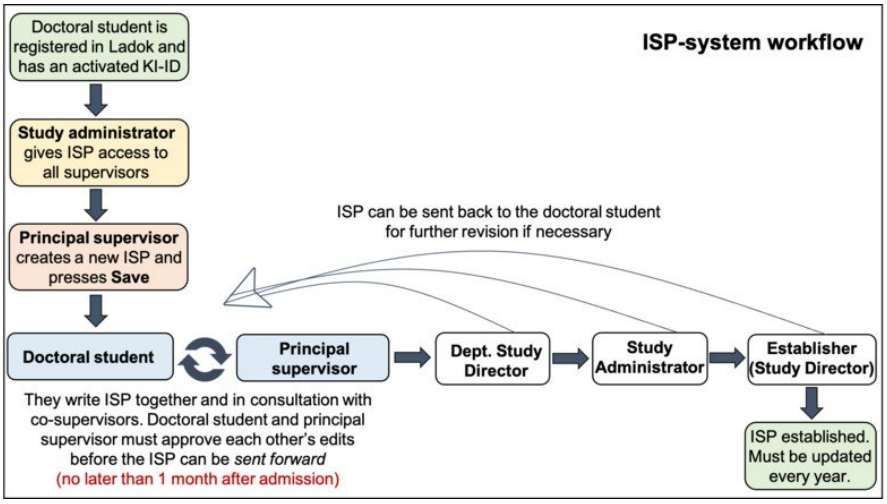

Figure 2. Flow chart of the approval steps in the digital ISP system.

The admission process

The admission process at KI aims to ensure that every doctoral student possesses the necessary prerequisites for a high-quality doctoral education.

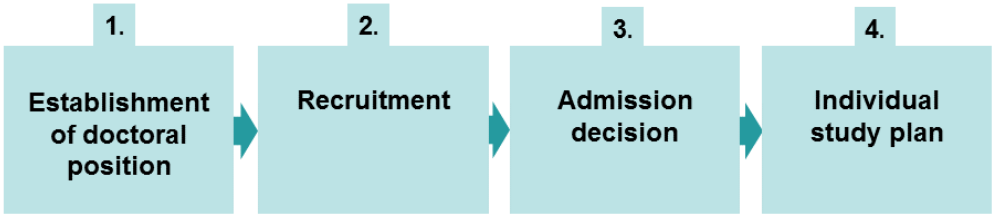

Figure 3. Flow chart of the admission process.

Step 1: Establishment of doctoral position

The basic principle at KI is that the supervisors' own research grants finance doctoral students. When a prospective principal supervisor has secured the necessary funding, they apply to their department to establish a doctoral position.

To approve an application for establishing a new doctoral position, the following requirements must be met:

- The scientific project is viable and suitable for doctoral studies.
- The principal supervisor meets the Green Light criteria (see below).
- The proposed supervisory team (principal and co-supervisors) is relevant to the project.
- The doctoral student can be offered a good doctoral educational environment.
- Ethical permit(s) (if required) is obtained or planned.
- The plan for financing the doctoral student is realistic and feasible.

Green Light is an assessment of the suitability of a supervisor, focusing on track record and time to supervise. The Green Light is issued for a specific doctoral position and not a general approval to supervise.
Explore further here: Green Light – approval of a doctoral supervisor.

Step 2: Recruitment

Procedures:

1. Advertisement
   When the doctoral position is established, it must be advertised. (Exemption: If a doctoral education will be undertaken within an employment outside of KI, the requirement of competitive recruitment is waived).
2. Assessment of eligibility of all applicants
   At KI, the eligibility is assessed by the central administration to ensure a fair and equal assessment of all candidates.
3. Selection among eligible applicants
   The recruiting supervisor conducts a combined assessment of the applicants' qualifications and suitability, assisted by their department, and selects a candidate.

Step 3: Admission decision

The admission decision is taken by the Head of Department on the recommendation of the departmental Director of Doctoral Studies. Appointing supervisors is included in this decision.

Step 4: Draw up an individual study plan (ISP)

Within a month of the commencement of studies, the student and supervisor must submit a proposed ISP. All doctoral students must have an ISP established by the Director of Doctoral Studies within three months of starting their studies.

In connection with establishing the ISP, the doctoral student shall give an 'ISP seminar'. Each department determines the format of this seminar. The purpose is to provide an opportunity for the doctoral student to present their research project and to help the department ensure that all doctoral students have an ISP.

Explore further here: Admission to doctoral education at KI

Monitoring progress

The supervisors are expected to follow-up the doctoral students through meeting on regular basis, as outlined in the supervision plan in the ISP. In addition, there is a mandatory formalised follow-up structure involving annual follow-up and a half-time review.

Annual follow-up

The annual follow-up involves a meeting between the doctoral student and the supervisor, resulting in an updated version of the Individual Study Plan (ISP).

Explore further here: Annual follow-up.

Half-time review

A half-time review consists of a half-time report and an open seminar. A committee of three independent researchers provides feedback on completed and planned work, identifying areas in need of improvement.

The purpose is both to serve as an educational opportunity and to inform the department of the student's progress.

The half-time report, written by the doctoral student, consists of:

- A literature review of the research field.
- A status report on the doctoral education project and the learning progress relative to the learning outcomes.
- A plan for the remainder of the studies.
- A text reflecting upon ethical considerations.

Explore further here: Half-time review.

External mentor

During the first year of study, an independent person shall be appointed to act as a mentor to the doctoral student. Ideally, the mentor should be external to KI and provide support and advice on issues such as career planning and establishing professional contacts outside KI.

Explore further here: Mentor to a doctoral student | Staff Portal.

Doctoral courses

The general syllabus states that all doctoral students must take courses and credit-bearing activities equivalent to 30 HEC (see Appendix II). KI offers a wide range of courses which will enable each doctoral student, in collaboration with their supervisors, to create a tailored combination of courses based on their needs, the requirements of their project and their prior knowledge.

Some courses are mandatory for all doctoral students, including courses in statistics, research ethics, and science communication. Others are mandatory for some doctoral students, but not all, depending on the requirements of the research project (courses in laboratory animal science, laboratory safety and quality assurance of clinical research) or depending on prior education (course in human biology/physiology and/or pathology).

Courses are provided by teachers from different departments, but all courses are open to all doctoral students regardless of department affiliation.

Explore further here:
Doctoral courses
Course requirements and choice of courses for doctoral students

Thematic doctoral programmes

Since many research fields span multiple departments, a coordinating structure for the course offerings is necessary. KI has addressed this by setting up interdepartmental, thematic doctoral programmes. These programmes coordinate, fund and arrange the majority of the courses.

The fundamental principle underlying this structure is that the required courses should be determined by experts in their respective fields who are closely associated with the doctoral students.

In addition to organising courses, the thematic programmes are encouraged to organise supplementary activities for doctoral students within their field, such as seminars, workshops and retreats.

Explore further here:
Thematical doctoral programmes | Staff Portal,
Guidelines for KI's thematic doctoral programmes (document).

Research schools

KI has five research schools in collaboration with Region Stockholm open to doctoral students employed by the Region. The purpose is to offer structured course periods, spread over two years, and the opportunity to network with other doctoral students and researchers.

Every other year (even-numbered years), four of the research schools start new cohorts, with a total of 100 places. In alternating years (odd-numbered years), two of the research schools start cohorts with a total of 58 places. Additionally, KI runs a research school in health sciences with 14 new doctoral students every two years.

KI's doctoral students can also be connected to other national and international research schools with varying structures and target groups.

A decision on admission to doctoral education must have been made by the Head of Department before the doctoral student can be admitted to a research school.

Explore further here: Research schools.

Study funding and employment

All doctoral students at KI receive financial support during their studies, either through employment at KI or elsewhere, or through stipends. The distribution between different funding categories is depicted in Figure 4.

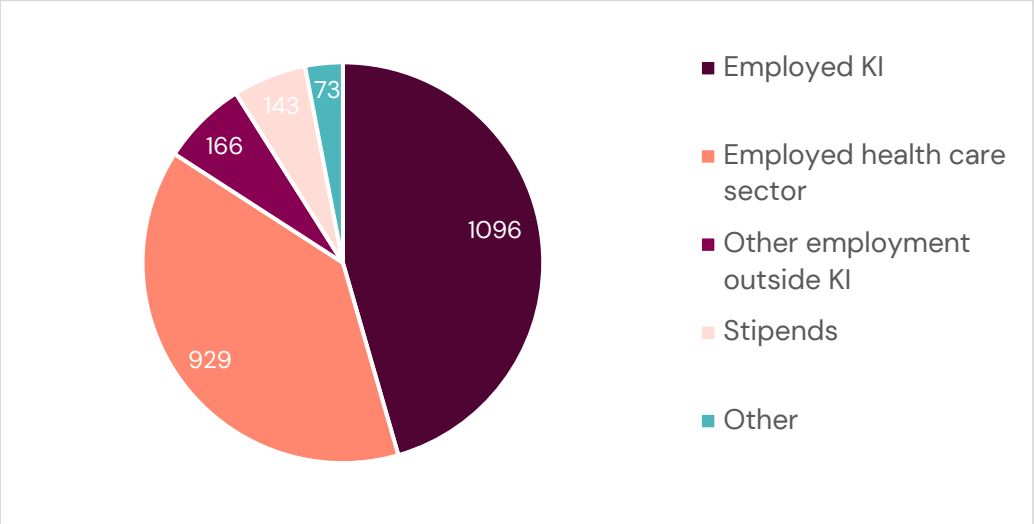

Figure 4. The number of students in each funding/employment category. Note: the same person can appear in more than one category. (2024 self-reported data. Source: Ladok.)

Sources of funding

Employment at KI

The basic principle in Sweden is that doctoral students are employed by the university. At KI this is normally financed by the principal supervisors' external research grants.

It is also possible as a prospective supervisor to apply for funds from KI's government allocations. The most extensive funding programme is known as KID (KI co-funding of doctoral student), which awards 60-70 grants annually with an approximate approval rate of 50%. A KID grant covers approximately half of the doctoral student's salary costs. The remaining funds must be provided by the supervisors.

Employment elsewhere

Doctoral students may also be employed outside KI. In those cases, it is the employer that provides the financial support. These employers may include other higher education institutions, government agencies or private companies. The largest group, however, consists of those employed in the healthcare sector, the so-called clinical doctoral students, read more in the next section.

Stipends

In a few situations, for example within international collaborations, it is allowed to finance a doctoral student through external stipends.

Clinical doctoral students

A 'clinical doctoral student' is a doctoral student who conducts their studies part-time within the framework of employment in healthcare. They make up more than 40% of all doctoral students at KI, and Figure 5 shows that this number is increasing.

Although there are some differences in the framework, it is important to emphasise that the clinical doctoral students are subject to the same requirements and regulations as other doctoral students at KI.

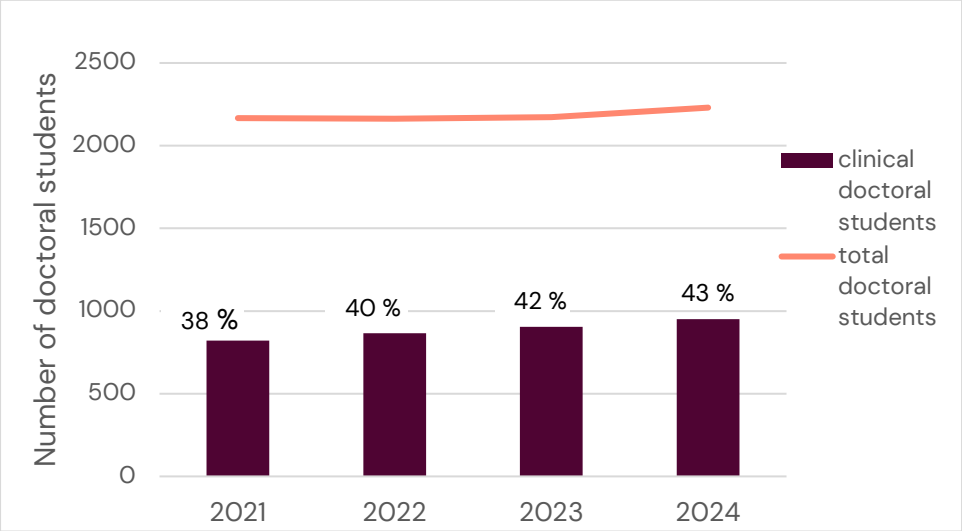

Figure 5. Diagram of the proportion of clinical doctoral (2024 self-reported data. Source: Ladok.)

The quality assessment system

Quality assurance (QA) in doctoral education forms part of the overall KI QA-system. There are six types of systematic follow-up methods for doctoral education:

- Dialogues
  - Annual departmental dialogues: The Academic Vice-President, the Vice-Chair of the Committee for Doctoral Education and the Central Study Director have meetings with each department (Director of Doctoral Studies, Head of Department and Head of Administration).
  - Group meetings: The Academic Vice-President, the Vice-Chair of the Committee for Doctoral Education and the Central Study Director hold mandatory meetings with the departmental Study Directors twice a year. Departmental administrators are also invited. These meetings are complemented by monthly voluntary digital Q&A sessions.
  - Regular meetings with the Doctoral student association, DSA and with the Doctoral student ombudspersons.

- Departmental written self-evaluation
  - Every four years (first time 2025).
  - Peer-learning through reviewing and discussing other departments' reports.
- Course evaluations
  - Mandatory course evaluations with standardised questions.
  - The evaluations are analysed and commented by the course organiser in a mandatory course analysis.
  - The course analyses are analysed by thematic programmes, research schools and the Course and Programme Committee respectively.
  - Annual follow-up of the thematic programmes and research schools.
- Exit Poll survey
  - Doctoral students respond to a questionnaire after their thesis defence, approximately 70% response rate.
  - The survey covers supervision, courses, outcome achievement, and occurrence of discrimination/harassment.
  - The results are compiled annually at an overarching level, and at the departmental level every four years.
- Statistics
  - Annually and as needed.
- External review
  - Every eight years (first time 2025).

The results of all these are analysed by the Committee of Doctoral Education and the central administration, feedback is provided to the departments, leading to improvement efforts, both centrally and at the departments.

Explore further: Principles for systematic quality assurance in doctoral education.

Doctoral student and supervisor population

Doctoral student population

KI has over 2,200 active doctoral students, 62% of whom are women, see Table 1. The average age among newly admitted doctoral students 2023 was 32.5 years (range 23-57 years), with a median age of 33 years. The average was similar for women (32.7 years) and men (32.3 years). 33% are international doctoral students[7].

[7] Source: Statistics Sweden, SCB. Definition of an international doctoral student: A person from a country other than Sweden who has been granted a residence permit for the purpose of studying, or who has immigrated within the last two years prior to commencing their doctoral studies.

Table 1. Doctoral students, doctoral degrees and study time (Source: Ladok)

	2022			2023			2024		
	Women	Men	**Total**	Women	Men	**Total**	Women	Men	**Total**
Number of active doctoral students (individuals)	1332	831	**2163**	1333	840	**2173**	1387	843	**2230**
Full-time equivalents[1]	989	636	**1625**	1009	633	**1643**	1026	625	**1651**
Number of new doctoral students	251	148	**399**	257	144	**401**	253	160	**413**
Number of doctoral degrees	232	158	**390**	195	134	**329**	204	137	**341**
Number of licentiate degrees	2	0	**2**	1	2	**3**	3	0	**3**
Average net study time[2], (doctoral degree)	4,7	4,7	**4,7**	4,7	4,8	**4,8**	4,6	4,8	**4,7**
Average gross study time[3], (doctoral degree)	6,4	6,4	**6,4**	6,6	6,4	**6,5**	6,7	6,7	**6,7**

[1] Full-time equivalents are calculated from the doctoral students' activity reports. The difference between the number of individuals and the full-time equivalents mirrors the occurrence of part-time studies.

[2] Net study time: The actual time in years devoted to doctoral studies from start to completion of studies, as reported by the student.

[3] Gross study time: Number of years from start to completion of studies.

Table 2 shows the distribution of doctoral students across departments, as well as the most common research fields for doctoral student within each department. Note that many research fields span multiple departments. For this reason, thematic doctoral programmes, which organise courses within a certain research field, are a beneficial solution, rather than each department arranging courses for their own students.

Supervisor population

There are in total 1,300 appointed principal supervisors to doctoral students at KI. On average, each principal supervisor oversees 1.8 students, although the median is one doctoral student per principal supervisor.

The gender of supervisors is not registered, but survey responses from the Exit Poll (with a 70% response rate) indicate a distribution of almost 50/50.

Principal supervisors are always either employed by, or affiliated with, the KI department to which the doctoral student is admitted. Co-supervisors, however, can come from other departments or other higher education institutions.

Table 2. Number of doctoral students by department, and most common research fields among the students (Source: Ladok 2024)

Department	Active doctoral students	% Women	The most common research fields of the doctoral students
Dep. of Clinical Neuroscience (CNS)	255	64%	Psychiatry – Neurology - Ophthalmology
Dep. of Medicine, Solna (MedS)	237	63%	Rheumatology and inflammation – Immunology – Cardiology, infection medicine – Public Health/Epidemiology
Dep. of Clincial Science, Intervention and Technology, CLINTEC	162	65%	Oto-Rhino-Laryngology – Surgery - Paediatrics
Dep.of Molecular Medicine and Surgery, MMK	147	55%	Surgery – Medical genetics – Orthopaedics
Dep. of Women's and Children's Health (KBH)	144	76%	Cancer – Paediatrics – Gynaecology – Public Health/Epidemiology – Cell-/Molecular Medicine
Dep. of Neurobiology, Care Sciences och Society (NVS)	128	70%	Geriatrics – General practice medicine - Physiotherapy
Dep. of Medicine, Huddinge (MedH)	165	68%	Haematology – Immunology – Cell-/Molecular Medicine – Gastroenterology
Dep. of Oncology and Patology (OnkPat)	126	57%	Cancer - Cell-/Molecular Medicine
Dep. of Global Public Health (GPH)	124	56%	Public Health/Epidemiology
Dep. of Clinical Sciences, Danderyd hospital (KI-DS)	98	59%	Cardiology – Surgery – Gynaecology
Dep. of Clinical Research and Education, Söder hospital (KI-SöS)	97	62%	Cardiology – Anaesthesia – Surgery
Dep. of Physiology and Pharmakology (FyFa)	84	54%	Anaesthesia – Pharmacology/Toxicology – Physiology
Dep. of Biochemistry and Biophysics (MBB)	71	62%	Cell-/Molecular Medicine
Dep. of Medical Epidemiology and Biostatistics (MEB)	68	60%	Public Health/Epidemiology
Institute of Environmental Medicine (IMM)	62	76%	Public Health/Epidemiology – Environmental Medicine
Dep. of Microbiology, Tumor- and Cellbiology (MTC)	61	46%	Cell-/Molecular Medicine – Immunology
Dep. of Laboratory Medicine (LabMed)	60	60%	Cell-/Molecular Medicine – Clinical Laboratory Medicine
Dep. of Neuroscience (Neuro)	57	56%	Neuroscience
Dep. of Cell- and Molecular Biology (CMB)	41	51%	Cell-/Molecular Medicine
Dep. of Learning, Informatics, Management and Ethics (LIME)	32	69%	Health Care Organisation – Health Politics and Economy
Dep. of Dental Medicine (DentMed)	29	62%	Odontology

Part 2 – Reflections on the evaluation questions

This section is structured according to the assessment criteria and evaluation questions outlined in the steering document for the external review. The exact wording of the assessment criteria and evaluation questions is provided in Appendix I.

Assessment criteria 1: Supervisors and teachers

Below is KI's reflection on the evaluation questions associated with the assessment criterion '**Assessment of human resources (supervisors and teachers)**'.

High-quality doctoral education relies on competent supervision and teaching, which are key prerequisites for academic success and research excellence.

Existing competences

Supervisors

Being a good supervisor involves a combination of many different types of competencies: one must among other things be well-versed in the research field, knowledgeable in methodology and scientific skills, possess a scientific mindset and integrity, and, above all, be able to support and foster these abilities in doctoral students.

Scientific competence

Scientific competence is a cornerstone of all doctoral supervision. Receiving highly competitive research funding, as many of our supervisors have, is a measure of the supervisors' research competence, but it takes more to be a good supervisor.

Supervisor training

Supervisor training is required for principal supervisors at KI. The 1-week mandatory introductory doctoral supervision course includes comprehensive modules covering effective supervision techniques, understanding the responsibilities of a supervisor, and navigating the various phases of doctoral education. Participants also engage in interactive discussions and practical exercises to enhance their supervisory skills.

The quality of the course is monitored through course evaluations. The results vary between the different course sessions, but in general, an overwhelming majority rate the course as ‘excellent’ or ‘good’.

Voices from participants of the introductory doctoral supervision course:

"The lectures were really informative and there was a red line throughout the course. It was a perfect mixture of lectures and listening and interactive parts. I was really impressed by the course and I have learned a great deal.

"Include the clinical doctoral student perspective more. … Perhaps a joint venture with the Region could be possible? The time management aspect of a clinical doctoral student … must be addressed better given the current legislative landscape. "

"Insights on the psychological relationship between the supervisor and the student"

Another mandatory course for principal supervisors is a web-based course on relevant regulations, which must not be more than five years old at the time a new student is admitted. This requirement ensures that all supervisors are up to date with the current rules and guidelines for doctoral education.

Although there are no mandatory courses for co-supervisors, they are encouraged to participate in the training. In practice, serving as a co-supervisor is a crucial learning phase that prepares them for the responsibilities of becoming a principal supervisor in the future.

Explore supervisor training further: Doctoral supervisor training | Staff Portal

Green Light

An important step in the admission procedure to ensure the competence of supervisors is the Green Light routine (see Part 1, '*Admission process*'). It was implemented seven years ago, and today most study directors and heads of department appreciate this routine, although they acknowledge that it is not without limitation. While departments rarely reject a Green Light application, this step has often prompted valuable discussions. In some cases, these discussions have led individuals to reconsider and ultimately decide not to recruit a new doctoral student.

The symbolic value of the Green Light should not be underestimated, as captured in the following quote:

Quote from a departmental self-evaluation regarding the impact of Green Light:

"The green light system serves as more than just an administrative checkpoint; it is a powerful tool of behavioural regulation and quality assurance. By necessitating formal approval […], the departments motivate supervisors to maintain best practices in mentorships. One of the key behavioural effects of the green light mechanism is that it reinforces the notion that supervision is not an automatic privilege, but a role that must be earned and maintained through demonstrated competence and ethical conduct."

The opinion of doctoral students

Most doctoral students appreciate their supervisors, though there are exceptions (see Figure 6 and 7). While it is difficult to determine cause and effect, it is encouraging to observe a positive trend comparing 2021-2024 with 2017-2020.

However, it is concerning that around 17% remain dissatisfied with their principal supervisor and around 15% feel that they have not received adequate supervision. This highlights the need to continue improving supervisor training and to maintain active discussions about supervision quality.

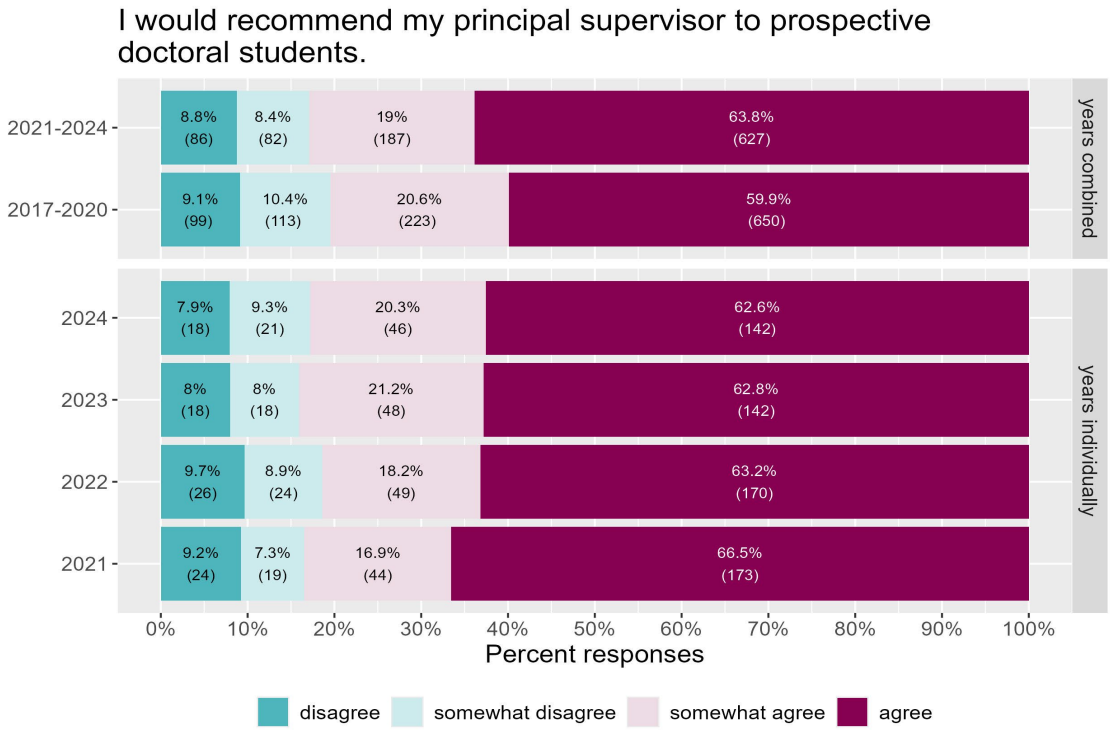

Figure 6. Results from the Exit Poll regarding the opinions of doctoral students on their supervisors.

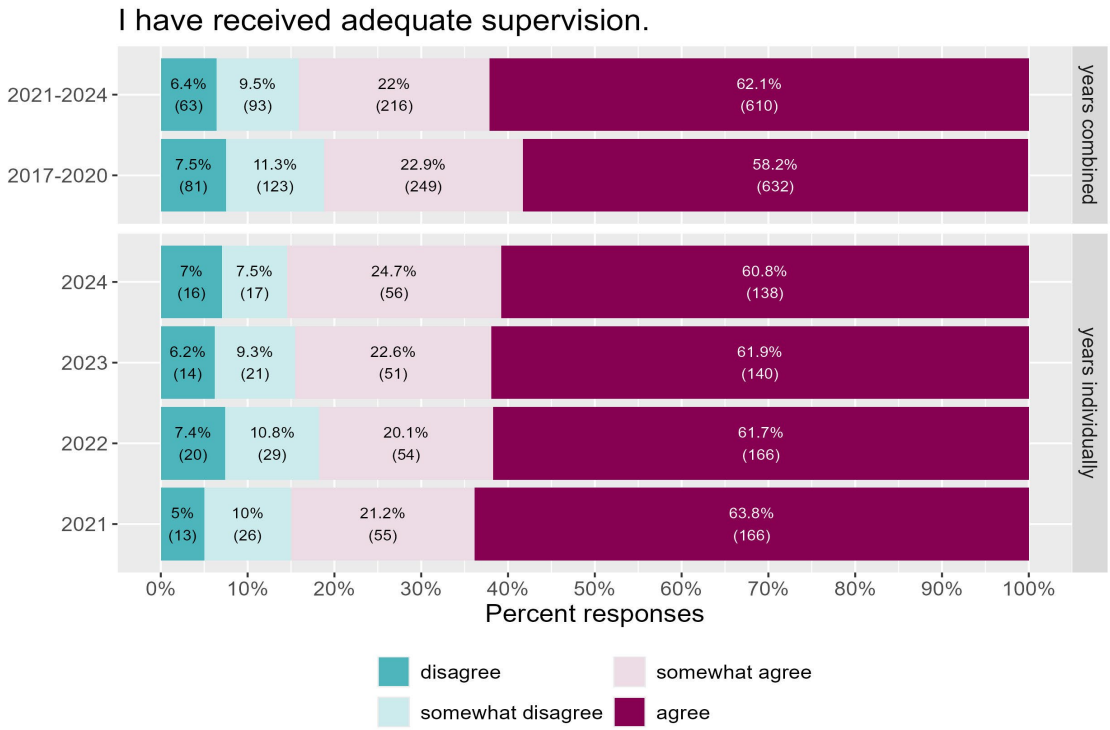

Figure 7. Results from the Exit Poll regarding the opinions of doctoral students on supervision.

It is also important to recognise that not all student-supervisor relationships can succeed. Good supervision depends not only on competence but also on personal chemistry, and even skilled supervisors may face challenges when the collaboration falters.

Teachers and organisers of doctoral courses

At KI there are no formal pedagogical requirements for leading a doctoral course. However, many course organisers hold teaching positions (see '*General competence*' below), which entails high expectations for both pedagogical and scientific proficiency. Examiners of doctoral courses must have a doctoral degree and be employed at KI.

The opinions of course participants are an important part of evaluating whether teachers possess the necessary pedagogical skills and competence. For the statement '*The teaching and learning activities facilitated achievement of the intended learning outcomes*' the average rating across all courses in 2024 was 4.3 out of 5.

General competence among KI staff

To qualify for a teaching position such as senior lecturer at KI, one must be a docent and have completed at least 10 weeks of pedagogical training. Other requirements are having demonstrated the ability to secure research grants and publish in high-ranking journals. These requirements help to ensure high level o of competence across the university.

A minimum of five weeks of higher education pedagogical training is required to be appointed as a docent, which is more than is required at many other universities.

Each doctoral supervisory team consists of at least one docent or professor.

Sufficient supervisory and teaching resources

Supervisory resources

At KI, extensive research is conducted, and many researchers are qualified to supervise doctoral students. Doctoral students are recruited when a researcher has secured research funding and has been assessed as suitable to supervise a new doctoral student (see Part 1, '*Admission process*'). There is a continuous influx of new applications for establishing doctoral positions.

The main challenge for KI regarding supervisor resources is ensuring that existing supervisors have sufficient time for supervision. Although we have a Green Light routine and a supervision plan established in the ISP, supervisors are sometimes still unable to prioritise adequate time for supervision.

A particular challenge involves supervisors employed in the healthcare sector. There are few incentives to combine a clinical position with supervising doctoral students, and many find it difficult to free up the time needed to provide adequate supervision. A positive example can be found at the KI-SöS department, where four starter grants are offered annually to cover administrative costs and resources such as computers and IT. This initiative has shown promising results, with more early-career supervisors taking on the role.

Changing supervisor

At KI, the general approach is to be open and supportive when a doctoral student wishes to change a supervisor.

Doctoral students can apply to their department for a change of supervisor using a KI-standard form. The way in which the department proceeds can vary, but it is possible to receive central support in finding suitable supervisors, either within the same department or another one. Often, a co-supervisor will be appointed, which is why we have recently initiated a discussion within the study director group regarding the benefits of having a co-supervisor from the same department.

A complicating factor is that the principal supervisor typically funds the doctoral education through their own research grants, and it is not always clear how this should be handled. However, since there is rarely a shortage of suitable individuals, there are many good examples of how departments have successfully resolved difficult situations.

In order to reduce the risk of supervisors retiring before their doctoral students have completed their studies, KI has introduced age restrictions on the appointment of supervisors. This means that individuals aged 69 or over cannot be appointed as principal supervisors.

Co-supervisors
In recent years, a key area for development has been the clarification of the role of co-supervisors. Co-supervisors are often seen primarily as providers of scientific expertise, but there is a need to clearly distinguish between being a collaborator or co-author and being a supervisor who actively contributes to the doctoral student's learning and development. This remains an ongoing challenge, and we inform the faculty about this distinction in appropriate forums.

Teaching resources

Thanks to the broad range of subject-specific courses and the bottom-up approach, KI can offer many relevant courses to the doctoral students. However, a key challenge is ensuring the availability of teachers for mandatory courses, such as in research ethics, basic statistics, and quality assurance of clinical research. These courses are in high demand, and require multiple course occasions, placing considerable pressure on specific teaching competencies. This challenge is further compounded by the fact that KI is a one-faculty university, which may lead to a shortage of faculty members with expertise in disciplines outside of medicine, such as ethics and philosophy.

Development of competences

Developing supervisor competences

As mentioned above, all principal supervisors must have completed the introductory doctoral supervisor course. Besides that, KI also offers other elective courses and activities for those seeking to deepen their pedagogical competence.

The continuation course, *Pedagogy for Doctoral Supervisors* explores pedagogical theories and educational research, has an emphasis on practical applications in doctoral education. Every year, approximately 50 supervisors participate in this course. It helps them develop skills in creating effective learning environments, setting clear objectives, and fostering meaningful learning through questions and reflection. The course also provides insights into medical science research settings, enabling them to align their supervision with these environments, and addresses conflict prevention and resolution.

Participation in this course enhances supervisory techniques, supports professional development, and contributes to the overall improvement of doctoral education at KI.

> Voices of participants in the course "Pedagogy for Doctoral Supervisors":
> *"I think that the time I have invested (and will continue to) into improving how I host supervision and group meetings will help me in the future. Similarly, I enjoyed that the course gave me the time to think critically and learn more about different approaches and subjects within doctoral student supervision. I especially enjoyed the group discussions since they reminded me that despite working in different departments and research areas, we all face the same challenges"*

KI also organises lunch seminars for doctoral supervisors to facilitate the exchange of experiences and foster professional development. These thematic seminars serve as a forum for discussing supervisory practices and engaging with guest speakers who offer insights into specific topics.

In addition to courses aimed solely at supervisors, there are other courses at KI that also contribute to the development of supervisory competences. For example, courses on work environment for managers and the leadership programme *Framtidens akademiska ledare* ('Future academic leaders').

Furthermore, there are activities at the departmental level aimed at developing and supporting doctoral supervisors. For example, the Department of LIME has implemented a supervisors' forum, which provides a space to discuss best practices, share insights and address challenges. Similarly, the Department of NVS holds biannual online supervisor meetings. Research schools also organise supervisor–student days to support joint development.

Developing teacher competence

Course evaluations play a crucial role, not only by providing structured opportunities for student feedback, but also by contributing to the professional development of teachers.

Course leaders are expected to write a course analysis that summarises the course outcomes, reflections, and suggestions for improvement. The analyses receive feedback from the thematic programmes, the research schools or the Course and Programme Committee (KPK). The purpose is for teachers to identify strengths and areas for improvement in their teaching and the structure of their course.

KI has launched several initiatives over the years aimed at improving course quality and developing teaching competence. One recent example is the Pedagogical Ambassador initiative which provides funded time for designated ambassadors aiming for a

pedagogical network within doctoral education. The Pedagogical Ambassadors are expected to lead discussions, initiate and address relevant pedagogical issues, lead development projects, support colleagues and to share best practices. A total of 10 ambassadors have been appointed up to 2025.

Additional support is available to all teachers at KI from the unit of Teaching and Learning, for example Educators' network on Teams and Bites of Learning - webinars in pedagogy. Another example is a course in course design: Designing doctoral courses.

General development of competence at KI

Activities and resources at KI designed for undergraduate teachers are also available to those involved in doctoral education. Examples include KI's Teacher Day and the annual Educational Congress.

Strengths and challenges

A summary of the strengths and challenges related to KI's effort to ensure **quality in supervision and teaching**:

Strengths:

- Mandatory and well-functioning supervisor training.
- An admission process that includes the Green Light assessment of supervisor suitability, which promotes accountability.
- Course evaluations and course analyses that provide teachers with feedback and encourage reflection on course quality.

Challenges:

- Supervisors with concurrent clinical responsibilities often struggle to prioritise sufficient time for supervision.
- It is a challenge to recruit teachers for mandatory and general science courses within a single-faculty university.
- The Green Light criteria are not always honoured, and 'unsuitable supervisors' are still occasionally appointed.

Assessment criteria 2: Doctoral education environment

Below follows KI's reflection on the evaluation questions related to the assessment criterion '**Assessment of the doctoral education environment**'.

A fundamental prerequisite for high-quality doctoral education is that doctoral students are immersed in an environment that offers ample opportunities for learning and development.

Quality and scope of research

KI fosters a research environment that is globally recognised for its excellence, providing doctoral students with access to state-of-the art facilities and resources, enabling them to conduct high-quality research. Most research funding is awarded following a thorough evaluation of the scientific quality of proposals. However, KI does not rely solely on the assessments made by external bodies, but we also carry out our own assessments to ensure the scientific quality of doctoral students' research projects.

When a new doctoral position is established, the suitability and feasibility of the scientific project are always assessed. However, striking the right balance between advanced scientific content with publications in high-ranking journals, and feasibility within the four-year timeframe, can be difficult. In some departments, there is a tendency to accept projects that are difficult to complete in time.

When KI announces opportunities for partial funding of doctoral students (e.g. KID, see Part 1, *'Source of funding'*), a comprehensive evaluation is conducted. This takes into account the competence of the supervisors, the educational environment, and the scientific quality of the research project, including its feasibility as a doctoral project.

In addition to investing in ground-breaking research there are also good reasons to provide incentives for doctoral education in the less ground-breaking fields. One important reason for that is to ensure a future supply of highly educated teaching staff in healthcare education. Examples include the Research School in Health Sciences, which provides both funding and a course and activity package, as well as the new initiative in 2025 for doctoral funding for strengthen ties between education and research.

Access to a good doctoral education environment

Ensuring that all doctoral students have access to a high-quality educational environment is fundamental to successful doctoral education. This has long been a central focus of KI's initiatives and processes.

Once again, we wish to highlight the process of establishing a doctoral position, in which the educational environment is one of the key aspects assessed. What constitutes a good doctoral education environment is not always clearly defined and can encompass many different aspects. To support the departments, a set of guiding questions are formulated to be used in the assessment process (see below). These questions may be further developed, but they nonetheless serve as a useful tool and reflect the standards that KI is aiming for.

From the document 'Rules of doctoral education at KI', chapter 2.1.2:

Questions to consider when assessing the environment:

- *Are there opportunities for contacts with other doctoral students and researchers, e.g. through networking activities, seminars etc.?*
- *Is there support available for the doctoral student's studies, e.g. in the form of postdocs, statisticians and biomedical analysts?*
- *Are there opportunities for international exchange/contacts?*
- *Are there alternative ways to achieve the objectives if the chosen strategy is not successful?*
- *What previous experience of supervision does the principal and co-supervisors have?*
- *Access to supervisors – full- or part-time, the same physical workplace, etc.? How many doctoral students are currently being supervised?*
- *How will the supervision of the proposed doctoral project be organised (in which way will the various competencies of the supervisors be utilised in the project)?*

Working environment

We ask doctoral students about the working environment within their research group. Perception of what constitutes a good working environment may vary between respondents; however, the overall trend is positive, as illustrated in Figure 8.

A crucial aspect of a good working environment is that it is free from harassment and discrimination. In the Exit Poll we ask doctoral students whether they have experienced any form of harassment, unequal treatment or discrimination at any point during their studies. KI maintains a zero-tolerance policy towards such behaviour. However, as with all other similar organisations, incidents do occur, and more common in some departments than others. Encouragingly, there is a downward trend in reported cases, largely attributed to improved conduct by supervisors, as illustrated in Figure 9 and Table 3.

It is also clear from the Exit Poll that some refrain from reporting such incidents based on the perception that it is not a good idea or that they are afraid of consequences. KI-wide employee surveys show that doctoral students are no more vulnerable than other staff groups. In many ways, this is not a doctoral student issue, but part of a broader challenge that concerns all of KI and probably the academic sector as a whole.

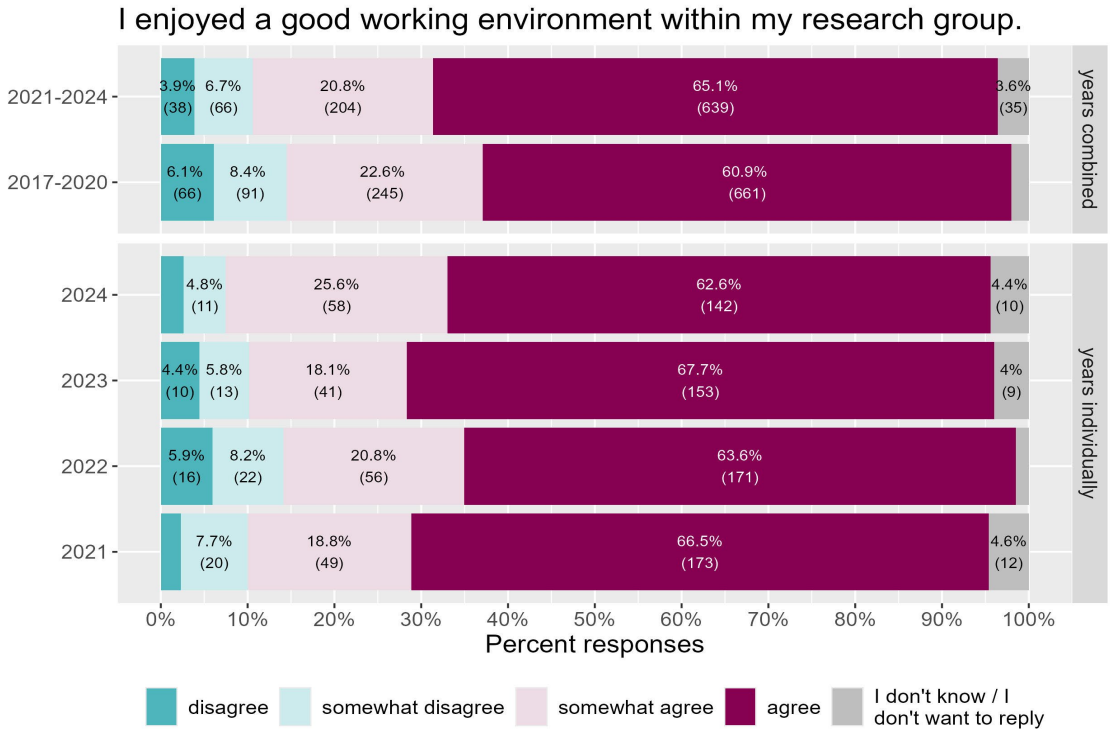

Figure 8. The opinions of doctoral students on working environment (Source: Exit Poll)

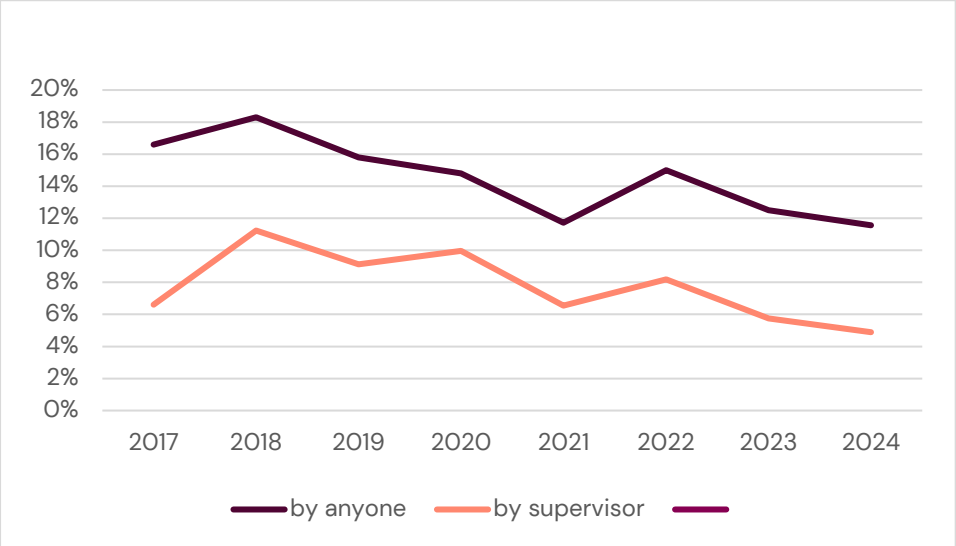

Figure 9. The proportion of doctoral students who reports have experienced unequal treatment, discrimination, degrading behaviour and/or harassment at any point during their doctoral education. (Source: Exit Poll)

Tabell 3. Distribution of answers to the follow-up question 'By whom?' asked to those who answered that they have experienced harassment, unequal treatment or discrimination. (Source: Exit Poll)

	2021	2022	2023	2024	2017-2020	2021-2024
supervisor(s)	30 (39%)	35 (45.5%)	31 (36.9%)	20 (31.2%)	174 (39.7%)	116 (38.4%)
member of teaching staff	5 (6.5%)	7 (9.1%)	5 (6%)	3 (4.7%)	36 (8.2%)	20 (6.6%)
administrative staff	5 (6.5%)	5 (6.5%)	2 (2.4%)	6 (9.4%)	23 (5.3%)	18 (6%)
fellow PhD students	15 (19.5%)	6 (7.8%)	20 (23.8%)	15 (23.4%)	78 (17.8%)	56 (18.5%)
undergraduate students	1 (1.3%)	1 (1.3%)	3 (3.6%)	0 (0%)	11 (2.5%)	5 (1.7%)
other categories of people	21 (27.3%)	23 (29.9%)	23 (27.4%)	20 (31.2%)	116 (26.5%)	87 (28.8%)
Total	77	77	84	64	438	302

Clinical doctoral students

For doctoral students employed outside KI, ensuring a good learning environment can be challenging. These doctoral students may not have other researchers or fellow doctoral students in their immediate surroundings and are somewhat distanced from the rest of KI.

While this applies to all externally employed students, the focus here is on the so called clinical doctoral students, since this is group is so large at KI (see Part 1 *'Study funding'*). Another challenge for this group is finding sufficient time to prioritise their doctoral studies.

In response to questions posed in the 2023 Exit Poll, 44% of clinical doctoral students reported that their doctoral education had been negatively affected by their clinical work. This represents an increase of 11 percentage points since 2017. In line with this, the proportion of students who felt that allocated research time within clinical employment 'makes all the difference' rose from 43% to 56%. This suggests that it is becoming increasingly difficult to complete a doctoral education while working clinically, likely due to the growing pressure to provide healthcare.

Results from the survey of clinical doctoral students are found here: Report Exit poll Clinical doctoral students 2023 in comparison with 2017.

KI and Region Stockholm have jointly addressed this issue in several ways. Research schools for clinical doctoral students (see Part 1) aim to strengthen networking and exchange with peers and researchers, while also ensuring protected time away from clinical duties to attend courses. In addition, there are funding programmes designed to

provide physicians with dedicated research time. However, these initiatives do not reach all clinical doctoral students.

Further efforts are underway to clarify the division of responsibilities between KI and Region Stockholm, and to ensure that employers provide a plan for how doctoral students will be given the necessary time for research and other study-related activities.

Several departments are also taking measures to support this group of doctoral students. For example, departments such as CLINTEC and KI-SöS are working to clarify doctoral students' affiliations with research groups at KI. Social events and meetings are also organised to foster a sense of community and reduce isolation from other researchers.

It is worth noting, however, that clinical doctoral students often report higher overall satisfaction with their doctoral education in the Exit Poll compared to other groups. While certain aspects of their situation are identified as areas for development, many aspects are functioning well.

Doctoral students' influence

KI recognises the importance of student influence and provides doctoral students with opportunities to exercise it. Student influence is an integral part of a good doctoral education environment.

The student unions appoint representatives to sit on KI's decision-making bodies. Doctoral students are appointed, for example, to the Committee for Doctoral Education (KFU) and to the Course and Programme Committee (KPK), where they contribute in a very positive and appreciated way. Doctoral students are also invited to participate in discussions and provide input on decision-making in departmental doctoral education boards and in different working and steering groups.

Explore further:
Student representative (web page)
Instructions for students' influence (document in Swedish)

Other aspects of a good doctoral environment

Other important elements of a high-quality learning environment include, for example, access to a wide range of high-quality courses and support from the department. These aspects are addressed under the section titled '*Support structures*' below.

Support structures

KI offers a range of support structures designed to foster a good learning environment and help doctoral students successfully complete their studies and achieve the intended learning outcomes. The most important of these are described below.

The individual study plans

The individual study plan (ISP) is a key tool for planning doctoral education and clarifying expectations. A well-written and elaborated ISP provides a solid foundation and good conditions for the doctoral student to receive the necessary supervision and support.

While many find the digital ISP system complex and cumbersome, others appreciate its benefits, as illustrated by the following quote:

> Voice of a doctoral student from a departmental survey:
> *"I really like the ISP system. It might seem a bit much, but it helps you map out your entire study period in a very efficient way."*

Supervisors and research group

As mentioned before, supervisors play a pivotal role in guiding students through their learning journey, offering both academic and professional advice. Regular meetings, whether formal or informal, provide opportunities for feedback, discussion of research progress, and resolution of any issues that arise.

Every year, the student and their supervisor should conduct a review of the ISP and the progress, in a process known as the annual follow-up (se Part 1 '*Monitoring progress*'). A checklist is available on the Annual follow-up webpage to facilitate and support these meetings. While 86% of respondents to the Exit Poll were satisfied with their annual follow-ups, unfortunately not everyone was. It is concerning that 8% reported not having any annual follow-ups at all.

Engagement with other researchers also enhances the doctoral experience. Being part of a research group allows students to collaborate on projects, share insights, and receive diverse perspectives on their work. This collaborative environment fosters a sense of community and belonging, which is essential for motivation and intellectual growth.

The external mentor (see Part 1, '*Rules, procedures and structures*') can also play an important role, particularly if the student-supervisor relationship fails.

Directors of Doctoral Studies and departmental administrators

The departmental Directors of Studies, together with the doctoral education administrators, have a key role in promoting a good environment for doctoral students.

Their responsibilities include making assessments when establishing new doctoral positions, monitoring students' progress, and managing any difficulties (see Part 1, '*Department*').

To support the departments, KI has developed a function for monitoring doctoral students in KI's integrated information system (VIS). This function provides an easy way to gain an overview of all doctoral students and their progress. For example, it is easily apparent which doctoral students have not participated in the introduction course, are due for a half-time review, or are approaching the defence of their thesis, see Figure 10.

Start	Aktivitet valt halvår %	Introkurs	Halvtids-kontroll	Huvudhandledare	Ack. aktivitet %	Ack. antal hp	Disputation	Lic-seminarium	Utfärdad examen	Avbrott
2018-05-18	70	2018-12-11	2022-11-11	[redacted]	764	16,5	-	-	-	-
2013-03-20	50	2014-02-13	2024-01-30	[redacted]	1 408	33,5	-	-	-	-
2021-06-17	100	2021-12-01	2023-08-31	[redacted]	715	18,2	2025-04-04	-	2025-04-15	-
2020-07-15	100	2021-05-26	2023-02-20	[redacted]	900	31,2	-	-	-	-
2020-04-01	50	2020-10-23	2023-06-19	[redacted]	550	20,5	-	-	-	-
2022-06-14	29	2022-10-31	-	[redacted]	438	19,2	-	2024-12-09	2025-01-10	2024-12-1
2022-10-14	80	2022-12-12	-	[redacted]	414	34,8	-	-	-	-
2013-11-29	8	2014-01-15	2019-12-18	[redacted]	1 062	42,3	2024-09-13	-	2024-09-25	-
2021-02-24	75	2021-05-26	2024-02-28	[redacted]	550	27,0	-	-	-	-
2020-09-09	100	2021-03-03	2023-05-12	[redacted]	862	24,3	-	-	-	-
2023-05-16	50	2023-10-30	-	[redacted]	163	10,3	-	-	-	-
2023-08-08	100	2023-10-30	-	[redacted]	229	22,3	-	-	-	-
2023-02-06	100	2023-03-13	2025-04-11	[redacted]	383	20,0	-	-	-	-
2021-02-18	56	2021-04-14	2023-05-23	[redacted]	420	21,9	-	-	-	-
2024-11-29	-	-	-	[redacted]	0	0,0	-	-	-	-
2022-02-11	100	2022-10-31	2024-09-20	[redacted]	567	25,3	-	-	-	-
2023-10-16	80	2024-06-03	-	[redacted]	193	4,0	-	-	-	-
2023-05-27	100	2023-10-30	-	[redacted]	319	4,3	-	-	-	-
2023-02-06	100	2023-04-24	-	[redacted]	400	15,4	-	-	-	-
2019-11-01	100	2020-01-22	2021-12-15	[redacted]	948	25,8	-	-	-	-
2021-09-01	100	2021-10-27	2023-12-06	[redacted]	666	30,6	-	-	-	-
2023-05-22	100	2023-10-30	-	[redacted]	322	11,5	-	-	-	-
2019-01-10	100	2022-03-09	2021-12-03	[redacted]	1 195	34,5	-	-	-	-
2024-12-11	-	2025-02-03	-	[redacted]	0	0,0	-	-	-	-

Figure 10. Part of the interface of the 'doctoral student progress' function in VIS. Colours indicate when it is time for introduction, half-time review and thesis defence respectively (yellow = it is time, red = overdue).

Most departments have introduced various types of individual and group review meetings with their doctoral students serving different purposes: to provide information, monitor progress, foster a sense of belonging etc. Almost all departments have now implemented, or are considering implementing, systematic meetings at the third-year milestone. These meetings aim to support students who are behind schedule in catching up and to assist them in planning the remaining time effectively, as well as to discuss career choices and to decide thesis format. Many departments hold one-to-one meetings with students, while larger departments organise group meetings.

Developing the competence of the study directors

It is important that the assessment and handling of doctoral student-supervisor matters are managed consistently across all departments. A new study director is always introduced to their role by the Central Study Director. The study directors exchange experiences and engage in dialogue with the Academic Vice-President, the Vice-Chair of the Committee for Doctoral Education, and the Central Director of Studies at termly meetings. They are also invited to attend the monthly digital Q&A sessions. This is an ongoing dialogue as both study directors and administrators are encouraged to contact

the faculty office and Academic Vice-President with any questions, an opportunity that is widely used.

A large majority of doctoral students indicate that they had received adequate support from the directors of studies at their department, see Figure 11.

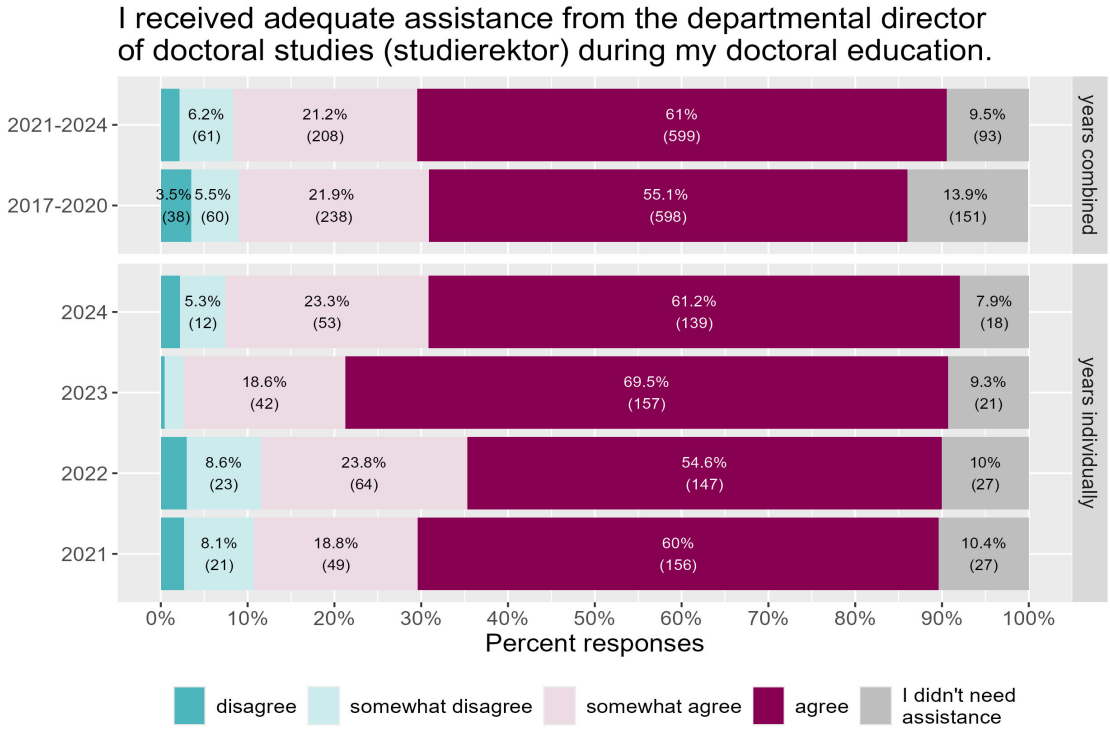

Figure 11. Results from the Exit Poll regarding the opinions of doctoral students on the support from the study directors.

Courses and other learning activities

As part of the educational environment to support the students achieving the intended learning outcomes, KI offers a wide range of elective courses. During 2024, a total of 224 courses were offered to choose from, mostly one-week courses (1.5 HEC[8]), covering general science, specific research fields and various methodologies. There is a supportive webpage designed to help students choose courses: Course requirements and choice of courses for doctoral students.

In addition to courses, other learning activities also contribute to a high-quality doctoral education environment. The thematic doctoral education programmes (see Part 1, '*Doctoral courses*') organise and coordinate activities for doctoral students, such as lectures, retreats and seminars on different themes within their research field. Another provider of learning activities is the University Library who organises workshops for doctoral students.

[8] HEC: Higher education credits (Sw: *högskolepoäng*). 1.5 HEC = one week of study

Collaboration opportunities

A strong learning environment includes collaborations with other researchers, both internationally and nationally, as well as with the surrounding society. This provides platforms for presenting research, networking with other scientists and gaining exposure to new ideas and methodologies.

International collaborations

KI's researchers are involved in many international collaborations. 76% of all scientific articles from KI are co-published with partners outside Sweden, and many of these include doctoral students. Being in an international context broadens academic and professional horizons.

Examples of support structures to encourage international collaboration:

- All doctoral students are required to participate and present their research at international conferences.
- Doctoral students can earn formal credits by undertaking research visits, nationally or internationally.
- The Committee for Doctoral Education awards travel grants to doctoral students for research visits. Around 35 grants are awarded each year.

Among those who graduated in 2024, 27% reported in Exit Poll having spent time abroad as part of their doctoral education (participation in international conferences not included as it is mandatory for all). This is a lower proportion than before the pandemic (38% in 2016), and although we would like to see more students broadening their horizons, a reduction in travel may be due to greater environmental awareness (promoted by Environment and Climate Action Plan 2021–2024) combined with the fact that collaboration is now more accessible through digital channels.

The large proportion of international doctoral students at KI, about one in three, also contributes to building networks that may offer increased opportunities for international cooperation in the future.

National Collaborations

Of KI's research articles, 19% are co-published with a collaboration partner within Sweden, which also reflects opportunities for national collaboration for the doctoral students. Many students also meet peers from other universities through, for example, national research schools, such as SWEAH, NatiOn and SINGS, by being part of SciLIfeLab or by benefiting from the university alliance Stockholm Trio.

Networking within KI

Networking with other doctoral students can be the first step towards future collaborations. At KI, this is supported by the large doctoral student population. When attending courses, participating in research schools, or engaging in other activities for examples arranged by the thematic programmes, they meet other doctoral students from a variety of environments.

Many departments have established various types of departmental networks and community forums for their doctoral students. One example is the Department of LIME, which has a Doctoral Student Council. This serves as a platform where doctoral students can voice concerns, share experiences, and discuss matters that impact their academic journey. Another example is the Department of MEB, where all newly admitted doctoral students are paired with a more experienced doctoral student as a 'study buddy' (Swedish '*fadder*').

Collaborations with the surrounding society

In some research areas, there are no straightforward and obvious ways to interact with the surrounding society. KI has actively worked to raise awareness of the importance of interacting, for example through an internship programme. KI Career Service offers up to 40 one-month internships each year at private and public sector companies and organisations in the life sciences sector for KI's doctoral students. The salary during the internship is financed by the Committee of Doctoral Education to release the supervisor from funding responsibilities during that period. Explore more: Internship for PhD students.

There are also some elective courses with this purpose, for example Career skills for scientists and Research for Societal Impact.

For the clinical disciplines, in contrast, interaction with the surrounding community is often part of daily work and frequently integrated into the research project. The doctoral students meet patients and research subjects and are often given opportunities to deliver lectures, for example to patient organisations and similar groups.

When asked in the Exit Poll 2023, around 60% of clinical doctoral students reported that their clinical work had benefited their doctoral studies.

Strengths and challenges

A summary of the strengths and challenges related to KI's efforts to **ensure good doctoral education environments**:

Strengths:

- A thorough assessment process when establishing new doctoral positions.
- A strong research environment.
- A large population of doctoral students means many opportunities for interaction and networking.

Challenges:

- Ensuring a supportive doctoral education environment for students employed outside KI, particularly for those who are clinically active.
- Addressing discrimination and harassment, and ensuring that all such situations are reported. This is a challenge for the whole university, not just within the doctoral education.
- Some doctoral students have projects that cannot be completed within the four-year timeframe.

Assessment criteria 3: Achievement of intended learning outcomes

Below follows KI's reflection on the evaluation questions related to the assessment criterion '**Achievement of intended learning outcomes**'.

Outcome-based education is an approach that focuses on achieving specific, measurable learning outcomes with defined learning activities and assessment. The three categories of learning outcomes - *Knowledge & Understanding, Proficiency & Ability,* and *Judgement & Approac*h - are inseparable and deeply interconnected. *Knowledge and understanding* provide the theoretical foundation for developing *proficiency and ability*, which involves practical research skills. Both are guided by *judgement and approach*, encompassing ethical considerations and critical thinking.

We have therefore chosen to begin with a general reflection on how KI works with outcome achievement in an overall perspective. This is followed by a deeper dive into the three specific categories under A, B and C below.

Outcome achievement – General reflection

This section provides a comprehensive evaluation of how the structure of the doctoral education supports the development of advanced knowledge, the honing of specialised skills, and the cultivation of sound attitudes and judgement in doctoral student.

Raising awareness of the learning outcomes

The outcomes for the degree of doctor and the degree of licentiate were first formulated by the Higher Education Ordinance in 2006. They represent generic outcomes for all doctoral education in Sweden.

KI has long been working to clarify and raise awareness about the existence and importance of the learning outcomes. Many faculty members became aware of this, if not earlier, in 2010, when those applying for KID funds (see '*Sources of Funding*', Part 1) needed to indicate the plans for the achievement of the intended learning outcomes within the scientific project in question. At the same time, outcome achievement plans were introduced in the individual study plans (ISPs), and a session about learning outcomes was included in the mandatory supervisor training, as well as in the doctoral students' introductory course.

To provide a comprehensive overview of how KI's doctoral education ensures achievement of each learning outcome, a matrix has been developed. This matrix systematically delineates which activities within the doctoral education contribute to the attainment of each learning outcome. The matrix is depicted below as Figure 13, 14 and 15, under A, B, and C respectively.

To educate and inform students and staff, we have a website that provides information and support: Outcomes for doctoral education according to the Higher Education Ordinance.

Despite these efforts the learning outcomes are not yet mirrored in the perception of all supervisors and students at KI. Not all acknowledge an outcome-based education or even acknowledge that doctoral education is in fact an education. Another challenge is reaching members of examination boards and opponents who come from other universities, and even other countries.

However, we believe that an awareness and interest for these aspects are rising. Continuing to remind, emphasise, and build reflection around outcome achievements in various contexts is the only way forward.

The doctoral learning journey

To clarify the learning process, KI has conceptualised doctoral education as a learning journey. Everything the doctoral student does within their doctoral education involves learning and contributes to the development of knowledge, skills and judgement.

Theoretical knowledge is operationalised through applied research practices, while critical reflection supports the development of scholarly and contextual awareness. This integrated approach contributes to a comprehensive learning environment in which doctoral students cultivate both disciplinary expertise and the capacity for independent, reflective, and responsible academic practice.

The progress of learning is regularly monitored through these steps:

1. Start: A plan for how the doctoral student will achieve the degree outcomes is established in the individual study plan (ISP).
2. Annually: Each year, the doctoral student and supervisor assess and discuss the progress, document it in the ISP, and plan the remaining education.
3. Half-time: The learning journey has reached the halfway point. The doctoral student writes a half-time report, which includes a reflection on progress and learning outcomes. The report is discussed during a half-time seminar.
4. Finish: The student and supervisor each write a reflection about learning and development (a new step, see below).

It has recently been introduced that the doctoral student, at the end of the learning journey, reflects on and summarises their personal professional development, what they have learned during their doctoral studies, and how they have achieved the learning outcomes. In the same document, the principal supervisor provides an account of the doctoral student's development into an independent researcher. The purpose is to wrap up and provide an overall picture of the doctoral journey from both their perspectives. This becomes a complement to the results presented in the thesis and constitutes a

basis for the examining board and opponent as they prepare the public defence. These reports are a recent addition, 2024, and their impact is yet to be evaluated.

Explore further: The doctoral student´s learning, development and achievement of outcomes for degree.

Learning outcomes from courses

Each course has its own intended learning outcomes (learning objectives) to guide and align with the content, teaching methods and assessment. These are connected to the overall educational outcomes (degree outcomes). In Appendix IV, we describe and analyse the relationship between intended learning outcomes in three courses with the educational outcomes.

To evaluate whether participants in courses have achieved the set learning objectives, there are questions in the course evaluation. The results show that doctoral students on average believe that they have achieved the course learning outcomes to a large extent (mean 4.2 on a scale of 1–5, where 1 indicates 'to a very small extent' and 5 indicates 'to a very large extent'). They also believe that the course design, along with teaching and learning activities had facilitated their achievement of the intended learning outcomes to a similarly high degree (mean 4.2).

Explore further: Report Course evaluations 2024 (document).

The individual study plan

To assess how ISPs function in practice as a tool for planning and documenting learning outcomes, we conducted a small a study as follows:

Three experienced ISP readers assessed 20 randomly selected ISPs. The aim was to gain an overall picture of the quality of KI's ISPs generally, and to determine whether the described activities were relevant for achieving the learning outcomes.

The ISP assessors generally had a positive impression of the ISPs (see quotes below). While the outcome activities were adequately described in most of the ISPs, they concluded that nine out of 20 did not quite reach the desired standard. This suggests that some doctoral students and supervisors may not have fully understood the importance of the learning outcomes.

Two examples of ISP with well described activities are presented in Appendix III.

Quotes from the ISP assessors:

"Most ISPs are very good with a high degree of relevance of the described activities to achieve the objectives. Some activities are quite generally described which for me pulls down the score."

"Most are good and the activities planned do not seem to be just copying but have probably been generally thought through. Quite a few had not updated the ISP with implemented activities."

Opinion of the doctoral students

In the Exit Poll, doctoral students are asked to what extent they have achieved the educational learning outcomes. A general, albeit modest, trend towards higher perceived outcome achievement can be seen, Figure 12. This can be interpreted both as doctoral students are becoming more aware of the existence of the outcomes and the expectation to achieve them, and that the education is becoming more effective.

It seems that the most difficult outcomes to achieve are those related to communication with the surrounding society (outcomes B6 and C2)[9], although there is a clear trend towards improvement (see also Assessment criteria 2 '*Collaboration opportunities*').

It must be emphasised that the Exit Poll data reflects how students *perceive* their achievement; it is not an objective measure of *actual* attainment. Respondents who indicated that they had achieved any of the outcomes to a low degree were asked a follow-up question about the reasons. One in four of these respondents indicated that they answered based on general dissatisfaction with their doctoral education. This suggests that a negative response may reflect broader concerns, rather than a lack of learning or progress.

[9] The wording of each outcome is found here: Outcomes for doctoral education according to the Higher Education Ordinance.

Figure 12. Overview of how the doctoral student has estimated their achievement of each degree outcome 2017-2024. Some data is missing for some outcomes before 2020 due to changes in the survey questions. (Source: Exit Poll).

A. Knowledge & Understanding

In addition to the general points mentioned above, issues relating specifically to knowledge and understanding are raised below.

The meaning of broad knowledge and understanding

Firstly, we must address the evaluation question specific for this area: **What does broad knowledge and understanding mean within the framework of KI's doctoral education in medical science?**

There is a challenge when more than 2,000 individuals, each with their unique research project, are admitted to the same educational subject. To manage this, KI has introduced an intermediate knowledge level called 'the research field', which sits between the broad doctoral education subject and the narrow individual project. The knowledge requirements for the three levels are defined in the general syllabus in Medical Science as follows:

1) ***The doctoral education subject (Medical Science)*:** On completing their education, doctoral students are expected to have a **solid ground** in medical science. To provide this, all non-medical undergraduates are required to take at least 3 HEC of courses in human biology/physiology and/or pathology. The general science courses, both mandatory and elective, also contribute to a broad knowledge.
2) ***The research field*:** On completing their education, doctoral students are expected to have acquired **broad knowledge and a systematic understanding** of their research field. This is achieved both through experiential learning (learning-by doing), and through courses and other learning activities (e.g. seminars, journal clubs, conferences).
3) ***The project***: On completing their education, doctoral students are expected to have acquired **advanced and up-to-date specialised knowledge** in their project and its surrounding context.

Activities contributing to learning outcomes – Knowledge & understanding

The schematic outcome matrix in Figure 13 illustrates how the various components of the educational structure contribute to the development of knowledge and understanding.

Outcomes for the Degree of Doctor according to the Qualifications ordinance, annex 2, Higher Education Ordinance	Activities contributing to the achievement of the intended learning outcomes and through which fulfillment of the outcomes can be shown							
Knowledge and understanding To obtain a doctoral degree, the student is required to	Research under supervision	Writing the thesis	Thesis defence	Doctoral courses (see their intended learning outcomes)	Research seminars, *journal clubs* among others	International conferences with own presentation	Teaching	Activities in co-operation with society in general
A1. demonstrate broad knowledge and systematic understanding of his/her research field as well as deep and current specialist knowledge in a particular aspect of this field; and	X	X	X	X	X	X	X	
A2. demonstrate familiarity with scientific methodology in general and with the methods of his/her specific field of research in particular.	X	X	X	X	X	X		

Figure 13. The outcome matrix regarding Knowledge & Understanding (outcomes A1 and A2).

Examples of activities:

1. Statistic courses contribute to a general knowledge and all doctoral students are required to complete at least one week of statistics training. There is a range of courses to choose from, for example:
    - Basic Course in Medical Statistics, 3 HEC.
2. Elective courses that contribute to knowledge and understanding in a specific research field, examples:
    - Basic Inflammation, 3 HEC
    - Neurodegenerative Disorders I: Genes, Mechanisms and Clinical Aspects, 1.5 HEC
    - Tumor Evolution in Space and Time, 1.5 HEC
3. Participating in research seminars and/or journal clubs and attending international conferences is an important way of developing knowledge within the field of research. This is credit-bearing and mandatory for all doctoral students.

B. Proficiency & Ability

In addition to the general points mentioned above, issues relating specifically to proficiency and ability are raised below. The schematic outcome matrix in Figure 14 illustrates how the various components of the educational structure contribute to this.

Outcomes for the Degree of Doctor according to the Qualifications ordinance, annex 2, Higher Education Ordinance	Activities contributing to the achievement of the intended learning outcomes and through which fulfillment of the outcomes can be shown							
Proficiency and ability To obtain a doctoral degree, the student is required to	Research under supervision	Writing the thesis	Thesis defence	Doctoral courses (see their intended learning outcomes)	Research seminars, *journal clubs* among others	International conferences with own presentation	Teaching	Activities in co-operation with society in general
B1. demonstrate a capacity for scientific analysis and synthesis and the independent critical review and assessment of new and complex phenomena, issues and situations;	X	X	X	X	X	X		
B2. demonstrate an ability to identify and formulate research questions critically, independently, creatively and with scientific rigour, and to plan and conduct research and other advanced tasks using appropriate methods and within given time frames as well as to review and evaluate such work;	X	X	X	X				X
B3. demonstrate through the writing of a thesis the ability to make a significant contribution to the development of knowledge through his/her own research;		X	X					
B4. demonstrate an ability to present and discuss research and research results, orally and in writing and with authority, both in national and international contexts and in dialogue with the scientific community and society in general;		X	X	X	X	X		X
B5. demonstrate an ability to identify the need for further knowledge; and	X	X	X	X	X			
B6. demonstrate an ability to contribute to the development of society and to support the learning of others in research, education and other advanced professional contexts.		X		X	X	X	X	X

Figure 14. The outcome matrix regarding Proficiency & Ability (outcomes B1-B6).

Examples of activities:

1. 'Learning by doing': One of the fundamental aspects of developing proficiency, ability, skills and competence is performing supervised research.

2. Courses for general skills, for example:
   - Present Your Research!, 1.5 HEC
   - Teaching and Learning in Higher Education: An Online Doctoral Course, 3 HEC
   - Writing Science and Information Literacy, 3 HEC

3. Courses for specific skills relevant for the research field and/or project, for example:
   - Construction and Validation of Measurement in Behavioural Science, 4.5 HEC
   - Epidemiology II: Design of Epidemiological Studies, 1.5 HEC
   - Bioinformatics Analysis and Visualization of Medical Genomics Data, 3 HEC

4. Other skill-developing activities, for example:
   - Teaching undergraduate students: KI's doctoral students earn credits for teaching.
   - Scientific writing: At the time of the half-time review, the doctoral student and the principal supervisor must certify that they have discussed scientific writing.
   - Taking active part in the publication of scientific paper: At least two of the constituent papers must have been accepted for publication in a peer-reviewed journal, with at least one as first author.
   - Learning new methods: Visiting a research group at another university to learn new methods, for example, is encouraged and can earn credits.

C. Judgement & Approach

In addition to the general points mentioned above, issues relating specifically to judgement and approach are raised below. The schematic outcome matrix in Figure 15 illustrates how the various components of the educational structure contribute to this.

Outcomes for the Degree of Doctor according to the Qualifications ordinance, annex 2, Higher Education Ordinance	Activities contributing to the achievement of the intended learning outcomes and through which fulfillment of the outcomes can be shown							
Judgement and approach To obtain a doctoral degree, the student is required to	Research under supervision	Writing the thesis	Thesis defence	Doctoral courses (see their intended learning outcomes)	Research seminars, *journal clubs* among others	International conferences with own presentation	Teaching	Activities in co-operation with society in general
C1. demonstrate intellectual independence and scientific integrity as well as an ability to make ethical judgements in research; and	X	X	X	X				
C2. demonstrate deeper insight into the possibilities and limitations of science, its role in society and the responsibility of the individual in its application.		X	X	X			X	X

Figure 15. The outcome matrix regarding Judgement & Approach (outcomes C1 and C2).

This area is more elusive and therefore more difficult to assess. The environment in which the doctoral student finds themselves has a significant impact on how their judgement and approach develop. This environment should be characterised by strong scientific integrity and sound academic judgement, which is why the assessment prior to admission is so important. (see also the discussion under Assessment criteria 2).

There are several courses, activities and processes that contributes to the development of the students' judgment and approach.

Examples of activities:

1. Courses in research ethics are mandatory for all doctoral students. for example:
   - Research Ethics, 1.5 HEC
2. Courses in quality assurance of clinical research is mandatory for students who are to conduct clinical research,[10] for example:

[10] Clinical research is defined as studies including intervention with physical and/or psychological effect, or sensitive personal data that is directly identifiable or is traceable to a living individual.

- Quality Assurance of Clinical Research, 1.5 HEC

3. Elective courses for communicating with the surrounding society, for example:
   - Research for Societal Impact, 1.5 HEC
4. 'Ethical considerations' is one of the headlines in the half-time report written by the doctoral student, and an issue that the half-time committee is instructed to raise during the half-time seminar.
5. Ethical permits:
   - Existing or prospective ethical approvals are requested several times throughout the course of the education: When applying for the establishment of a doctoral position, in the ISP, at annual follow-up meetings, at half-time review and in the application for a doctoral thesis.
   - Prior to defending the thesis, an expert scientific reviewer will confirm that the research has received the necessary ethical approval.
6. Responsible use of sources:
   - In the introduction course that all doctoral students attend, there is an online module 'Using Sources Effectively and Avoiding Plagiarism'. This module also contains a section on generative AI and scientific writing.
   - At the half-time review, the doctoral student is expected to upload their texts in a text-matching system (iThenticate) and have results as a basis for a discussion with their supervisor regarding scientific writing and plagiarism on the basis of the half-time report. A recent decision by the Committee of Doctoral Education will also require students to reflect on their use of generative AI in the half-time report (not yet implemented).
   - All theses are uploaded to iThenticate and the results are sent to the examination board. The use of generative AI is declared in a statement in the thesis.

Explore further:
Plagiarism checks in doctoral education
Using generative AI when writing the comprehensive summary for your doctoral thesis
Ethics at KI

Strengths and challenges

A summary of the general strengths and challenges related to **KI's work to enable and ensure outcome achievement**:

Strengths:

- KI's ambition to highlight intended learning outcomes throughout the doctoral studies, providing greater understanding and insight.
- Well-formulated individual study plans in terms of planning learning outcome achievement.
- A broad and diverse range of courses, enabling each doctoral student to find those needed to develop knowledge, skills and judgement.
- A strong focus on raising awareness of the importance and requirements of ethical permits.

Challenges:

- The understanding of how the individual study plan should be used as a tool for planning and monitoring is still not fully internalised by all supervisors and doctoral students.
- Difficulties in some research fields and projects to achieve the learning outcomes concerning interaction with the surrounding society.

Concluding summary

The Committee for Doctoral Education considers that we have established an innovative, flexible platform for doctoral education at Karolinska Institutet, with careful construction of an array of quality assurance mechanisms. We believe that the structure and support that we offer represent a generally well-functioning doctoral education of high quality.

Some aspects that we are most satisfied with include the wide range of discipline-specific research environments, which allow for widespread and mutually beneficial scientific collaborations that provide doctoral candidates with wider opportunities for learning. This exemplifies that fact that each doctoral candidate conducts a completely unique doctoral education, and this demonstrates that great flexibility to offer personalised learning experiences. The admission process is structurally multifaceted, with innovations such as the Green Light which contribute to the possibility of providing the best working environments for new doctoral candidates to be exposed to. Lastly, the portfolio of doctoral supervisor training opportunities that we offer gives our supervisors the best possible chance of understanding their role and responsibilities, which in turn should provide a high-class experience for the doctoral candidates.

The committee is also aware of the constant need for improvement, and two major areas for current focus include firstly the possibilities of conducting a worthy and enjoyable doctoral education as a part-time healthcare professional, the expectations and practicalities of which we must negotiate with stakeholders within Region Stockholm. Secondly, despite professing a university 'Zero tolerance' policy for discrimination/harassment and despite providing multiple forms of supervisor training, some doctoral candidates still experience unacceptable behaviours within the workplace, with supervisors overly represented as the perpetrators of such behaviour. Full implementation of quality assurance tools such as the Green Light, for example, should be achieved in this respect.

Appendix I

The assessment criteria and evaluation questions – full text

Assessment criteria 1:
Human resources (supervisors and teachers)

The number of supervisors and teachers and their combined competences (scientific and pedagogical) are adequate and proportionate to the volume, content and realisation of the doctoral education.

Evaluation questions

1. What scientific and pedagogical competence do the supervisors, co-supervisors and teachers with whom the doctoral students come into contact during the studies have?
2. How does KI work to ensure that the supervisory and teaching resources are characterised by stability and availability? How are sufficient supervisory resources ensured, e.g. in the event of retirement or if the doctoral student needs to change supervisor?
3. How does KI work to ensure that supervisors and teachers can maintain and continuously develop both their scientific and pedagogical expertise, both individually and collectively?

Assessment criteria 2:
Doctoral education environment

The quality and scope of research at KI are such that the doctoral education can be conducted at a high scientific level.

The doctoral education environment provides good educational conditions in other aspects.

Relevant collaboration takes place with the surrounding society both nationally and internationally.

Evaluation questions

1. How does KI work to ensure that the quality and scope of research is such that doctoral education can be conducted at a high scientific level?

2. How does KI work to ensure that all doctoral students have access to a good doctoral education environment?
3. What support structures are in place for doctoral students to help them achieve the intended learning outcomes?
4. What opportunities for collaboration, both with researchers nationally and internationally and with the surrounding society, are offered to doctoral students?

Assessment criteria 3: Achievement of intended learning outcomes

3a. Knowledge and understanding

Through its design and realisation, KI's doctoral education enables and ensures through examination that the doctoral student, when the degree is awarded, can demonstrate broad knowledge and understanding of both the doctoral education subject/research field and of scientific methodology within the doctoral education subject/research field (*degree outcome A1 (partly) and outcome A2*[1]).

Evaluation questions

1. What does broad knowledge and understanding mean within the framework of KI's doctoral education in medical science?
2. How is work done, throughout the doctoral education, to ensure that doctoral students achieve the above outcomes? For example, how is progression achieved during the education, and what is the link between objectives, intended learning outcomes, learning activities and examination?
3. How does KI work with the individual study plan so that it supports the achievement of the intended learning outcomes?

3b. Proficiency and ability

Through its design and realisation, the KI's doctoral education enables and ensures through examination that the doctoral student, when the degree is awarded, can demonstrate the ability to plan and conduct research and other qualified tasks using appropriate methods within given time frames, and in both national and international contexts can present and discuss research and research results with

[1] The complete learning outcomes for doctoral education, as defined by the Higher Education Ordinance, annex 2: Outcomes for doctoral education according to the Higher Education Ordinance.

authority in dialogue with the scientific community and society in general. (*degree outcomes B2 and B4*).

The doctoral student shall also demonstrate the prerequisites for contributing to the development of society and supporting the learning of others, both in research and education and in other qualified professional contexts. (*degree outcome B6*).

Evaluation questions

1. How is work done, throughout the doctoral education, to ensure that doctoral students achieve the above outcomes? For example, how is progression achieved during the education, and what is the link between objectives, intended learning outcomes, learning activities and examination?
2. How does KI work with the individual study plan so that it supports the achievement of the intended learning outcomes?

3c. Judgement and approach

Through its design and realisation, the KI's doctoral education enables and ensures through examination that the doctoral student, when the degree is awarded, can demonstrate intellectual independence, and scientific integrity as well as the ability to make ethical judgements. (*degree outcome C1*).

The doctoral student will have gained a deeper insight into the possibilities and limitations of science, its role in society and people's responsibility for how it is used. (*degree outcome C2*).

Evaluation questions

1. How is work done, throughout the doctoral education, to ensure that doctoral students achieve the above outcomes? For example, how is progression achieved during the education, and what is the link between objectives, intended learning outcomes, learning activities and examination?
2. How does KI work with the individual study plan so that it supports the achievement of the intended learning outcomes?

Appendix IV

Connecting course learning outcomes with educational outcomes

The alignment between educational outcomes and course learning outcomes is a central component of quality assurance, although courses contribute only to a certain extent to the achievement of the doctoral degree outcomes (see the outcome matrix in the main document).

Three compulsory and regularly offered doctoral courses are presented below as examples of how these groups of outcomes (knowledge & understanding, proficiency & ability and judgement & approach) are not treated as separate entities but are instead deeply integrated within the structure and pedagogy of a course as an educational activity.

Example 1: Basic Course in Medical Statistics

The learning outcomes in the course syllabus:

A. Knowledge & understanding:

After having completed the course, the doctoral student should be able to:

- perform and ***interpret*** basic descriptive statistics from frequency tables and graphical presentations,
- perform and ***interpret*** results from basic inferential statistical analysis and tests,
- ***recognize*** and critically examine the statistics being presented in articles within the medical field of research.

Verbs: "recognize," "interpret"

Outcome: Students will be able to recognize and interpret statistical data presented in medical research articles, demonstrating their understanding of statistical concepts. This includes the ability to critically examine and make sense of the data.

B. Proficiency & ability:

After having completed the course, the doctoral student should be able to:

- ***perform*** and interpret basic descriptive statistics from frequency tables and graphical presentations,
- ***perform*** and interpret results from basic inferential statistical analysis and tests,
- recognize and critically examine the statistics being presented in articles within the medical field of research.

Verbs: "perform"

Outcome: Students will gain proficiency in performing basic descriptive and inferential statistical analyses, ensuring they can independently carry out these tasks accurately.

C. Judgement & approach:

After having completed the course, the doctoral student should be able to:

- perform and interpret basic descriptive statistics from frequency tables and graphical presentations,
- perform and interpret results from basic inferential statistical analysis and tests,
- recognize and ***critically examine*** the statistics being presented in articles within the medical field of research.

Verbs: "critically examine"

Outcome: Students will develop the ability to critically examine the statistics presented in medical research, applying their judgement to assess the validity and reliability of the data.

Example 2: Course: Writing Science and Information Literacy

The learning outcomes in the course syllabus:

A. Knowledge & understanding:

After having completed the course, the doctoral student should be able to:

- ***describe*** the key principles, structure and style that governs most scientific research writing, from original scientific articles to other types of scientific texts, such as grant applications and popular science summaries
- demonstrate practical knowledge of how to write different types of scientific texts, such as grant applications and popular science summaries
- ***demonstrate an understanding*** of the publication process, including how to use relevant resources to choose a journal in which to publish your research
- thoughtfully reflect on the risks as well as the benefits of using generative AI for scientific communication
- demonstrate an ability to give, take and make use of constructive criticism
- demonstrate an ability to search for and manage scientific literature in a structured way.

Verbs: "describe," "demonstrate an understanding"

Outcome: Students will be able to describe the key principles, structure, and style of scientific research writing. They will also demonstrate an understanding of the publication process, including how to choose a journal for publishing research.

B. Proficiency & ability:

After having completed the course, the doctoral student should be able to:

- describe the key principles, structure and style that governs most scientific research writing, from original scientific articles to other types of scientific texts, such as grant applications and popular science summaries
- ***demonstrate practical knowledge*** of how to write different types of scientific texts, such as grant applications and popular science summaries
- demonstrate an understanding of the publication process, including how to use relevant resources to choose a journal in which to publish your research
- thoughtfully reflect on the risks as well as the benefits of using generative AI for scientific communication
- demonstrate an ability to give, take and make use of constructive criticism
- demonstrate an ability to ***search*** for and ***manage*** scientific literature in a structured way.

Verbs: "demonstrate practical knowledge, "search," "manage"

Outcome: Students will gain proficiency in writing various types of scientific texts, such as grant applications and popular science summaries. They will demonstrate practical knowledge in these areas, ensuring they can effectively apply what they have learned. Additionally, they will be able to search for and manage scientific literature in a structured way.

C. Judgement & approach:

After having completed the course, the doctoral student should be able to:

- describe the key principles, structure and style that governs most scientific research writing, from original scientific articles to other types of scientific texts, such as grant applications and popular science summaries
- demonstrate practical knowledge of how to write different types of scientific texts, such as grant applications and popular science summaries
- demonstrate an understanding of the publication process, including how to use relevant resources to choose a journal in which to publish your research
- ***thoughtfully reflect*** on the risks as well as the benefits of using generative AI for scientific communication
- demonstrate an ***ability to give***, ***take*** and ***make use of*** constructive criticism
- demonstrate an ability to search for and manage scientific literature in a structured way.

Verbs: " thoughtfully reflect," ability to “give," "take," "make use of"

Outcome: Students will thoughtfully reflect on the risks and benefits of using generative AI for scientific communication. They will also demonstrate the ability to give, take, and make use of constructive criticism, applying their judgement to improve their writing and research skills.

Example 3: Course: Medical research ethics

The learning outcomes in the course syllabus:

A. Knowledge & understanding:

After having completed the course, the doctoral student should be able to:

- ***give an account*** of research ethical theories, principles, and, to some extent, guidelines
- ***account for*** common problems that arise in the area of research ethics
- identify, analyze, and discuss research ethical issues and conflicts
- conduct a research ethical argumentation for or against a matter

Verbs: "give an account," "account for"

Outcome: Students will be able to give an account of research ethical theories, principles, and guidelines. They will also account for common problems that arise in the area of research ethics, demonstrating their understanding of these concepts.

B. Proficiency & ability:

After having completed the course, the doctoral student should be able to:

- give an account of research ethical theories, principles, and, to some extent, guidelines
- account for common problems that arise in the area of research ethics
- ***identify***, ***analyze***, and ***discuss*** research ethical issues and conflicts
- conduct a research ethical argumentation for or against a matter

Verbs: "identify," "analyze," "discuss"

Outcome: Students will gain proficiency in identifying, analyzing, and discussing research ethical issues and conflicts. They will demonstrate practical knowledge in these areas, ensuring they can effectively apply what they have learned.

C. Judgement & approach:

After having completed the course, the doctoral student should be able to:

- give an account of research ethical theories, principles, and, to some extent, guidelines
- account for common problems that arise in the area of research ethics
- identify, analyze, and discuss research ethical issues and conflicts
- ***conduct*** a research ethical argumentation for or against a matter

Verbs: "conduct"

Outcome: Students will develop the capacity for ethical reasoning and argumentation for or against a matter, applying their judgment to assess and articulate ethical positions.