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GRADUATING AROUND THE GLOBE



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GRADUATING AROUND THE GLOBE

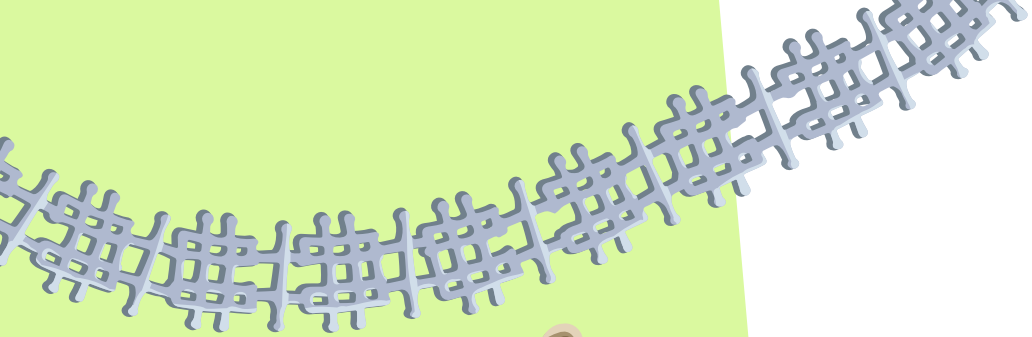


GRADUATING AROUND THE GLOBE

PROTOCOLS, PRINCIPLES, AND TRADITIONS
FOR PHD GRADUATIONS

EXAMPLES FROM THE LEARNING SCIENCES

TON DE JONG (ED.)



PREFACE

Doing a PhD is one of the oldest academic traditions in the world. Sources differ a bit on the first PhD ever given but most of them point to the German von Humboldt University issuing the first PhD diploma around 1650. The title bestowed was the *philosophiae doctor*, in which the term philosophy indicated a general level of wisdom. After its start in Germany, the PhD title spread over Europe and to the US, and now is an established tradition around the globe.

A PhD is an academic title, and it signifies that the holder is capable of doing research in an independent way and according to the rules of science. One could say that the PhD is the highest academic title (in some countries, there is also a “second PhD,” the habilitation), since you have it for life, while the title of professor is merely an indication of your position that persons will lose once they leave the position.

In this booklet, you will find an overview of PhD regulations and traditions around the globe. Overall, a PhD always consists of a collection of (original) studies that are bundled in a thesis as separate chapters or as a monograph. The work by the PhD candidate is also always assessed by an independent committee and there is usually a defense of the work by the candidate before a committee. Within this scheme, there are many variations, as will become clear from all the contributions in this booklet.

Apart from the scientific aspect, PhD defenses also often have a ceremonial aspect, with specific traditions and habits, formulae, clothing, and so forth. These vary largely between countries, with some having very sober traditions, whereas for others there is much showing-off and celebration. In any case, the event is always one of the highlights of the PhD candidates’ personal lives and something they will remember forever.

I would like to thank all my colleagues who were so friendly and spent their precious time in writing a contribution about their own country, all together covering all continents (save Antarctica). I am especially thankful to Emily Fox for language and consistency checking and to Corona Zschuschen for the design of the cover and for formatting all of the chapters. I hope this book will inspire many youngsters to take up the adventure of doing a PhD and to enjoy doing science, and in this way contribute to the advancement of knowledge and prosperity in the world.

Enschede, September 2021

Ton de Jong

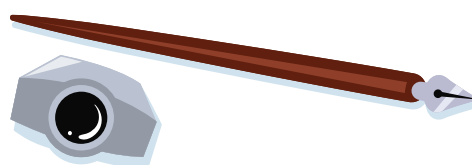


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AUSTRALIA



PETER GOODYEAR & KATE THOMPSON

It is probably too soon to say whether the PhD will take root in Australia. Modern humans (*Homo sapiens*) have lived here, on the world's largest island, wisely and well, for at least 70,000 years. By contrast, until 40,000 years ago, the only credible candidates for academic positions in the frosty swamps around Oxford, Berlin, Paris, Bologna and Enschede were *Homo neanderthalensis*. When the British invaded Australia in 1788, their scientists and curious explorers encountered Indigenous Peoples who had worked out how to flourish in every ecological niche,

and whose ways of life had adapted to accommodate changing environmental conditions. Indigenous Peoples knew how to farm with fire, to migrate without maps, to settle disputes without war and to live lightly on the land. Their knowledge of nature ran deep. Indigenous ways of knowing cherish the connections between all forms of life, learning and land, and raise deep questions about some of the claims of Western science. Whether knowledge can be the property of an individual is a case in point.

“The Australian PhD has been around for just 70 of the 70,000 years of human occupation.”

Australia’s first university, The University of Sydney, opened in 1850, but it was not until after the Second World War that Australian universities began to award PhDs. Prior to that, academics working in Australian universities typically studied for a PhD at a university in the UK or USA. In other words, the Australian PhD has been around for just 70 of the 70,000 years of human occupation. Not until the 1980s did the number of Australian PhD supervisors who had themselves done a PhD in Australia reach a level where one might speak of an “Australian way” of doing a PhD.

Currently there are some 40,000 FTE (full-time equivalent) doctoral students in Australia, distributed across 42 universities, but with a very heavy

concentration (approximately 50%) in the “Group of 8” most research-intensive universities. In 2019, there were just under 9,500 PhD completions, of which 4,800 were in Go8 universities. Just over 50% of PhD students, by FTE load, are domestic. (International student education is a major source of export earnings for Australia. International students are usually enrolled full-time.)

The field of Education has around 2,000 FTE PhD students, covering a wide range of topics. In contrast to lab-style models of graduate study, PhD projects in Education tend to be student-led and are sometimes only tangentially related to the research interests of the supervisor. Research closely aligned with the Learning Sciences is concentrated in a small number of universities. There are also some significant groupings in cognate areas, such as instructional psychology, learning analytics and digital education. Notable clusters can be found at The University of Sydney, University of Queensland, Melbourne University, University of New South Wales, Queensland University of Technology,



“In Australia, rather few PhD students come straight on from full-time study.”



University of South Australia, University of Wollongong and Monash University. Education has seen rapid growth in international PhD student numbers in the last 20 years or so. For example, the share of Education PhDs awarded to international students grew from 13% in 2000 to 31% in 2009.

Universities differ in the evidence they use to approve an application to study for a PhD, but this usually includes some combination of transcripts from past study, evidence of prior research outputs or training (the completion of a master's of philosophy, for example, an honours degree, and sometimes co-authoring of peer-reviewed work), and a brief proposal for the student's intended area of study. This is sometimes prepared in collaboration with the proposed supervisor; sometimes, supervisors are allocated after the student has submitted an application.

In Australia, rather few PhD students come straight on from full-time study. Numbers vary from university to university and between lab sciences and other fields, but only around a third of PhD students move directly from undergraduate/master's study into a PhD. More than 60% of PhD students are aged over 30 and 60% study part-time. In Education, many PhD students take up their studies after a decade or more of successful school-teaching experience and they study part-time, while continuing to work full-time.



In general, students make their own arrangements for funding themselves while studying for a PhD. Australian domestic PhD students are not charged tuition fees, but neither can they expect to be paid by their university. The Australian federal government provides stipends that partly fund domestic students' living expenses. (The base rate for the Research Training Program Stipend is approximately \$24,000 [USD] per annum, tax free.) Some PhD students get opportunities to earn extra money through casual teaching, but these opportunities are not evenly distributed. There is no equivalent of the North American TA system, nor is it common for PhD students to be paid to work on research projects, other than through occasional small amounts for casual research assistance.

The Australian PhD is closer to the British than the North American model, insofar as the focus is almost entirely on researching for, and writing up, a thesis. The typical expectation is that a PhD will take 3-3.5 years to complete, if studying full-time, and 6-7 years if studying part-time. Until recently, there has rarely been a compulsory coursework requirement and as with the British model, the core activities involve the student in reading and reviewing the literature, preparing for and carrying out some empirical research and writing it up in an extended form: all under the supervision of a principal supervisor, and sometimes with the active guidance of one or two auxiliary supervisors. On this view, it is quite a private affair.





The disconnect between the way in which supervisors are selected and the development of a productive relationship between the supervisor(s) and student mean that universities have established clear procedures for replacement of supervisors if needed.

What also makes researching for a PhD an unusually private experience in Australia is the practice of examining for the awarding of the PhD on the basis of the thesis alone. In Australia it is very unusual to have a *viva voce* exam and there is no equivalent of the public defence that we find in European traditions. Instead, three examiners are appointed, of whom at least two will be from other universities. Use of international examiners is encouraged. Given between one and three months to return their decisions, the examiners carry

out their reading and assessing of the thesis in strict independence. Indeed, they will not normally know who else is examining the thesis until their written reports are complete. An inconvenient feature during this examination period is that candidates are not considered to be enrolled at the university, and access to libraries and other services ceases. Some universities offer scholarships to support students to produce publications from their doctoral research for three months after thesis submission. For some international students, the submission of their thesis results in the cessation of the visa that permitted them to live in Australia, and they are required to pack up their lives and move back to their home country.

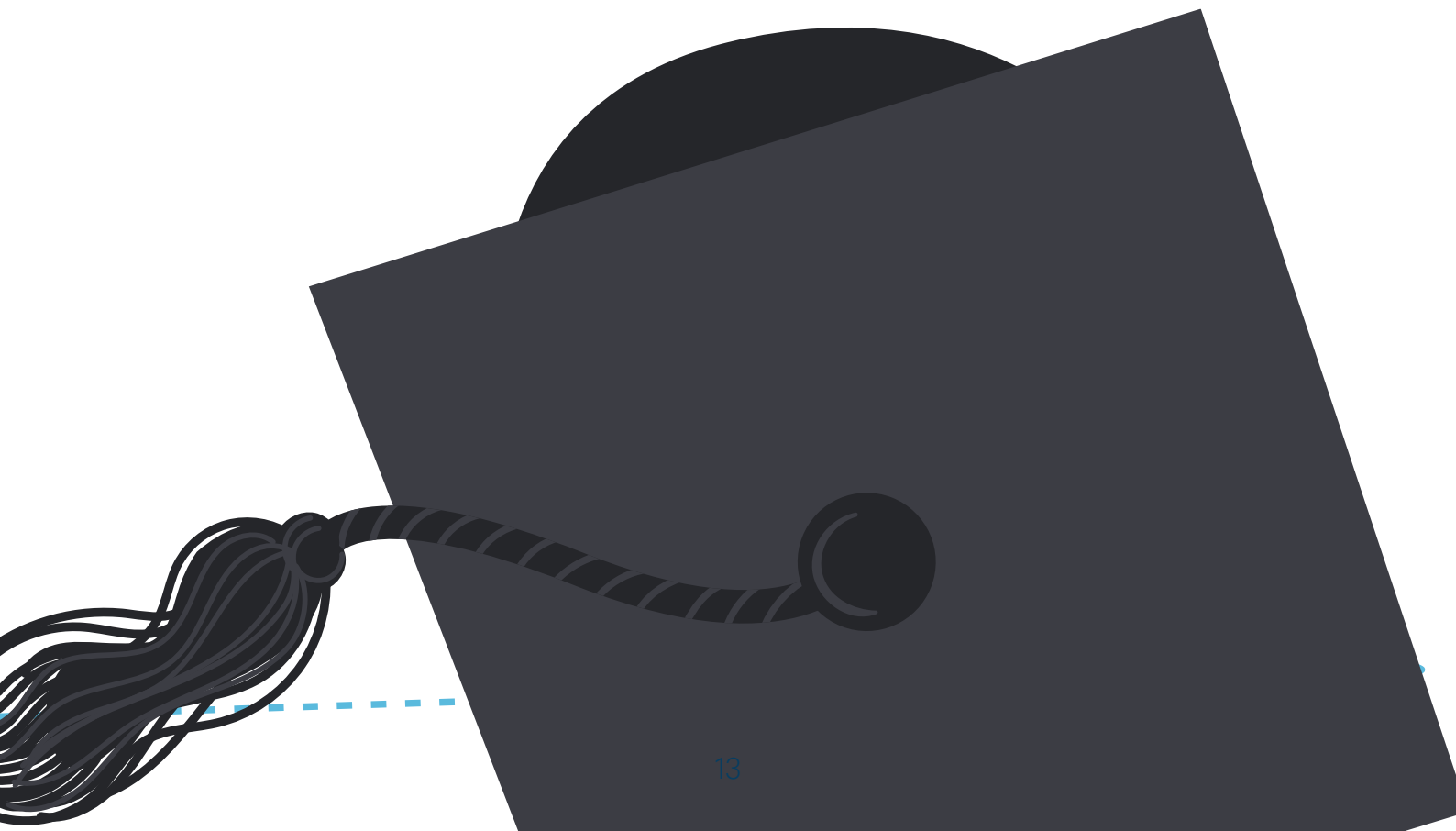
When the examiners' reports are returned, an academic nominated by the head of the department in which the student is enrolled—not the supervisor—will collate the independent examiners' reports and a standing committee will

guidance of their supervisor, has made some minor or some more significant amendments. On occasion, the student may be told to make major revisions and resubmit after substantial further work. Very rarely, the thesis is failed. Practices vary, but some universities allow examiners to remain anonymous. So, it is possible to have a situation in which the student does not know who sat in judgement on their work.

“... it is possible to have a situation in which the student does not know who sat in judgement on their work”

endorse, or modify, their recommendation. Recommendations may be to accept the thesis as it stands—that is, with no corrections required—or to accept it and move to the awarding of a PhD after the student, with the

Because there is no viva or public defence, there is no tradition of celebrating the awarding of the PhD, other than as a participant in one of the university's general graduation days. This has the virtue of being able to share one's PhD graduation with other students and their families, but this is a different, and perhaps more dilute, form of conviviality than can be seen in some other university systems.



“Research into the Australian PhD examination process has suggested that it favours research that is original, but not too original, thereby breeding a kind of academic caution or conservatism.”

Since the mid-1980s, a steady stream of research into the Australian way of doing a PhD has pointed to a number of potentially problematic issues. One of these concerns originality. The two criteria commonly underpinning PhD examinations are that the thesis must make an original contribution to knowledge and that the student should demonstrate the capabilities needed to move forward as an autonomous researcher. Research into the Australian PhD examination process has suggested that it favours research that is original, but not too original, thereby breeding a kind of academic caution or conservatism.

Arrangements and expectations are changing. While the classic model is for the student to write a unitary book-like thesis of 80,000 words or so, many universities also allow some version of “thesis by publication,” such that the central part of the thesis consists of three or four chapters, each being a journal article (published, or under review). Some universities require the student to have a paper accepted for publication before they can submit their thesis.

For most PhD students, voluntary courses are available to help them develop advanced research design and analysis skills, including online literature and database searching, project and records management, obtaining ethics clearance, statistics, qualitative methods, thesis writing and writing for publication. In contrast to PhD coursework requirements in some other systems, Australian PhD students rarely take courses aimed at strengthening their domain knowledge. Growing realisation that many PhD students do not go on to make academic careers, but take up a wide range of positions in knowledge-intensive work, has been accompanied by a proliferation of courses and support services intended to improve their chances of gaining employment outside academia. Alongside this, we see increasing use of coursework requirements

At the same time, universities have been introducing more rigorous procedures, and more centralised structures, for monitoring and managing the progress of PhD students towards timely completion: with well-defined milestones and mechanisms in place to structure expectations and to provide scaffolding for students and supervisors. Rightly or wrongly, this can be seen as a shift from trusting the professionalism of individual supervisors to creating institutional quality assurance arrangements, with the intention of protecting the student and/or the university if things go wrong.

Given these shifts of focus and scope, at some point soon serious attention will have to be paid to the contradiction between a program of PhD education that is aimed at producing an employable knowledge worker, and an examination process that speaks about a thesis, not the person who created it.

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BELGIUM



LIEVEN VERSCHAFFEL & JAN ELEN

Doing a PhD in Belgium takes four years for PhD students with a full-time research assignment (allowing them to work almost all of the time on their PhD project) or six years for those appointed to an assistant position (where they provide teaching assistance for 1/3 of their time and can work for 2/3 of their time on their own PhD project). These two groups of PhD students get a salary that is relatively high—actually, it is comparable to what a starting full-time upper secondary school teacher would get. There are also a number of self-supporting PhD students. They do not receive

a scholarship or salary and can work on their PhD at their own pace using the facilities of the research centres to which they belong. Some PhD students can only start after a pre-doctoral period where they have to improve their theoretical and methodological skills. At Belgian universities, PhD students pay a relatively small course fee (of about €500) at their first enrolment and a similar fee in the academic year during which their public defense takes place.



During their PhD period, PhD students not only have to realize their research project; they also have to fulfil a number of requirements in the context of the doctoral school with which they are obligatorily affiliated. In the French part of the country, the Fonds de la Recherche Scientifique (FNRS) coordinates the activities of the doctoral schools by means of graduate colleges, whereas in the Flemish part, these doctoral schools are organized by the

universities themselves. For instance, at the KU Leuven, there are three doctoral schools, one of which is for all PhD students of the cultural and behavioral sciences. These doctoral schools have mainly a managerial function, but they also offer some generic courses (e.g., on scientific integrity) and require PhD students to fulfil a specified package of requirements, such as following a minimum number of research seminars, giving a seminar themselves, presenting



a paper or poster at an international conference, following a course on research integrity, ...). But, this package of extra (course) work is comparatively very small. Still, doctoral programs are obligatory and must be successfully completed before the PhD researcher is permitted to submit his/her thesis.

For more than two decades, a typical PhD thesis consists of a compilation of typically a minimum of three published journal articles and/or manuscripts submitted to or accepted for publication, in which the PhD research-

Most theses are written in English, but they can also be written in Dutch, French, or any other language for which permission is granted. Whatever format or language the PhD takes, the PhD researcher should be the first author of an already published or definitively accepted international scientific publication related to the doctoral research project at the moment of submission of the thesis.

A candidate can only start a PhD if (s)he has a supervisor who is a full professor, an associate professor or an assistant professor of the faculty. In most cases, the supervising team also consists of one or two co-supervisors. All (co-)supervisors are jointly responsible for the guidance and monitoring of the PhD's doctoral trajectory. In most cases, they are also co-authors of the (published) manuscripts that constitute the PhD thesis. Quite commonly, a number of master's thesis students are involved too. For their master's thesis, they help with the literature

er reports on the research conducted in the framework of the doctoral project, preceded by an introductory chapter and followed by a discussion and/or conclusion chapter. However, theses can still take the form of a monograph.

review, they do a pilot of a newly developed research instrument or intervention program, or they help with the collection of the data for one of the empirical studies.



Besides the team of (co-)supervisors, a broader committee provides additional supervisory assistance, but the nature of that latter committee differs between universities. For instance, at the KU Leuven, an additional supervisory committee consisting of two faculty members monitors the progress of the doctoral research by evaluating the candidate's annual progress report, and before the end of the first half of the doctoral period, another committee, called the mid-term evaluation committee, consisting of members from within and outside the faculty, is appointed by the Faculty Board to evaluate the candidate's research accomplishments and plans based on a 20-pages report.

When the PhD project is realized, the supervising team agrees that the PhD is ready for public defense, and all other requirements are fulfilled, the PhD student submits the thesis. At the same time, the supervisor makes a proposal for the composition of the final evaluation committee, which typically consists of three to four opponents (at least one from within the faculty and at least one from outside the candidate's own university). It is common to invite an internationally well-known scholar in the field as one of the opponents. If the committee is approved by the faculty, the manuscript of the PhD is sent to all opponents, who have sufficient time to read and evaluate the thesis. Again, regulations differ between

“At some universities, the decision to approve the thesis for public defense is taken after an internal defense. During that defense the candidate discusses the thesis with jury members. Such discussions can take several hours.”

universities, but in most cases the examination committee not only can decide to approve or reject the thesis for public defense, but also can ask the PhD researcher to make minor or even major changes to the thesis. At some universities, the decision to approve the thesis for public defense is taken after an internal defense. During that defense the candidate discusses the thesis with jury members. Such discussions can take several hours.



“The public defense may take several hours (in some universities a time limit is imposed, for instance, of two or three hours) and has a clear ceremonial flavor, but at the same time a genuine scientific component.”

Once the thesis is definitively accepted, the candidate can prepare the final version of the PhD thesis book, send out the invitations for the public defense and start preparation of the related festivities. At all universities, the public defense is a very special day for the candidates, their family, and their research unit. The public defense may take several hours (in some universities a time limit is imposed, for instance, of two or three hours) and has a clear ceremonial flavor, but at the same time a genuine scientific component. It typically takes place in a nice hall or room in a prestigious university building, the members of the evaluation committee wear gowns, it follows a rather strict schema, and language use is rather formal. The defense is a public event. At some universities, jury members for whom it is impossible or difficult to participate live can attend the defense and raise their comments and questions through video-conferencing tools. The chair opens the session and invites the PhD student to give a short presentation of his/her PhD research. The length of the presentation may differ among universities, but generally does not exceed 30 minutes. Afterwards the opponents are invited to give their general evaluative comments, to ask questions and to engage in some discussion with the candidate. Depending on the number of opponents, this part of the session takes about 45 to 60 minutes. Next, the examination committee holds its deliberations and decides whether or not



the PhD candidate can be awarded the degree of doctor. While it is possible in principle, in practice it never happens that the degree is not awarded. For quite some years now, no grades are given. The result is announced in public immediately after the deliberations by the chair, and the diploma (or often a “proxy,” as the official document may not be ready yet, given the need for signatures of dignitaries) is handed to the candidate. Then, the supervisor expresses a *laudatio* to the candidate, highlighting—often in a humorous way—important characteristics of the candidate and his or her PhD trajectory. And, finally, in return, the candidate says some words of thanks to everyone

who has contributed to the successful completion of the PhD trajectory. It is not uncommon that some tears appear during these typically rather personal moments that close the session, and that end with the invitation to the reception by the new doctor. In some faculties, it is common that the graduate invites the members of the evaluation committee, together with some closest relatives and friends, for a festive dinner in the evening or that (s)he gives a more informal party with a larger number of participants.



CANADA



SUSANNE LAJOIE & PHIL WINNE

Completing a PhD in Canada typically takes 3-5 years depending on a few factors. For example, a student beginning a PhD with a master's degree in Learning Sciences or a similar field can shorten the time to complete a program because they likely have completed some theory-based seminars and quantitative courses required in the core PhD program. Usually, the PhD is lighter on coursework than a master's program and emphasizes more about research. PhD students commonly engage in research at the outset by collaborating with their faculty

supervisor(s) and members of research teams. PhD students are encouraged to develop research proposals for external funding early in their program to gain extra financial resources to accomplish their dissertation goals. Supervisors also encourage students to submit papers to conferences and for publication.

There are 5 major parts to the PhD program: courses, comprehensive examination, doctoral proposal, dissertation, and doctoral defence.

“Some programs recommend or mandate a course on teaching and learning in higher education to help students prepare for teaching at the university level.”

Courses

Courses in the PhD program build knowledge foundational to the learning sciences. These generally include: theories of learning, cognition and instruction, self-regulation, motivation and emotion, technology-rich learning environments, socio-cultural and historical theories of learning; quantitative and qualitative research design and data analyses. Additionally, some programs require an advanced PhD seminar. It

helps establish a social and scholarly cohort and highlights current research by faculty. Topics in these seminars often provide guidance about reviewing and synthesizing literature to help students refine research interests and build foundations for writing comprehensive examination papers. Some programs recommend or mandate a course on teaching and learning in higher education to help students prepare for teaching at the university level.

The comprehensive examination

This examination usually occurs at the beginning of the second year of the PhD or once core courses have been completed. While it is an examination, almost all programs treat comprehensives as an opportunity for formative evaluation. Examination papers mainly assess students' abilities to gather and critically review research, and design or constructively critique research methodology. Most programs set the examination as “take-home” tasks, and topics of exam items usually are tailored to



the student's research focus. The exam items, usually 2 or 3, may be drafted by the student or by the senior supervisor. In some programs, the student and supervisor review items before the examination begins; in other programs, items are not shared with the student until the examination commences. The period for writing responses varies among programs, ranging from 2-3 weeks to an entire semester.

In some programs, the comprehensive exam is a stepping stone to the dissertation proposal. In other programs, a preliminary form of the proposal for the PhD dissertation provides a framework for topics on the exam.

Beyond the substance of examination papers, marking is also based on clarity of expression, using appropriate academic language and demonstrating competence in applying schemas of the discipline. Many programs include an oral component in the examination, usually providing written feedback from faculty readers before the oral. Students may be invited to revise responses if the examining committee judges that this experience provides an opportunity for the student to extend their knowledge and build skills for developing solid scholarly work. Passing the comprehensive examination opens the gateway to formal work on the dissertation. It is very rare that a student is not passed and is required to withdraw from the program.

The dissertation proposal

Almost all programs require students to develop a formal proposal for the dissertation and present it to the supervisory committee for review, perhaps revision, and final approval. Usually, the faculty committee supervising the dissertation is the same as the comprehensive examination committee, sometimes minus one of the comprehensive exam readers. Supervisors forming the dissertation committee generally see the candidate through to completion of the dissertation.

The dissertation proposal summarizes the literature and rationale for the student's research, poses specific research questions, and typically goes into some detail about methods and analyses that will be used to answer the research questions. The committee and the student work together to ensure the research project is manageable given available resources and makes an original contribution to scholarly knowledge. Some programs require the student to present a formal seminar about the proposal. In other programs, the student and supervising faculty gather at a roundtable to fine-tune the proposal. The committee must approve the proposal before the student begins actual work on the dissertation project. In a sense, the proposal serves as a blueprint and a contract for the student's doctoral research.

The dissertation

“There are two types of dissertations, a traditional monograph and a multi-study dissertation.”

There are two types of dissertations, a traditional monograph and a multi-study dissertation. Both include a comprehensive review of relevant literature, describe methodology applied in the research, carefully present results and provide scholarly discussion of them. Throughout, it is important to make clear how the research makes an original contribution to knowledge.

The monograph-style dissertation usually presents a single study. The nature of the research can range over those in the learning sciences: an experiment situated in the field or a laboratory, a meta-analysis, a qualitative investigation or a mixture of these methods.



The oral defence committee



“The doctoral defence usually takes 2-3 hours. The candidate is invited to make a 20- to 25-minute presentation. After the presentation, one by one, each member of the examining committee questions the student about the dissertation.”

The multi-study dissertation includes at least two, usually more, scholarly papers on which the student is the first author or co-first author. These may be published, under review for publication or in near final form to be submitted for publication. Preceding the chapters presenting each paper is a general introduction to the entire collection of work that provides a rationale for them as a set. Often there are bridging texts between chapters to provide conceptual glue joining the several studies. This dissertation ends with a final discussion that interprets the body of research and summarizes its contributions to knowledge.

Throughout the process of working on the dissertation, the chair or senior member of the supervisory committee mentors the student. As drafts are produced, committee members provide feedback for revisions. Once the full committee agrees the dissertation is ready to move forward for external review, the supervisor and student decide on possible external examiners. The supervisor informally contacts the examiner to see if they are willing to serve in that capacity, then university forms are completed to set the date for a doctoral dissertation defence.

The external examiner is given 4-6 weeks to read and evaluate the dissertation, and provide a report about it. The report usually includes general and sometimes specific questions that may be asked at the oral defence.

The doctoral defence

The composition of the oral defence committee includes a chair of the oral defence appointed by the university, the chair (senior supervisor) of the student's dissertation committee and, of course, the student. Others examining the student at the oral defence vary from university to university. They may include: other members of the student's dissertation supervisory committee, the department Chair or Associate Dean for Graduate Studies, the external examiner who may attend remotely, and a member of the university faculty outside the student's academic unit.

Doctoral defences are usually open to the public, so fellow students, family and close friends may attend.

The doctoral defence usually takes 2-3 hours. The candidate is invited to make a 20- to 25-minute presentation. After the presentation, one by one, each member of the examining committee questions the student about the dissertation. Exchanges between each questioner and the student usually take 5-10 minutes. The protocol varies among universities, but usually external members of the committee are first to ask questions followed by members of the supervisory committee.



The post-defence celebration





The post-defence celebration

Almost always, there are 2 rounds of questions from committee members. After the examining committee completes its questioning, it is customary to ask anyone attending if they have questions of the student.

After everyone's questions have been addressed, the candidate and everyone who is not a member of the examining committee is asked to leave. The examining committee then discusses the student's presentation, answers to questions during the oral defence and the general quality of the dissertation.

A vote is taken to evaluate the dissertation and the student's defence. Most universities have four categories: pass with no revisions to the dissertation, pass with revisions to be approved by the supervisory committee's chair/senior member, reserve judgment pending major revisions to the dissertation and possibly a second oral examination, or failure. Almost always, the decision is a pass with minor revisions.

Graduation day

Following the examining committee's vote, the student and audience are invited to return and the candidate is informed of the examining committee's decision. The candidate is congratulated and, when people can assemble at the university or another venue, there is a celebration.

Come rain or shine, this important day is filled with joy and anticipation of a bright future. Different universities have different customs. At McGill and Simon Fraser, bagpipers lead faculty members and graduands are piped into the graduation venue.

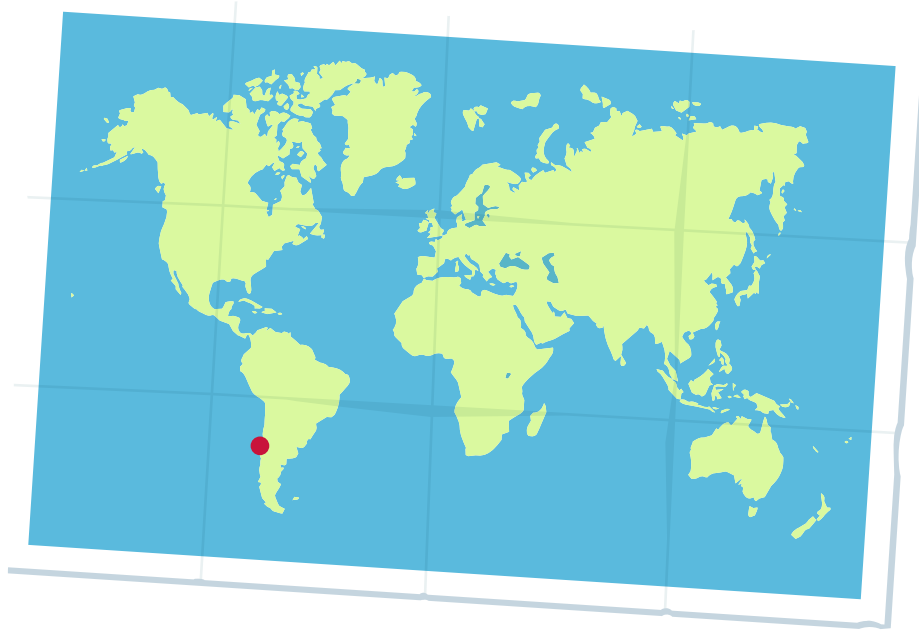


Convocation Day



CHILE

MIGUEL NUSSBAUM & VALERIA HERSKOVIC



A PhD in Chile typically lasts four years (eight semesters), with a minimum time of 2-3 years and a maximum time of 5-6 years. In 2012, the actual average time to graduate across doctoral programs was a bit over 6 years (SIES2014), but this figure has probably decreased in recent years as programs have taken measures to help students graduate within the expected time. Students are usually funded through governmental scholarships that cover four years of the PhD program (plus a possible six-month extension to write the thesis document) as well as a stipend. These scholarships

are only available to students from accredited programs. Other possibilities for students to fund their research include university scholarships, or research projects. There are also students who self-fund their studies, which (probably) lengthens their stay in the program.

The rules for the PhD programs vary for different institutions and can also vary slightly between programs. The two top research universities in Chile are Pontificia Universidad Católica de Chile (UC) and Universidad de Chile (UCh).



The PhD defence at UC (picture from Michael Arias)

At UC, students will typically take three semesters of coursework (8 courses) followed by a candidacy exam in which students must present, in front of their thesis committee (but without the presence of their advisor!), their research area and their planned research (including, e.g., their research question, proposed methodology and work plan). After the exam, students are considered PhD candidates, expected to mainly focus on thesis work for the remainder of their doctoral program. They are also required to complete three courses in

core research-related skills, including ethics, to certify proficiency in a second language, and to carry out a research internship abroad during their studies. At UCh, in the Computer Science PhD program, students have to take 3 courses in their research area during the first year of studies, as well as a course relating to research methodology, and conduct initial thesis work. After the first year, students must undertake an oral qualifying exam covering the area where they will do their research, as well as their initial thesis work.





Cutting the shirt collar at UCh (picture from Pedro Rossel)

If this step is completed successfully, students will work on their thesis for three semesters, after which they must take a Doctoral Proposal Exam. This exam must convince the Thesis Committee that the research is worth continuing (i.e., that the student has made enough progress in the three semesters and will be able to finish in another three semesters). After this, students work on their thesis for the next three semesters.

Most PhD programs require the student to publish at least one Web of Science-indexed journal article as first author to be eligible for graduation. Many students graduate with more than one article, or with several articles in conferences or other venues as well. When students have fulfilled this requirement, they write their dissertation—either as a complete document or as a coherent collection of published research articles with an added introduction and conclusion— send it to the committee, and if the committee approves it, they can prepare for their final thesis presentation.

The thesis committee is generally composed of the research advisor (and co-advisors if there are any) as well as other guests.

The Engineering PhD program at UC in particular includes five additional professors, as follows:

- one professor from the same (or close) research area and PhD program;
- one professor from the same (or close) research area;
- one professor or researcher studying related research topics and belonging to another institution;
- one international professor from the research area (who will generally be invited to attend the exam in person); and
- one professor that represents the UC Engineering School of Graduate Studies, who may be from any other Engineering discipline and acts as the president of the Committee. The president is usually a full or retired professor.

The exam is usually public, so students will bring their friends and family members, and often other PhD students will also attend to see the process. The exam is a formal event in which students are usually dressed formally, but the committee members may be dressed in their regular clothes. The president of the committee will

“There is no limit to the number of questions each member may ask, no limit to the time they may take, and no limit to the number of rounds of questions that are asked.”

introduce all members of the committee and lay out the rules of the exam. Then, the student will present their work for an allotted time, usually around 45 minutes to an hour, and then, the committee will ask questions in a pre-determined order. There is no limit to the number of questions each member may ask, no limit to the time they may take, and no limit to the number of rounds of questions that are asked, so each member of the committee can ask questions until they are satisfied with the answers. The overall questions portion will last on average for about an hour. After this, the president of the committee will ask all guests and the student to leave the room, and the committee will deliberate. If students have reached this milestone, it is expected that they will pass the exam—however, if the committee is not satisfied by the presentation or the answers, it



would be possible to fail the student at this point. When they have reached an agreement, everyone is called back into the room and the student is informed of the decision, which is usually positive.

After the exam, each department will have its own tradition. Some offer a brief celebration—champagne, juice, sandwiches, hors d'oeuvres—while others will have the committee and students briefly congratulate each other and then return to their offices. At the UCh Department of Computer Science, students' shirt

collars or a small lock of hair are cut, pasted on a sheet of paper, and pinned on a bulletin board with their name, so other students and family can write congratulatory messages.

A final, formal ceremony is usually held by the university to celebrate all of the students who have graduated in the previous year, who in past years have been over a hundred at both UCh and UC. In this ceremony, students are handed diplomas or medals by the University Rector.



Final UC University ceremony

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Final UC University Ceremony picture retrieved from: <https://www.uc.cl/noticias/165-nuevos-doctores-se-graduaron-en-la-pontificia-universidad-catolica-de-chile/>



CYPRUS

ZACHARIAS C. ZACHARIA & ELENI A. KYZA



The Republic of Cyprus is a small island-country in the Mediterranean, with a population of around a million. The higher education system, which is governed by the Cyprus Ministry of Education, Culture, Sport and Youth, is aligned with the direction provided by the European Higher Education and the Bologna Process. The Cyprus Agency of Quality Assurance and Accreditation in Higher Education (CYQAA) is the local authority that is responsible for monitoring the quality of the education provided by all higher education institutions in Cyprus. There are three

public universities in Cyprus and five private ones, and all of them grant PhD degrees. The structure and implementation of the doctoral studies programs may vary across institutions, with the three publicly funded universities being more closely aligned than the PhD degrees offered by private universities. This document is focused on the PhD processes characteristic of the public university programs in Cyprus.

PhD positions are publicly announced twice a year, and students can begin their studies in the fall or spring semester; those selected should have already successfully completed, at a minimum, a bachelor's degree in a related field, and preferably a master's degree. Studies are usually face-to-face for the two of the public universities in Cyprus (and not the Open University that focuses on distance learning), even though a combination of methods are used to meet and support students.

Completing a PhD in Cyprus takes about four to five years, with a minimum residency of three years, while the upper limit of the duration of studies is eight years. In this time period the candidates

usually have to attend a number of courses, pass a comprehensive qualifying exam, present a research proposal, and design, implement and report their research through their thesis. All these stages usually run under the auspices of the graduate school of the university, which in the end is responsible for granting the PhD degree. (However, not all universities have organized Graduate Schools.)

The PhD thesis is the culmination of the higher education preparation for intellectual work. The thesis can follow a variety of models, which should represent the innovative and original work of the candidate: it can either be a monograph or it can take the form of



The first graduation ceremony and the first oath ceremony of the University of Cyprus Medical School.

“Most of the theses are written in Greek, but they can also be written in English.”

a series of journal-style papers, which have been, or will be, submitted for publication in peer-reviewed journals. Most of the theses are written in Greek, but they can also be written in English.

As part of their PhD graduation requirements, PhD candidates often undertake teaching responsibilities, which may be part of their formal requirements for graduation. Many are also employed as research assistants in funded research projects during their PhD studies.

The thesis is supervised by a faculty member (who can belong to any of the four tenure-track positions, from lecturer to full professor) from the PhD student’s department. This faculty member acts as a mentor and a supervisor throughout the PhD studies of the candidate, along with two other members of the department, or one member of the department and one member from another department of the same university, who evaluate the candidate’s proposal and advise the candidate as part of the supervising committee, up until the completion of the thesis.



The gowns used by University of Cyprus graduates were inspired by the Byzantine years.



When the PhD thesis reaches maturity, as assessed by the supervisor and the supervising committee, the aforementioned three-member committee has to formally approve the work. This is usually done after a four- to five-year intensive supervision period, with many revisions. Once the thesis is approved by the three-member supervising committee, an examination committee is formed. At UCY this committee consists of five members, whereas at CUT it currently consists of three members. External members of this examination committee should be at the rank of full professor and should have prior experience in supervising PhD students. The members of the committee receive the thesis and have four to six weeks to give written feedback and decide whether the thesis is “defendable.” Right after the thesis is deemed defendable, a date is set for the final defense.

During the defense, the candidate has 45 minutes to publicly present his/her work, followed by questions from the examination committee and, if time permits, the attending public. The process is strictly academic, with no particular rituals attached to it. After all questions are answered, the examination committee decides whether the thesis is accepted as is or whether further revisions need to be made. The committee may also invite the candidate for further questions during their deliberations. In the case of revisions, the candidate needs to make the necessary



The Cyprus University of Technology PhD gowns have been designed to emphasize intellectual victory, perseverance and reward, using ancient Greek symbols such as the olive branch.





changes and receive approval from the examination committee that the revisions made were sufficient in order for the process to move forward.

After the thesis is approved, it is printed, and along with the necessary paperwork it is forwarded through the Graduate School to the Senate of the university for the final approval. The diploma is received at a ceremony organized for all graduate students. This ceremony is formal.

Both academics and graduates wear gowns, which were inspired based on the history of Cyprus. For example, the gowns used by University of Cyprus graduates were inspired by the Byzantine years (see pictures on page 37), whereas the gowns of the Cyprus University of Technology were inspired by the ancient Greek times, with olive

branch patterns at the center, which signify the concepts of victory and reward, symbolic of the effort, rigor, and perseverance of the PhD candidate (see pictures on page 38).

SOURCES

Picture on page 36. Retrieved from: <https://twitter.com/UCYMedical/status/1149287389694713857/photo/4>

Top picture on page 37. Retrieved from: http://ucy.gownhirecyprus.com/index.php?route=product/product&product_id=51

Bottom picture on page 37. Retrieved from: <https://ucy.ac.cy/fem/en/home/272-kothari-honorary-doctorate>

Picture on page 39. Retrieved from: <https://www.cut.ac.cy/news/article/?contentId=186970>



ESTONIA



MARGUS PEDASTE & ÄLI LEIJEN

In Estonia, doctoral studies in Educational Science often start almost a year before the formal start of the studies. Usually, the potential student candidate gets in contact with a potential supervisor, or the latter seeks a student who could be involved in a research project. Often, the PhD studies are carried out in the context of larger projects, and the project team supports the PhD student in one way or another in becoming a researcher and joining the research community. The first step towards starting with PhD studies is for the potential supervisor to write up a

PhD project. Sometimes, the potential PhD student candidate already collaborates in this phase. Often, there will be more than one supervisor for a project, to provide the students with different types of guidance needed in their studies. The co-supervisors might be experts from abroad. The supervisors' projects are examined by the doctoral programme council; based on evaluations made by two reviewers, it is decided which projects will be presented to potential candidates. The candidate will choose one of them and prepare their admission application

“The standard period of study for PhD studies in Educational Science is four years. However, it might often take five or six years to complete the studies.”

(often in collaboration with the potential supervisor). The admission decision is made based on the PhD student’s project, which has been developed further based on the supervisor’s initial project, and an admission interview with the admission committee.

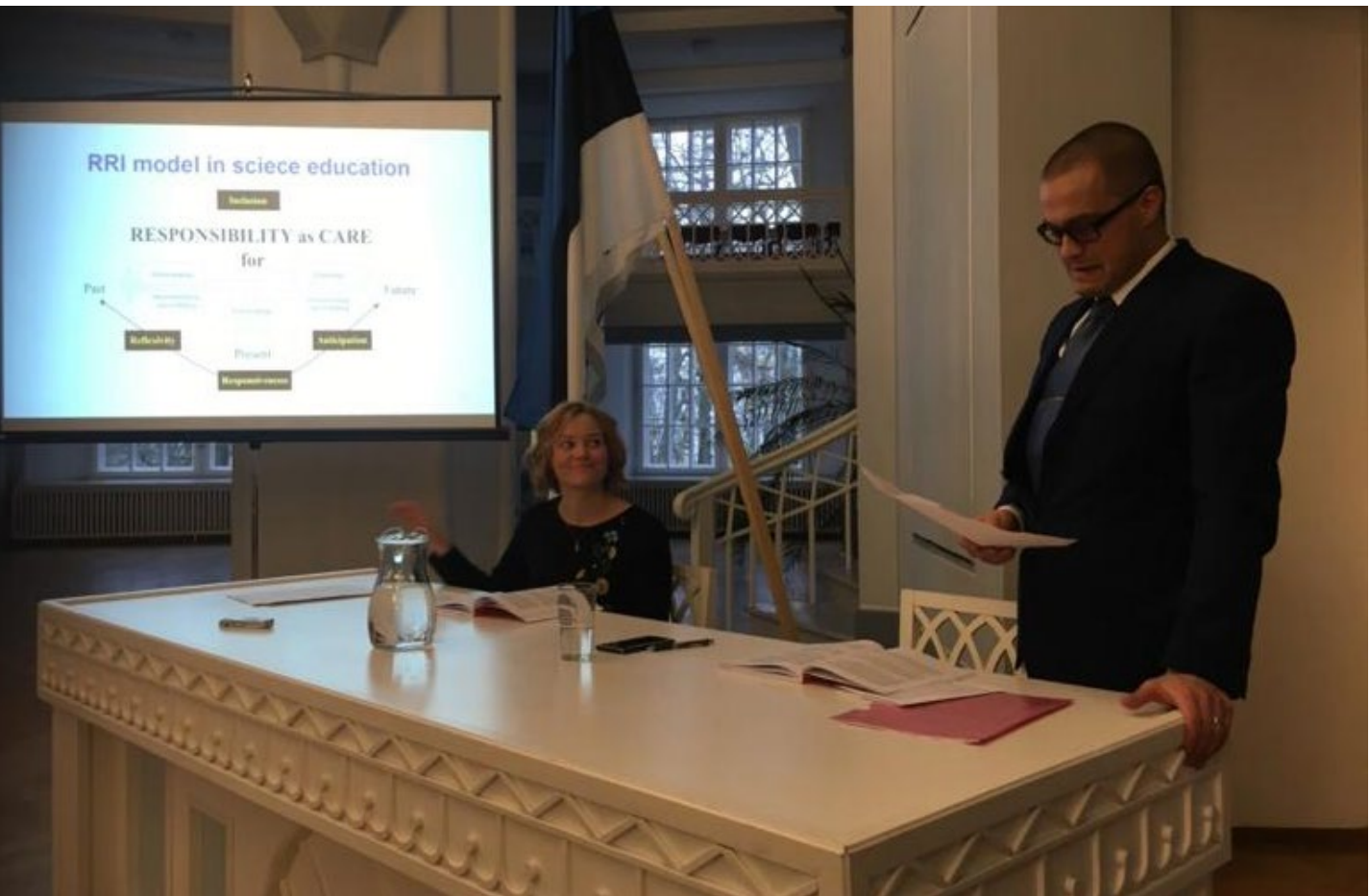
The standard period of study for PhD studies in Educational Science is four years. However, it might often take five or six years to complete the studies. The main part of the PhD studies is research, which accounts for 180 ECTS credits out of the total 240; however, the students also need to complete courses for 60 ECTS credits. There are obligatory specialty courses such as Doctoral Seminar, Philosophy of Science, Qualitative Research Methods

in Education, Quantitative Research Methods in Education, and Writing Scientific Articles. In addition, students need to complete some specialty elective courses and university-wide elective courses focusing on transferable skills. Finally, they can also select a few optional courses to adapt their studies to their specific needs according to their PhD project. In addition, PhD students are expected to actively participate in the activities of the doctoral school. This is a project-based activity where the Educational Science PhD students and their supervisors all over Estonia have discussions (summer schools, winter schools, other seminars), writing camps and many other events together supporting the PhD studies and building a community of researchers. In these events our partners from abroad are also involved.



PhD thesis will be printed as a book





Main part of the PhD defence is an academic discussion between the student and opponent

Students' progress is regularly monitored by the supervisor, but also by an evaluation committee, which gives feedback and recommendations and awards credit points for scientific research based on presented materials and discussion, for example, submitted or published articles, presentations made at scientific conferences or work done in research projects related to the PhD studies. Evaluation takes place after the first semester and at the end of each academic year. If students are not progressing well, they can take academic leave and postpone the evaluation until after their return. The evaluation committee mainly focuses on students' progress on their PhD dissertation.

The PhD dissertation (a thesis) is usually a collection of at least three original scientific publications and a rather long summary (usually 50–100 pages) presenting the research problem covered in different articles, the theory of the study, research design, main findings, discussion of the findings, as well as limitations and implications of the study. It is also possible to present a monograph as a PhD thesis, but this is very rare, because the PhD student and supervisor(s) are usually interested in already publishing the first findings of the study in scientific journals or conferences. In the case of a monograph, only one article needs to be published.

When all the required courses have been completed, necessary publications have been published or accepted in journals indexed by the Web of Science or Scopus (conference articles indexed in these databases are also accepted if the respective conferences have organised a thorough review process) and the draft of the thesis is ready, then the student can present his/her work to the defence committee, consisting of academics (usually professors) from the university. The student presents the draft of the thesis, all related articles, an application for accepting them for consideration, and the supervisor's opinion, together with the permission for the thesis to proceed to defence. The academic secretary of the university checks if all requirements are met—if the required courses have been completed and if the thesis meets the formal requirements. The permanent members of the defence committee read the thesis and if they deem it fit for defence, two internal reviewers will be assigned—usually one from the committee and another from another university in Estonia.

After the thesis has undergone the internal review, a pre-defence is organised. First, the PhD student has 30 minutes to give a presentation on the study and its main points to be discussed at the defence. Next, the internal reviewers will have a discussion with the PhD student, followed by a discussion with other committee members.

“In the end, the committee makes one of two decisions—to approve the thesis for public defence or to send it back for revision. In the case of the former, it is up to the PhD student and his/her supervisor(s) to revise the thesis.”

Usually, numerous recommendations are made in this phase that should be taken into account in revising the draft of the thesis. In the end, the committee makes one of two decisions—to approve the thesis for public defence or to send it back for revision. In the case of the former, it is up to the PhD student and his/her supervisor(s) to revise the thesis. In the latter case, they need to implement the changes and present to the committee a document with responses to all comments. If the thesis is approved for defence, the supervisor contacts a potential opponent (or sometimes two), usually a professor from a university abroad (or at least from another university in Estonia, if there are two opponents appointed). After getting the opponent's agreement



and negotiating the date of the defence, the committee assigns the opponent(s) and announces the date and place of the defence. Then, the thesis can be printed with all this information included. Usually, the opponent is also included as a member of the defence committee. Sometimes, a few additional members are appointed to increase the expertise of the committee, based on the focus of the thesis.

The opponent is expected to read the thesis and related articles (most of them are usually published in English) and present a summary of his/her opinion of the thesis and questions/discussion topics that could be taken up at the public defence. This should be presented to the committee and the PhD student, a few days before the defence at the latest. It will guide the PhD student in preparing for the defence.



New doctor thanks the supervisors and the opponent after the defence

“After the discussion with the opponent, all committee members and, later, everyone from the audience can ask up to three questions.”

The public defence starts with an introduction of the procedure by the head of the defence committee. After that, the floor is given to the supervisor(s). He/she makes a few remarks about the PhD student's journey to the defence day and usually wishes the student good luck with the defence. Next, the PhD student introduces his/her work for 30 minutes. This is followed by an academic discussion between the opponent(s) and the PhD student. There is no fixed time limit for that, but the recommended time frame is 30 to 60 minutes. It has mostly been done sitting at a desk next to each other, with the audience watching the “show.” In the discussion, the opponent can choose the topics that are most important and relevant according to the expertise of the opponent, the content of the thesis and the PhD student's presentation. There is no need to stick to the questions and comments made in the written review presented a few days earlier.

After the discussion with the opponent, all committee members and, later, everyone from the audience can ask up to three questions. The PhD student tries to answer all questions. When there are no more questions, the committee goes to a separate room to discuss the thesis and defence. The committee's discussion is secret, but they will decide what comments will be presented to the audience by the head of the committee so that everyone can learn from the defence.



After the defence guests congratulate the new doctor

After the discussion, all committee members vote on awarding the PhD degree. Sometimes, a few committee members find that the student should not receive the degree.



However, so far, the decision has always been positive in Educational Sciences. After the vote, the committee comes back to the main room of the defence and announces the decision: “to award a Doctoral Degree in Educational Sciences.” However, there is no diploma or any other document presented at the defence.

Right after the announcement of the decision, the PhD student takes a moment to express his/her gratitude; then, the head of the committee, the supervisor(s) and all others congratulate the new doctor. Most of them bring flowers and sometimes a small present. Often, there are not only academic colleagues present at the defence, but also family, good friends and interested people from the local community. The defence is really a public event and it is also advertised to the public. Of course,

“The defence is really a public event and it is also advertised to the public.”

the supervisors are also congratulated, and the new doctor often has a small present for both the supervisor(s) and the opponent. After everyone has expressed their

good wishes and shaken hands with or hugged the doctor, the new doctor invites all guests to join a reception right after the defence – usually an approximately one-hour long event with drinks and finger food. Sometimes, an additional defence party is organised in the evening.

At some universities, there are special ceremonies to give the doctoral diplomas. For example, once a year on the 1st of December, the birthday of the University of Tartu, the national university, there is an official ceremony in the university’s assembly hall where all the new doctors awarded with a PhD degree during the preceding year will get their official certificate of the degree – the diploma. It will be presented by the Rector of the University.



PhD diplomas



are presented by the Rector of the University once in the year in the University's anniversary ceremony



FINLAND



ERNO LEHTINEN & SANNA JÄRVELÄ

Finnish universities' doctoral degrees are equivalent to a PhD, but the titles vary according to disciplines. For example, in educational sciences the title is *kasvatustieteen tohtori* (doctor of education), officially translated in English as PhD in Education.

Doctoral studies in Finnish universities have been in transition during the last 20 years. When the first author of this article earned his PhD in the beginning of the 1980's, doctoral studies were based on the personal relationship between the supervising professor and the doctoral student. Doctoral studies

were solely focused on writing the doctoral dissertation. Particularly in humanities and social sciences, formal training was underdeveloped. In the late 1990's, the Ministry of Education started to fund national doctoral programmes. Some of them were organized within one discipline and some were multidisciplinary. Funding allowed the doctoral programmes to hire full-time doctoral students and organize courses. In addition to the full-time positions, there were also part-time doctoral students who had permission to participate in the courses organized by the programme.



This model was in many ways successful. Professors from several universities worked together in developing courses and the model provided doctoral students with opportunities to get support from a larger group of scientific experts. National doctoral programmes were also active in developing international collaboration in doctoral studies. For example, the National Doctoral Programme of Multi-disciplinary Research on Learning Environments, in which both of the authors of this article worked, collaborated with the Dutch ICO programme in organizing winter, spring, and summer schools

for doctoral students. The PhD students already started to network internationally during their PhD studies.

However, the problem with this model was that the national programmes, which selected full-time doctoral students and organized courses for them, were separate from faculties responsible for formal student admission, organizing the review of dissertations and awarding doctoral degrees. In addition, many of the doctoral students in various faculties did not belong to any of the national programmes. Because of these problems, the Ministry of Education decided to move the funding to universities.



During the last decade, universities have developed new models for doctoral education. In most of the Finnish universities, there are nowadays one or more university-wide graduate schools responsible for taking care of general guidelines and the quality control of doctoral studies. Within these graduate schools, there are disciplinary and multidisciplinary doctoral programmes that organize the practical training. Since the introduction of graduate schools, “quality control” has been seen in terms of acceptance to the PhD studies and the way PhD students and supervisors have engaged in the PhD process, as well as shortened time in PhD studies and achieving the degree.

Doctoral studies are designed to take four years (240 ECTS points) of full-time work, but because many of the students work part-time, there are no binding time limits for individual students. Doctoral students have one to three professors or adjunct professors as supervisors and an additional follow-up group. Typically, students have to complete 40 to 60 study points worth of coursework and write a doctoral dissertation. According to national legislation, the dissertation can be a monograph or a collection of articles with a summary, which includes the general theoretical introduction, research aims, methods, results and general conclusions. Articles can be co-authored, but the independent role of

the doctoral candidate has to be clearly indicated. Traditionally doctoral dissertations in the humanities, social sciences and education were monographs written in Finnish, but since the late 1990’s, article-based dissertations have gradually become the most typical dissertation form in educational sciences. There are no national legislative rules about the number of articles included in a dissertation or the required level of publication forums. However, various faculties of education have their own requirements. Typically, article-based dissertations consist of three to four articles in recognized scientific journals or in edited books with



“The public defence is a big and festive event. Traditionally men wear a tailcoat and women a formal black dress.”

a reliable peer review process. In many cases, local regulations make use of the Publication Forum database maintained by The Federation of Finnish Learned Societies. In this database, accepted journals and publishers are listed and classified into three quality levels.

After the supervisors agree that the dissertation is ready for the review

process, the faculty council or the dean nominates at least two pre-examiners. The pre-examiners have two months to review the manuscript and propose a detailed review statement, in which they have to decide if the manuscript meets the common quality criteria for PhD theses. They can propose giving permission to defend the thesis or rejecting permission. Based on the pre-examiners' review statements, an official decision is made as to whether the thesis is ready for public defence, and one or two opponents are nominated. Pre-examiners and opponents cannot have recent close collaborations with any of the supervisors. In practice, they come from other universities in Finland or abroad.



Before the public defence, the doctoral candidate has to finalize the text of the thesis by taking into account the possible suggestions of the pre-examiners. The thesis has to be made publicly available in printed or electronic form about one week before the defence. The public defence is a big and festive event. Traditionally men wear a tailcoat and women a formal black dress. The main supervisor or another professor of the faculty is nominated as the *custos* who opens and closes the event. The *custos* and the opponents have their Finnish doctor hats (a special top hat) or foreign scholars their academic capes.

“The discussion typically lasts about two hours, but it can be much longer if there are several difficult problems to be discussed.”

interested in the topic of the thesis. In the beginning of the ceremony, the audience stands up when the doctoral candidate, *custos* and opponent(s) march to the front of the auditorium.



After the *custos* has opened the public defence, the doctoral candidate gives her or his *lectio praeursoria* which is a short (15-20 minutes) general description of the thesis. At the end of the speech, the candidate asks the opponent(s) to present the remarks about the thesis. The opponent(s) typically starts the defence with a short speech including general comments about the topic and content of the thesis. After this short

The audience, ranging from 20 to 200 participants, consists of the doctoral candidate's family members, relatives, friends, colleagues and other people

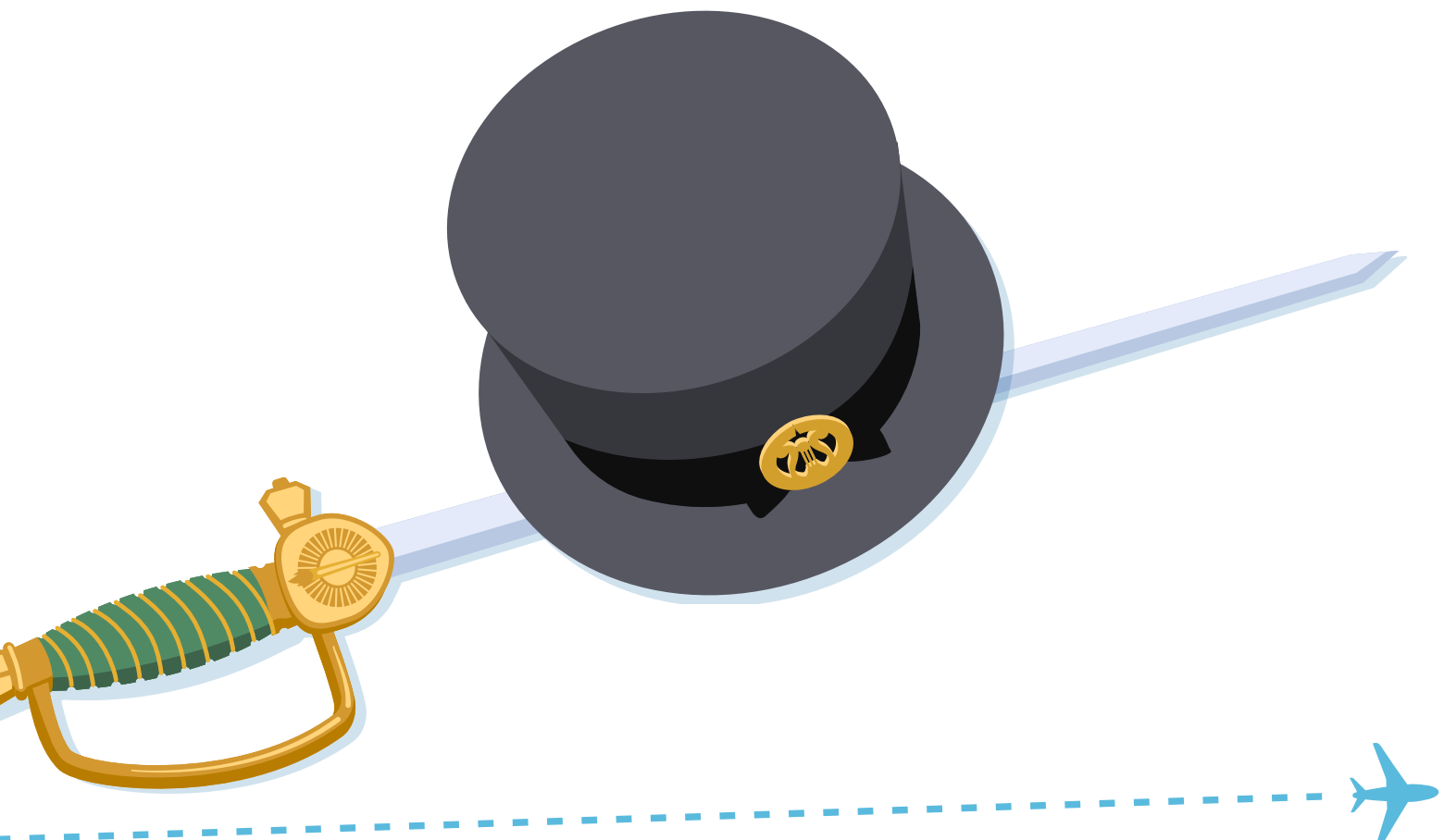
presentation, the opponent(s) starts asking questions dealing with the theoretical background, research questions, methods, results and conclusions of



the thesis. The discussion typically lasts about two hours, but it can be much longer if there are several difficult problems to be discussed. At the end of the discussion, the opponent presents the concluding statement in which she or he recommends to the faculty whether the thesis should be accepted. Normally this recommendation is positive, because there has been a careful pre-examination before the public defence. The last, for the doctoral candidate stressful, part before closing the event is the tradition that justifies the term public defence. The doctoral candidate turns to the audience and invites any members of the audience who wish to offer criticisms of the dissertation to request the *custos* for permission to speak. Normally nobody asks

anything and the *custos* quickly says that the public defence is concluded. However, in some cases there can be an additional opponent who presents a critical comment about the thesis.

A small committee, which consists of the opponent(s) and a professor nominated by the faculty, meets and decides about the grading of the dissertation. There are two grading models used in various faculties. In some faculties a 5-level scale is used, whereas in other faculties the grading is pass or in exceptional cases pass with distinction.





Besides the scientific procedure, there are also some very established social traditions attached to the doctoral examination. Immediately after the public defence, the doctoral candidate invites the audience to have coffee and cake, which is served close to the auditorium. In the evening of the defence day there is a formal dinner called the *Karonkka*, in honour of the opponent. The size of the *Karonkka* varies, but normally the doctoral candidate invites the opponent, supervisors, colleagues, family members and friends. During the formal dinner, there are plenty of speeches and toasts. First, the doctoral candidate delivers what is often a very

emotional speech in which she or he thanks the opponent, supervisors and all who have in some way helped in the dissertation process. All the participants who are mentioned in the doctoral candidate's speech have to give a talk in which they typically tell some jokes and express what they admire in the doctoral candidate. In all, the Finnish doctoral defence tradition has remained almost the same for centuries and it is still the academic highlight, not only for the doctoral candidate, but also for the supervisors and close colleagues.



FRANCE

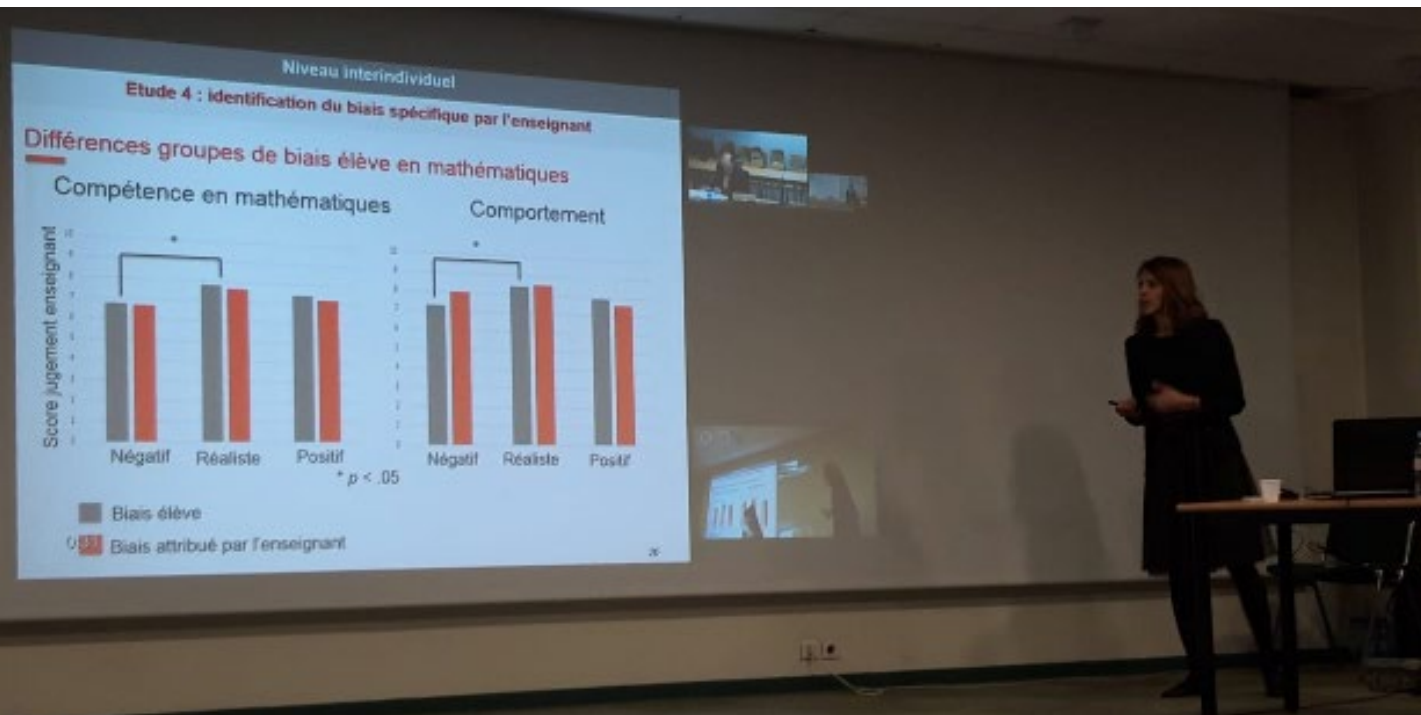


ERICA DE VRIES & NICOLAS BALACHEFF

In France research in the learning sciences is largely multidisciplinary within the Human and Social Sciences (HSS) and involves educational science, psychology, cognitive science, sociology and linguistics. The learning sciences nowadays also involve disciplines such as science, technology, engineering and mathematics (STEM), including computer science. Thus, students with different backgrounds, for example, with a master's in Educational Science, in Psychology, in Computer Science, or in the didactics of a specific discipline, may engage in PhD research in the

learning sciences. A PhD in Technology-Enhanced Learning can be pursued in a computer science lab or an educational science lab, depending on the supervisor.

PhDs are pursued within doctoral schools accredited by the Ministry of Higher Education, Research and Innovation. Doctoral schools are affiliated with universities and regroup research labs from related disciplines. Although national rules govern the pursuit of a PhD, there may be variations within these rules depending on the university or on the discipline.



To pursue a PhD, students must fulfill two conditions: hold a master's degree and have the agreement of a supervisor. The supervisor needs to be a full professor or an associate professor holding a habilitation degree. If there is more than one supervisor, at least one of them needs to satisfy this requirement. Students may apply for specific funded projects or submit their own research proposal. The majority of

HSS candidates develop their research project themselves in collaboration with a supervisor. Obtaining a doctoral contract is rather difficult, because there are many more candidates than contracts offered within public institutions. Thus, students go through a very competitive process involving an oral examination on the research project in front of a committee. Students may also contact a company and apply for a stipend partly financed by the ministry and the company. In some disciplines, a doctoral contract, a stipend or other resources are mandatory for enrolling in a PhD. This is often the case in STEM, but less so in HSS, in which students may enroll based solely on the quality of their research project and their integration into a research lab.

“Obtaining a doctoral contract is rather difficult, because there are many more candidates than contracts offered within public institutions.”

The formal duration of a PhD is three years, which is the maximum covered by a doctoral contract. However, most

students do not succeed in completing their PhD in this time. In order to finish writing the dissertation, students often apply for a temporary teaching position of one or two years. In educational science, primary or secondary school teachers engaged in PhD research may extend their enrolment up to six years. During the pursuit of a PhD, students are fully part of a research team, participating in seminars, conferences, and in the writing of manuscripts. In such an apprenticeship approach, PhD students are junior researchers contributing to the collective effort. Each year, the doctoral school requires a progress report in which the student describes the research activities. An individual committee also checks with the student whether the work environment and supervision are adequate for carrying out the project.

PhD students dedicate all of their time to research, although there is an obligation to follow at least 120 hours of courses before the end of the PhD. Students may also teach a maximum of 64 hours per year in order to build up experience in academics. A PhD dissertation is traditionally a monograph written in French, but nowadays it may be in English. Moreover, it may consist of a set of articles with a substantial introduction to frame the research, a presentation of the methodology, and

a conclusion recapitulating the results. In any case, a dissertation in a foreign language has to include an abstract in French. Thus, PhD dissertations are slowly changing from very elaborate monographs constituting individual conceptual contributions within an intellectual tradition to sets of articles published in international journals as proof of the ability to apply techniques and procedures in rigorous investigations.



The authorization and organization of a PhD defense

Once the supervisor approves the manuscript, he or she solicits two colleagues to be the formal referees. These need to be full professors or holders of a habilitation degree. As external assessors, referees are necessarily from outside the university and possibly from abroad. At about the same time, the supervisor asks at least two academics to be members of the jury. The number of



“A PhD defense is called a ‘soutenance de these’. This means that in French, rather than defending a PhD dissertation, the candidate gives arguments supporting or backing the research and its outcomes.”

jury members is between four and eight, and at least half of the jury members should be external to the university. Moreover, the composition must allow a balanced representation of women and men. In order to ensure the presence of all jury members, the expected defense date is agreed upon amongst the jury members. After consulting the doctoral school, the jury is then appointed by the president of the university. The two external referees are requested to write a review report of two to eight pages. They have a month to write the report and they need to authorize (or not) the defense in their concluding sentences. Both authorizations need to be received by the doctoral school at least three weeks prior to the PhD defense.

Once the defense is authorized, the manuscript can be sent to all jury members and the actual defense can be organized. Some faculties have a special room for PhD defenses, but otherwise the defense takes place in a regular lecture theatre or seminar room. The PhD candidate prepares his or her presentation of the dissertation, which can take up to 40 minutes, accompanied by a slideshow. The presentation is an important part of the defense and PhD candidates often organize one or two dry runs with friends and colleagues in order to rehearse and practice question-answering before the actual event. PhD defenses usually take place at the end of the academic year. In any case, they need to take place before the end of the calendar year in order to meet the deadline for the national qualification board (see below).

The PhD defense

A PhD defense is called a *soutenance de these*. This means that in French, rather than defending a PhD dissertation, the candidate gives arguments supporting or backing the research and its outcomes. When the defense takes place in the afternoon, the jury usually meets for lunch in a restaurant paid for by the university. The jury chooses one of its members to chair the PhD defense. A PhD defense is a public event and the door of the room must therefore remain open. The audience consists essentially of colleagues or people interested in the

topic, and of family and friends. After the opening of the session and the presentation of the dissertation, the chair invites each jury member to interact with the candidate, starting with the external referees. Jury members expose their view on the dissertation in the light of their knowledge and expertise in the field and ask questions. They interact with the candidate regarding critical remarks, remaining issues, or implications for educational practice. Each jury member takes up about 20 minutes of interaction time. The PhD supervisor also gets the opportunity, either as the first or the last speaker, to address the candidate and the audience. He or she narrates their collaboration with the candidate. Sometimes, before adjourning the session, the chair asks if a doctor in the audience has a question. Then, depending on the setting in the university, either the jury leaves the room or

the audience is asked to step outside. The supervisor participates in the jury, but does not take part in the deliberation. After the deliberation, the jury delivers the result: the candidate obtains the doctoral degree. The candidate then invites everyone, jury, family and colleagues, to gather for a drink or more. Family and friends arrange for drinks and, most often homemade, snacks.

After the defense

The jury is in charge of writing a PhD defense report signed by all jury members. In HSS, the report is rather long (up to 12 pages) consisting of the accumulated individual minutes of the jury members, written by each of them in the third person. In some other disciplines, such as computer science, the defense report is a rather short text describing the jury's general





Epilogue

appreciation of the dissertation, its presentation, and the defense. Therefore, depending on the discipline, the referee reports authorizing the defense and/or the defense report are important documents in the national qualification procedure. The national board of universities has sections for each discipline and examines applicants seeking a university position once a year. A positive outcome results in being “qualified,” which allows applying for a permanent position at a university in France. Finally, PhD dissertations are published on <https://theses.fr/> and/or on <https://tel.archives-ouvertes.fr/>.

In the future, traditions may radically change because of the COVID pandemic. During the past year, academics have had intensive training in videoconferencing technology and the formalities have been adapted to include rules for in-person, at a distance, and hybrid PhD defenses. Even if the threat of the virus vanishes, academics may appreciate no longer traveling across the country or abroad for a PhD defense. Still, family and colleagues will always be present for the celebration. A new tradition will be born, preserving the initiatory character of the PhD ceremony.



GERMANY



KATHARINA SCHEITER & FRANK FISCHER

In Germany, the expected duration of a doctorate is three years (as determined by the duration of most project funding schemes), with the average being somewhat longer than that. The exact title of the doctorate will depend on the faculty promoting the student. Students doing their doctorate within the Faculty of Science obtain a “Dr. rer. nat.” as their final degree, whereas within the Humanities and Social Sciences a “Dr. phil.” is awarded. Traditionally, doing a PhD was based on a personal relationship with a single supervisor, called the *Doktorvater* or *Doktormutter*, for whom the PhD

candidate would work on a research project while at the same time doing the PhD. This situation was, however, criticized, mostly because the PhD students were dependent on a single person’s ability and willingness to promote them. Thus, the level of supervision could vary from nearly nothing to having a great scientific mentor who cared about and supported the student at great length. Moreover, the duration of the doctorate could vary immensely, depending on how much of the seemingly unrelated duties (e.g., teaching, grading, running studies for the supervisor)

the supervisor would assign to his/her student. Thus, the situation for students was very opaque, in that it often was not clear what would be expected of them in doing a doctorate and how long it would take. At that time, PhD students were required to write a monograph on their research; the majority of students would not have publications in addition to the “big book” when graduating.



The situation changed when, among other things, the *Deutsche Forschungsgemeinschaft* (German Research Foundation) decided to provide funding for establishing research training units

and graduate schools. Graduate schools were funded for a maximum of 10 years. They provided stipends for doctoral students, who were expected to solely focus on their dissertation projects. Additional money was available to offer (international) summer schools and structured training for the students to support them in acquiring the skills necessary to become a successful junior researcher (e.g., scientific communication, academic writing, methods). Within a graduate school, the student would also have at least two supervisors, a supervisory agreement, and regular meetings based on target agreements, and more means were established to ensure that the doctoral student was not solely dependent on a single person.

By now, universities especially those with a strong research profile and extra-university research institutions, have adopted many of the procedures that were initially developed in the context of graduate schools. Doctoral students are expected to sign up with the faculty at the beginning of their doctoral studies. For this, they hand in a supervision agreement that specifies the rights and duties of the parties involved (i.e., the student and at least two supervisors) and that is signed by everybody. Deviations from that supervision agreement can be brought to the attention of an ombudsperson. At many universities, students are asked to submit an *exposé* (an outline of their doctoral project) and one or two progress reports based

on target agreements, for which they receive feedback from their supervisors and additional external experts. Typically, students will do their doctorate in the same subject area as they did their bachelor's and master's degrees and only after they have completed a master's degree. Accordingly, it is expected that by-and-large they possess the necessary skills to do a doctorate. Thus, comprehensive formal education and training at the doctoral level with a required number of ECTS points is rare. However, many universities offer professional development courses and domain-specific training that students can participate in. In some cases, students earn a certificate in addition to their doctorate if they have taken a certain number of courses. In other cases, there may also be area-specific structured PhD programs that implement the aforementioned offers and regulations in collaboration with one or several faculties, but provide additional support that is specifically tied to the field of the dissertation. Some of these programs award a PhD title (e.g., PhD in the Learning Sciences).

During the course of the dissertation students are expected to conduct their research, attend conferences, and write up manuscripts. Moreover, especially when they are hired as research associates and paid either from intramural or third-party project funding, they may be expected to perform project-related duties along with doing the doctorate.



Alternatively, the doctorate can be done in the context of a graduate school, which offers a contract for three years to work only on the PhD. Research associates and members of graduate schools are given a work contract for 65-75% of a full-time equivalent position. Officially, for research associates the corresponding work time is to be spent on duties that come with the job description, and the remaining (unpaid) 25-35% may be spent on doing the doctoral project. However, very frequently, project duties and PhD duties have a large overlap.



“Some programs still use the traditional grades, which are summa cum laude (excellent), magna cum laude (very good), cum laude (good), rite (satisfactory) and fail.”

There still exist different forms of handing in the dissertation for evaluation at the end of the doctorate, which may vary across universities. A monograph is still possible and somewhat more popular in some fields of education research; however, it has become quite rare in educational psychology. Instead, students are encouraged to publish their work in national and international peer-reviewed outlets. This makes them eligible for a paper-based dissertation, for which rules and definitions vary by university. For instance, at the University of Tübingen a paper-based dissertation is “cumulative” when at least two journal manuscripts have been accepted for publication and/or published. In that case, the PhD student submits the papers together with a preceding introduction of around 20 pages and a

concluding discussion of 10-15 pages. However, to avoid making students wait for the acceptance of their manuscripts before they can graduate, there is another dissertation format, which may also include unpublished manuscripts but requires a longer introduction and discussion.

One of the peculiarities of the German system is that students receive a grade for the written dissertation and its oral defense. In former times, the grading was often done by the supervisors themselves. This was fine as long as the dissertation consisted of a monograph solely written by the student. However, for paper-based dissertations, this has been criticized, as supervisors are often co-authors on their students’ papers; therefore, they will be asked to evaluate the quality of their own contributions. There is currently a transition going on, with more and more universities



implementing rules so that only one dissertation reviewer can be a co-author at the same time. Some programs still use the traditional grades, which are *summa cum laude* (excellent), *magna cum laude* (very good), *cum laude* (good), *rite* (satisfactory) and fail. This is very confusing for Dutch people, where *cum laude* refers to “with distinction,” whereas in Germany, this is a low grade that will typically prevent you from having a subsequent academic career. Some of the more recently established programs use grading systems from 1 (very good) to 5 (fail), similar to those used in bachelor’s and master’s programs in Germany.

After the dissertation has been evaluated by two reviewers, the dissertation and reviews need to be made available to faculty members for at least two weeks; these faculty members could (in principle) intervene in case of disagreement with an evaluation statement. These interventions are, however, extremely rare. If both reviewers graded the dissertation with *summa cum laude*, a third reviewer is usually invited to evaluate whether this exceptional grade is warranted. After the reviews are in and have been acknowledged by the faculty, the defense can take place.

Even though the procedures vary by university, the oral defense is often quite uneventful in Germany. It can take place anytime and in any room of the university. The committee consists only of the two reviewers plus one to two additional



professors who were not involved in the dissertation process. Members from other universities can be involved, but this is not the rule, rather the exception for the traditional doctoral programs, and more frequently done in PhD programs. No formal attire is required and professors might show up in their regular street clothes. No fancy togas! On a side note, a lot of academic traditions were abandoned as a consequence of the 1968 protests in Germany.





Then, students demanded that universities deal with their own problematic history during the *Drittes Reich* (1933-1945) and finally start developing as democratic institutions. Robes (*Talare*) and other elements of the academic traditions were seen as symbols of an anti-democratic culture. In the following years, most of these elements vanished in German universities.

Doctoral students usually are dressed up. Again varying by university, the defense starts with a presentation of the dissertation by the PhD student. Then, the committee members get the chance to ask questions—in no particular order, and they also develop their questions spontaneously. In most universities and faculties, these two parts are typically open to the public. Then everybody (including the student) has to leave the room, while the committee discusses the performance of the student and everybody gives a grade. The grade for the oral defense is then announced to the student. From now on, the student when approached by others as “Dr.” does not need to correct this mistake any more. However, s/he obtains the doctorate only after publishing a copy of the dissertation in the university library repository. From then on, s/he may also call her/himself “Dr.”

Afterward the defense, colleagues, family and friends welcome the student with some snacks and drinks. As one of the gifts, successful doctoral candidates

“As one of the gifts, successful doctoral candidates may receive their individually designed hat, the *Doktorhut*.”

may receive their individually designed hat, the *Doktorhut*. The hat is created by fellow colleagues and decorated with pictures from the PhD time, small toys, and symbols relating to the topic of the PhD and to the student.

Some universities organise big celebrations for all the successfully completed doctorates in one field, for instance, or all students having obtained the Dr. phil. For example, the Ludwig-Maximilians-Universität in Munich organizes an event in one of its most impressive lecture theatres with all the successful Dr. phil. candidates and their families. The celebration typically starts with a short lecture by an eminent scholar followed by the handing over of some 200 individual doctoral diplomas, with every individual being called to the stage and the complicated title of every dissertation being presented to a typically amused audience. This succession is interrupted once or twice by classical music performances and followed by a celebration with some sparkling wine. At the University of Göttingen, doctoral diplomas are handed out to all the PhD



students of that year on a specific day. After the ceremony in the *Aula*, each PhD student gets to sit in a hand cart, decorated to represent the field of the PhD and its specific topic. Fellow colleagues will pull the hand cart from the *Aula* (imagine a lineup of colorful hand carts being pulled through the inner city) to the *Gänselieselbrunnen*. Upon arrival, every PhD student has to get out of the hand cart, climb up to the *Gänseliesel*, and kiss it. Since the bronze figure is placed in the middle of a well, getting up there (especially when wearing fancy clothes) can become an interesting experience.

Some consider the *Doktorhut*, as well as the more festive events offered at some universities, as part of a desire to (re-)establish a more salient tradition to mark the extraordinary event of a successful doctoral defense. On the one hand, many academics in Germany

would not be opposed to having a slightly “more eventful event” as the final step in a doctorate. In fact, they come home from defenses in the Netherlands and Finland and enthusiastically tell stories of dignified procedures and traditions. And yes, you can hear from time to time that it is a pity that we do not have these in most of our faculties around Education and Psychology. On the other hand, re-discovering and selecting the more appropriate traditions and symbols from a set of older traditions, or even establishing new ones is not easy and is currently undertaken rarely in Germany’s faculties. After all, organising a defense in its current rather ordinary style is not very exhausting and time consuming, which is certainly an advantage. And from time to time, we are invited to one of the fancy doctoral events abroad, which we all look very much forward to.



Gänseliesel, by Marc Olivier Schulz/Universität Göttingen, licensed under CC BY-SA 3.0



Greece

STAVROS DEMETRIADIS & ANGELIQUE DIMITRACOPOULOU



Why a PhD?

The first question we often ask of someone who inquires about starting a PhD is, "Have you ever thought that you can live happily without ever getting a PhD degree?" This is not, of course, to disappoint them, but to make them seriously consider the difficulties of working as a doctoral student in Greece. Indeed, a PhD candidate student remains usually without financial remuneration, spending countless hours on

advancing their research work, supporting (as teaching assistant) the courses of their supervising professors, working (if lucky) for a research project (EU- or nationally-funded) and/or struggling to get any of the few awarded scholarships from the State Scholarships Foundation (iky.gr) or the Hellenic Foundation for Research & Innovation (elidek.gr).

Acceptance to the PhD program

If, however, you are serious about starting your PhD, there are two ways for getting accepted as a PhD student:

A. Each semester, the school (department) issues an open call for those interested in submitting an application and a concise research proposal as a future PhD student. Applicants should mention the broader area of their research focus, a possible PhD title, the proposed supervisor (should be a professor; full, associate or assistant) and a draft research proposal (2000 words at most). The school could have already published the subject areas where it wishes to accept PhD proposals, or, if not, the applicants may propose any subject area of interest, selecting—of course—among those offered by the school faculty.

B. Alternatively, you may directly contact the professor you would like to work with and inquire about being accepted as a PhD student. In this case, and provided that the professor is willing to accept you as a PhD candidate, a specific open call for interest in PhD positions is published, defining exactly the area of interest for research. As it is an open call, all those interested may apply, but, as it usually happens, those who initiated the call are better prepared and suited, thus highly qualified, and their application is shortlisted as first, so you get selected.

In both of the above cases, the school's General Assembly appoints a three-member "acceptance committee" of faculty members to examine the applications. The committee examines the files and invites—if necessary—the candidates for an interview. The committee then submits to the Assembly a memorandum stating the reasons why each candidate should or should not be accepted, as well as the nominated supervisor, in case the one nominated by the candidate is not appropriate. Eventually, the Assembly, after considering the committee's memorandum, approves or rejects the application of the candidate(s). In case of approval, the Assembly also defines the principal supervisor and two other faculty members to form the three-member "supervising committee" of the new doctoral student.

The typical formal qualifications required for admission to doctoral studies are:

A. A basic degree from a Greek university or technical institute or an equivalent degree from a foreign institution recognized in Greece by the Hellenic National Recognition and Information Center of Higher Education (Doatap.gr), with a grade of at least very good.

B. Postgraduate diploma from a domestic university (or an equivalent from a foreign institution).

C. Very good knowledge of English, based on certification.

“The length of the doctoral studies should be no less than three years, while the upper limit usually depends on the internal rules of each institution.”

All of the above must be completed by the time the application is submitted, with the exception of the postgraduate degree, provided that a satisfactory detailed score is presented and a certificate from the university the applicant is attending, stating the expected date of graduation from the postgraduate program. In some cases (e.g., interdisciplinary research), the Department Assembly agrees that the candidate will also be assigned certain specialization courses selected from among those offered in the Department’s master’s programs.

Doctoral studies

The length of the doctoral studies should be no less than three years, while the upper limit usually depends on the internal rules of each institution. Typically, an upper limit is set at six years, but after an appropriately justified request, this period could be extended to eight years at most.

The key objective of doctoral studies is, of course, to provide evidence of a) making an essential contribution to the development of scientific knowledge, and b) publishing a number of scientific publications in high-quality international scientific journals and conference proceedings.

The former is accomplished in close collaboration with and under the supervision of the principal supervisor. The other two members of the supervising committee may guide and support the candidate, but their role is usually not so essential in bringing the research to a successful end. Usually the first (or even the second) year is devoted to literature study that should lead to the successful presentation and defense of a concrete research proposal. During the presentation, the candidate usually gets guiding comments and suggestions by faculty, but the proposal itself is not critical in continuing the PhD studies. The objective of this activity is to set a pace for the candidates and make them aware of the necessity for clearly defining concrete research questions and methodologies for collecting adequate research data and getting reliable results.

The latter is usually achieved as the candidate matures and is able to publish interesting and high-quality research outcomes in international fora. The exact number of publications required for successful PhD work varies





depending on the internal rules of the school. Some of them may define a specific number (for example, they require at least two major publications in indexed international journals with impact factor), while others leave this issue open for the supervisor to decide. Journals indexed in the first quartile (Q1; such as, for example, *Computers and Education*, *IEEE Transactions on Learning Technologies*, *International Journal of Computer-Supported Collaborative Learning* and others) are typically major publication targets for candidates, although second quartile-ranking journals are also considered.

While the PhD work advances, the candidate and the supervising committee are responsible for submitting a progress report each year to the General Assembly. This report should concisely explain the progress and publications achieved in the previous academic year and suggest either continuation of the dissertation or its suspension, in case the doctoral student fails to work successfully and advance the PhD work as planned.

In the field of learning technologies (aka “educational technologies”), one should keep in mind also the “cultural” difference between the Science vs. Humanities research perspectives.

Depending on whether the dissertation is conducted in a Science/Engineering or Humanities (e.g., Pedagogical) school, the research approach and publication record may differ. In the former case, the dissertation might include the development of a technology (software/hardware) prototype and its evaluation using a quantitative or mixed methods approach, while in the latter case the research plan may be largely based on qualitative methodologies (also mixed methods), collecting data from field studies in the school context and using technologies that either are already produced, or do not require a hard design/development process. Either way, the publication record of the doctoral student is evidence of maturity and successful work, and defending the thesis

without any reputable publications should be considered as an exceptional situation that raises concerns about research integrity and should normally be avoided.

The grand finale

Working conscientiously under well-targeted supervision, the candidates should not have a problem in producing research results that conclude their PhD dissertation in a period of four to seven years (in case of part-time studies). It is the sole supervisor's decision to say when the dissertation has come to an end; however, the quality of the candidates' work, their overall maturity as researchers and their publication record are strong evidence that justify the decision.



When the decision is taken, the supervising committee submits to the Assembly the final progress report and suggests that the doctoral student be given the coveted *typothíto*, which actually simply means “print.” This is the formal “green light” for writing the dissertation, which typically includes an introductory part with background literature and research question formulation, a second part involving a number of chapters presenting the theoretical framework and the research design, a third part lining up the research work and outcomes and a last part or chapter with discussion on the results and major conclusions summary. The dissertation also includes an abstract section with

an extended abstract in English. In the case of a foreign student who writes the dissertation in English, the text includes an extended abstract in Greek.

After the dissertation is written, the Assembly assigns a seven-member evaluation committee for the candidates to defend their thesis. Typically, the PhD evaluation committee consists of the three members of the supervising committee, some additional members of the school or department and some external faculty members (from other departments, schools, or universities).



“It should be emphasized that there is not any ‘opponent’ examiner role during the PhD defense, as happens in some other countries.”

When the first version of the dissertation is ready, the candidate typically submits the text to the members of the evaluation committee and asks for their comments/suggestions. Most of the time (and since the text has already been checked by the supervisor), the other members’ suggestions are minor remarks (typos and such) that the candidate considers in order to produce the final version. Of course, if one member has serious objections regarding the quality of the work and/or the dissertation text, more time should be given for appropriate remedial actions.

When the big day of thesis defense comes, the candidate is naturally a bit anxious about the event (a public PhD defense). In reality, and as long as the candidate has really done good work, there is no reason for that, since the core evaluation of the work has already

taken place during the reading of the first version by the members of the evaluation committee. Thus, all the candidate has to do is to concisely present the work (usually in 30 to 40 minutes) and provide reasonably well-thought and scientifically adequate answers to the examiners’ questions. It should be emphasized that there is not any “opponent” examiner role during the PhD defense, as happens in some other countries. Examiners take turns in asking the candidate their (2 to 3 usually) questions, focusing on further exploring various aspects of the presented work and—as it usually goes—advising the candidate, after hearing their answers, on how to go on with future work and further explore interesting outcomes that their current research has revealed.

The whole event (presentation and examination) should last no longer than two hours, and after answering the examiners’ questions the candidate leaves the room for the committee to reach a decision and sign the relevant document. Although by law the grade for the dissertation can be either “Excellent” or “Very Good,” we have rarely witnessed a committee assigning a degree to a successfully defended thesis other than “Excellent.” Afterwards, the candidate is invited into the room again and the decision is announced, along with congratulating him/her for the work he/she did and the successful presentation and defense.





Traditionally (at least in the pre-COVID era), the newly nominated PhD holder invites the members of the committee, along with friends, and offers a lunch where in a happy spirit many wishes for prosperity and future success are said by participants.

Sometime later (which could be a few weeks depending on the scheduling by the institution), the new Drs. of the university are given the oath in a formal ceremony in front of the university authorities. In this oath, (stated in the Ancient Greek language) they declare that: "Science, as much as possible, we will always try in our lives to cultivate and brighten and lead it to be the most perfect, without practicing it for

profit and arrogance, but with the aim of advancing knowledge for the social good," or in the case of another university (since each one has its own oath), in Modern Greek they declare, inter alia, that: "...I will fulfill the obligations of being a Doctor of the University, with conscientiousness, morals, dignity, as demanded by scientific ethics and academic freedom."

The corpus of all PhD theses produced by Hellenic universities are published online by the National Documentation Center (Ekt.gr) and thus can be viewed and downloaded from the National Archive of PhD Theses (didaktorika.gr).



INDIA



RAGHU RAMAN & RAJLAKSHMI KANJILAL

In India, doctoral studies programs are very competitive. Moreover, beginning in June 2021, a doctorate will become a mandatory recruitment requirement for appointment to an assistant professor position at universities. Given the diverse backgrounds of prospective doctoral candidates, universities offer integrated programs (master's and PhD), dual degree programs, and traditional programs. In addition, eligible candidates can opt to take up full-time or part-time research.

A prospective doctoral student's journey begins by taking a standardized test, since the pool of candidates is very large. Subject-specific exams are held by the National Testing Agency (NTA). The National Eligibility Test (NET) is conducted for Humanities and Social Sciences disciplines, and the Council of Scientific & Industrial Research (CSIR) holds exams related to the Sciences. These exams are held twice a year, and only the top 6% qualify. Finally, the Graduate Aptitude Test in Engineering (GATE) is held for candidates in Engineering and allied disciplines.

Based on their test scores, prospective students apply to individual universities, where an entrance exam and interview are conducted. Students who clear NET or GATE are exempted from writing this exam and are directly invited for an interview. The selection of candidates is based on the standardized test results, academic background, Statement of Purpose, Research Proposal, and interview performance.

At Amrita University, project proposals aligned with tangible solutions for region-specific issues/problems identified in their study are encouraged. Therefore, candidates who demonstrate an understanding of society and reflect pathways to achieving sustainable development goals that drive social change are accepted into the PhD programs across disciplines. The university awards scholarships to PhD scholars to make the program accessible to researchers.

Typically, a full-time student takes between three to six years to complete a PhD, while part-time students may take six to eight years to complete the program. The times may vary across disciplines, and the period may differ for dual degree or integrated PhD programs. Once a doctoral student is admitted to the PhD program, the first year is dedicated to completing the coursework. The coursework provides a theoretical foundation and in-depth understanding of subjects related to the scholar's research area, emphasizing

Research Methodology and Ethics. A written examination assesses the student's understanding, and a CGPA of 8.0 must be maintained.



Following the successful completion of the coursework, a Comprehensive viva is conducted. In the form of an oral examination, it is conducted in the presence of the doctoral committee members and other experts to assess the doctoral scholar's grasp of the subject. Then the doctoral student formally begins to actively participate in research-related activities. During this crucial period, the essential role played by the thesis advisor reflects the *guru-shishya parampara* (teacher-student tradition), where the advisor directs and guides the student's work. During this time, the groundwork for the research, comprehensive review of literature, mastery of the subject, and critical thinking skills give shape to the research project.

The progress of each doctoral student is evaluated at the end of each term, where the work completed to date is presented. Based on the scholar's satisfactory progress, the doctoral committee allows one to enroll in the following semester. The next crucial step is the Qualifying Examination, an oral examination. The scholar submits the research proposal and presents it to the doctoral committee, experts from the department, and an external examiner.

Following the successful completion of this stage, the doctoral candidate shifts focus to research and writing the thesis. The candidate advances to "candidacy." In collaboration with the thesis advisor and the international advisor, a recommended practice, they co-author journal articles and present papers at noted national and international conferences. The requirement for peer-reviewed paper publications and paper presentations varies across disciplines.

The thesis advisor recommends to the doctoral committee that two Open Seminars are conducted. The candidate presents the research work during the seminar to the doctoral committee members, experts, and other researchers. Based on the feedback received, in consultation with the thesis advisor, the candidate incorporates the suggested changes and prepares the Synopsis and thesis. Next, the PhD candidate submits the Synopsis to the thesis advisor, and it is duly forwarded to the university.

After the Synopsis submission, the PhD candidate submits the thesis and the additional documents prescribed by the university to the thesis advisor. The thesis advisor forwards to the university these details and the list of at least eight panel members, four Indian academics and four academics from abroad, who have agreed to evaluate the thesis. Next, the university selects the examiners. The thesis is assessed by two Indian experts and two international experts, within 6 to 8 weeks. The examiners can either accept (with modifications) or reject the thesis.



Based on the examiners' report, and if the examiners have approved the thesis, the date of the PhD defense is finalized. The public PhD defense takes place, where the PhD candidate presents the research work followed by a question-and-answer session guided by the panel members. The decision made on whether to award the PhD is based on the comments from the panelists. The formal awarding of the doctoral degree is on Graduation Day.



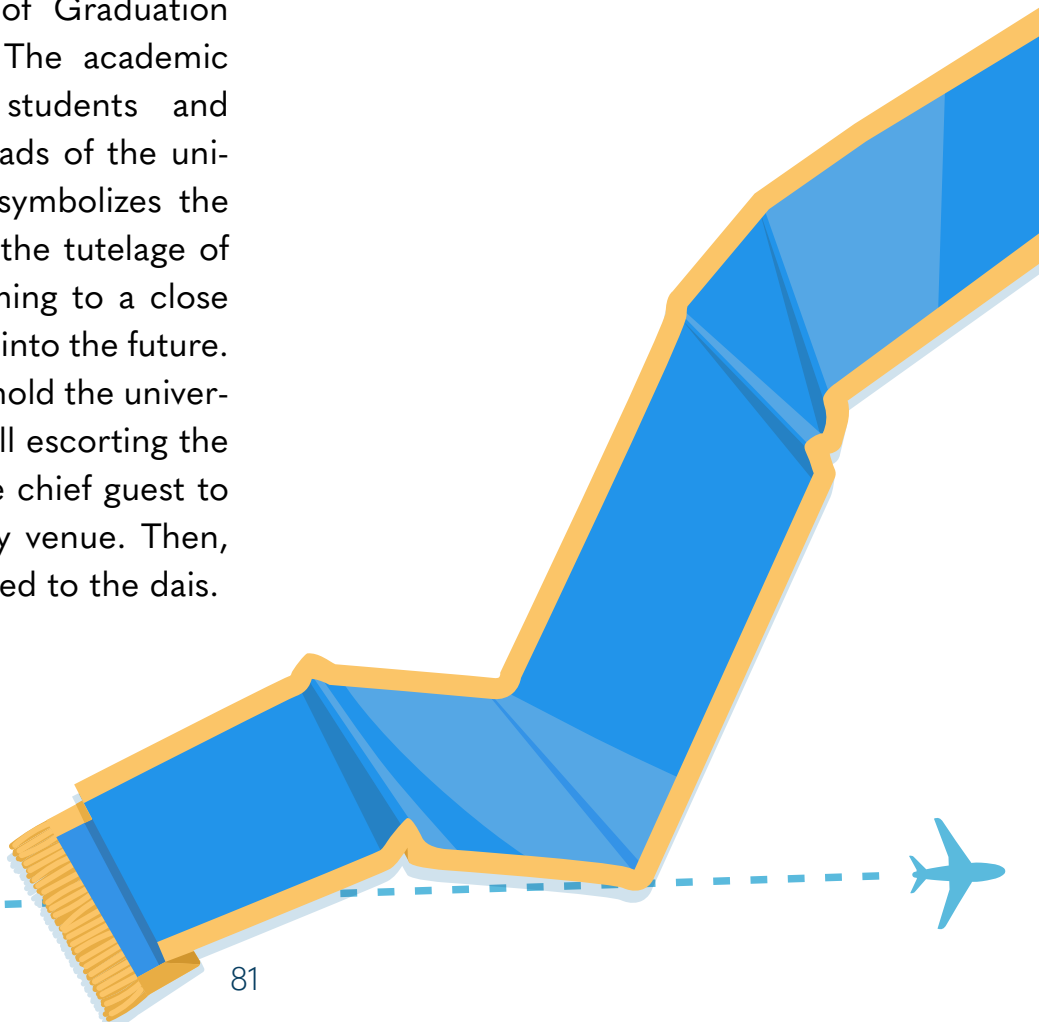
Following the university system in the UK, traditionally, the attire worn on Graduation Day in most universities included the ceremonial black gown and cap. However, the color black is not considered an auspicious color and is inappropriate for a formal occasion. Therefore, Amrita University embraces the diversity of Indian culture and traditions, reflected in the attire worn during the graduation ceremony. Traditional dress is adopted on Graduation Day.

Men wear a traditional cream *dhoti*, or pajamas, and women wear a *saree* with a golden border. The PhD graduates wear a blue cap with gold trimmings and a blue stole with the University emblem. Other premier universities like the Indian Institute of Technology Madras and the Indian Institute of Technology Delhi have followed suit. The deans and other heads wear the same attire, but sport a maroon turban and sash with gold trimmings.





Another essential part of Graduation Day is the procession. The academic procession comprises students and the various academic heads of the university. The procession symbolizes the students' journey under the tutelage of the academic heads coming to a close as they take the first step into the future. Student representatives hold the university flag and enter the hall escorting the heads of schools and the chief guest to the graduation ceremony venue. Then, the dignitaries are escorted to the dais.







The ceremony commences with the invocation of blessings from all the sages and masters on this auspicious occasion. Then, the chief guest addresses the new graduands. Following this, the Graduation Day is formally declared open, and next, the oath-taking ceremony takes place. Finally, the PhD candidates are invited onto the dais. The doctoral degrees are awarded to them, marking the end of their doctoral studies and the beginning of their new careers.

SOURCES

Picture page 78: <https://amma.org/news/amrita-phd-fellowships>

Picture page 79: <https://www.facebook.com/AmritaUniversity/photos/umas-thesis-was-titled-progressively-immersive-multimedia-representations-for-en/10156688517968719>

Picture page 80: <https://www.amrita.edu/event/graduation-day-2019-amrita-vishwa-vidyapeetham-amritapuri-campus>

Picture page 81: <https://www.amrita.edu/event/graduation-day-2019-coimbatore-campus>

Picture page 82: <https://www.amrita.edu/event/graduation-day-2019-amrita-vishwa-vidyapeetham-amritapuri-campus>



ITALY



LUCIA MASON & CHRISTIAN TARCHI

Admission

Doing a PhD in Italy takes three years with a full-time research assignment. Doctoral students receive a monthly scholarship from the university, which gets funds from the Ministry of University and Research. There are usually very few positions available each year; thus, a highly competitive admission contest selects the students to enroll in a doctoral program. For instance, there may be more than 100 applications for 12 positions (scholarships). At the end of the contest, only the students whose

rank-order position is not greater than the number of available scholarships are admitted to the program they applied for. It is also possible that a scholarship is available within research funds, but this happens to a much smaller extent, and only a candidate who has been selected through the competitive contest can get the scholarship. A graduate student, therefore, can be enrolled in a PhD program only if s/he is in a position to get one of the available scholarships. Another particular type of scholarship is called "industrial," as it is sponsored by an industry or private company that

“There are usually very few positions available each year; thus, a highly competitive admission contest selects the students to enroll in a doctoral program.”

supports research training at the university for an employee. Private companies can also open a call for an “apprenticeship” PhD.

The competitive admission contest is based on requirements that may vary across the universities. For instance, at the University of Padova, for admission to the PhD program in Psychological Sciences, which includes educational psychology, the competitive contest is based, in the first stage, on master’s graduation grades, CV, interest letter and research project written in English, two recommendation letters and, possibly, conference presentations and publications. Only the candidates who

pass the first stage are interviewed (in English) in person or remotely. Finally, the ranking of the interviewees is drawn up.

Regulations may differ across universities. At the University of Florence, for instance, PhD programs are interdisciplinary (e.g., Education and Psychology) and candidates from different disciplines may compete for the same ranking. It is mandatory for candidates to include a CV and a research proposal when applying; it is also desirable to include publications or other qualifications, besides a master’s degree or equivalent. The exam can be written or oral and it includes: i) an assessment of the CV, publications, master’s degree thesis and other titles; and ii) an assessment of the research proposal. The oral exam can be held in Italian or English. If the oral exam is held in Italian, then English competence is assessed.

Trajectory

At the beginning of the PhD trajectory, doctoral students are usually assigned a supervisor and, in some cases, a co-supervisor. They may be full, associate,



“During the second (or third year), it is mandatory (or strongly encouraged) to spend a period of research (at least three months) in a university or research center of another country.”

or assistant professors. In addition, a supervisory committee of three professors (or the entire panel) of the doctoral school evaluates the PhD students at the end of each year based on the written report and oral presentation of their work. A formal judgment is required for admission to the next year of the doctoral program.

During the PhD period, doctoral students not only have to realize their research project under the supervision of one or two professors, but also to fulfil a number of requirements in the context of the doctoral school. More specifically, during the first year, students must attend a number of courses mainly devoted to the acquisition of methodological skills. Mandatory courses are about various advanced

statistical procedures and software, scientific writing, and publishing in high-ranking journals. Courses about current topics and research paradigms and techniques are also mandatory. When enrolled in interdisciplinary PhDs, students need to attend courses on a variety of themes and topics to be exposed to different academic fields and extend their research methods and contents, in accordance with the complexity of the contemporary world and multicultural knowledge. At the end of each year, PhD students must present their work to the aforementioned committee.

During the second (or third year), it is mandatory (or strongly encouraged) to spend a period of research (at least three months) in a university or research center of another country. All courses and seminars are taught in English. Students are strongly recommended to attend (and present at) international conferences. They are financially supported for registration, travelling, and accommodation expenses.

During each year, PhD students are offered several other mentoring opportunities; for instance, they are asked to attend “school lunch” presentations of invited professors as well as the presentations of the students who are approaching the end of their doctoral training.

Photo © University of Padova – Massimo Pistore – All rights reserved



PhD awards ceremony at the University of Padova

On a voluntary basis, a doctoral student can also run seminars for bachelor's or master's students. It is very common that PhD students co-supervise master's students in designing an empirical study for their master's thesis, helping in particular with the preparation of research instruments and materials, and data collection in labs.

Around the end of the third year, PhD candidates present their work to all members of the doctoral school and fellow students of the doctoral school.

Doctoral thesis and evaluation

As concerns PhD students' research projects, they must include multiple research studies that become part in the doctoral thesis. These are typically written in English. If one or more studies are published in journal articles during the PhD period—as recommended—they are presented in the thesis. These articles should have the PhD student as the first author.





Photo © University of Florence – All rights reserved

PhD awards ceremony at the University of Florence in 2019

At the end of the PhD period, the doctoral school appoints external evaluators of doctoral theses. Evaluators are proposed by the supervisors from among international and national well-known scholars who are experts in the topics of the theses. The external evaluators access and review a thesis through an online system. They may recommend major or minor revisions, or accepting the thesis as is. If major revisions are required, a candidate is offered an extension of time for the submission of the final version.

When the PhD project is completed and the thesis ready for defense, the supervisor makes a proposal for the

composition of the final evaluation committee, which typically consists of three members, all external to the candidate's own university. The examination committee is approved by the doctoral school. Again, regulations may differ across universities

Defense

The "defense" is not a very formal event in our universities, as it is distinct from the event in which the PhD diploma is handed to neo-doctors. The defense is public and for each candidate takes about one hour, possibly in the department's nicest room. The event does not have a ceremonial flavor, only a

scientific flavor. The members of the examination committee are dressed formally, but without gowns. The chair opens the session and the candidate is invited to give a presentation of his/her work in 30-40 minutes. After the candidate's presentation, the committee members give their general evaluative comments and ask questions to engage in discussion with the candidate. Again, the length of students' presentation

and of the whole session may vary across universities. Next the examination committee deliberates and decides whether the PhD degree can be awarded to the candidate. In practice, it never happens that the degree is not awarded. The result is announced in public by the chair of the committee.



Photo © University of Padova – Massimo Pistore – All rights reserved

PhD awards ceremony at the University of Padova



“The ‘handing’ over of the PhD diploma is an event with a real ceremonial flavor, which typically takes place in the nicest room of the university.”

Grand finale

The “handing” over of the PhD diploma is an event with a real ceremonial flavor, which typically takes place in the nicest room of the university. For instance, at the University of Padova this ceremony takes place in the historical *Aula Magna* where Galileo Galilei and other exceptional scientists taught (Galilei’s chair is still there). In Florence, the ceremony takes place in a prestigious location in the city, for instance, in the Opera theatre. It is an open ceremony, so parents, relatives, and friends are admitted, but in a limited number for each neo-doctor because of the room’s capacity. However, other rooms are videoconference-connected with the *Aula Magna*. Supervisors also take part in this ceremony. At the beginning of the ceremony, announced by a speaker, the procession of neo-doctors of various doctoral schools, who wear gowns,

enter the *Aula Magna* accompanied by applause. Then, all the audience and neo-doctors stand up as the speaker announces the entry into the *Aula* of the chairs of the doctoral schools. They wear gowns and cups.

The pro-rector for scientific research gives a short talk with a *laudatio* for the neo-doctors. The president of the alumni association also gives a short talk to appraise the work done during the PhD and to invite neo-doctors to join the association and network of alumni to keep relationships and interests developed at the university. Then, each neo-doctor is called by name and receives his or her diploma and a small present. Official pictures of neo-doctors holding the diploma are taken.

In Florence, all neo-doctors are awarded at the same event, with the public authorities present and involved.



THE NETHERLANDS

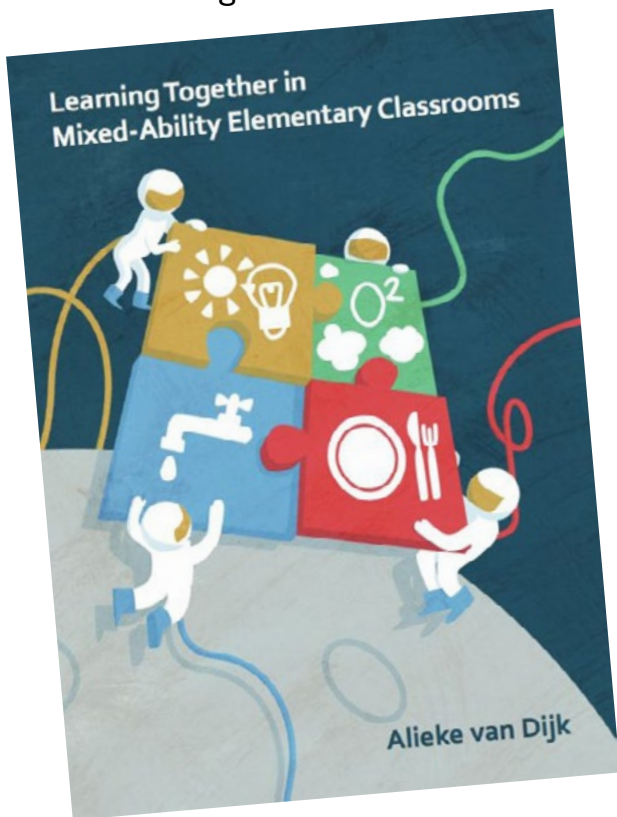


TON DE JONG & ELIANE SEGERS

Doing your PhD in the Netherlands normally is a full-time four-year enterprise, although the number of part-time trajectories (5 years at .8 FTE) is increasing. In these four years, PHDs do their research and there is obligatory coursework. The amount of coursework gradually becomes smaller over the four years, and normally students follow a program that is offered by what is called a research school. The main research school for educational science in the Netherlands is [ICO](#). At some universities, students also have a teaching obligation (e.g., 10%), but that is not a general rule, and the majority

just concentrate on the coursework and their research. Again, there is much variation, but as a normal rule you could say that a thesis comprises three or four empirical studies that each have been published or are potentially acceptable for an international journal. These papers have been accepted or submitted to international, peer-reviewed journals, with the student being the first author, and the supervisors as co-authors. There is a separate theoretical or introductory chapter that precedes the empirical chapters and a concluding chapter that puts all results into context.

However, these can also take the form of a monograph. Almost all these are written in English.



Example of a PhD thesis

The main person in approval of the thesis is the academic supervisor. This supervisor is a full professor or an associate professor with specific qualifications; they have what is called the *ius promovendi* (the right to supervise a PhD trajectory), which they keep until five years after their retirement. There can be more than one supervisor, but more than two is exceptional. The supervisor can be assisted (and when the PhD student follows the ICO trajectory must be assisted) by an assistant supervisor who does the supervising of the PhD work on a daily basis. This assistant supervisor can be an associate or

assistant professor, who needs to have a PhD himself or herself.

When the work is done, the supervisors have to approve the work. This, of course, is done over a four-year intensive supervision period, with many revisions of separate studies going back and forth. Once the supervisor has approved the work, the manuscript is sent to a scientific committee. The supervisor makes a proposal for the composition of this committee, but the committee needs to be approved by the board of the university in which the PhD student will do his or her defense. Different universities have different rules, but the scientific committee normally consists of around six to eight persons, with a minimum number of full professors and a prescribed minimum number of persons from inside and outside the university where the defense will take place. The assessment committee members receive the manuscript and have around six weeks to give their opinion on the thesis. This opinion is a simple “yes” or “no,” with “yes” meaning that the member of the committee thinks the thesis is “defendable” (nowadays, more and more universities also ask for a brief reflection on the quality of the work). In order to say “yes,” a committee member does not need to agree with the content of the thesis, but just has to judge if the thesis is defendable. Then by simple counting of the votes and with a simple majority it is decided if the defense can take place.



Doctoral defense of the editor back in 1986

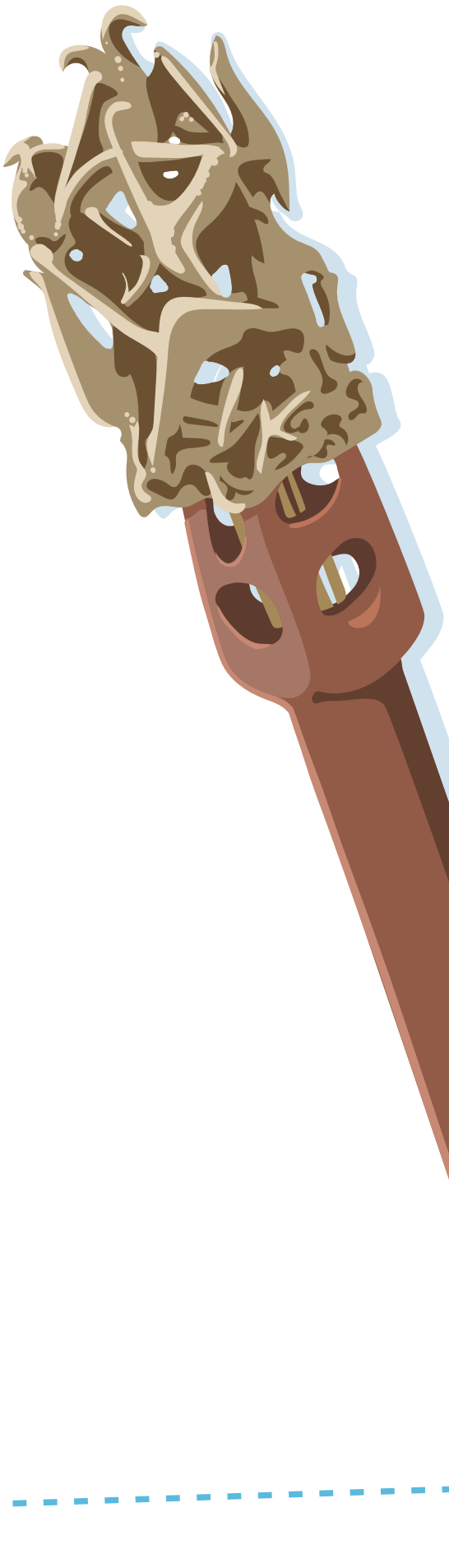
After this is reported to the dean of the faculty, the supervisor is informed of the outcome, and, in the case of a “yes,” the supervisor grants the PhD candidate permission to print the manuscript. In the Netherlands, this takes the form of a small book; there is a range of publishers who have specialized in publishing PhD theses. It is not obligatory, but the candidate may decide to add a set of “propositions” to the manuscript. Basically, this set consists of three types of propositions. The first set (around five) summarize the main points from the thesis, the second set (around three) shows that the candidate has a broader view on science and society than just the topic of the thesis, and the final set (mostly around two) has a more humorous character. The supervisor (and the rector) has to agree on the list of propositions.

The defense is a big day. It is public and friends, colleagues and family gather to see the event. The candidate stands behind a desk and the committee sits on the dais. The candidate is supported by two persons who are called *paranymphs* (literally groomsmen or bridesmaids, from Greek). These *paranymphs* nowadays have a more ceremonial function, but originally they were there to support the candidate in the defense. The professors all wear their gowns. Each university has its specific type of gown, but the predominant color is black. The rector opens the session. The candidate then first gives a 10-minute layman’s talk, to explain his/her work to the general audience. Then, the formal part of the defense starts, and each of the members of the committee (apart from the supervisors) asks a question.



Eliane Segers giving a laudatio at the Radboud University Nijmegen





A question normally takes around three minutes, an answer around four minutes. Even when a member of the assessment committee and the candidate know each other very well, they use the “polite” language form while addressing each other (“u” instead of “jij”). The whole question and answer session takes exactly 45 minutes. Then an academic assistant (the beadle, also dressed in a gown) enters the room, walks towards the dais, knocks with an academic staff on the floor, and says “*hora est*,” the hour is over. Even when in the middle of speaking a sentence, the defense is then stopped. (Indeed, when this academic assistant says “the hour is over,” it was only 45 minutes, but at universities an hour has what is called an academic quarter. If your lecture officially starts at 11.00, it actually starts at 11.15. If it really starts at 11.00, it is announced as “11.00 precisely”). Then the chair (officially the rector, but normally someone who replaces the rector) stops the defense and asks the candidate to take a seat in the audience, and then the committee retreats. In this retreat, they decide on the granting of the diploma, and if applicable, whether a *judicium (cum laude)* will be given. What is said in this meeting is secret, but once the committee has made a positive decision, the diploma is always given; there is no second round in which comments from the committee need to be included in the thesis.

“After exactly 45 minutes of defense, the beadle enters the room and knocks with a staff on the floor saying ‘hora est’. The defense is then stopped immediately.”

After this retreat, which only takes around 15 minutes, the committee enters the room again and the diploma is handed over by the first supervisor. In doing this, the supervisor normally uses a prescribed formulation, in which the candidate is also reminded of the duties the diploma brings in

terms of serving science and society. Nowadays, the candidate also has to testify that the work was done in accordance with the principles of scientific integrity: careful, honest, transparent, independent and responsible. After the formal part, everybody can relax and sit back, and the supervisor or assistant supervisor takes some time



Universities in the Netherlands all have different gowns



Nicolas Balacheff from France visiting the University of Twente as a committee member

to say the *laudatio*, which is a short, more personal word to the candidate. Then there is time for a reception. The chair closes the meeting and the now “young doctor” proceeds to leave the room, followed by the corona (this is the scientific committee in their gowns) and the family and the rest of the audience. Normally this all happens in the afternoon and the graduate often gives a party that same night.



NORWAY



STEN LUDVIGSEN & PALMYRE PIERROUX

To do a PhD in Norway takes normally four years of full-time work that includes the PhD thesis and the educational program. The PhD consists of three main components: the thesis, the educational program, and teaching of higher education students. All of the students are enrolled in a PhD program that is governed by a faculty. The funding for PhD positions is sourced from the university or through research projects financed by the Research Council of Norway (RCN). A PhD position is a full-time, paid position. Students are admitted to the PhD program

by a committee of appointed faculty members.

The educational program requires a minimum of 30 European Credit Transfer and Accumulation System (ECTS) credits and consists of coursework in areas such as philosophy of science, research ethics, research-related legal issues, quantitative and qualitative methods, and in specific knowledge domains.

The PhD thesis typically consists of three or four articles published in international peer-reviewed journals or

“To become a PhD in Norway means taking part in the modern system of apprenticeship.”

books. Today, most PhD theses are written in English. In addition to the articles, the thesis contains an extended abstract that frames the thesis. The extended abstract typically ranges from 40-60 pages and consists of theory, methods, literature review, summary of findings, and a discussion in which the whole thesis is positioned as a research contribution to a specific field of knowledge or discipline. To become a PhD in Norway means taking part in the modern system of apprenticeship. Candidates work with the experts in specific fields of knowledge and often meet international scholars during travels to conferences. Through this trajectory, one develops expertise that can be used to continue to a post doc position, in the educational sector, ministries and directorates, the private sector, or as an independent researcher.

Short summary of the historical development of PhD education in Norway

At the University of Oslo, a PhD program started in the late 1980s. Other universities established PhD programs in subsequent years. All new PhD programs received approval from the national educational authorities. The PhD programs became increasingly formalized during the 1990s, with coursework and visiting international scholars who gave courses. Until around the year 2000, the PhD thesis was either a monograph or an article-based thesis. However, in many educational sciences areas, the thesis was typically a monograph written in Norwegian, with some exceptions.

PhD programs and research schools

As part of an international trend, some universities in Norway started PhD research schools. At the University of Oslo, the Faculty of Education was one of the first faculties to establish a specialized research school, which ran for five years. One of the important



elements in the specialized research program was collaboration with international partners. In addition, it became gradually normal for PhD students to have two supervisors.

Starting in 2009, the Faculty of Education at the University of Oslo took the lead, together with seven other universities, to establish a national PhD school in educational sciences. The National Graduate School in Educational Research (NATED) offered specialized education and training in thematic fields central to educational knowledge. The Research Council of Norway financed NATED. The construction of NATED was inspired by the ICO in the Netherlands. Since 2017, the universities that are approved to organize a PhD program in educational science have been responsible for their program and for collaboration with national and international partners.

PhD supervision

The faculties normally appoint supervisors in collaboration with the research group in which the PhD work is organized. A PhD student has two supervisors, one of whom serves as the main supervisor. The supervisors can be a professor or an associate professor. Supervising a PhD student over a period of four years is intensive work. The supervisor often works together with the PhD students on a research project or the PhD student may establish a more

“After two and half years, the supervisors organize a meeting with a faculty member or an invited scholar who acts as external reader.”

independent project. The supervisors are often co-authors on two to four articles with the PhD candidate. Other colleagues may also be part of the team of authors. When multiple authors are involved, the authors need to document who is responsible for which part of the article and how the collective responsibility is distributed.

The PhD thesis: progress and quality control

As mentioned previously, the thesis consists of three or four articles and the extended abstract. Thesis research passes through two important points of quality control. After two and half years, the supervisors organize a meeting with a faculty member or an invited scholar who acts as external reader. In this event, the external reader points out the strengths and weaknesses of the work at that time. The PhD candidate writes a summary of the feedback that needs to be approved by the faculty

representatives (supervisors, external reader, and the head of the PhD program at the faculty or in some cases the department). This process is called the midterm evaluation.

After around three and half years, when the thesis is close to completion, the faculty appoints an external reader from the faculty. The external reader and the supervisors give feedback to the PhD student. After this event, the PhD student writes a summary of the feedback that must be approved by the representatives of the faculty/department. The PhD students and their supervisors make a plan for the last

period of the PhD work before it can be submitted to the faculty. This evaluation is often called the end-of-term evaluation of the PhD period.

Approval of the thesis

The PhD candidate is primarily responsible for submitting the thesis for committee approval. However, this happens in collaboration with the supervisors, who give advice on how to frame the thesis for consideration as a research contribution to a specific field of knowledge. To submit the thesis, the educational program has to be approved by the faculty, with at least 30 ETCS. One of the articles should be published or accepted for publication. The other articles should be submitted in a format that is acceptable for publication. In most theses, more than one article is published before the defense (Figure 1).

The dean of the faculty appoints the committee that will do the evaluation of the thesis. Typically, the committee consists of three professors or associate professors who have been suggested by the supervisors. Two of the three must be external, and the third member most often is a professor at the faculty. The evaluation report should be written within approximately three months after the PhD thesis is sent to the committee. The report should elaborate on the strengths and weaknesses of the thesis and specify the research contribution of the thesis.



Figure 1. Examples of published theses at the University of Oslo



The committee will write a report based on the criteria for a PhD degree. The report is usually three to six pages, sometimes a bit longer. The dean then approves the report. The committee can recommend three forms of evaluation: accept as is, revision within six months, or reject. Most of the theses are accepted as is. When the thesis is accepted, the PhD students must write a short summary of the main findings, which are published online and, in some cases, sent to the media.

The defense

The requirements for PhD thesis defense consist of a formalized set of rules and a less formalized set of expectations for the external committee members. The dean of the faculty leads the defense

(or an experienced faculty member acts as the dean's representative). The first opponent presents a summary of the main points in the thesis in 20-25 minutes, and begins the questioning of the PhD candidate. The first opposition typically lasts an hour and a half, and the expectation is that the opponent will engage the candidate in critical conversation about important issues in the thesis. The opponent and candidate are expected to test the boundaries of the thesis with regard to its contribution to a field of knowledge. The second opponent follows and is expected to similarly raise critical questions for the candidate to address, often focusing more on methodological issues. The second opposition is expected to last around one hour.



Private picture. P. Pierroux

Figure 2. Department reception at Faculty of Education, the University of Oslo. From left: Supervisor Palmyre Pierroux, First Opponent Chris Hoadley, PhD candidate Rolf Steier, Second Opponent Marianne Achiam.

“The PhD program rules mandate that the candidate host a formal dinner for representatives from the faculty and the committee, and traditionally, colleagues, friends, and family are invited.”

The defense is an open and public event that lasts around five hours, including a break for lunch. The participants who attend the event can ask the leader of the defense for permission to pose a question *ex auditorium*. The participants in the event are usually colleagues, PhD students, and family members.

The critical conversations and dialogues between the PhD candidate and the opponents represent the essence and goal of the PhD trajectory. After the defense, the committee holds a short meeting to discuss the quality of the defense, and they sign a protocol to approve the thesis and the defense. This is reported to the faculty and, in an informal manner, immediately communicated to the PhD candidate. After the defense, the PhD candidate’s department holds a short reception to honor the PhD candidate, the supervisors for their work, and the contributions of the committee (Figure 2).

The doctoral dinner

The PhD program rules mandate that the candidate host a formal dinner for representatives from the faculty and the committee, and traditionally, colleagues, friends, and family are invited. The degree of formality involved in the dinner varies; however, formal speeches are expected. Most dinners involve a lot of humor within a relaxed atmosphere. A doctoral dinner can involve a range of 15 to more than 100 participants.





© Jarli&Jordan/UiO

Figure 3. Graduation ceremony at the Aula, University of Oslo. From left: Education Faculty Dean Sten Ludvigsen, distinguished PhDs, Rector Svein Stølen.

The graduation ceremony

In most universities in Norway, one may be called a PhD following formalization at a graduation ceremony. This ceremony usually takes place three months after the defense, and is held at a special location like an *aula* at the university (Figures 3, 4). Here, PhD candidates from all the faculties who have successfully defended their thesis take part. Deans from the respective faculties present each PhD candidate by reading a short summary of the thesis, and the doctoral diploma is presented by the university rector. The ceremony usually lasts about an hour and a half and features classical music and a procession in and out of the *aula*. The graduation ceremony is followed by a reception with drinks and finger food.



Fig

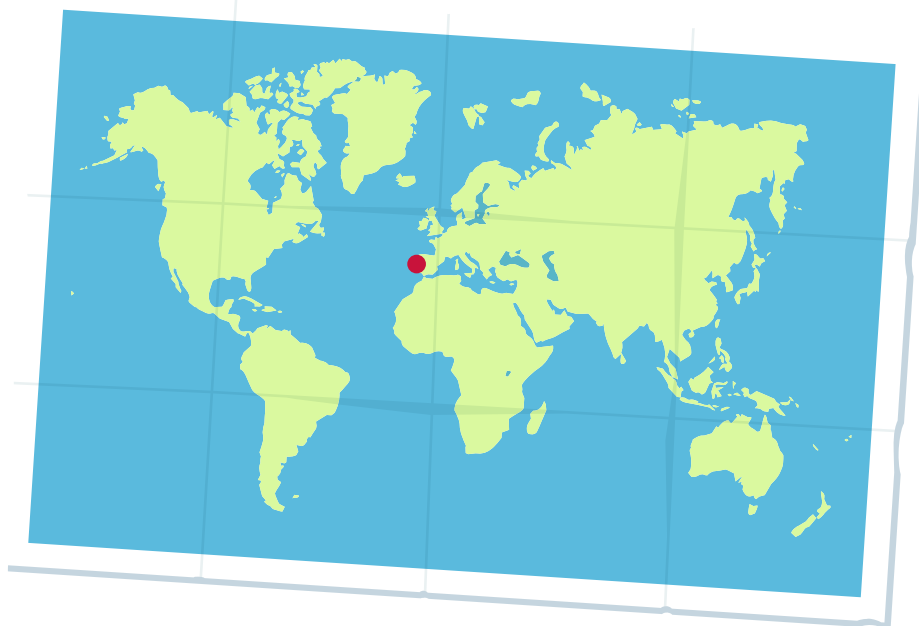


Figure 4. Graduation ceremony at the Aula, University of Oslo, with murals by Edvard Munch.



PORTUGAL

ROSA SERRADAS DUARTE & VITOR DUARTE TEODORO



Portuguese higher education degrees had a significant change in 2006, with the implementation of what is known as the Bologna Process. Since then, the legislation has undergone minor changes; the current Decree-Law n.º 65/2018 establishes the legal regime for higher education degrees and diplomas. The doctoral degree is conferred on those who demonstrate:

- A.** Capacity for systematic understanding in a scientific field of study;
- B.** Competences, skills and research methods associated with a scientific field;
- C.** Capacity to conceive, design, adapt and carry out significant research while respecting the requirements imposed by the standards of academic quality and integrity;
- D.** Having carried out a significant body of original research work that has contributed to expanding the frontiers of knowledge, part of which merits national or international dissemination in publications with a selection committee;
- E.** Being able to critically analyse, evaluate and synthesize new and complex ideas;

F. Being capable of communicating with their peers, the rest of the academic community, and society in general about the area in which they specialize;

G. Being capable, in a knowledge-based society, of promoting technological, social, or cultural progress in an academic and/or professional context. (Decree-Law n.º 65, 2018, pp. 4165-4166)

Doing “original research” is the most important part of the PhD process and usually takes between three and five years (sometimes more, particularly for candidates who have a full-time job). Currently, most doctorates are divided into two parts: a doctoral course of one academic year consisting of thematic and methodological seminars, followed by the two years of research. Besides the classical PhD thesis, the candidate can also present “a coherent and relevant set of research works, already published in journals with selection committees of recognized international merit” or a “work or set of works or achievements with innovative character, accompanied by written grounds that

“The degree can only be offered at accredited institutions, and after a process of accreditation of each specific PhD programme by the A3ES, Assessment and Accreditation Agency for Higher Education.”

explain the process of conception and elaboration” (Decree-Law n.º 65, 2018, pp. 4166-4167) in any field of arts.

The degree can only be offered at accredited institutions, and after a process of accreditation of each specific PhD programme by the A3ES, Assessment and Accreditation Agency for Higher Education (<https://www.a3es.pt/en>). The accreditation is only valid for a limited number of years.



“Normally before the end of the first year, the candidate must present a ‘research report,’ assessed by a committee of three or more professors in a viva.”

For accreditation, the proponent institution must have a Research Centre with an evaluation of “Very Good” by the Foundation for Science and Technology (<https://www.fct.pt/index.phtml.en>).

To be admitted for a PhD, candidates must have a master’s degree or an “academic, scientific or professional curriculum vitae that is recognized as attesting to their capacity to carry out this cycle of studies by the legally and statutorily competent scientific body of the higher education institution to which they wish to be admitted” (Decree-Law n.º 65, 2018, p. 4166).

The PhD candidate works with one or more supervisors, usually from the institution that offers the programme. The research is done by the candidate with supervision and, usually, the collaboration of colleagues and other staff of the research centre. Normally before the end of the first year, the candidate must



After the viva (2017), a photo of an experienced high school teacher, Teresa Rodrigues (center) with the jury at the New University of Lisbon.



After the viva (2018), a photo of Lúcio Ximenes (center), from East Timor, with the jury at the Lusófona University.

present a “research report,” assessed by a committee of three or more professors in a viva; at least one is from a different institution (in engineering, it is common to have members from outside the academia). This session is an important step of the PhD work since it helps the candidate prepare the research and the thesis.

When the supervisor considers that the thesis is ready, a “preliminary analysis” follows by the viva members, who approve, or not, the version that is presented. If not approved, the thesis must be reformulated. The final viva is a public exam, with a jury of five to seven professors (two necessarily belonging to a different institution than

the programme). The viva lasts two to three hours, in which the candidate presents the work and is questioned by the members of the jury, always with the right to defend his positions. After the viva, the jury gathers and assigns a classification (pass or fail), and in many institutions with attributions (“with distinction,” “with praise,” and in some universities assigning a rating on a scale of 0 to 20). At the end of the viva, the jury, the doctor, friends and family often come together, usually in a lunch or dinner where the new PhD is welcomed.



Until the early 2000s, after getting a PhD, most graduates were employed in the higher education system (universities and polytechnics) and there were more male than female graduates (Figure 1). More recently, female graduates have exceeded males and the jobs have diversified, namely, in natural and physical sciences and engineering. A specific type of student, high school teachers, are common in many programmes, particularly in the field of education, but also in other fields. According to the OECD (2019), 1.3% of teachers and 3.1% of principals have a PhD (the OECD average is 1.3% and 3.5%, respectively). These numbers had a large increase in the last decade, and the numbers are expected to increase

even more. Currently, there are many PhD students who are not higher education teachers working in non-higher education schools or other sectors of education.

The themes addressed in the doctoral theses have changed over time (Table 1), although without abrupt breaks (Ribeiro & Meneses, 2016). In the first phase, the basic disciplines of education had greater expression, with didactics being the most frequent. In a second phase, the training of teachers, curriculum development, and ICT in Education appeared. In a third phase, the specificities of educational contexts and problems emerged.

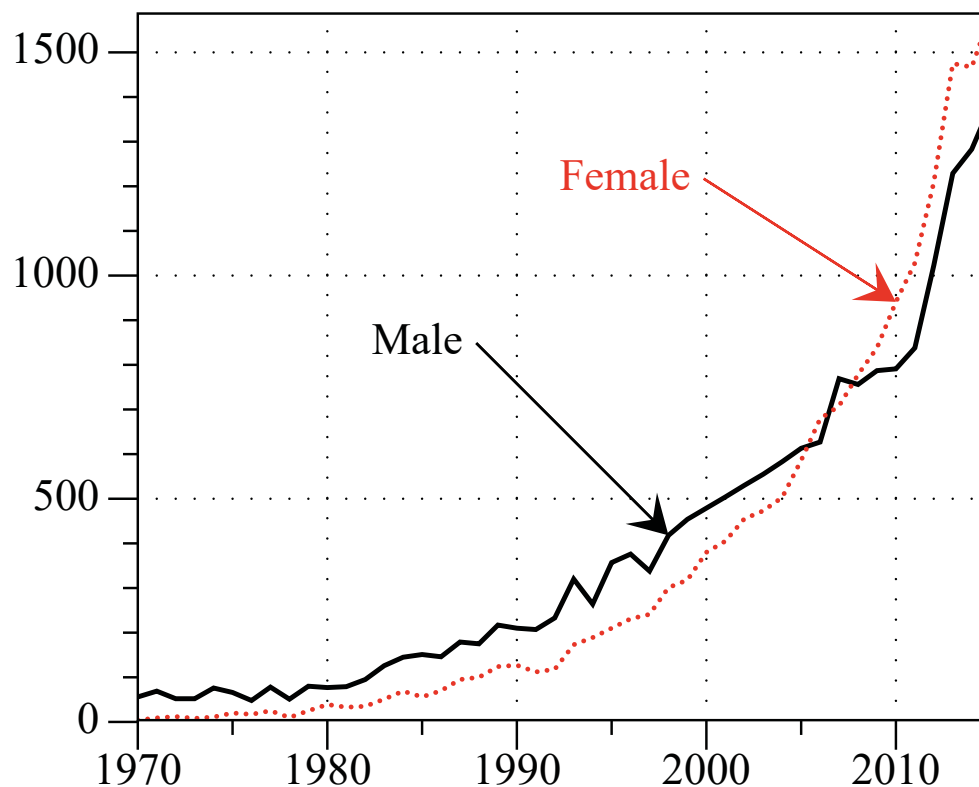


Figure 1. Number of PhDs granted in Portugal since 1970, by gender, between 1970 and 2015 (PORDATA, 2021).

Themes	N	%	Percent by Theme from 1988 to 2017			(c) – (a)
			1988-1997	1998-2006	2007-2017	
			(a)	(b)	(c)	
Teacher Education	185	11.9	3.4	10.2	13.3	9.9
Technology in Education	130	8.4	2.2	7.7	9.2	7.0
Curriculum Development and Evaluation	176	11.3	6.7	10.6	12.0	5.3
Higher Education	73	4.7	0.0	5.1	4.9	4.9
Adult Education and Training	66	4.3	0.0	3.6	4.9	4.9
Health and sexuality education	53	3.4	1.1	1.0	4.5	3.4
Inclusion & Special Education	45	2.9	1.1	1.8	3.5	2.4
Mathematics Education	85	5.5	3.4	5.6	5.6	2.2
Intercultural Education	32	2.1	0.0	3.1	1.9	1.9
Arts Education	22	1.4	0.0	1.8	1.5	1.5
Citizenship and Environment	33	2.1	2.2	2.6	2.0	-0.2
Administration, Leadership, and Educational Policy	139	9.0	10.1	6.1	9.9	-0.2
Sociology of Education	90	5.8	7.8	8.2	4.8	-3.0
History of Education	70	4.5	7.9	5.1	4.0	-3.9
Language Teaching	90	5.8	10.1	5.4	5.6	-4.5
Other Didactics	42	2.7	6.7	4.9	1.7	-5.1
Science Education	81	5.2	11.2	5.9	4.5	-6.7
Philosophy of Education	31	2.0	9.0	3.1	1.1	-7.9
Psychology of Education	108	7.0	16.9	8.2	5.7	-11.2

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Table 1. Themes of Educational Theses in Portugal, 1988-2017 (Ribeiro & Menezes, 2017).

Regarding methodologies, we observed a positive evolution towards greater robustness in doctoral work. Descriptive and qualitative studies, case studies and some research/action projects also prevail.

Doing a PhD in Education in Portugal, in addition to obtaining an academic degree, means joining a scientific community in the field of Education and creating better conditions to be able to integrate an international scientific community, by participating in international research projects.

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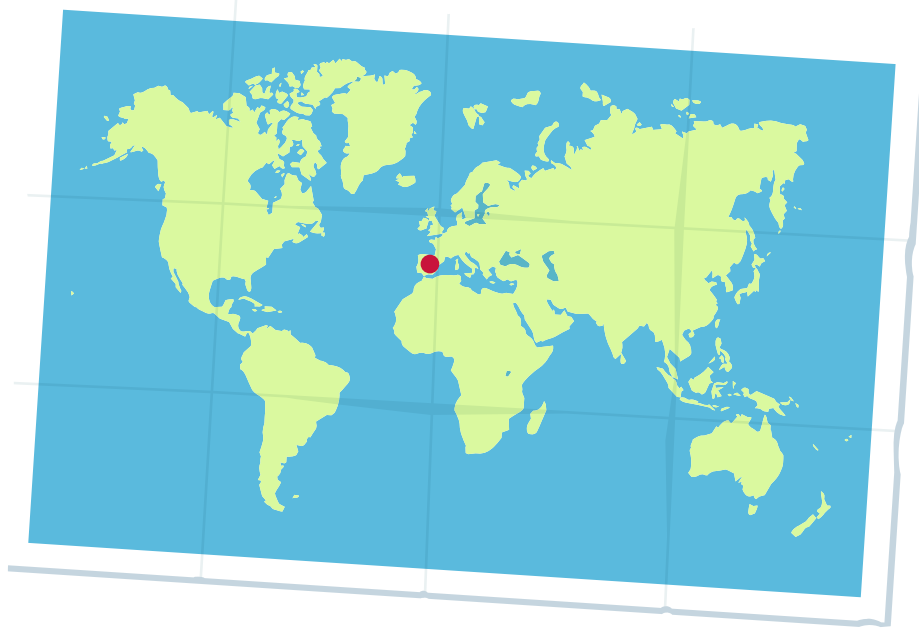
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SPAIN



LADISLAO SALMERÓN & MARÍA TERESA BAJO

Most PhD programs in Spain have a four-year duration, although there is some flexibility to extend it for one more year. Programs offer courses oriented towards soft research skills, such as writing scientific papers or using databases. They may also offer scientific workshops specific to the field, such as research methods. Students are usually supervised by one or two professors who take an active role in tutoring the student during the program. Some programs incorporate guidance committees during the second year, formed by a group of professors, to supervise

the adequate development of the PhD work. Nevertheless, there is still a long-standing tradition that conceives of the PhD as the work between the candidate and the advisor. Indeed, advisors have the ultimate voice in deciding if and when a dissertation can be defended. At this stage, an external committee, composed by 3-6 professors different from the advisor, must review and approve the dissertation for its defense. Those committees usually suggest rather minor changes, and although they have the right to do so, it is not common that they disapprove the dissertation and

“In an effort to boost internationalization of PhD programs, a few years ago the Spanish Minister of Education created PhD degrees with an international distinction, called *mención internacional*.”

send it back to the candidate for major changes. Some universities require that the quality of the thesis is backed up by some publications or alternatively by positive reports from external experts.

The dissertation itself can take the traditional form of a book, but most programs also accept its presentation as a compilation of research papers, not necessarily published yet. If the dissertation is written in English, as is the case for most of those presenting it as research papers, a long summary in Spanish (or any of the additional official languages of different regions, such as Catalan, Galician or Basque) is required. Traditionally, candidates would print a

few copies of the dissertation in hard cover in A4 format. Nowadays, many candidates print it in soft cover with more modern covers, or they simply hand it to the PhD committee as a PDF file.

In an effort to boost internationalization of PhD programs, a few years ago the Spanish Minister of Education created PhD degrees with an international distinction, called *mención internacional*. Students can obtain such distinction if they fulfill the following requirements: a) the candidate must have spent at least 3 months in a research laboratory abroad, b) the dissertation must be written mostly in English (or other research-relevant international language different than Spanish), c) at least two members from the external committee, and one from the defense committee, must work in a research institution outside Spain.



The PhD defense is an open act, where the candidate summarizes the dissertation, and subsequently engages in a discussion with a committee of 3 to 5 professors. Committees must be composed of professors with an active research record, with professors both from the candidate's department (who tend to act as secretaries, to deal with the paperwork) and from other universities. The most senior professor leads the committee, and is in charge of opening and closing the act, and of guiding the session. Advisors can't be part of the committee, but they are expected to introduce the candidate before the committee starts their discussion. Indeed, after the candidate finishes the presentation, any person in the room with a PhD can pose a question to the candidate, although this rarely takes place. A major difference with the defense in other countries

“Indeed, after the candidate finishes the presentation, any person in the room with a PhD can pose a question to the candidate, although this rarely takes place.”

is the length, as it takes an average of 5 hours (data from 2015-2019). The defense does not finish until the last member of the committee to speak (the president) is satisfied with the candidate's responses. Once the defense is finished, the committee meets to discuss the grade for the thesis, which can range from No-Pass (*No-Apto*), Pass (*Apto*), Satisfactory (*Notable*) to Very Satisfactory (*Sobresaliente*). If the committee unanimously decides on granting a Very Satisfactory grade, each member is asked to secretly vote on whether the dissertation deserves “*Cum Laudem*.” Of note is that approximately 85% of these are granted *Cum Laudem* designation (data from 2018-2019), which differs from other countries with stricter grading systems. As the dissertation defense is a public act, most often family and friends of the candidate attend, and therefore



PhD defense at the University of Granada



PhD defense at the University of Valencia

the defense is also a social act and a celebration. Many defenses finish up with a social event involving lunch or dinner with the members of the committee and close family. A difference from defenses in many other countries is that in Spain there is no dress code, and the defense usually takes place in regular university rooms. Candidates, as well as the PhD committee, can dress more or less formally. Only months after the defense, when the Rector invites the PhD graduates from a particular year, will candidates have the opportunity to dress in the classic academic outfit of Spanish academia: black suit and hat, with a color band representative of each academic field: purple for Psychology, light blue for Education. In historic

universities, such as those of Valencia and Granada, this act takes place in the main lecture hall of the universities' historical buildings.

Research funding in Spain, particularly in Social Sciences, suffers from a chronic shortage. Still, career paths in the Educational and Psychological sciences are quite popular among students. To fulfill this growing demand, departments require a constant flow of new teachers. This situation shapes the conditions in which PhD candidates will pursue their degree in Educational Sciences. While some candidates get research grants to pay for their studies, many do their PhD without any funding. The way a PhD path looks in each of these two options



“In general, PhD candidates without funding grants outnumber those with a grant.”

is really different.

On the one hand, most candidates with a research grant get additional funding to spend one semester abroad in a collaborating lab, to complete their training and to initiate their own research network. As one of the requisites to get a research grant is to get enrolled in a research-active group, those students are encouraged to publish their studies during the PhD period, and they tend to write the thesis as a compendium of research papers in English.

On the other hand, most candidates without a research grant are forced to actually work during their PhD training program. In this case, the universities recommend students to enroll in the programs on a “partial” basis, in which case they are allowed to have more time to complete their activities and dissertation. Contrary to what is done in other universities, departments can’t hire PhD students to work as teaching assistants, which means that candidates without funding must work outside academia. Usually, students without funding take more time, and engage in fewer

activities than full-time funded students. Similarly, they have fewer publications and fewer opportunities for collaboration with other national and international research groups.

In general, PhD candidates without funding grants outnumber those with a grant. For example, at the University of Granada, only 32% of those who obtained their PhD in 2014 had grants. The good news is that this trend is slowly improving, as universities are increasingly investing in research resources for PhD students. From 2010 to 2014, the percentage of PhD candidates with a grant at the university of Granada increased by an annual average of 3%. New funding opportunities are being offered for those candidates without a full grant, such as scholarships to support research stays. All in all, although the situation for PhD candidates of Psychological and Educational Sciences in Spain is improving, there is still room for improvement, until most candidates can enroll in fully funded PhD programs.



Annual reception of the new PhDs by the Rector at the University of Valencia

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SWEDEN



ROGER SÄLJÖ & MONA LUNDIN

The Swedish PhD training follows a model that was implemented during the last decades of the 20th century, but many features of the process and the ceremonial elements go back a long time in history. At the formal level, the reforms of the late 20th century implied introducing a structured four-year PhD programme with courses and dissertation work. Another important element of the reform work was that a funded position as *doktorand* or “research student” was created. This new PhD degree replaced the earlier doctoral degree, which was a more individualized

activity and which did not have a clear financial platform.

The PhD career begins with applying for a PhD position, which is publicly advertised. The competition between candidates is generally very stiff, and the enrolment procedure involves several steps of evaluations and interviews. There is also another route into PhD training for “cooperation doctoral students,” funded by external bodies collaborating with the university. The formal requirements for enrolment are the same.

“At the end of the first year of study, or sometimes at the beginning of the second year, there will be what is often referred to as a 25% seminar.”

When successful candidates begin their studies, they are introduced to the department and the research groups relevant for their PhD studies. An important element of this introduction is to be assigned supervisors. Over the years, a practice of having at least two supervisors has emerged. There is a main supervisor and an assistant supervisor, and quite often the main supervisor is a senior scholar (professor) and the assistant supervisor a junior scholar (assistant or associate professor). The distribution of responsibilities between the supervisors differs, but generally this team of three members will collaborate closely during the process. The doctoral candidate also has a say in who is appointed as supervisor.

The studies involve courses and dissertation work. Originally, the expectation was that two years would be spent on each of these activities, but in recent years more credit points tend to be given to the dissertation work. The first year of study is spent on courses and on developing the dissertation project. An initial version of the idea of the dissertation has to be included in the application, but the further specification of the research problems and the methods to use is an important element of the first year in the programme. The progress of the studies is monitored through a digitized Individual Study Plan (ISP) system. In most departments, the dissertation work is followed up at three points in time (with some local variations). At the end of the first year of study, or sometimes at the beginning of the second year, there will be what is often referred to as a 25% seminar. On this occasion, the PhD student, in the presence of colleagues, supervisors and researchers from the department, will present the general ideas and structure of the PhD work and receive feedback. After about two years of study, there is a “mid-seminar” that follows the same model.



“The Dean or head often writes ‘Vidi’ on the front page, and the origin of this tradition is said to be that the university guarantees that the text does not contain blasphemy, slander or anything else that might upset authorities.”

When the dissertation work is about to be finalized, there is a critical step, which is referred to as a “90%” or “final” seminar. On this occasion, an external “discussant” from another university will be invited to scrutinize the manuscript and to provide advice on how to complete it. In most cases, there will be a report written on the basis of the discussion, and this document comments on the manuscript and gives an account of what has to be added in order to complete the manuscript. Dissertations can be of two kinds, either monographs or article based. In the latter case, an extensive abstract has to be provided to frame the research results and to give a broader conceptual and theoretical background than is possible to include in the separate articles. As the PhD work progresses, the salary of the doctoral candidate increases.

All dissertations have to be printed and given an ISBN number; thus, they have to be published in the legal sense of the term. When the dissertation has been printed, the candidate goes to the Dean of Faculty or the head of the department and gets his or her signature on one copy. The Dean or head often writes “Vidi” on the front page, and the origin of this tradition is said to be that the university guarantees that the text does not contain blasphemy, slander or anything else that might upset authorities. Three weeks before the viva, the student literally has to “nail” the dissertation on a wall or sometimes a

pole in the university/faculty building. The question, “When will you be nailing?” has a highly concrete meaning in the career of a PhD student, as the candidate has to drill a hole in the top left corner of the book, and nail it on to the wall/pole where all the other dissertations are on display. This counts as the sign that the text is public and can be read by all. Again, this tradition is very old and emerged when books were expensive and dissertations were not printed. Interested readers would have to stand in a queue and take turns to read the copy publicly displayed on the pole/wall. After the *viva*, this copy is taken down from the wall and sent to the candidate, who usually saves it for future nostalgic purposes. Nowadays, this elaborate procedure still exists, but the official publishing is through electronic archiving of the text.

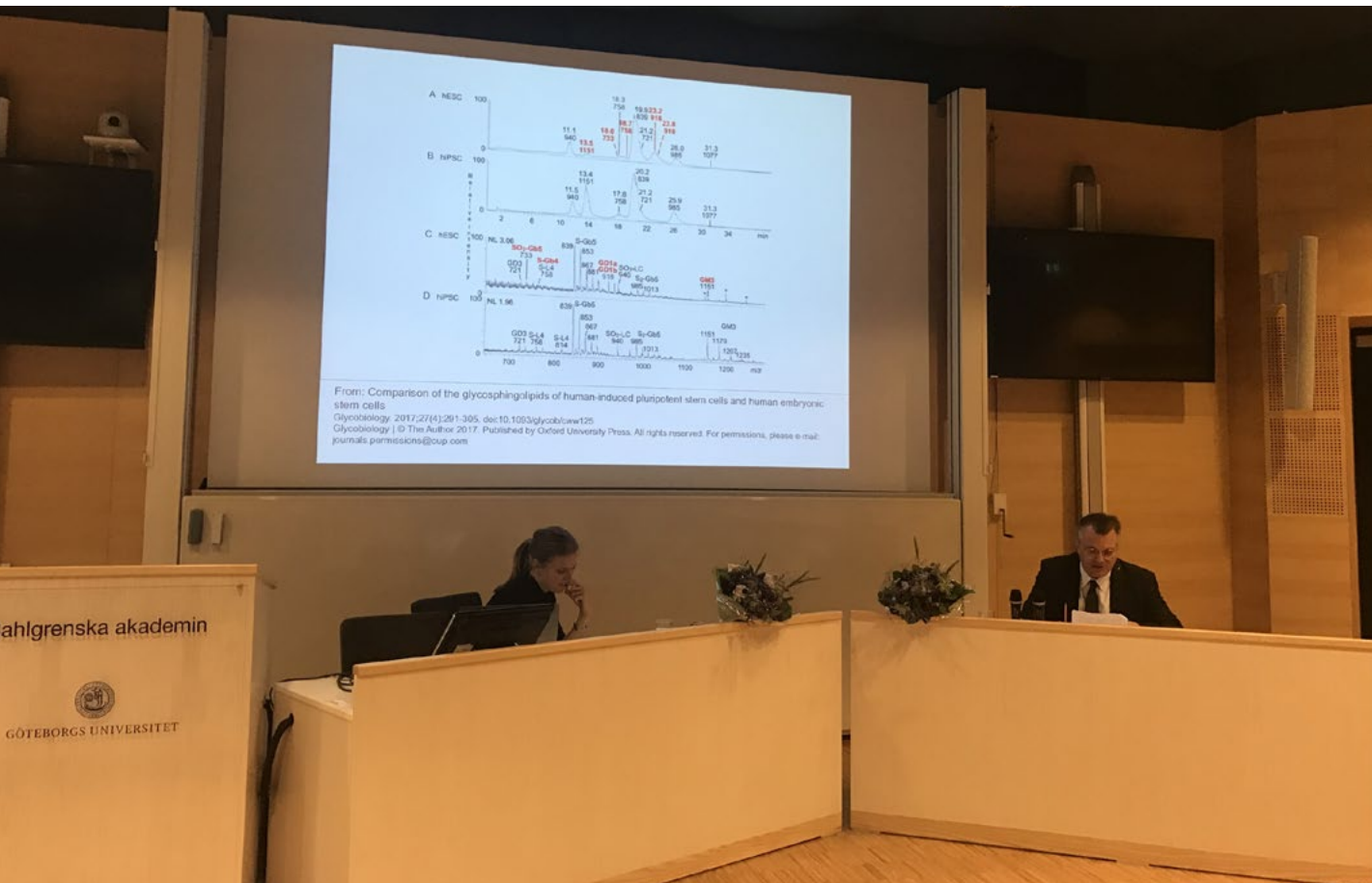


Nailing on the wall



“Three weeks before the viva, the student literally has to ‘nail’ the dissertation on a wall or sometimes a pole in the university/faculty building.”





An ongoing viva

The *viva*, which has to be open to the public, is referred to as the “disputation.” On this occasion there will be three members of the examination committee, one (or sometimes two) “opponents” and an audience. Thus, in the Swedish system, the opponent is not a member of the committee. During the *viva*, the candidate responds to the questions raised by the opponent. After this, the members of the committee will raise questions, should they wish to. As a final element of the procedure, the floor is opened to the audience to comment or raise questions. Generally, a *viva* takes about two hours, but it can sometimes go on longer. The length is decided on by the opponent and the chair in situ.

After the *viva*, the committee meets with the opponent and supervisor(s) present. Following this, the committee members return to meet the candidate, the family and the audience, and the verdict is given. The committee has to answer two questions: a) Is the quality of the dissertation in line with expectations? and b) Was the defense appropriate? The next step will be speeches and celebrations, which may very well go on until late; a truly memorable, inspiring, but also exhausting day in the life of a PhD.

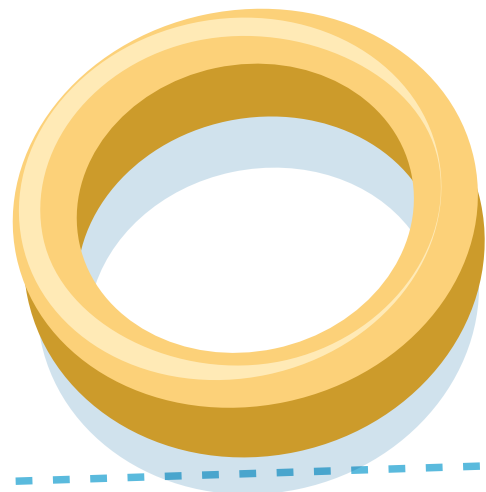
The final element of this journey is the annual Promotion Ceremony, when all the new PhDs of the university are inducted into academia as Doctors of Philosophy. This memorable event starts in the early afternoon with an award ceremony open to the public. The ceremony is partially in Latin and includes parades with flags, banners and standards, and interludes with performances by musicians and singers. The symbols that represent the identity shift for the *Promovendi* are the hat (or the laurel crown, depending on faculty), the diploma and the ring, the latter symbolizing life-long fidelity to science and scholarship. After the conferment, the promotor takes the candidate by the hand and assists her or him across the *Parnass*, a symbolic elevation in the floor, and this is the final confirmation of the doctoral status of the candidate. The celebrations continue with a magnificent full-menu dinner and many carefully orchestrated and inspiring speeches and entertainment. Finally, dancing starts, usually quite late in the evening, in a large and decorated ballroom. The dress code throughout the day is strict. Ladies wear long dresses and men tails, but this is also an occasion to wear a folk costume for those who wish. The vice-chancellor, deans and other members of the academic leadership wear gowns of different colours. This is another truly memorable, inspiring, but equally exhausting day in the life of a PhD.



Candidates being promoted by being given hats



Start of the inauguration ceremony



SWITZERLAND

MIREILLE BÉTRANCOURT & PIERRE DILLENBOURG



So close and yet so different! Our labs are located about 60 KM away from each other, in Geneva and Lausanne, respectively, both in the French-speaking region of Switzerland. Our research activities in both labs address learning technologies, they share a strong experimental flavor and yet, we'll see that the PhD processes are very different. This fact won't surprise those who know that this country of 8 million inhabitants counts no less than 26 ministers of education, which reveals how deeply local differences are rooted in the Swiss culture.

The University of Geneva (UNIGE) is a comprehensive university with about 17,000 students, while Ecole Polytechnique Federal in Lausanne (EPFL) is a science and technology university with 12,000 students. Each university counts more than 2,000 PhD students. Our PhD processes do, of course, share some similarities: the duration is 4 to 5 years; the final jury is generally composed of 3 to 5 persons, including one from a different lab at the same school and one from another university; students are expected to have published

“Despite these similarities, the doctoral models are quite different, Geneva being closer to the European model of lab affiliation, but the EPFL model being inspired by the US doctoral school.”

2-3 papers in acceptable venues before defending. We do, however, have to disclose the fact that, although we do similar research, Bétrancourt’s lab belongs to the School of Psychology and Educational Sciences while Dillenbourg’s lab is located in the School of Computer & Communication Sciences, which may explain some of the following differences.

Status

Despite these similarities, the doctoral models are quite different, Geneva being closer to the European model of lab affiliation, but the EPFL model being inspired by the US doctoral school. At UNIGE, a PhD student is firstly a lab member who joins in contributing to all lab duties, devoting sometimes up to 50% to teaching. At EPFL, PhD students are more viewed as students who come to complete their studies, with about 20% of their time devoted to teaching duties. Some doctoral programs at EPFL even include a first-year fellowship: students who obtain this fellowship are allowed to do projects in two different labs before becoming affiliated with one of them. The courses where these PhD students are teaching assistants are not necessarily related to the lab the student belongs to; they can be, for instance, the large undergraduate introductory classes. This difference in students’ status between UNIGE and EPFL is important, but it does not necessarily impact how the doctoral students feel integrated in the lab, which depends more on the professor’s leadership style than on the institution.



“The school administrator first filters the approximately 700 applications. Then, each committee member reviews about 50 applications.”

Recruiting

There is an admission committee for each of the 21 EPFL doctoral programs. In the CS doctoral program, for instance, the committee is composed of 23 professors or senior scientists, representing all research areas in CS, for a school that has fewer than 50 professors. The school administrator first filters the approximately 700 applications. Then, each committee member reviews about 50 applications. Finally, the committee meets during a full day for selecting admissible candidates; this happens twice per year. This huge time investment illustrates how critical it is for the school to maximize the quality of PhD recruitment. Once students are declared “admissible” by the program committee, they can be interviewed by the professor(s) interested in hiring them. About 90% of them do not come

from EPFL. About 50 of the selected students receive a fellowship that provides them a salary for the first year, whatever lab they choose. As most of them receive offers from other universities, the school organizes a physical visit on campus, meetings with the faculty and other students, and of course, a cheese fondue and a tour of the lake or of the mountains.

In comparison, Geneva applicants directly contact their future supervisor, often because they previously interacted with her or with an acquaintance. It is up to the supervisor to accept the applicant, on the basis of the match between the student’s background and interest on one hand and the supervisor’s research areas on the other hand. When a special profile is required, generally for externally funded scientific projects, Geneva PhD students are recruited through a competitive ad hoc search. Most PhD students are hired as research assistants with or without teaching, but some are just enrolled as students without a salary from the university or a fellowship. This is the case in Education for teacher trainers who want to move up in their career to a professor position in their institution.

Doctoral school

The EPFL doctoral path includes between 12 and 30 credits of courses; it is indeed a “school.” At UNIGE, doctoral schools are facultative and vary in format across disciplines, even within the same faculty. In the faculty of Psychology and Educational Sciences, students in education can enroll in the Western Switzerland doctoral school in education, where they can choose to attend thematic or methodological sessions of their choice. No minimum amount of credits is required. In Affective Sciences, students who enroll in the doctoral school have to attend seminars to acquire a certain number of credits.

Interestingly, the EPFL doctoral scheme was optional for the first few years. At one point in time, half of the students were enrolled in a doctoral program and the other half in labs following the traditional European model. A survey comparing their experience revealed that taking doctoral courses with students and professors from other labs triggered interactions beyond the lab walls and resulted in a lower percentage of students feeling isolated.

Lab life

The culture of our respective labs is quite different. Typically, Dillenbourg’s lab is made of 8-12 PhDs plus some postdocs, all of them leaving the lab after 4-5 years and having no permanent



After his public defense, Louis Faucon was told the only pen available to sign his diploma was in the wooden box with a number code. He had to solve 4 enigma to get those numbers, as in an escape game.

position. After completing their PhD, students may briefly stay for finishing a project, but they have to leave soon. The lab includes mainly students who come from abroad without their family, and for some of them, the lab becomes some kind of substitute family, with its own tradition, stories, and so forth. For instance, the lab being too large for celebrating birthdays with



cakes, lab members prepare some munitions and, at a signal given by the lab “happiness officer,” we bomb the beneficiary with objects reflecting her personality: chocolates, socks, chips, ... We sing for 20 seconds and then go back to work! This does not happen in every EPFL lab, though. At UNIGE, the average number of PhD students per lab is smaller (4 to 5) and they do not constitute the bulk of the lab, but this may reflect more the difference in schools (psychology and education versus CS) than the difference in universities. Consequently, birthdays in Educational Technologies are still celebrated with cakes and sparkling drinks, but no more candles because of sensitive smoke alarms.

PhD process

At UNIGE, the first formal step is the submission of a thesis project to the thesis committee, composed of the supervisor(s), and two to three experts in the field, of which one is from the same faculty and discipline. The project is a 15-page paper presenting the theoretical rationale, some preliminary findings and the roadmap for the next studies. It has to be submitted within the first two years of PhD work. If the committee agrees, the project is then defended before a “doctors’ college” in which all the PhD holders of the department can participate. After the presentation, the doctors’ college decides if the PhD candidate can continue for the next two

years or so. In education and psychology, a typical completed PhD thesis consists of 3 to 4 experimental studies, but could only be one empirical study if a longitudinal or ethnographic methodology is used. Students are expected to have submitted one or two journal papers when they defend, and to have another two or so in preparation.

There are similar publications requirements at EPFL. The main difference is that the EPFL doctoral path includes a candidacy exam after one year. Each doctoral program has different practices, some focusing questions on the PhD project while other focus on the deep understanding of relevant scientific papers. This is a prognostic assessment: does the jury believe, given what has been achieved so far by the student or given the quality of answers, that the candidate will be able to complete a good thesis? If this is not the case, it’s tough to stop the candidate, but fairer to stop him/her after one year than later on. In case of failure, the candidate has a second chance (a first failure is also a way to wake up students who do not perceive that 4 years is not so long). The few students (1% out of 2200) who fail again have to leave EPFL within a short time. The candidacy exam committee is made up of the supervisor(s) plus two colleagues; in that way, the responsibility for failing a student is shared by 3 or 4 colleagues.

“I once chaired a defense in which the barefoot student wore shorts and did everything on the blackboard.”

The defense

Let's now get to traditions about the way defenses are organized, namely, in one event at UNIGE and two events at EPFL. At EPFL, first the jury joins the candidate in a private defense without any audience. The jury is composed of a chair (who does not ask any

questions but oversees the procedure), the supervisor (who usually does not ask questions), one internal and two external members. We tend to invite externals with high scientific reputations, often from one from the USA and one from Europe. The exam is tough but informal. I once chaired a defense in which the barefoot student wore shorts and did everything on the blackboard. After a 30-40 minute presentation by the student, the jury asks questions for about 90 minutes, in rounds of 2-3 questions each. In case of success, the student has one more month to finalize minor aspects of his or her manuscript and to organize the public defense attended by the other lab members plus the candidate's family and friends.





At the end of his public defense, Lorenzo Lucignano receives his diploma from Pierre Dillenbourg, shaking hands as long as it takes for all to take a picture.

The public defense is more of a show than a defense; the student gives a talk and the supervisor and doctors in the audience ask some light questions. The candidate has to play the tricky game of being understandable by her family and friends, while showing off her scientific excellence. There is often an old uncle or so who wants to show off.

At UNIGE, when the supervisor and the committee consider that the PhD is ready to be defended, they appoint a jury that is composed of the thesis committee (the three to four persons who already acted to accept the thesis project) and additional members who act as external experts on the topic. The jury is minimally four persons, but it can reach 7 to 8 members in some

cases. The jury has to read the PhD manuscript and agree that it will pass for the defense to be organized, so that no PhD that is publicly defended can fail. There is therefore only one public defense, with the jury plus the family and friends. The defense consists of a 30-minute presentation by the student and a two-hour formal scientific debate hardly understandable and probably quite boring for family and friends, except for the few anecdotes that some members may tell to liven things up (or not).

In both cases, the public event is followed by food and drinks, often with some presentation about the past years of the new doctor. The team of students sometimes set up fancy events: Ayberk had to ski through the Rolex Learning Center, Khaled was welcomed back to the lab by “Men in Black” (see picture). The new doctor often receives gifts that kindly make fun of their peculiar habits or related to their PhD topic, like Sunny, who is a kayaker, receiving a paddle made with a 3D printer and laser wood-cutter.



“Men in Black”: After the public defense by Khaled Bachour, his teammates placed a red carpet and two bodyguards, Hamed Alavi (right) and Pierre Dillenbourg (left), protected Khaled from the crowds of media and fans waiting for him after his doctoral triumph.



TAIWAN

CHUN-YEN CHANG & CHIA-LI DEBRA CHEN



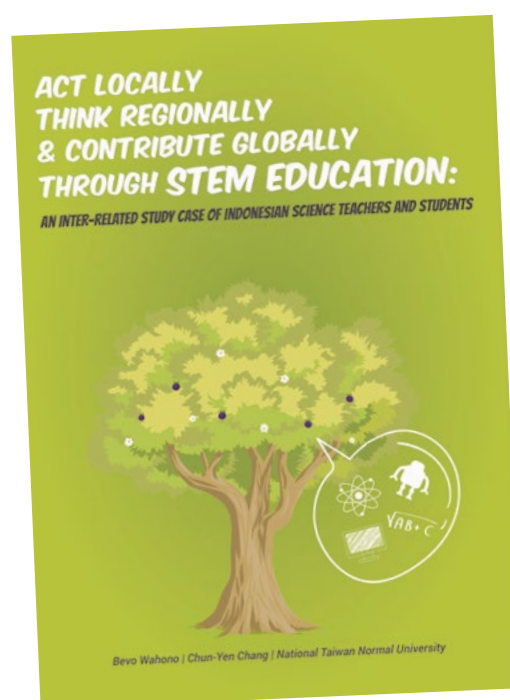
To complete a PhD program in Taiwan may take about 3-10 years. As an example, the average completion time for a doctoral program at the Graduate Institute of Science Education (GISE) in National Taiwan Normal University (NTNU) may take about 3-5 years on average. Students' admission to the PhD program is based on an entrance exam set up by five exam committee members from various specializations of the graduate school. The exam committee members evaluate students' qualifications based on their written documents (including publications,

research proposals, autobiography, recommendation letters, transcripts, and the like) and personal interviews. The students who receive the highest scores from the committee members are admitted to the program. Once NTNU's PhD program admits students, they need to form an official academic advisory committee during their first academic year, through which their course-related matters can be advised. The academic advisory committee is responsible for the evaluation of the students' academic course plans. If students wish to change their original

“Students’ admission to the PhD program is based on an entrance exam set up by five exam committee members from various specializations of the graduate school.”

academic course plans, they should initiate an academic advisory committee meeting to obtain approval from the academic advisory committee before making any changes. Students should select and enroll in courses according to their current course plans. Also, they need to decide and confirm who will be their faculty advisors by the end of the second academic year. Depending on students’ area of study, the minimum total credit hours for graduation at GISE range from 43 to 49 credits. Each credit hour corresponds to an hour that a student spends in the class per week. For GISE, one course is typically 3 credits.

Having completed their coursework, students can apply for the qualifying examination upon the approval of the academic advisory committee. The qualifying exam usually takes one of two forms, either a written exam or a portfolio assessment, followed by an oral examination several weeks later. The questions on the written exam are set up by the committee, based on the coursework content. Students need to finish the written exam in a specified amount of time. On the other hand, the portfolio assessment requires the students to publish two review or position papers in peer-reviewed journals at either the national or international level.



In addition, at least one of the two articles should be published in TSSCI, SSCI, SCI, or SCOPUS journals, and the student should be the first author of at least one article. An accepted manuscript is considered published as long as an acceptance letter from the journal is provided.

After passing the qualifying exam, the students are considered doctoral candidates and can start applying for the

preliminary examination of their “Review of Dissertation Proposal”. The dissertation proposal is composed of the first three chapters of the dissertation, including (a) introduction, research title, objectives, questions, and background; (b) review of literature; and (c) research methodology, results of the pilot study, and the anticipated final results. When the doctoral candidates complete their dissertation proposals, they must give a 30-minute presentation as the dissertation proposal presentation. Then, the committee, consisting of 5 members, starts asking questions and giving feedback regarding their proposals. The question-and-answer session usually takes no more than two and half hours. Other than the dissertation proposal presentation, the GISE requires the candidates to give at least two oral conference presentations on science education or mathematics education at the national or international level. The presentation should be orally presented in English at an international conference with a peer review mechanism. The Director will initiate a discussion with the most recent Candidacy Examination Committee members to determine if the student’s presentation at the conference is considered legitimate.

Having finished the presentations of dissertation proposals, the candidates can move on to data collection and analysis and drawing conclusions about their research. Upon completing their dissertations, they can schedule to have the





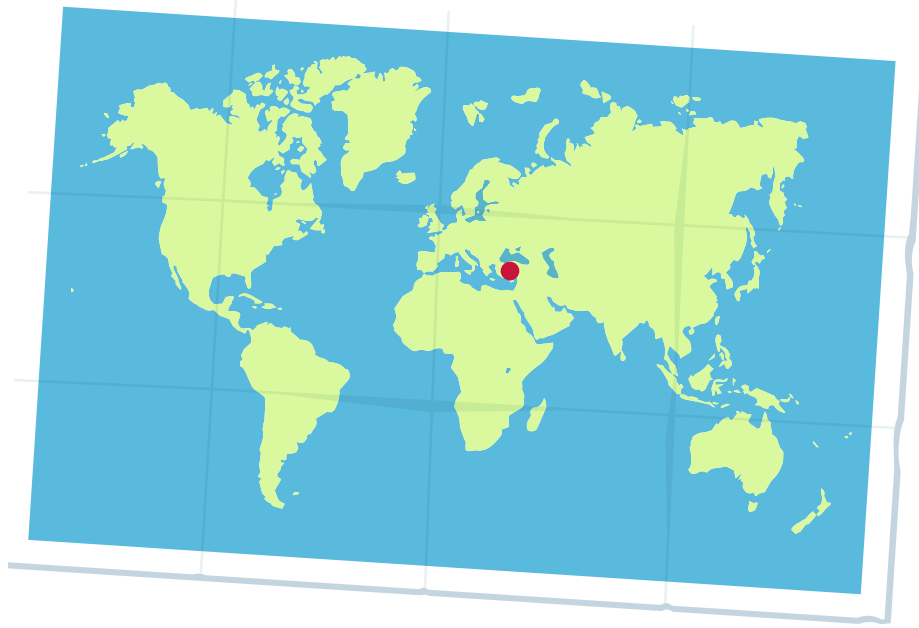
final oral defense meetings with their committee members. For GISE, there is another option of using the Scandinavian PhD model for the writing of a dissertation. The model generally consists of four inter-related research articles, usually with one being a review paper from the portfolio assessment and the other three related empirical studies. Out of the four research articles, two have to be published, while the other two can be manuscripts in submission, revision, or preparation. The dissertation typically starts with an introduction explaining the rationale of conducting the inter-related research, followed by the four articles, and finishes with an elaboration on the contributions of the four research articles. The current educational system in Taiwan tends to overvalue the importance of SSCI/SCI

journal publications. Therefore, many international students choose to use this dissertation model to help them find good academic jobs after graduation.

As for the oral defense meetings that are open to the public, committee members will provide criticisms and feedback on the candidates' dissertations and give directions on how to revise them to make the dissertations more solid. After the candidates pass the oral defense meetings, they need to amend their dissertations according to the suggestions provided by the committee members and submit their revised dissertations to the university. At this point, the doctoral degree program is considered completed.



TURKEY



MEHMET FATİH TAŞAR & JALE CAKIROĞLU

In Turkey, graduate/doctoral degree-awarding universities have academic units called an “institute” in different research fields (e.g., Institute of Science, Institute of Social Sciences, Institute of Educational Sciences, Institute of Medical/Health Sciences, Institute of Information Technologies [IT], etc.), instead of one graduate school as is the case in the USA. Tasks and procedures such as student acceptance, registration, student affairs, and graduation are conducted by each institute separately. Students are not allowed to register and/or enroll in more

than one graduate program concurrently. However, a student can take courses from another university’s institute and have it included in her/his total credit count.

In Turkey tuition and fees charged to doctoral students are very low (140 TRY \approx €15 per semester). In addition, there are possibilities of low interest rate long-term education loans (1950 TRY \approx €200 per month) and scholarships. In addition, TÜBİTAK (The Scientific and Technological Research Council of Turkey) provides competitive research

“Doctoral students need to complete at least nine courses, including a seminar, a course on scientific research methods and research and publication ethics, and a thesis preparation course.”

funds for doctoral students, with the possibility of conducting parts of the research abroad in collaboration with foreign universities. Another possibility to finance research costs is through Scientific Research Projects (SRP) funds that are made available by each university's own resources. A doctoral student's dissertation project costs may be financed by SRP through a joint application by the doctoral advisor and the doctoral student.

Completing a doctoral program in Turkey typically takes eight academic semesters, which can be extended up to a maximum of 12 semesters. By the end of the second semester, a doctoral

advisor is assigned to each student by the institute's executive board, by taking into account students' preferences and the approval of the department's academic board. If a student prefers, a co-advisor can also be appointed. Full-time faculty members with experience in having supervised a master's thesis to successful completion can qualify as doctoral advisors.

Doctoral programs include five stages: completing the coursework, passing the qualifying examination, submitting a doctoral proposal, undertaking dissertation work, and defending the doctoral dissertation. These stages are explained on the next page:



Coursework

Doctoral students need to complete at least nine courses, including a seminar, a course on scientific research methods and research and publication ethics, and a thesis preparation course. Each semester is typically 60 ECTS, and 240 ECTS total are required for graduation, including the thesis research and PhD dissertation for students holding a master's degree (students without a master's degree need to complete coursework totaling 300 ECTS in six semesters).

The qualifying examination (QE)

After successfully completing the coursework with a minimum GPA of 3.0/4.0, doctoral students are eligible to take the QE no later than the fifth semester into their doctoral studies. A QE is given by a panel of five faculty members: the student's own advisor and two faculty members from another higher education institution must be on the panel. The QE mainly assesses students' knowledge of the major concepts and issues in their field and their skills in conducting independent



Enrobing by the academic advisor after a successful defense

“There is no restriction on the language to be used in theses/dissertations. However, except for foreign language departments, Turkish is the dominant language.”

research. The QE is composed of written and oral examinations. QEs are given twice a year, as announced in the academic calendar. A student may take the QE two times in a PhD program.

A dissertation monitoring committee (DMC) of three faculty members is formed for each doctoral candidate after passing the QE. In addition to the doctoral advisor, one member should be from the same department and the third member should preferably be from an outside institution or a different department of the same institution. The student’s progress is regularly monitored by the advisor and the DMC, which periodically meets and provides feedback and recommendations for improvement.

Dissertation proposal

Within six months after the QE, the student needs to prepare the proposal

for the dissertation and submit it to the DMC for review and approval. The dissertation proposal includes the purpose of the thesis work and research problem/questions, the research method and a future work plan.

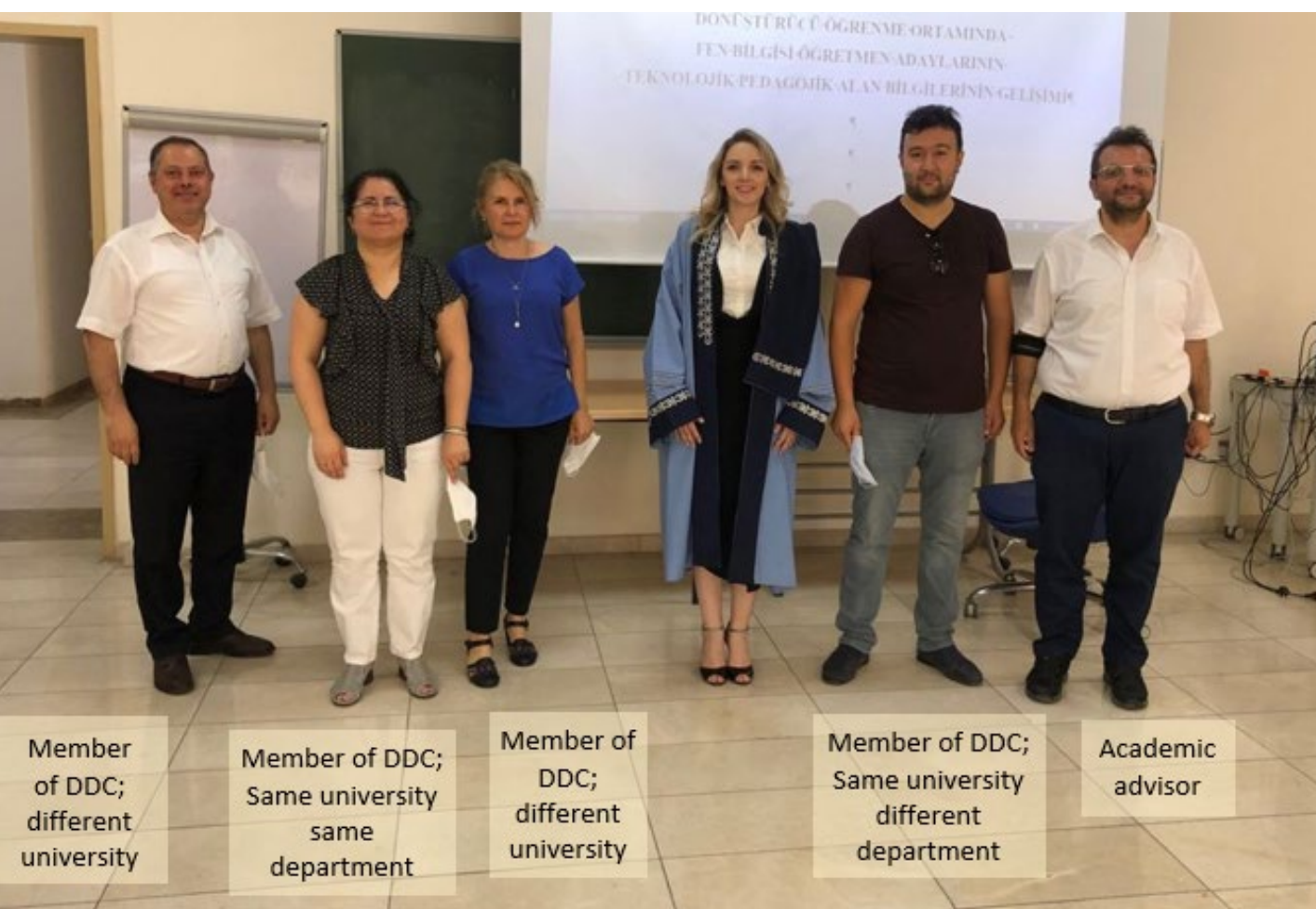
DMC meetings are held twice a year, once between January and June and once between July and December. The candidate submits a written progress report including a summary of the completed work to her/his DMC at least 15 days before the meeting date.

Dissertation work

A typical dissertation includes the following chapters: introduction and literature review that leads to statement of the problem, theoretical/conceptual framework, methodology, data and data analysis, findings and results, and lastly conclusion and discussion. In Turkey there are several English-medium universities, which mandate that theses and dissertations be written in English. Otherwise, there is no restriction on the language to be used in theses/dissertations. However, except for foreign language departments, Turkish is the dominant language.

University senates determine and publish regulations related to preparation and finalization of the doctoral dissertations. Each institute determines details of thesis/dissertation preparation guidelines in their published manuals. Before a dissertation defense





Posing together with the committee members

committee is formed, a student must publish an article produced from their dissertation work in a scholarly journal. Each completed dissertation has to be subjected to an online certified plagiarism test. If plagiarism is detected, the institute executive board decides on the disciplinary and penalty consequences to be applied. The dissertation defense committee (DDC) consists of five members, at least two of whom are faculty members of another higher education institution; the former three members of the DMC are natural members of the DDC.

Dissertation defense

The doctoral defense takes place within one month after the candidate delivers the completed dissertation. During the defense the candidate makes a short presentation followed by a question-and-answer session. The defense is open to an audience of academics, graduate students, and/or experts in the field. In a closed session, the committee gives a verdict by absolute majority to accept, reject, or request revisions. The decision is reported to the institute with personal reports, within three working days following the defense date.

If revisions are requested, the candidate must submit the revised dissertation within six months. If a candidate is found successful by the committee after the defense, s/he is enrobed in academic regalia by the doctoral advisor or, in some cases, by the eldest member of the committee. After enrobing, a dinner usually follows at a fancy restaurant.

Candidates successfully completing all these stages are entitled to receive a doctoral diploma with the written decision of the institute's executive board. The graduation date of a doctoral candidate is the date committee members sign the dissertation signature

page. Doctoral degrees are conferred upon candidates during a commencement ceremony. All academics and candidates wear gowns at this ceremony.

National statistics

The national theses/dissertations [database statistics](#) show that in the last 40 years, the number of completed theses/dissertations has risen dramatically from slightly over 100 to more than 7000 in 2020 (these figures do not include the fields of medicine/health/dentistry/veterinary sciences).



A doctoral diploma awarded by Gazi University



UNITED KINGDOM

MIKE SHARPLES & CHRISTOTHEA HERODOTOU



A PhD in the UK normally takes between three and four years of full-time research, but that can vary greatly. One student at his first supervision session asked for the minimum time to complete a UK PhD. He was told that formally it is two years, but nobody completes it within that time. "I will," he replied. Precisely two years after registration, he submitted his thesis and passed after minor revisions. For some other students, the opposite is the case: their funding ends, yet the PhD drags on for up to eight years.

Higher education in the UK is complex, not least because the four parts of the UK (England, Scotland, Wales and Northern Ireland) have different systems with their own funding and policy requirements. However, the PhD process is fairly similar throughout the UK. Overseas students pay considerably more in fees than UK students (fee levels for European PhD students beyond 2022 have yet to be resolved). Many universities offer scholarships and bursaries for selected students. The UK supports four-year funded doctoral

“Higher education in the UK is complex, not least because the four parts of the UK (England, Scotland, Wales and Northern Ireland) have different systems with their own funding and policy requirements.”

training programmes, with coursework and research components. There are also UK Research Council grants, particularly in national priority areas such as artificial intelligence. For a standard academic PhD, some universities provide training and support in research methods, but there is no formal coursework element. There may be opportunities to work up to four hours per week on teaching or supporting undergraduates, or as part of a funded research project, but that will depend on local arrangements.

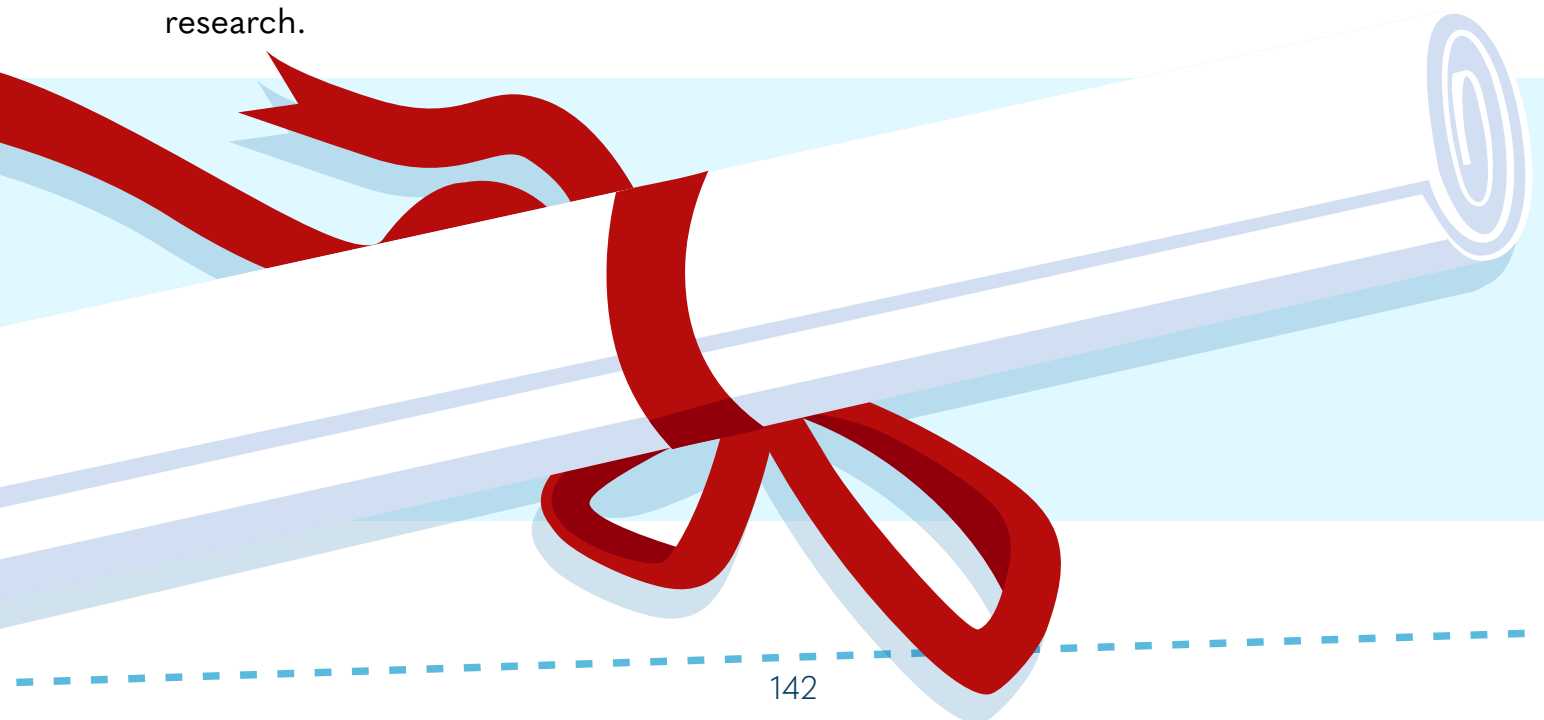
The typical academic route to a PhD is to gain a master’s degree, then proceed to two or three years of research study followed by one year to write up the thesis. Some universities will accept students for a PhD with lower qualifications and significant professional experience. Other routes include a Professional Doctorate, for students heading towards a profession such as engineering, architecture or nursing, or for professionals to gain a doctoral qualification in their area of expertise. This can take up to eight years, with a substantial coursework element and less research. There is also a PhD by Publication for students who have worked in an academic position and have published a set number of academic works.

Applying for a PhD involves searching (See for example: <https://www.jobs.ac.uk/search/phds>) for funded studentships, browsing university websites, or contacting a prospective supervisor directly with an outline for a plan of research. Some academics will be glad to hear from a candidate with experience in their research area and a well-thought proposal. Others will just forward the query to the university’s postgraduate admissions.



Before starting a PhD programme, the student will need to find, or be assigned, one or two supervisors in the broad area of study. Some universities require a third supervisor, perhaps with expertise in a related area such as data analysis. Typically, the student will meet once a month with the supervisors during the first year, less often in subsequent years, and exchange emails when needed. How the supervision session is organised will depend on the topic and supervisors. In a well-organised session, the student will provide the supervisors with material in advance (such as a draft section of the literature review) and will also suggest a list of topics and issues to discuss. Supervisors should read and provide written or oral feedback for this work. In the early months, supervision sessions can be intimidating, particularly if two or three supervisors argue among themselves as well as offer differing advice. The key is for the student to come well-prepared and to ask questions if anything is unclear, aiming to identify what should be the next steps in their research.

The standard UK PhD is split into three stages. In the first year, the student meets regularly with supervisors and they decide together whether there is a need for research training. The first three or four months is for a literature review, ending with an outline of a proposal for a research project. The remainder of the first year will normally comprise one or more pilot projects, developing the research outline, and preparing for the end-of-year review. This review is an important rite of passage. Normally, it involves preparing a document that includes the literature review, results of any pilot projects, and a proposal for the main research project. How it is assessed will depend on the university and department, but it may involve an oral examination by academics normally not known to the student. An unsatisfactory outcome may require substantial revisions, with the possibility of being demoted to MPhil, or even being required to leave the university.



In a few rare cases, this can become fraught with problems, with the student entering the second year in limbo, unclear of their status, with their transition under formal review. Some universities also require students to attend a series of research training courses during their first year, assessed on satisfactory attendance or by graded performance.

The second year will involve running the main studies, collecting data, and starting to write chapters of the thesis. Students will normally be expected to present their early findings at academic conferences and to build a network of colleagues. The focus of the third year is on finishing the main project, collating data, analysing results, and starting to write the main body of the thesis. The student would normally submit one or more articles for journal publication, with supervisor(s) reviewing these and being named as co-author(s). The thesis writing may well continue into a fourth year, which is often unpaid as there is no or limited supervision involved.

“It is not unknown for a student to submit a thesis against the wishes of the supervisor.”

One or more supervisors will normally read the thesis chapter by chapter or as a whole, suggest revisions and correct minor errors. The supervisor may indicate when the thesis is ready for submission, but the decision to submit rests with the student alone. It is not unknown for a student to submit a thesis against the wishes of the supervisor. In essence, the responsibility of the supervisor ends when the student submits. Sometimes, the supervisor(s) may give additional help by running a mock viva, and by discussing with the student any post-viva revisions to the thesis.

In the UK, there is no public defence of a thesis. The viva examination takes place in a closed room, attended by the student, external and internal



“There is no formal ceremony, no academics wearing funny hats bobbing up and down and making speeches.”

examiners. Nowadays, a chair (typically, an academic from a different discipline) is present to ensure fair conduct. A supervisor may sit in to take notes for the student, but is expected to keep quiet throughout the proceedings.

The *viva* arrangement is managed by the internal examiner—normally an academic within the university who is familiar with the research area, but who has not supervised the student—assisted by the postgraduate office. The student and supervisor may suggest the names of one or more external examiners, but the decision to appoint examiners is made by the postgraduate office. There are often limitations as to who can be assigned as an examiner; for example, examiners should have not co-authored any publications with supervisors or the candidate.

A *viva* can last anything from two to five hours. At some universities, the student is given the option to start the *viva* with a short presentation of the thesis. At others, the external examiner may start by asking the student to summarise the

thesis. Then, both examiners will address substantive issues raised by the thesis. Sometimes, the examiners will also go through the thesis page by page, raising minor points of wording or asking the student to explain specific sections of the text. The *viva* is far from a formality. At the end of the discussion, the student leaves the room and the examiners must agree on the result. Universities normally specify a range of outcomes. These could include (in descending order) pass with no corrections, minor corrections, major revisions, resubmission after further work, award of MPhil, or fail. The student returns and is told the decision. For most, this is either minor corrections (such as clarifying wording or adding a few sentences), or major revision (perhaps further data analysis, or an enhanced discussion of findings). Sometimes the thesis falls between minor and major revisions and there is a discussion with the student as to how long it would take to make the changes. It is important to note that the examiners make recommendations; the final decision is made by the university.

What happens next is often an anti-climax. There is no formal ceremony, no academics wearing funny hats bobbing up and down and making speeches. The student walks out of the room, the supervisor rounds up other students, pours warm sparkling wine into plastic cups, and toasts the outcome. The student then starts on a round of revision, which may take from two weeks to a year,



A PhD graduation ceremony at The Open University UK

depending on the requirements of the viva. For minor revisions, the external examiner may be willing to give the student informal feedback or clarify an uncertainty. At the viva, the examiners will have decided whether the internal examiner, external examiner, or both should review the revised thesis. Once they have both agreed that the thesis is ready, the student submits it, the university approves it, and the student is invited to the degree ceremony.

Any other ritual is entirely up to the university and department. The student may be invited to an evening dinner with the examiners after the viva (at which time the student may be emotionally and mentally drained, probably just wishing to be at home recovering). Some universities hold a small ceremony when the student submits the final revised thesis. The main ceremony is the graduation, when the PhD graduate joins other post-graduates, undergraduates and parents in an elaborate ceremony of speeches, tapping of maces and doffing of caps.



UNITED STATES OF AMERICA



PATRICIA ALEXANDER & RICHARD MAYER

Background information

Before we offer our description of the doctoral experience, it would be helpful to share a few facts about higher education in the United States and how it compares to other countries around the globe. The US is a large and very diverse country, and so are its doctoral offerings. It is home to more than 4300 institutions of higher education (National Center for Science and Engineering Statistics, National Science Foundation, 2019). Of those colleges and universities, 444 can grant doctoral degrees.

Among these public and private institutions, 115 qualify as “very high research activity” or R1 institutions and 107 are classified as “high research activity” or R2s (Indiana University Center for Postsecondary Research, n.d.). During their studies, US doctoral students, unlike graduate students in some other countries, spend a good portion of the time in formal classes meant to expand their substantive knowledge and their methodological expertise. Despite that fact, there is no prescribed curriculum or common set of requirements for a doctorate in education or psychology

in the US. That means each of the 444 degree-granting institutions can set its own requirements and protocols. Further, because students in some institutions can enter doctoral programs directly after completing their bachelor's degrees, the amount of coursework required within a specific program can vary.

Of course, over and above any coursework, doctoral candidates at both R1 and R2 institutions can expect to engage in research activities during their studies. The intensity of those research experiences is typically higher for those enrolled at R1 universities. Minimally, the culminating dissertation is representative of the doctoral students' ability to design and carry out a research study that contributes new knowledge to their disciplinary field. As with peers in the Netherlands, US doctoral students can also produce a multi-study dissertation consisting of published and new work. Whether they choose the single or multiple study option for their dissertation, doctoral students in R1 programs can be involved in any number of research projects. Also, even if the average time required to complete a

doctoral program is four or five years, there are those who achieve all requirements in markedly less time or, more often, significantly more time. Because doctoral programs can be tremendously expensive in the US, a good percentage of those who are not awarded teaching assistantships or research fellowships that support their studies must be employed during their studies, which can prolong the time required to finish.

What this brief overview makes apparent is that the doctoral experience in the US can be quite variable in terms of research expectations, curriculum, specific requirements, nature of the dissertation, and time to completion. Nonetheless, there are particular milestones and traditions that those pursuing doctoral degrees in very research-active (R1) universities will recognize and that are common to our respective programs and institutions: The Department of Psychological and Brain Sciences in the College of Letters and Sciences at the University of California, Santa Barbara, and the Department of Human Development and Quantitative Methodology in the College of Education at the University of Maryland.



Doctoral experience benchmarks

Despite our programs being located on opposite coasts of the US (balmy California and somewhat less balmy Maryland) and housed in different administrative units (Psychology and Education), our students share many of the same major benchmarks in the pursuit of the doctoral degree: acceptance process, apprenticeship experiences, earlier research projects, participation in conferences, course teaching, advancement to candidacy, completion of coursework, dissertation proposal and defense, and the graduation ceremony.

Acceptance in the program

It is not always an easy path to becoming a doctoral student at R1 institutions. That is because the number of students who can be admitted may be limited, and the funding available to support those students is another factor. Also, those who are accepted into doctoral programs work closely with faculty members who must be willing and able to take them on as mentees. Therefore, when students apply for admission to these programs, they need to demonstrate their ability to carry out the expected research activities and perform well in the required courses. Their applications should also establish their interest in the program of research with which their potential advisors are

“The first big step in the doctoral experience comes when applicants receive their acceptance letters from the department.”

identified. There are typically letters from former professors or employers who speak to applicants' knowledge and skills, as well as transcripts from prior institutions documenting their academic history. In the past, scores from national assessments such as the Graduate Record Examination (GRE) or equivalents were required as evidence of scholarly potential. However, in recent years such tests have been called into question by many universities and colleges due to their perceived bias against students from underrepresented populations. Upon receiving a positive evaluation, prospective students are notified about their acceptance in the doctoral program.

The first big step in the doctoral experience comes when applicants receive their acceptance letters from the department. This letter generally spells out the amount of financial support students are guaranteed, the number

of years that support will be provided, and any specific responsibilities they may have (e.g., research or teaching assistantship). Applicants to all doctoral programs across the US have until April 15 to sign their acceptance letters. Once the acceptance is official, the students' advisors and soon-to-be lab mates can begin planning in earnest about classes and ongoing research projects. At the beginning of the fall term, departments will hold orientation meetings for incoming students and various formal and informal social events will also take place.

Apprenticeship models

The role of the advisor in R1 institutions is largely to ensure that those completing the doctoral program are prepared to step into positions in higher education, governmental agencies, or the corporate world that are research-oriented. Under their advisors' guidance, doctoral students are apprenticed into the research process from conceptualization of a study to data analysis; they also begin to hone their academic writing and presentation skills, learn grantsmanship, and receive guidance in teaching college classes. Many advisors work collaboratively with their doctoral students throughout the program. It is not unusual for the two of us to continue collaborating with our former students on research and writing projects even after they have become established in their careers.



Earlier research projects

At both UC Santa Barbara and UMD, students are expected to undertake research in the first year of their programs. The nature of those projects and the level of support they receive from their advisor are, of course, commensurate with their existing knowledge and skills. Typically, over the course of students' first year, they meet regularly with their advisor to design and carry out a research project under their mentor's watchful eye. They also turn to more advanced doctoral students in their labs for guidance and support. The goal of these projects is to produce the makings of a publishable research paper or conference presentation.





These early research experiences are also meant to immerse students in the art and science of conducting research and help them sharpen the line of inquiry they hope to carry forward during their program. For some of our students, these early research studies become major publications and presentations, which is an added bonus.

Conference participation

Although doctoral students at R1 institutions are urged to attend conferences even in their first year in the program, they are given multiple opportunities to develop their presentation skills before they move up to a national or international conference stage. Those opportunities come in the form of program or department colloquia or mini-conferences featuring graduate student research, and as graduate-student organized conferences at the college and university level. At UC Santa Barbara, for example, doctoral students in their second year make a presentation at a mini-convention that focuses

on the progress they have made on their second-year research paper. This mini-convention is planned and managed by third-year doctoral students. At UMD, students are expected to present their research at an educational psychology colloquium and annually at a graduate student conference. By their third year in the program, if not before, UMD students are expected to submit their research to a major national research conference, such as those held by the American Educational Research Association, the American Psychological Association, or the European Association for Research on Learning and Instruction. These more high-profile presentations, while even more nerve-wracking than those delivered in the department or college, afford doctoral students the opportunity to share research ideas and socialize with other young scholars and to interact with leading scholars in their area.

Course teaching

Doctoral students who want to work in institutions of higher education must not only be capable of doing research, but also be able to teach classes. Therefore, another benchmark in their doctoral experience is serving as a teaching assistant of a faculty instructor or teaching a course independently. The amount of mentoring they receive in how to teach can differ greatly from program to program, however. At UC

Santa Barbara, for example, all Psychology graduate students take a course in college teaching during their first year on campus. Regrettably, for most R1 institutions, scholarly publications, presentations, and grants often have more importance than pedagogical abilities. Thus, the degree to which doctoral students are mentored into teaching in higher education is far less orchestrated than their research experiences.

Advancement to candidacy

At some point in the doctoral experience students must demonstrate their knowledge and abilities in their respective fields, before they are permitted to move into the final stages of their degree program. This demonstration of competence generally takes two forms: qualifying examinations or academic portfolios. Passing qualifying examinations is a major turning point—and a major relief—in students' graduate careers at UC Santa Barbara. These examinations occur the week before the start of students' third year in the program, when they are required to take a written portion based on reading lists approved by their doctoral committee. This is followed several weeks later by an oral examination administered by the students' committee, which is composed of the advisor and three additional faculty members. For doctoral students at UMD, qualifying examinations were replaced several years ago with a portfolio assessment.

The portfolio has to contain four acceptable scholarly products that are consistent with the goals of the doctoral program, such as published articles, conference presentations, student-developed course curricula, or grant proposals. All portfolios must contain a systematic, meta-analytic, or hybrid literature review related to the students' area of inquiry. A three-member faculty committee then judges the quality of those products.

Passing the qualifying exam or receiving acceptable scores for the portfolio are major milestones, but they are also associated with high anxiety. The anxiety is understandable because students whose performances are judged as unacceptable may be required to complete additional work, redo portions of the examination or portfolio, or they may even be asked to leave the program. On the other hand, a positive outcome can be exhilarating because success means students officially



to provide guidance and feedback as needed. With their advisors' approval, students submit their proposal to members of their dissertation committee weeks ahead of the proposal defense date. This gives committee members time to thoroughly evaluate the multi-chapter or multi-study document.

advance to candidacy, and they begin to see the light at the end of the proverbial tunnel. For these reasons, successful passage of the qualifying examination or portfolio assessment is inevitably grounds for celebration.

Dissertation proposal

When doctoral students at R1 institutions have much of their coursework behind them, have met the requirements in the earlier phases of their program, and advanced to candidacy, they take on the next major milestone of their academic careers—proposing their dissertation study. In most cases, these proposed studies are extensions of the research in which students have been engaged in their first, second, or subsequent years. By the time students reach this point in their doctoral programs, they are expected to carry out this research more or less independently, although their advisors and members of their doctoral committee are there

On the big day of the proposal meeting, students begin by making a presentation to the committee that summarizes the key elements in the envisioned study. Then, committee members raise questions, voice concerns, or seek clarification from students, who are to respond to whatever inquiries are raised. Following this question-and-answer period, students are asked to leave the room as committee members deliberate on whether the proposal is acceptable as is, needs changes that will be reviewed again by the committee, needs changes that will be reviewed only by the mentor on the behalf of the committee, or needs to be redone. Once any required modifications have been made and accepted by the committee, the approved proposal serves as a contract between the doctoral student and the committees. If unexpected events make it necessary to deviate in non-trivial ways from the accepted proposal, committee members will need to be informed and must approve.

Dissertation defense and public lecture

Generally, in the fifth or sixth year in the program (sometimes earlier or later), students have completed the work described in their dissertation proposal, have written it up, and are ready to set a date for its defense. Of course, before the dissertation is formally submitted to the students' committee it has likely been revised multiple times based on extensive feedback from the students' advisor and communications with other committee members. Once the dissertation document has received the tentative approval from the advisor, a date is set for the defense and the dissertation document is sent to the committee members for their evaluation. As with the proposal meeting, the defense begins with a presentation by the doctoral candidate that will summarize the completed study, including what questions it was addressing, what was done, what was learned, and the significance and implications of the findings. This presentation is open to the public but is mainly attended by students' family and friends, graduate students, and interested faculty. At UC Santa Barbara this public lecture is about one hour, whereas at UMD it rarely exceeds 30 minutes. When the public talk concludes, guests other than university faculty and graduate students leave and the formal defense portion commences. The questioning during this phase can be quite rigorous and stressful



for the doctoral candidates, which is one reason that family and friends are not in attendance. As with the proposal, the questioning period ends with the candidate and any graduate students or non-committee faculty departing the room, so that committee members can freely deliberate.

The outcomes of these deliberations range from the acceptance of the dissertation as written (which is quite uncommon); minor modifications overseen solely by students' advisor (popular choice); major modifications that require members of the committee to read and approve the revisions (not unusual); and the rejection of the document as currently submitted. Although the most severe judgment is a rarity due to the oversight of the work by the students' advisor, it can happen. When that occurs, students



will need to redo the document and perhaps even make a new presentation to the committee. Once the committee has come to its decision, students are called back into the room and, if all goes well, congratulated by the committee. Students are also informed about changes to be made in the document

and the level of scrutiny required from the advisor or the committee. It is at that point that the outcomes are shared with family, friends, fellow students, and other faculty, who have been waiting expectantly with congratulatory signs and balloons in hand. This hopefully cheerful moment is commonly followed by informal or more organized celebrations. The filing of the final paperwork that signals the completion of this final milestone will happen at some time in the future, when all changes have been accepted and the approved version transmitted.

The graduation ceremony

In addition to the many informal celebrations that occur after students' dissertations have been successfully defended and submitted, there is a formal university ceremony that takes place at the end of the fall and spring terms. At this ceremony, students are presented their diplomas and publicly acknowledged as doctors of philosophy. For students at UC Santa Barbara, the graduation ceremony takes place outdoors on a grassy field overlooking a fresh-water lagoon with the Pacific Ocean in the background. At UMD, the ceremony takes place indoors at one of several large venues on campus.

Whether outdoors or indoors, the event begins when a university official carrying a ceremonial mace leads a procession of school administrators, honored guests,



doctoral graduates, and their advisors into the venue to the sounds of *Pomp and Circumstance*. After the National Anthem is sung, an invocation is given, and speeches are made by one or two honored graduates, groups of doctoral students and mentors move toward the stage. As school administrators read the name of the graduating student and the advisor, the pair cross to mid-stage where the advisor proceeds to hood the student. Then comes congratulatory handshakes, hugs, photographs, the singing of the school song (that few know), and a closing invocation.

The official ceremony then ends as it began—with a procession out of the venue led by the university designee. Once outside, there are more handshakes, hugs, and photographs. Friends and family mill around with the new graduates enjoying the excitement of the moment and preparing for the untold celebrations that will certainly follow. After four, five, or more years of hard work, those celebrations are well deserved.



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ZAMBIA



OVERSON SHUMBA & JANE M. KWENYE

Application and enrolment

Zambia currently has more than 7 public universities and more than 60 private universities, and thus, there will be some variations in the PhD journey that we describe. Overall, prospective PhD students in Zambia start by purchasing an application form from the university of interest at a prescribed fee. The completed application form, a draft proposal, and the associated support documents are submitted to the university, typically to the Directorate or

School of Graduate Studies. Generally, PhD applications are open throughout the year. To be successful with the application, a prospective PhD student has to fulfill requirements stipulated by the Senate of the university. For example, possessing a bachelor's degree and a relevant master's degree from a recognized institution and submitting a research proposal are typical requirements. Some institutions may require proof of full financial support for the entire PhD programme for applicants to be successful.

“PhD students are normally expected to prepare a research proposal at the time they apply for consideration for enrolment.”

Registration and modes of studies

Selected PhD students are expected to register for their PhD studies with the university. Some institutions require registration to be done at the beginning of the academic year. Registration is contingent on payment of tuition fees; these vary across institutions. In terms of the mode of research study, PhD studies are offered on a full-time and part-time basis. Students who pursue the PhD study on a full-time basis are expected to complete their

programme of study within 3-4 years, while those pursuing their studies on a part-time basis are required to complete their studies within 6 years. Nevertheless, in most institutions the University Senate can allow for extension of the duration of study, in some institutions for a period of 1 year.

The research proposal, study plan and candidacy

PhD students are normally expected to prepare a research proposal at the time they apply for consideration for enrolment. In many institutions, PhD students present a seminar on the research proposal to the faculty and use the input to improve on it. The proposal is then submitted to the School Postgraduate Selection Committee (SPGSC) for assessment and approval. The entire process from proposal preparation to approval is normally not expected to exceed the first 6 months of their studies for full-time students and the first 9 months of their studies for part-time students.







The graduation ceremony, which includes bachelors, masters, and PhDs, begins when the Chancellor's procession enters the arena. The procession is in the order: mace bearer, academic staff, members of Senate, members of the University Council and Management, and the Chancellor and a guest of honour.



University regulations provide guidelines for the acceptance of the research proposal. Some typical guidelines in the Zambia Standards and Guidelines for Quality Assurance in Higher Education include the following:

- degree of fit between the intended field of study and the school's research activities;
- a research plan that shows a feasibility timeline for completion of the research and thesis;
- availability of senior academics to supervise the doctoral research project; and
- availability of research facilities and resources to satisfactorily conduct the proposed research.

Besides approving the research proposal, the SPGSC also recommends senior academic staff members for appointment as supervisors. Supervisors work with PhD students to refine the research proposal, create a study plan and prepare for candidacy examinations within the first 6-9 months of studies. At some universities, a student is expected to prepare a study plan to the School of Graduate Studies within one month after enrolment. The study plan provides a detailed timeline of proposed research activities and progress reports. The plan can be updated continually, but the revisions must be approved by the School of Graduate Studies.

The PhD student is also expected to be ready for candidacy examination within 6-9 months after enrolment. The candidacy examination accords the PhD student the opportunity to demonstrate the ability to undertake independent research and outline his or her research problem, as well as the methods of solution that he or she proposes to use for the study. This period will also be used for ethical clearance of the proposed research. The candidacy examination typically takes the form of a seminar presentation to the school's Postgraduate Selection Committee or a panel of experts constituted for this purpose. The panel normally includes the supervisors and professors or senior lecturers from the enrolling school and from any school other than the one where the candidate is enrolled. After passing the candidacy examination, the student proceeds to undertake their research in the 2nd and 3rd years of their PhD studies. The student conducts the research, analyses data, presents preliminary results to a seminar, and writes the thesis chapters. The expectation is that the thesis can be presented for examination in the third year. However, many candidates fail to achieve this target and end up getting their theses ready a year or two past this deadline. It is not uncommon to see candidates complete their PhDs after 5 or more years.



The Chancellor of Copperbelt University addressing the graduating class and guests. Typically, the Vice Chancellor, the Chancellor, and the guest of honour give speeches and congratulatory messages at the ceremony.





The graduation ceremony requires formal attire by directors of the ceremony and the graduates

Quality assurance and supervision

The PhD journey is quality-assured at many stages of the research and thesis development. The Higher Education Authority has now provided the Standards and Guidelines for Quality Assurance in Higher Education against which institutions can benchmark themselves. Supervisors are required to be of senior academic rank, experience, and expertise. They are to be full-time

academic staff members, and only in exceptional cases may a part-timer be assigned to serve as the main supervisor. In most institutions, the quality of supervision to a large extent relies on the experience and judgement of individual supervisors, since they may not have formal training in supervision as pedagogy. Generally, the universities approach this deficiency through occasional seminars and workshops.

An important quality assurance milestone is the preparation of the quarterly or half yearly progress report by the student and the supervisors. This is to be presented and evaluated by the SPGSC before it is submitted to the School of Graduate Studies. In these reports, all research activities and achievements of the past 3 months or 6 months are documented. The report outlines progress, conference attendance, teaching responsibilities, and any publications resulting from the research. By the time of the oral examination (*viva voce*), some institutions require PhD students to have published two articles in peer-reviewed or refereed journals, while others require publication of only one article in refereed journals.

In the end, the thesis is written and presented for internal and external examination, and after that, it is defended in the *viva voce*. Institutions provide guidelines on the word limit for the written thesis. For instance, in the Arts at CBU, the number of words must not exceed 100,000, while in the Sciences the word limit is 60,000. Once the written thesis is ready for examination, the assessment process is a regulation-guided process. As a general practice, institutions provide detailed guidelines for appointment of the examiners, marking and preparing examination reports, and for the conduct and verdict in the *viva voce*.

“An important quality assurance milestone is the preparation of the quarterly or half yearly progress report by the student and the supervisors.”

In many institutions, the examination process begins when the supervisors submit the candidate's thesis to the head of the department or the coordinator of graduate studies. For this purpose, official approval and consent forms are completed and signed by the supervisor to confirm that the thesis is ready for examination. Following this, the standard practice in most institutions involves the examination of the written PhD thesis by at least three examiners. These examiners can be two internal examiners and one external examiner in some institutions. The common practice among most institutions is to appoint one internal examiner and two external examiners. The thesis is presented to them for perusal and assessment within 1-3 months. In most cases, a thesis assessment guideline is provided to the examiners to guide their assessment. After assessment of the written thesis is completed, the Board of Examiners also conducts an oral examination (*viva voce*) of the PhD student.





Music and dance performances mark graduation ceremonies and parties carry on well after the ceremony with family and friends

In many institutions, the viva voce lasts up to 3 hours. Traditionally, this has been done in person, but due to high costs involved in bringing examiners to the university and now with the COVID-19 pandemic, the viva voce is conducted virtually. During this process, the PhD student, who is dressed in formal attire, makes a PowerPoint presentation of the thesis, from conceptualization, methodology and design, and research results, to evaluation of contribution and significance. This presentation lasts for 30-60 minutes. After the presentation, the examiners engage the PhD candidate by asking questions on the presentation

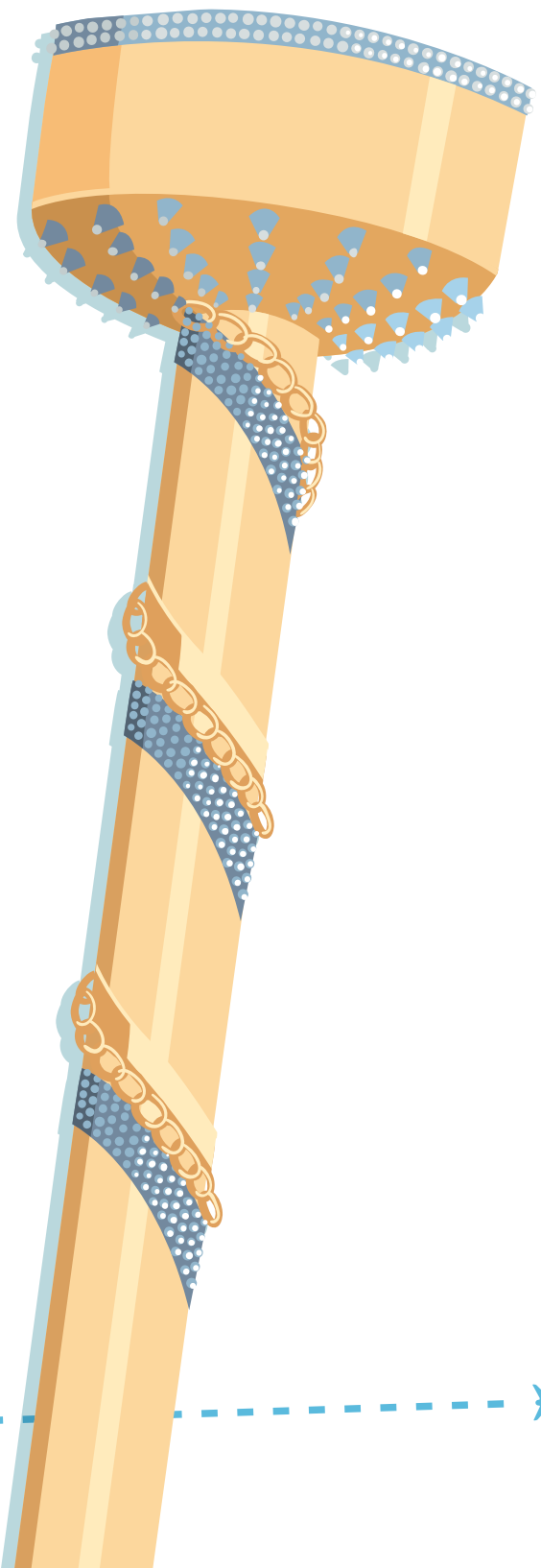
and the written thesis. In addition to the internal and external examiners, the supervisors and the head of the department and/or coordinator of graduate studies attend the viva voce. The university community and members of the public are also allowed to attend the viva voce. Some institutions allow them to ask questions, while others do not. Once the viva voce is complete, the university community, members of the public and the PhD student are asked to leave the viva voce venue. This leaves the examiners to deliberate on the performance of the candidate and decide on the final verdict.

Both the thesis and oral examination are considered in the evaluation. A pass is awarded when a candidate attains a pass mark from the majority of the examiners. Receiving at least the minimum pass mark is mandatory for successful completion of the PhD. The minimum pass mark varies across institutions. Once the verdict is reached, the PhD candidate is invited back to the venue to hear the verdict, which can be one of the following:

- Pass without any corrections
- Pass subject to minor corrections
- Pass subject to moderate corrections
- Re-submission for re-examination within six months
- Re-submission for re-examination within nine months by all examiners, including a *viva voce* examination.

PhD students who meet the minimum pass mark for successful completion of the PhD are passed and congratulated by the examiners. Candidates whose verdict is a pass are expected to attend to corrections raised by the examiners before submitting the thesis to the supervisors for final approval. Some corrections may require being done to the satisfaction of the examiners. In cases where the verdict requires that corrections are done to the satisfaction of the examiners, the examiners are provided with a checklist form on which to provide their feedback. Once

approved, the thesis is cleared and the official result is communicated to the candidate. Celebrations begin and will reach their climax on graduation day, when the PhD is conferred.







Getting capped is a crowning moment for both the earned and honorary doctorate

Graduation and conferment of the PhD

Conferment of the PhD typically involves submitting a written thesis, publishing one or two articles in a refereed journal, passing the *viva voce* examination, and making corrections to the thesis. It must be pointed out that the PhD is a high-level qualification that few achieve and as such, there is no separate ceremony. The PhD is conferred during the same ceremony when diplomas, bachelor's degrees and master's degrees are conferred. However, the capping of the PhD is a special ritual, as shown in the pictures.

The degree is conferred at the university's graduation ceremony. The graduation ceremony is a public event and

a time of celebration. It starts with an academic procession and ends when all candidates are capped by the Chancellor. During the ceremony, the Dean of Graduate Studies calls out the name of the candidate and presents him/her to the Chancellor to receive the degree. As he or she comes up, the supervisor reads out the thesis title and gives a synopsis of the research, and the Chancellor caps the recipient, who is dressed in a graduation gown. Family and friends of the PhD recipient attend the graduation ceremony to celebrate with the PhD graduate. They shower the PhD recipient with various gifts after conferment of the PhD. Graduation parties are held after the graduation ceremony to celebrate the PhD recipient's achievement.

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BRIEF AUTHOR CVs

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Nicolas Balacheff is an emeritus senior scientist at the *Centre National de la Recherche Scientifique* (CNRS). He contributed to research on teaching and learning mathematical proofs, as well as bridging AI research and mathematics education research, with a focus on student modelling. He started the latter as a member of the *Cabri-géomètre* project, which paved the way for research in dynamic geometry. He chaired several national and international



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Mireille Bétrancourt is a full professor in Information Technology and Learning processes in the Faculty of Psychology and Education, University of Geneva. Since 2003, she has been the head of TECFA, a research and teaching unit dedicated to the design and evaluation of educational digital technology. Her research goals are to advance scientific knowledge in the domain of digital learning as well as to provide recommendations for the design of effective computer-supported instruction and systems that foster learning on the cognitive, relational and emotional levels. She has (co)supervised 15 completed PhDs and currently (co)supervises 7 PhD students on a large variety of topics including multimedia learning, emotional design, instructional video, collaborative writing and computers in the classroom. She is an active member of research associations such as EARLI, AERA and EAIH. In particular, she was the coordinator of EARLI SIG-2 Comprehension of Text and Graphics from 2014 to 2018. She also acts as expert advisor for the State of Geneva in the implementation of their plan for digital education that aims to reinforce the use of digital tools for instructional purposes and fostering students' digital skills.

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