

# Some Guidelines for Doctoral Dissertations at the University of Skövde (Informatics area)

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*This is an advice document and not part of the official regulations of the University. All supervisors and students must, of course, follow the regulations of the University. The document is approved by the Committee for Research Education (Utbildningskommitté för Utbildning på Forskarnivå) after consultation with the Supervisor Forum (Handledarkollegium). It is always under review and suggestions for improvements are welcome – contact the Committee.*

In this short advice document the supervisor group at the University of Skövde presents some brief guidance for doctoral students on their common expectations for doctoral dissertations within the thematic area of Information Technology/Informatics (currently the only degree that the university offers). It should be understood as some guidance to reduce confusion, and ensure compliance with internationally accepted practice (we're not promoting a special dissertation variant for our university). It is not intended as a set of rules to be slavishly followed: good dissertations can vary considerably in form and content.

## Theme

The dissertation has an IT-related theme (Swedish: informationsteknologi, formally translated in the University's English documentation as Informatics) such that its major results are (in principle) publishable in the (500+) IT-oriented journals and conferences. We don't have a comprehensive list of these; actual outlets may include the IT-oriented parts of other disciplines, for example engineering. In as much that the thematic area is very broad and characterised by three areas (computational, socio-technical, industrial informatics), the dissertation may cover all kinds of IT related subjects and be located in a variety of academic disciplines and fields. However some subject areas can't normally be considered IT themes (biology, nursing, physics) and we can't give degrees in these subjects - so there are boundaries even if these are wide. A dissertation is normally a deep examination of a narrow, focused, contemporary theme. A PhD candidate is more often an expert in a narrow academic area (making their first incremental contribution to science), than a generalist holistically pulling together theories from different fields and disciplines, or a revolutionary challenging the established wisdom of decades. The theme is contemporary in the sense that it is understood to be a current research problem; it may also be a topic of importance to industry or society in general. Many disciplines have IT-dependent research methods such as simulation, statistical modelling, automated text analysis; however an IT-dependent method is not the same as an IT theme.

## Form

The doctoral dissertation is either a monograph (a through-written sustained research contribution which may have related publications but is not dependent on them), or a collection of published articles with a summary (also known as collection of articles or thesis by publication). There are some hybrid forms in which elements of both are combined, but these are not encouraged. It's written in Swedish or English; however, since the article and summary form contains internationally published articles in English it's also normal to write the summary in English. A monograph has a standard structure which often echoes the structure of a scientific article. It usually contains these components: (abstract) introduction, theory/state of the art, research method/design, results/data/analysis, discussion/conclusion (known as the hourglass model<sup>1</sup>). The actual chapter headings may differ a little. It's perfectly acceptable to modify the standard form; however you can't normally lose these components or make them unrecognisable. A Swedish convention in some fields is to include a background chapter after the introduction. In the article and summary form, the summary follows the monograph structure, but in miniature, and usually includes some tailored short assessments of the articles indicating how they contribute to the overall dissertation, often replacing the results/data/analysis chapter. The summary gives the unified overview of the PhD research, the articles fill in the details. The articles are presented in their published form, usually at the end. Four to seven articles are enough, depending on some factors including contribution, length, complexity, relevance for the dissertation, scientific quality and where they are published. They should be published in internationally recognised outlets (we are guided by the Norwegian and Danish lists) and predatory publishers should be avoided. Most of the articles should be published or accepted for publication – it's always acceptable to include one which is still in review. In most fields, 1-2 journal articles and 3-4 conference papers published in recognised legitimate international outlets is fine; some fields prioritise conference papers, so a focus on conferences is also fine in these fields. In other fields the conference articles have no legitimacy and you must focus on journal articles. It's also normal to include at least one sole-authored article to demonstrate the independence of the candidate, and some variety of co-authors to demonstrate that the candidate can cooperate with different research colleagues. The contribution of the candidate to the various articles can be indicated in the summary text. The publication strategy (what, where, when) is a complex issue which is a discussion with the supervisor team.

## Length

Some PhD theses are very long, but longer is not necessarily better. A long, complex thesis is hard to navigate for examiners and creates difficulties of structure and narrative for the author. For a monograph 150 pages (A4, single line spacing, 12pt) is fine, for a summary 70 pages is fine. Scientific quality and focus, good structure and a well-developed argument usually beats extensive detail and coverage of multiple themes. However some researchers prefer to write long – it's not forbidden. Dissertations are normally written in Word or LaTeX.

## Content

Here's a list of things required in most theses:

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<sup>1</sup> SCHULTE, B. A. 2003. Scientific writing & the scientific method: Parallel "hourglass" structure in form & content. *The American Biology Teacher*, 65, 591-595.

- A well-defined problem to investigate
- Focused research question(s) and/or objectives, and the background and justification for these
- Up-to-date and relevant theory in the research domain
- A relevant research approach/method recognised in the target domain (some exceptions in very technical and very applied fields), conscientiously applied
- Research design establishing that the research is planned in an appropriate way
- Data and empirical material of some kind
- Analysis of the empirical material
- Original contributions: primarily theoretical, sometimes empirical or practical
- Some form of discussion of the contributions
- Synergy between the things listed above, such that there are common themes and a consistent argument ('red thread' for those with a Scandinavian background)
- A suitably elaborated presentation, employing the scientific writing conventions of the target field
- A recognised reference and citation form
- University of Skövde presentation and formatting standards

This is a list of required elements, not the chapter structure of a thesis. There are also a variety of legal and ethical obligations for researchers concerning the rights of their collaborators, colleague researchers and data subjects (and the data that describes them) which must be observed in the dissertation – sometimes it's necessary to make these conditions explicit for the reader. The dissertation and the taught part of the education, taken together, must fulfil the Swedish national quality criteria.

Though this list of content items works for the majority of dissertations in our PhD education, there are several perfectly acceptable variants. For instance a theoretical dissertation may not be much concerned with empirical data, and in some technical disciplines there may be little focus on research method.

## Language

Students writing in their second or third language commonly have some difficulties writing fluent, idiomatic and grammatical academic English (beyond those which can be fixed by spell and grammar checkers). The same sometimes applies to students writing in their first language, whether Swedish or English. Supervisors may help, but can't be expected to take the burden of language revision for the thesis, so PhD students must draw on colleagues, family and friends and sometimes professional editing services. Perfect English without flaws is not a requirement, but clear and appropriate language is.

## Licentiate

A licentiate dissertation usually follows the same patterns as a doctoral dissertation; however the scope is smaller. If you look at our examination regulations the licentiate dissertation covers 75 points whereas the PhD dissertation is at least 150. A licentiate can therefore be shorter, with fewer articles and the examiners will not expect the same research quality or level of contribution. Most of the advice covered above will still hold. Where the doctoral dissertation follows on it will normally extend the licentiate research, so some of the content

of the licentiate, suitably reworked and re-written for the new context, can be re-used. New articles are normally required for the summary and articles form.

## The dissertation audience

Dissertations are normally written for a particular international academic community (which has traditions and expectations), and more precisely for examiners who serve as representatives of that community. It's important that the dissertation respects those research traditions (even where they conflict with the generalised advice in this document). Dissertations are not graded (they just pass or fail) – but a good dissertation makes a positive decision easy for the examiners.

## Formal procedures, checklists and templates

These are listed at: <https://www.his.se/en/Research/PhD-programmes/Regulations-forms-and-templates/>

University of Skövde, 24<sup>th</sup> June 2019