Guidelines for Seminar, Bachelor and Master Theses

At the Human-IST Institute, Boulevard de Pérolles 90, 1700 Fribourg

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This document provides guidelines to write scientific work within the Human-IST (Human-Centered Interaction Science and Technology) research institute at the University of Fribourg. The remarks are related to all kind of theses which are supervised by members of the Human-IST institute, i.e. seminar reports, Bachelor Theses and Master Theses.
This document is an adaptation of the document created by Prof. Dr. Andreas Meier for theses conducted in the information systems (IS) research group [1], which has been updated to reflect the standards of the Human-IST Institute, as well as the requirements of the Faculty of Science and Medicine of the University of Fribourg.

Contents

1. Selection of a Research Topic 2
2. What has to be considered in the Proposal? 2
3. Evaluation of the thesis 2
3.1. Presentation of the thesis 2
3.2. Evaluation 3
3.3. Evaluation of prototypes 3
3.4. Plagiarism 3
4. Scientific research 3
4.1. Structure and criteria of scientific papers 3
4.2. Literature 5
4.3. References and bibliography 6
4.4. Research method of the Human-IST Institute 7
4.5. Collaboration and project management 7
5. Regulations on seminars, Bachelor and Master theses 7
5.1. Regulations 7
References 8

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1. Selection of a Research Topic

Open research topics for Seminar, Bachelor and Master Theses are published on the website of the Human-IST Institute (http://human-ist.unifr.ch/). Anyone who is interested in one of the topics is friendly invited to contact directly the responsible supervisor (assistant).

Own propositions of students regarding a research topic are *very welcome*. However, the acceptance of the topic proposed follows upon agreement with the examiner (professor) and the supervisor (assistant). The research topic should always meet the interests of the student *and* the supervisor, *i.e.* it has to contribute to the *field of research* of the Human-IST Institute. Moreover, for seminars, the proposed topic has generally to comply with the topic of the seminar.

For motivational and organizational reasons, it is recommended to chose the *right research topic* carefully.

2. What has to be considered in the Proposal?

The following points have to be considered in every **project proposal**:

a. **Title page**:
   - Name of the university and department
   - Provisional **title of the thesis**
   - **Author**: full name, matriculation number, postal and e-mail address
   - **Examiner** and **supervisor**
   - **Place** and **date**

b. **Background** and **motivation** of the thesis (why writing a work about this topic?)

c. **Problem statement** and **research questions.** For each research question it has to be specified:
   - **Why** the question is relevant, and
   - **How** one plans to answer that research question (i.e. discussion of the literature, case studies, empirical study)

d. **Objectives** and output of the thesis (what has to be achieved within the work?)

e. **Proceeding and method** (which research methods are used?)

f. **Time schedule** (**~5 milestones**; sub-goals, activities, steps)

g. **Contents** (provisional table of contents with 2 hierarchical levels)

h. **Literature** (at least 6 sources)

3. Evaluation of the thesis

3.1. Presentation of the thesis

For Bachelor and Master theses, the **written thesis** has to be submitted in electronic form to the examiner, which will review and evaluate it. Once the final version of the report is accepted, it has to be submitted in *hardcopy* and *electronic form* (PDF) to both the examiner and the secretary's office. In the case of seminars, submitting to the supervisor and the examiner an *electronic copy* (PDF) is sufficient, if not stated otherwise.
The PDF of the theses will be published on the Human-IST website. Students have to clarify in the thesis if the results are not supposed to be published for nondisclosure reasons.
Bachelor and Master theses are to be presented to the members of the Human-IST Institute in a meeting. The **presentation** lasts circa *30 minutes*, and is followed by a **discussion** of 15 minutes. Additionally, a short (5-15 minutes) *initial* and a *mid-term* presentation are also to be done to present the plan and progress of the thesis.

3.2. Evaluation

The **grading** of the work of a student (or group, for some seminars) will consider the *knowledge of the topic*, the *quality of literature research*, the *spirit of initiative*, as well as the quality of both *achieved results* and their *presentation* (written and oral).
Considering the mentioned criteria, each work receives a grade 1-6 with a granularity of 0.5, where 6 is the best possible result. A grade of 4 or more indicates an accepted thesis, while a grade below 4 corresponds to a not accepted work.
For Bachelor and Master Theses, a *detailed evaluation* is written and communicated to the author.
Results of seminars are *discussed verbally*. A detailed evaluation of a seminar work will be provided on request, for instance, if the author needs better self-evaluation in regard to a Bachelor or Master thesis.

3.3. Evaluation of prototypes

If a **prototype** was developed for the thesis or seminar, the following additional criteria are considered in the evaluation process:

Table 1. Criteria of evaluation of prototypes

Knowledge & skills	Scientific research	Quality of results	Presentation of results
• Used programming language • Developer tools used • Standards • Etc.	• Methods & development approach used • Documentation of system analysis & design	• Usability • Robustness	• Program delivery, installation and presentation • Installation manual • User manual

3.4. Plagiarism

Every submitted thesis and seminar report will be checked with **plagiarism software** and web-based services. These tools search the internet and indexed books and compare information from the web with the content of the thesis.
Theses including plagiarism will be evaluated with the **grade 1.0**. In severe cases, a disciplinary procedure is opened, which can end with the exmatriculation of the student from the University of Fribourg.
"Non quoting" and "copy-pasting" does not pay off in any case! [1]

4. Scientific research

4.1. Structure and criteria of scientific papers

Any **Bachelor and Master thesis** should be written using the Human-IST templates (resp. http://human-ist.unifr.ch/bachelorprojects and http://human-ist.unifr.ch/masterprojects). Other than that, the following points should be respected:

- A thesis always starts with an **abstract** followed by the **table of contents**. The abstract includes half to one page of text, discussing the main results of the research.
- At the end of the abstract, some **keywords** are listed. Those help categorize the thesis.

- After the table of contents, follows a list of figures, a list of tables and a list of abbreviations. All these pages are numbered with roman numbers (I, II, III, IV, …).
- **Acknowledgements** *(not mandatory)* are usually written before the abstract, or after the list of abbreviations.
- The **Introduction** chapter contains: the **problem statement** (which scientific questions have to be answered), **objectives** (which goals have to be achieved) and **Outline** (which research methods are taken in account).
- At most 3 hierarchical levels are used for **sections.**
- The **references list** or bibliography follows the main text of the thesis.
- **Appendices** follow the bibliography, and are usually enumerated with letters (A, B, C, D, …).
- The evaluation of the Thesis can last up to one month (4 weeks). This period has to be considered in regard to **official deadlines**.

Seminar reports should be written using the ACM SIG Proceedings Templates (https://www.acm.org/publications/proceedings-template) or using the provided templates, according to the details communicated at the beginning of the seminar. These reports should:

- Contain an **abstract** of about 150 words, describing the main results of the research.
- A list of **keywords** which help to categorize the thesis, following the abstract.
- An **Introduction** chapter at the beginning of the paper, and **Discussion** and **Conclusion** at the end.
- The list of **references**.
- The rest of the structure is free, students can choose to structure their report in the way they find more appropriate.

To better write scientific texts, please also consider the next tips:

- Follow a *clear and logical structure* (**red thread**).
- "**1 paragraph = 1 thought**".
- Important **key words** have to be *defined clearly*.
- A **scientific language** has to be used (e.g. formal sentences in passive). Spelling, grammar and punctuation have to be correct.
- **Figures** and **tables** have to be *captioned and referenced.*
- **Legends** are used to explain *symbols* in figures.

For what concerns details on **time, length** and number of **ECTS** credits of the different types of works, please refer to **Table 2**.

Table 2. Number of pages, ECTS and time for theses

Type of work	*Number of pages*	*ECTS*	*Hours (approx.)*
Master thesis (MSc)	80-120[1]	30	900
Bachelor thesis	60-80[1]	15	450
Seminar	20-30[2]/6-10[3]	5	150

[1] Not a priority, can also be shorter/longer, as soon as the report is complete, detailed and well written.
[2] When a standard report is required
[3] When the ACM SIG Proceedings format is explicitly requested

4.2. Literature

Searching, reading and analyzing **existing literature** on the research topic are important processes and basis of any scientific research. It is expected from every author of a thesis to research the relevant literature *systematically* and *carefully*.
Different categories of scientific literature exist, in Table 3. these categories are enumerated, as well as their **advantages** and **disadvantages**.

Table 3. Categories of scientific literature

Category of literature	Advantages	Disadvantages
Text books	• Easy to find • Comprehensive • Comparative	• Often not up-to-date • Often not specific • Not available for new fields
Research papers (journals)	• Topic oriented • Up-to-date	• Narrow (author is focused on the strengths of his own idea)
Research papers (conferences)	• Topic oriented • Very up-to-date	• Narrow • Not mature
Habilitation & dissertation	• Methodical founded, specific • Established in research	• Too specific • Not adequate for own research
Bachelor & Master thesis	• Manifold and high quantity • Discussion of the literature	• Quality not guaranteed • Often low scientific contribution
Websites	• Very easy and quick to find • Easy to copy • Very up-to-date	• Quality not guaranteed at all • Information overload • Reference not stable

For theses in the research field of Human-Computer Interaction and Soft Computing, the following scientific **journals** are recommended:

- ACM Transactions on Computer-Human Interaction (http://tochi.acm.org/)
- IEEE Transactions on Human-Machine Systems (http://www.ieeesmc.org/publications/transactions-on-human-machine-systems)
- Applied Soft Computing (https://www.journals.elsevier.com/applied-soft-computing/)
- Cognitive Computation (http://www.springer.com/biomed/neuroscience/journal/12559)
- Soft Computing (http://www.springer.com/engineering/journal/500)
- Interacting with computers (https://academic.oup.com/iwc)
- Human-Computer Interaction (https://www.tandfonline.com/toc/hhci20/current)
- International Journal of Human Computer Studies (https://www.journals.elsevier.com/international-journal-of-human-computer-studies)
- Virtual Reality (http://www.springer.com/computer+science/image+processing/journal/10055)
- IEEE Transactions on Fuzzy Systems (http://cis.ieee.org/ieee-transactions-on-fuzzy-systems.html)
- International Journal of Fuzzy Systems (http://www.springer.com/engineering/computational+intelligence+and+complexity/journal/40815)
- Journal of Visualization (http://www.springer.com/engineering/journal/12650)

- Journal on Multimodal User Interfaces (http://www.springer.com/computer/hci/journal/12193)
- … And many others

These journals, and many other sources of scientific papers, are **accessible for free** when connected to the *university network*, either directly, or via *VPN software* (https://www3.unifr.ch/it/fr/acces-distant-a-l-intranet-vpn.html).
The **research of literature** starts at different sources: in an internal or external *catalogue* of **libraries** (e.g. https://explore.rero.ch/en_US/rero), in **bookshops** offline or online (e.g. https://www.amazon.com/), or in the **internet** (e.g. https://dl.acm.org/, https://scholar.google.ch/, https://ieeexplore.ieee.org, http://www.sciencedirect.com, http://www.springerlink.com).
Due to information and literature overload, it is recommended to create an own **list of literature**. The literature quoted in the thesis can be **collected and managed** in a literature *database* using specific software.
The use of a professional software to manage references and sources can be helpful. For instance **EndNote** (https://www.endnote.com/) is a database to store different sources and import them directly in text documents. Recommended *open source software* for managing literature is **JabRef** (http://www.jabref.org/), which is based on the BibTeX format of LaTeX, but it can also be used in Microsoft Word and OpenOffice.

4.3. References and bibliography

The reference (bibliography) items in scientific works should contain the following details (taken from [2]):

Journal article

A basic reference list entry for a journal article in APA must include:
- Author or authors. The surname is followed by first initials.
- Year of publication of the article (in round brackets).
- Article title.
- Journal title (in italics).
- Issue of journal.
- Page range of article.
- DOI.
- The first line of each citation is left adjusted. Every subsequent line is indented 5-7 spaces.

Example: Ruxton, C. (2016). Tea: Hydration and other health benefits. *Primary Health Care*, *26*(8), 34-42. doi:10.7748/phc.2016.e1162

Book

A basic reference list entry for a book (print version) in APA must include:
- Author or authors. The surname is followed by first initials.
- Year of publication of the book (in round brackets).
- Book title (in italics).
- Place of publication.
- Publisher.
- The first line of each citation is left adjusted. Every subsequent line is indented 5-7 spaces.

Example: Arnott, G. D. (2005). *Working in aged care and disability services: An introduction*. Croydon, VIC: Tertiary Press.

For more document types and examples, please consult [3].

4.4. Research method of the Human-IST Institute

Seminars as well as Bachelor and Master theses conducted within the Human-IST Institute, should have both a **theoretical-deductive part ("concept")** *and* a **practical part (case** or **application**; i.e. a *case study*, *quantitative/qualitative empirical study* and/or a *prototype*). This reflects the most common research methods in the fields of interest of the Human-IST Institute.

For **empirical studies**: for each single question in a *questionnaire*, one has to ask themselves if the question is *really necessary* and *for what* is the question necessary.

4.5. Collaboration and project management

The following points should help to improve the **collaboration** between the student and the supervisor.

- If you have **questions**, please write an e-mail spontaneously to the supervisor. Please formulate your questions shortly and *clearly*.
- The supervisor should be **regularly informed** about the *status* of the thesis. Please contact the supervisor if you reach a mile stone, or at least *every second month*.
- Before submitting a thesis to the Dean's office, please give a *draft* of the thesis to the supervisor. You will then receive a *feedback* on how to improve certain aspects of the thesis for the final version.

5. Regulations on seminars, Bachelor and Master theses

5.1. Regulations

All actual *regulations* and *rules* concerning seminars, Bachelor and Master theses can be found on the website of the faculty (https://www3.unifr.ch/scimed/), on the website of the Joint Master of Science BeNeFri (http://mcs.unibnf.ch/) or at the Dean's office.

The **duration** of seminars, Bachelor theses and Master theses is *usually* of *one semester*, but can change for students with particular needs. The effective duration of a research work is discussed at its beginning with the supervisor of the thesis.

Bachelor and Master theses in **collaboration** with other students are *not allowed*, while for *seminars* it is *up to the examiner* to allow or forbid collaborations.

2 bounded copies of both **Bachelor and Master theses**, as well as the corresponding PDF, have to be given to the *examiner*. For what concerns **seminars**, *one electronic version* of the report has to be sent to the *examiner* and the *supervisor*.

References

[1] A. Meier, "Guidelines for Seminar, Bachelor and Master Theses," *Information Systems*, 2009. [Online]. Available: https://diuf.unifr.ch/main/is/student-projects. [Accessed: 29-Jun-2018].

[2] S. Poliness, "Library Guides: APA Referencing: Getting started in APA Referencing." [Online]. Available: http://libraryguides.vu.edu.au/apa-referencing/getting-started-in-apa-referencing. [Accessed: 04-Jul-2018].

[3] S. Poliness, "Library Guides: APA Referencing: APA reference formats & examples." [Online]. Available: http://libraryguides.vu.edu.au/apa-referencing/apa-referencing-formats-and-examples. [Accessed: 04-Jul-2018].

Appendix A. TL;DR: The essential points of the guidelines

- Find open topics for theses on http://human-ist.unifr.ch/
- Find topics for seminars during the first seminar session or propose your own
- Contact the supervisor for more details and write a proposal (Page 2)
- Thesis = dissertation + presentation(s)
- Theses and seminars usually composed by a theoretical-deductive part and a practical part
- Keep supervisor(s) informed about thesis progress
- Don't forget to **quote** the sources!