

Academic / Technical Writing

in Computer Science

Topic 2: Planning and Structuring your Manuscript for the Purpose



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Plan

- Why planning your manuscript?
- Is structure the part of the plan?
 - What is the structure of your manuscript?
 - Tips on structuring
- Possible purposes and structure patterns
 - A technical report
 - A thesis
 - A research paper
 - A literature overview/review/survey
 - A journal paper
 - A conference / workshop paper
 - ...

Credits

- **Methodology of Science:**
 - **Dodig-Crnkovic, G.:** Scientific Methods in Computer Science. Proc Conf for the Promotion of Research in IT at New Universities and at University Colleges in Sweden (2002)
 - <http://www.mrtc.mdh.se/publications/0446.pdf>
- **Patterns for structuring:**
 - John M. Swales & Christine B. Feak: Academic Writing for Graduate Students, 3rd Edition: Essential Skills and Tasks, Michigan ELT, 2012
 - <http://www.press.umich.edu/titleDetailDesc.do?id=2173936>
- **Insights:**
 - **Hans Akkermans** ... many other colleagues and peers

Why Planning?

Reasons to Have a Plan

- **How much time** will it take you to write a coursework report?
 - Have you asked yourself before?
 - Have you failed to finish on time before?
 - Normally it takes times more than your “informed estimate”
- Planning is a way to **keep you on schedule**
- **What is a schedule?**
 - A **structured** outline of:
 - **What** to be done
 - **When** this “what” has to be done and using “what”
 - **How much** needs to be done for every “what” and “when”
- Hence: “what”, “using what”, “when”, and “how much” need to be thought about

What is a Structure?

Manuscript Structure is ...

- **Partitioning** into sections, subsections, ... etc.
- An **intent to convey** your idea through the narrative ...
- A way to present the parts of your text in a **logical sequence** ...
- A way to map your **research workflow** into the paper ...
- Please **choose** as appropriate ...
- **ALL**

Partitioning ...

- ... into sections, subsections, ... etc.
- Important. **Why?**
 - A(n informed) reader always has a **structural pattern** for:
 - A **skim through** a paper
 - Selecting the parts that are **most interesting**
 - Selecting the sections that are **most informative**
 - Unstructured texts ... **annoy**

Logical Structure

- A way to present the parts of your text in a **logical sequence**
- Important. **Why?**
 - If not, a reader is lost in your **patchwork**
 - If not:
 - You do not have a **holistic story** to catch your reader
 - You are not **convincing**
 - Your manuscript is **not read**
- Logical structuring pattern:
 - Situation-Problem-Process-Solution-Evaluation
 - Does it **resemble** something?

Methodological Structuring

- A way to map your **research workflow** into the paper ...
- Important. **Why?**
 - A professional reader knows about research **methodologies** in your field
 - Therefore, expects that you **follow** a robust methodology
 - Therefore, expects to see how the outputs are **conveyed through** the method
 - If not, you are **not trusted** and **not convincing**
 - Lack of **grounded evidence**
 - In CS, it is very often:
 - Situation-Problem-Process-Solution-Evaluation/Proof

Intentional Structure

- A pattern to **convey your idea** through the narrative
- Important. **Why?**
 - Within a section, how to keep your reader tuned and following your idea?
 - **Outline** / mention what s/he already knows – to catch the audience
 - Continue with **elaborating** the pain-points
 - State how **your approach** makes life less painful
- Structuring patterns:
 - **General** to **Specific**
 - **Specific** to **General**

How to Use ... in Combination

- Partitioning
 - Logical Structuring
 - Methodological Structuring
 - Intentional Structuring
-
- Which is the **first to use**? More or less **important**? How to **combine** effectively?
 - You have to have a **story to tell**
 - For that, you have to have your **research done**
 - Recall **Hans Akkermans** ...



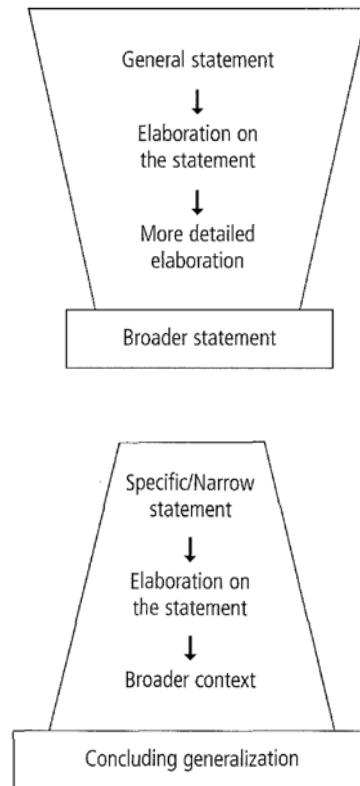
Structuring Tips

Logic and Methodology

- Present the parts of your text in a **logical sequence** – map your **research workflow** into the paper
 - **Pattern:**
 - Situation-Problem-Process-Solution-Evaluation/Proof
 - Explain the **situation** and your **motive** to improve it
 - Great if the motive is **shared** by your **readership**
 - Explain what was the **problem** that led to the situation
 - Look around – at the **related work** (Topic 3)
 - Perhaps, someone has already solved it, in part
 - Describe how did you **approach** the solution
 - Methodology and workflow
 - Present your **solution** to the problem
 - Present your **evaluation**: was it correct, useful, efficient, effective, accepted by the victims, ...
 - **Conclude** and outline your plans for the **future work**

Intentional Structuring*

- A pattern to **convey your idea** through the narrative
- **General to Specific**
 - Start with a general statement / situation
 - Elaborate in more detail / specifics
 - Finally, put in the context of a broader statement
- **Specific to General**
 - Begin with a specific focus
 - E.g. event, a piece of art, an individual (a patient in a case report in Medicine), an organization (a company in a Business case study)
 - Progressively become more general
- **NEVER** be **mixed** in one paper
 - There are cases when **you may wish** to
 - It is like making enemies – you may, but **be wise**



* John M. Swales & Christine B. Feak: Academic Writing for Graduate Students, 3rd Edition: Essential Skills and Tasks, Michigan ELT, 2012 <http://www.press.umich.edu/titleDetailDesc.do?id=2173936>

Partitioning

- Is **straightforward** after defining your logical structure:
 - Introduction, including Motivation
 - Problem Setting
 - Related Work
 - Approach to Solution (Background-Transition-Foreground)
 - Solution (and Discussion)
 - Evaluation (and Discussion)
 - Conclusions, Recommendations, and Future Work

Purposes



Writing Genres

Writing Genres

- As a M.Sci student or later a Ph.D Student you may **wish** to write several of the following:
 - A(n) (M.Sci) Ph.D project proposal
 - A technical report
 - A project proposal
 - A research paper
 - A literature overview/review/survey
 - A journal paper
 - A conference / workshop paper
 - A discussion/opinion/position paper
 - A thesis
- All those are
 - **Different** in structure and content
 - Written with **different motives**
 - Written for **different purposes**
- **Purposes** (have to) and **motives** (wish to) are different things

E.g.: a Technical Report

- A **basic** component of R&D output
- **When** you may **wish** to write a Technical Report?
 - On a project, to document your **accomplishment(s)**
 - To mark up a **milestone**
- **What is your motive** to write it? (wish to)
 - **Inform the community** about my progress
 - **Tame a land**
 - **Share important results** with my community
 - Have a **fully detailed backup** for my future publications
 - Get **feedback** from the community
 - Later, **reuse** it for my **thesis**
- ...

E.g.: a Technical Report

- A **basic** component of R&D output

...

- What is your **purpose** to write it? (have to)
 - Contractual **commitment** = otherwise I will not finish my M.Sci / Ph.D **program**
 - I **promised** to my mentor = **ethical** commitment
 - I have to do it for my **career** = your **Hall of Fame**
- More **important**: Does **someone** have a **motive** to read it?
 - Yes, to be informed about the latest results in **full possible detail**
 - Do not **disappoint** people ...

E.g.: a Technical Report

- How to get **most value** of it?
 - Satisfy your **motives**
 - Make it **public, ASAP**
 - E.g. @ResearchGate

Technical Report Full-text available

Cross-Evaluation of Automated Term Extraction Tools

September 2017
Report number: TS-RTDC-TR-2017-1 · Affiliation: Zaporizhzhia National University, Ukraine
Projects: [SemData: Semantic Data Management](#) · [OntoElect: a Methodology for Domain Ontology Refinement](#)

Victoria Kosa · David Chaves-Fraga · Dmitriy Naumenko · [Show all 7 authors](#) · Aliaksandr Birukou

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E.g.: a Technical Report*

- Oh, yeah ... advise on **structuring** ...
- **Priorities:**
 - I – Logic & Methodology
 - **Why I-st?**
 - II – Intent (story)
 - ... – Partitioning (more or less a pattern)
- A quick skim through:
 - https://www.researchgate.net/publication/319987878_Cross-Evaluation_of_Automated_Term_Extraction_Tools

Kosa, V., Chaves-Fraga, D., Naumenko, D., Yuschenko, E., Badenes-Olmedo, C., Ermolayev, V., and Birukou, A.: Cross-Evaluation of Automated Term Extraction Tools. Technical Report TS-RTDC-TR-2017-1, 30.09.2017, Dept of Computer Science, Zaporizhzhia National University, Ukraine, 61 p.

E.g.: a Technical Report

- **Partitioning:**

- Introduction, including Motivation
- Problem Setting
- Related Work
- Approach to Solution
- Solution (and Discussion)
- Evaluation (and Discussion)
- Conclusions, Recommendations, and Future Work

- **Contents:**

- Introduction
- Motivation and Related Work
- OntoElect Saturation Metric and Measurement Pipeline
- Research Questions and Experimental Workflow
- Instrumental Software
- Document Collections and Datasets
- Experiments and Discussion
- Conclusions and Recommendations

- **Why not a 1-1 mapping?**

E.g.: a Coursework Report

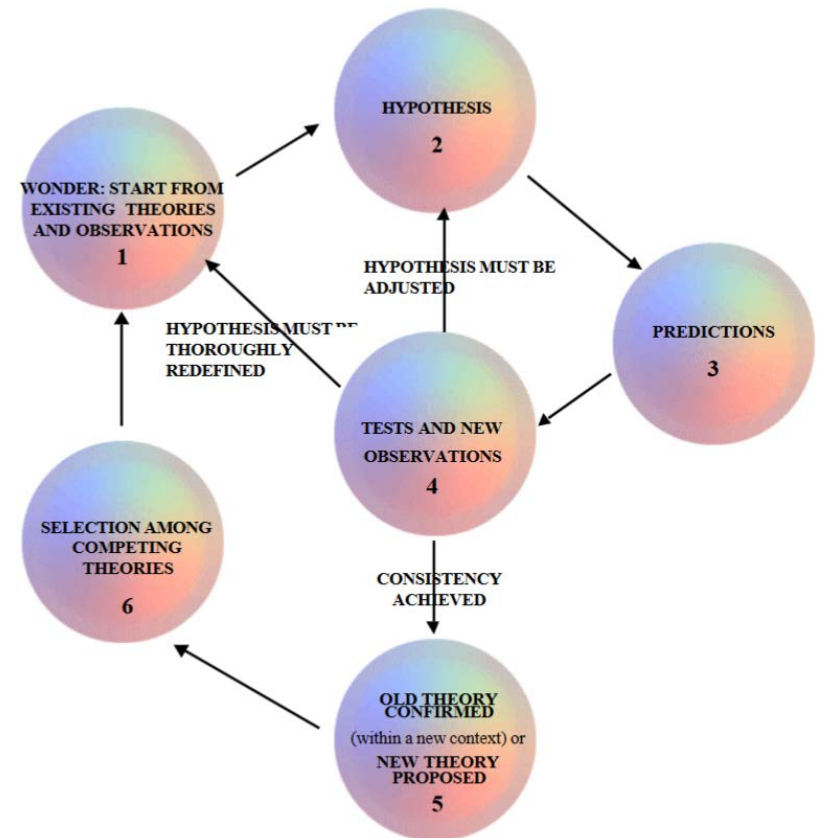
- **Is a Coursework Report – a Technical Report?**
 - Could be, if a coursework is regarded as a **project**
 - Could be if your course promotes the **methodology of science** as its **learning methodology**
- **What is the Methodology of Science?**
 - A **bundle of methods and activities** as a **pattern to acquire knowledge** about unknown things
 - E.g. <http://www.mrtc.mdh.se/publications/0446.pdf> *
- **Were your LA Coursework Reports technical reports?**

* Dodig-Crnkovic, G.: Scientific Methods in Computer Science. Proc Conf for the Promotion of Research in IT at New Universities and at University Colleges in Sweden (2002)

Methodology of Science

An **outline***:

- Very **similar** for different branches
 - CS ... Medicine
- **Iterative**
 - Question (1)
 - Hypothesis (2)
 - Prediction (3)
 - Test (4)
 - Revision / Refinement (5)
 - Benchmarking (6)
- **Is AW a scientific methodology?**
 - Topic 8



* Dodig-Crnkovic, G.: Scientific Methods in Computer Science. Proc Conf for the Promotion of Research in IT at New Universities and at University Colleges in Sweden (2002)

Your LA Coursework Reports

- **Partitioning:**

- Introduction, including Motivation
- Problem Setting
- Related Work
- Approach to Solution
- Solution (and Discussion)
- Evaluation (and Discussion)
- Conclusions, Recommendations, and Future Work



- **In fact (one of):**

- Introduction
 - A mention of problems
- Related Work
 - Mentions of some RW
- Method
 - Was it background or your foreground?
- Conclusion
 - A statement unsupported by any evidence

Your LA Coursework Reports

- **Partitioning:**
 - **Introduction**, including **Motivation**
 - Problem **Setting**
 - **Related** Work
 - **Approach to** Solution
 - Solution (and **Discussion**)
 - **Evaluation (and Discussion)**
 - Conclusions, **Recommendations, and Future Work**
 - **In fact** (one of):
 - Introduction
 - A mention of problems
 - Related Work
 - Mentions of some RW
 - Method
 - Was it background or your foreground?
 - Conclusion
 - A statement unsupported by any evidence
- Were your LA Coursework Reports technical reports?

E.g.: A Ph.D Proposal

- Also known as a **Ph.D Exposé**
 - Some Unis require even an **M.Sci Exposé** before admissions
- **When you may wish to write a Ph.D Proposal?**
 - It is a **proposal**. For been **admitted** to the program.
 - Before talking to my potential **mentor**
- **What is your motive to write it?**
 - I believe that my **project idea** is great and extends the **State-of-the-Art**
 - I believe I **know enough** about the field to be admitted
 - I know that Prof. X is an **expert** in my **field of interest**
 - I want to **sell** my project idea as a Ph.D **project** to this potential **mentor**
- ...

E.g.: A Ph.D Proposal

- Also known as a **Ph.D Exposé**
 - Some Unis require even an **M.Sci Exposé** before admissions
- ...
- What is your **purpose** to write it?
 - Otherwise **the mentor** will not **talk** to me
 - Otherwise he will not **endorse** my admission
 - Otherwise I will not **get funded**
- More **important**: Does **someone** have a **motive to read it**?
 - Yes, I know that Prof. X has a **vacancy**
 - Hence, there is an **Open Call for Proposals**

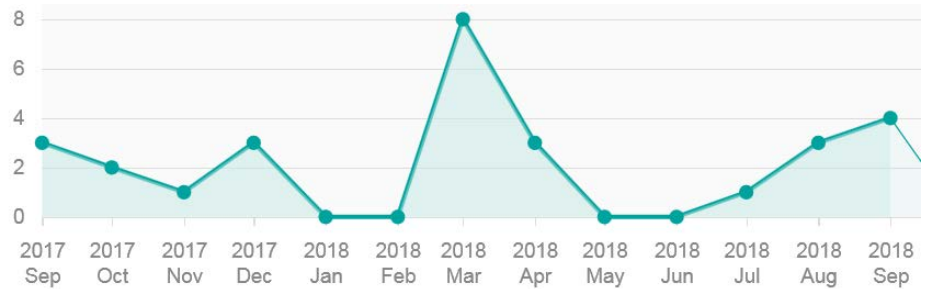
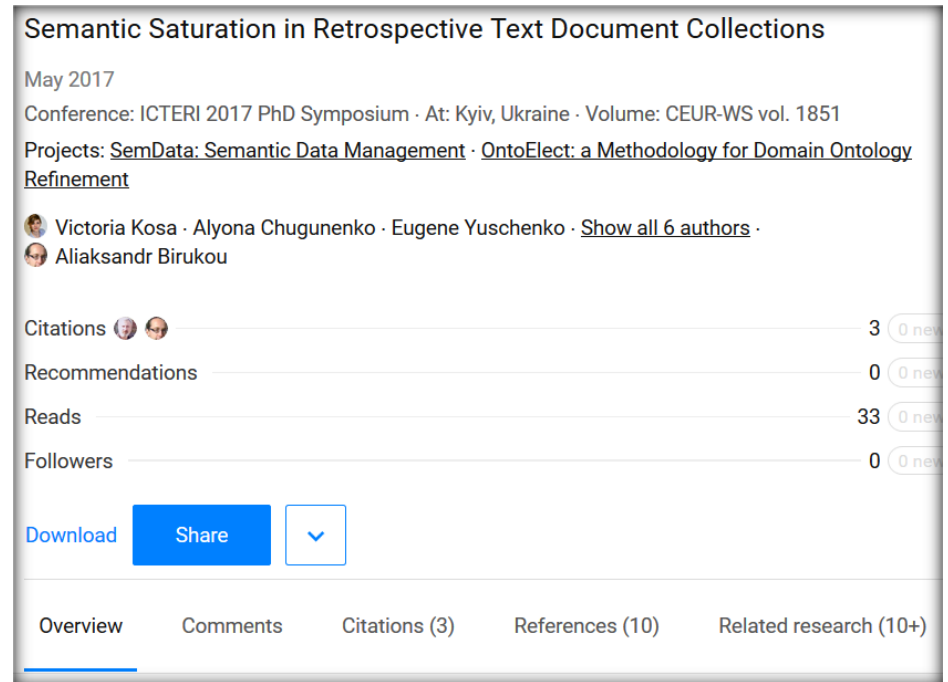
E.g.: A Ph.D Proposal

- Advise on **structuring** ...
 - Differs from a **Technical Report**
- **Priorities:**
 - I – **Intent** and **Motive** (story)
 - **Why I-st?**
 - II – **Logic**
 - III – **Methodology**
 - ... – Partitioning (more or less a pattern)
- A quick skim through*:
 - <http://ceur-ws.org/Vol-1851/paper-1.pdf>

* Kosa, V., Chugunenko, A., Yushchenko, E., Badenes, C., Ermolayev, V., Birukou, A.: Semantic Saturation in Retrospective Text Document Collections. . In: Mallet., F. and Zholtkevych, G. (Eds.): Proc ICTERI 2017 PhD Symposium, Kyiv, Ukraine, May 16-17, 2017, CEUR-WS vol. 1851, p. 1-8, online

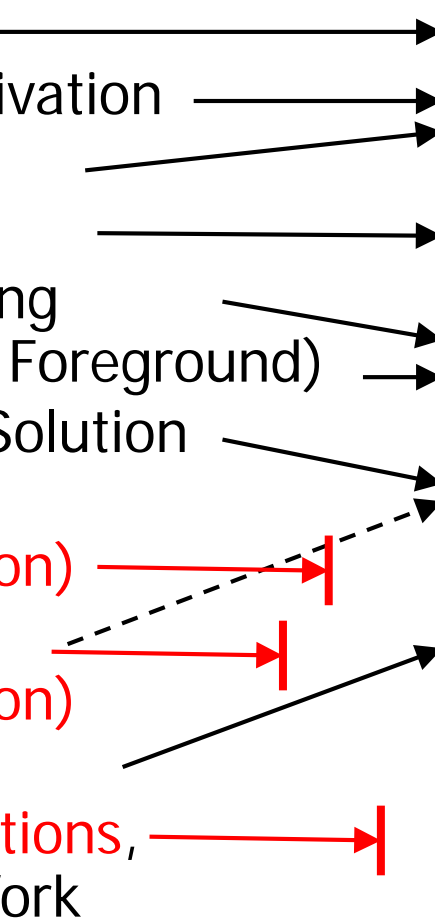
E.g.: A Ph.D Proposal

- If admitted, is it really **worth doing** that?
 - Publish as a **position paper**
 - E.g. at a **Ph.D Symposium** in your community
 - Make it **public**
 - Check **reads** and **citations**
- One of the **reviewers**:
“...a Ph.D expose as it should be and presented.”
- **Best Ph.D Symposium paper award**
- A kick-start of a **good Ph.D project**



E.g.: A Ph.D Proposal

- **Partitioning:**

- Introduction, including Motivation
 - Related Work (Background)
 - Problem Setting (Hypotheses, Foreground)
 - Approach to Solution
 - **Solution (and Discussion)**
 - **Evaluation (and Discussion)**
 - Conclusions, **Recommendations**, and Future Work
- 

- **Contents:**

- Introduction
- Related Work and Motivation
- OntoElect Saturation Metric and Measurement
- Experimental Settings and Workflow
- Early Results
- Conclusive Remarks and Future Work

A.k.a. a **Position Paper**

E.g.: A Master Thesis

- Is a **Master Thesis** a Technical Report?
 - Not really ... It documents the **entire M.Sci project**
- Is a **Master Thesis** a Final Project Report then?
 - Not really ... It documents the project in **full detail**
- Is a **Master Thesis** a Research Monograph?
 - Not really ... It is not published
- Could it **become** a book?
 - Yes, if the results were **excellent**
 - And, potentially, may have **impact**
 - **How to check?**
- A **Master Thesis** is a research monograph style manuscript
- Yeah, tips on **structuring**



E.g.: A Master Thesis

- How would **you structure** it?
 - Propose ...
 - I will be writing on the whiteboard ...
- My advise on structuring in **Topic 4**
 - We will **compare to your proposals**

Reading

Basic Reading

- **Structuring tips:**
 - **John M. Swales & Christine B. Feak:** Academic Writing for Graduate Students, 3rd Edition: Essential Skills and Tasks, Michigan ELT, 2012
 - <http://www.press.umich.edu/titleDetailDesc.do?id=2173936>
- **Methodology of Science:**
 - **Dodig-Crnkovic, G.:** Scientific Methods in Computer Science. Proc Conf for the Promotion of Research in IT at New Universities and at University Colleges in Sweden (2002)
 - <http://www.mrtc.mdh.se/publications/0446.pdf>

Additional Reading

- Examples to **check structures**:
 - Tech Report: **Kosa, V., Chaves-Fraga, D., Naumenko, D., Yuschenko, E., Badenes-Olmedo, C., Ermolayev, V., and Birukou, A.**: Cross-Evaluation of Automated Term Extraction Tools. Technical Report TS-RTDC-TR-2017-1, 30.09.2017, Dept of Computer Science, Zaporizhzhia National University, Ukraine, 61 p.
 - https://www.researchgate.net/publication/319987878_Cross-Evaluation_of_Automated_Term_Extraction_Tools
 - Ph.D. Exposé: **Kosa, V., Chugunenko, A., Yushcenko, E., Badenes, C., Ermolayev, V., Birukou, A.**: Semantic Saturation in Retrospective Text Document Collections. In: Mallet., F. and Zholtkevych, G. (Eds.): Proc ICTERI 2017 PhD Symposium, Kyiv, Ukraine, May 16-17, 2017, CEUR-WS vol. 1851, p. 1-8, online
 - <http://ceur-ws.org/Vol-1851/paper-1.pdf>
 - Journal Review Paper: **Ermolayev, V., Batsakis, S., Keberle, N., Tatarintseva, O., Antoniou, G.**: Ontologies of Time: Review and Trends. Int. J. of Computer Science & Applications. Vol. 11, Issue 3, 57–115, 2014
 - <http://www.tmrfindia.org/ijcsa/v11i34.pdf>
 - A Research Paper: **Kosa, V., Chaves-Fraga, D., Keberle, N., Birukou, A.**: Similar Terms Grouping Yields Faster Terminological Saturation. In: Ermolayev, V, et al. (Eds.): (eds) Information and Communication Technologies in Education, Research, and Industrial Applications. 14th International Conference, ICTERI 2017, Kyiv, Ukraine, May 15-18, 2017, Revised Selected Papers, CCIS, Springer, Cham – hopefully to appear
 - **Link to be added ...**

Final Remarks

What We Learned ...

- Why it is important to **plan** your manuscript. What are the aspects in planning
 - **Structure** is one of the basic aspects in the plan. Which **structuring aspects** are important and help you convey your story:
 - Partitioning, Logical Structuring, Methodological Structuring, Intentional Structuring
 - What are the **genres** in Academic Writing and what are the related **structuring patterns**
 - Technical Report, Coursework Report, Ph.D Proposal, Master Thesis
-
- **Next topic:** Working with Literature

**Will be happy
to answer
your questions ...**

Will be also happy to continue discussions

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