Research Methodology and Scientific Writing, 2011, II2202

KTH Information and Communication Technology

Qualitative method IV

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Usability testing

- The ease with which people can employ a particular tool
- Test interface of computer system / web sites (Human-Computer interaction)
  - Identify needed functionality
  - Identify design flaws
  - Contextual inquiry method in context of the users own environment

Source: Nielsen, J. Usability Engineering. Academic press, Inc. San Diego, 1993

Usability testing

Issues when testing:

- How many subjects are needed?
- What test tasks are the subjects asked to perform?
- What criteria will be used to determine when the users have finished each of the test tasks correctly?
- What users aids (manuals, online-help) are available to the subjects?

Usability testing

- To what extent will the experimenter help the users during the test?
- What data is going to be collected and how will it be analyzed once it has been collected?
- What will be the criterion for pronouncing the interface a success?

Usability testing

Criterion Interface success - measurable:

- System start problems
- Successful start inserting information in the system
- Using the menu bar
- The frequent use of manuals and the time spent on it
- Controlling the task to be performed
- Looking in manuals

Usability testing

- Amount of “dead time” = Thinking time
- Number of user errors
- Time spent recovering from errors
- Number of times they say something negative about the system
- Ask for the help with the system
- Frustrating question to the experimenter
- Successful inserting right information in right place

Usability testing

- Problems noticed by the **users**
- Problems noticed by the **experimenter**
- Interest in continuing the work with the system
- Total time for the observation

Drawing task

- Concretizes their thoughts by drawing a picture of the system
- The picture could reflect the subjects' thoughts about the systems contents
- The picture could reflect the users' needs in an interface

Quality in research

- **Validity** (or trustworthy)
  - ✓ Credibility – Sure that research has been conducted according to existing rules
  - ✓ Respondents validation (objectivity) - Participants confirm that results are correctly understood
  - ✓ Triangulation as confirmation method
- **Transferability** – Create rich descriptions that become database for others

Quality in research

- **Dependability** (*Reliability)*

  ✓ Use a reviewing point of view (auditing)

  ✓ Have a full and available report on every phase of the research process (auditing) :

  - *problem formulation, choice of participants, interview descriptions, analysis decisions*

  ✓ Use reviewers for the process – judge the correctness of the conclusions

Quality in research

- **Confirmability** – confirm that investigator has acted in good faith

  - No personal assessments

  - Not affect the result of the investigation

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Scientific Writing

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Scientific Writing

- Proposals
- Reports
- Master thesis
- Conference paper (- optional)

- write a proposal, a report in English
- write in good English in an acceptably academic style, using your own words

Earlier experiences?

- A thesis
- Technical reports
- Other reports
- Non-technical writing

-> Did you have and use writing instructions?

Difference in text

What characterizes different material academic / scientific / technical?

- Purposes
- Audiences
- Organization/structure
- Styles
- Content
- Presentation

Purposes

- Proposal?
- Report? (lab report or task report)
- Conference paper?
- Master thesis?

Is it to:

✓ Explain project
✓ Inform
✓ Persuade
✓ Provide knowledge
✓ More?

Audiences

- Other students?
- Supervisors or teachers?
- Other researchers or staff?
- Industrial sponsors?
- Public

- A combination of these above?

-> Write to meet their expectations

Purpose and audience affect the structure

For report and thesis:

✓ Aim is provide information fast
✓ The material must be read quickly
✓ The readers read selectively
✓ The readers expect to find specific information in pre-determined places

-> Need informative headings
-> Need informative structure/organisation

Before writing

Planning is important:

- Use keywords and outlines
- Begin writing a skeleton
- Revision

PLAN -> WRITE -> REVISE

Skeleton - example

- Describe the general background
  - knowledge-based systems, teaching strategies, learning styles
- Specify the background
  - *knowledge-based systems for students and teachers*
- Incorporate learning objectives into knowledge-based system
- Provide design principles for systems
- Details about:
  - knowledge-based systems
  - teaching strategies
  - learning styles

Hourglass method

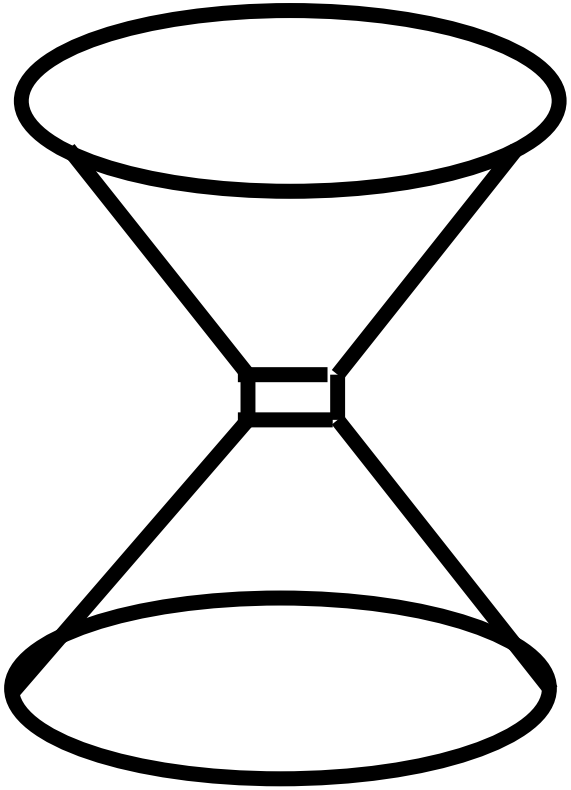
- Introduction

(general to specific)

- Description

- Result

(specific to general)



Hourglass method

- General description about the subject
- Detail information about the subject
- Tie together the description about the subject

  (Result - Implication or conclusion)

Report / Thesis

- 1. Introduction
- 2. – 5. (6.) Main part
- 6. Conclusion (result)

Report / Thesis

2. Main part
- 2.1 Introduction section
- 2.2 – 2.5 Main sections
- 2.6 Result section

2.6 Main section
- 2.6.1 Introduction sub-section
- 2.6.2 – 2.6.5 Main sub-section
- 2.6.6 Result sub-section

- *Absolutely NOT* Goals**:** Methods**:**

Hourglass - example

1. "In a knowledge-based system, knowledge is acquired from a domain expert."
2. According to Durkin (1994) the domain expert "is the person who possesses the skills and knowledge to solve a specific problem in a manner superior to others".
3. The elicited knowledge can be categorized by e.g., procedural, declarative, meta-knowledge, heuristic, and structural knowledge (ibid).
4. In a knowledge-based system, the procedural and declarative knowledge types are commonly covered (Durkin, 1994).

Hourglass - example

1. Introduction: "In a knowledge-based system, knowledge is acquired from a domain expert."
2. Description: According to Durkin (1994) the domain expert "is the person who possesses the skills and knowledge to solve a specific problem in a manner superior to others".
3. More details: The elicited knowledge can be categorized by e.g., procedural, declarative, meta-knowledge, heuristic, and structural knowledge (ibid).
4. Result: In a knowledge-based system, the procedural and declarative knowledge types are commonly covered (Durkin, 1994).

Report / Thesis Introduction

Introduction

✓ Subject
✓ Background information
✓ Problem statement

Current situation
- The problem
- The causes
- The effects

✓ Hypothesis

✓ Purpose
- Main point /Significance

✓ Goals / Objectives
- Benefits

✓ Method for the report / thesis
- Literature
- Structure /Design

✓ Limitations
✓ Disposition

Report / Thesis

Main parts

- Detailed description about the subject / other topics
- 2-5 major findings

Method

- Research method (Q / Q)
- Research approach (D / I)
- Research design
- Data collection methods
- Data analysis
- Results
- Quality assurance

Conclusions

- 2-5 major recommendations
- Reflect introduction
  - Hypothesis
  - Purpose
  - Goal
- Discussion
  - The investigation
  - The report / thesis
- Further work
  - Look to the future

Style for reports and theses

Authors' guidelines are strict and detailed

✓ Section headings must be consistent and informative

✓ The text and references must be adjusted

✓ - Not irregular, follow standards

✓ Follow guidelines!

✓ Avoid *I* – can accept *we*

✓ Use formal expressions, not "colourful"

✓ Aim to express objectivity

Writing - *I*

To understand the state of the art of knowledge-based systems **I** conducted several *Literature review.* Moreover **I** tried to get a better understanding of the central topics within computer and system science and pedagogy. Within computer science **I** studied knowledge-based systems, different kinds of knowledge and reasoning strategies in knowledge-based system, knowledge management, and hypermedia systems. Related to pedagogy **I** did a literature review directed towards theories of learning, multiple intelligences and learning styles.

Writing - *we*

To understand the state of the art of knowledge-based systems **we** conducted Several *Literature review.* Moreover **we** tried to get a better understanding of the central topics within computer and system science and pedagogy. Within computer science **we** studied knowledge-based systems, different kinds of knowledge and reasoning strategies in knowledge-based system, knowledge management, and hypermedia systems. Related to pedagogy **we** did a literature review directed towards theories of learning, multiple intelligences and learning styles.

Writing - *problems*

To understand the state of the art of knowledge-based systems**, we** conducted **several** *Literature review**s**.* Moreover**, we tried to get a better understanding** of the central topics within computer and system science**s** and pedagogy**.** Within computer science**, we** studied knowledge-based systems, different kinds of knowledge and reasoning strategies in knowledge-based system**s**, knowledge management, and hypermedia systems**.** Related to pedagogy**, we did a literature review** directed towards theories of learning, multiple intelligences and learning styles**.**

Writing - *problems*

- For the author or for the reader?

"To understand" "we tried to get a better understanding"

- Repeat

"*Literature review*" **<-> "we did a literature review"**

- Plural?

"conducted **several** *Literature review"*

conducted **several** *Literature review**s***

How many reviews for a thesis?

Writing

For the state of the art of knowledge-based systems, a *literature review* was conducted. The review captures central topics within computer and system sciences and pedagogy. Within computer science, knowledge-based systems, different kinds of knowledge and reasoning strategies in the field of knowledge-based systems, knowledge management, and hypermedia systems was studied. Related to pedagogy, the review was directed towards theories of learning, multiple intelligences and learning styles.

-> consider dividing the sentence into two sentences.

Presentation – Text

- A short and descriptive report /thesis title

- **Never** use title and subtitle **without** text in between
- Not too many levels (max four)
  2.6.2.1 – 2.6.2.5 For a sub-section or bold text without numbers

- One "thing" (topic) per sentence
- Not longer than 2-2.5 lines for a sentence
- If enumeration – more lines

Presentation – Text

- Not “aristocratic texts”
  - Not too many “old words”

- Not novel texts
  - Write “right forward”

- Put the verb in the middle
  - Not “left heavy” or “right heavy” sentences

Presentation – Text

- Use correct words:
  - The interviews “will only focus on” the students and teachers.
  - To “find out the thinking” of the participants
  - While “taking interviews”, make sure that they are brief or not waste time.
- Bridges between sentences
  - One a sentence does not follow from the preceding sentence

Presentation – Text

- ’s or s’
  - Singular or Plural
  - User’s experience or users’ experience
    User’s experiences or users’ experiences

- *The result’s validity*
- The validity of the result
- The validity of the results

- The project’s hypothesis
- The hypothesis of the project

Presentation – Text

- Write in a "direct" form:
  - the investigation of socializing behavior
  - investigating socializing behavior

  - The project will investigate on how
  - The project investigates how
- Plural for users and participants
  - Users' experience, participants' opinions

- Interviews, Observations, Results

Presentation – Text

- "that" with restrictive clauses and "which" with nonrestrictive clauses

- That:
  - She took the test that was hard

- Which:
  - Collect data on this issue, which cannot be directly observed

The Van Gogh that was hanging in the foyer, which we purchased in 1929 for $10,000, was stolen.

Presentation – Text

- Not use **for example** and **etcetera** in the same sentence.

- Cut **so** (whenever it is possible)

- Not – And (together)

- … not using "ethnography" *and* "action methods".
- … not using "ethnography" **or** "action methods".

References

☐ Justin Zobel, *Writing for Computer Science*, Springer; 2nd edition (April 27, 2004), paperback: 280 pages, ISBN-10: 1852338024, ISBN-13: 978-1852338022

☐ Angelika H. Hofmann, *Scientific Writing and Communication: Papers, Proposals, and Presentations*, Oxford University Press, USA (December 16, 2009), Paperback: 704 pages, ISBN-10: 0195390059, ISBN-13: 978-0195390056

Questions?