UiT The Arctic University of Norway

Department of Computer science

Lecture 10:

A closer look at the requirements for the exam report

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Project: Research or Development ?

We received some insightful questions about the project, and we think it is fair to share our answer with everyone:

Slightly rephrased, the questions went: ***"Can you clarify where our focus in the project should be? Should it be on creating a functional or semi functional solution, or do you want us to focus more on innovation and research and try to outline a project which is more innovative by for example using AI?***

We understand that this might be confusing and refer you to the required outline of the exam-report (given as part of Lecture 2) for how we want you to focus and document the work in your group. In addition, we will set up a 1-hour lecture the coming Monday to explain this to all of you in the course.

But until then, some answers to your questions are given below: You are right in pointing out that INF-3780 and INF-2900 Software engineering have overlapping learning objectives about skills in developing a system or software, as a team and documenting the process. However, at this point in your study we do already expect you to be able to do basic software engineering as a team (without customers and users), so making yet another prototype system and documenting the process, - is not the focus in the course. In INF-3780 we want you to integrate the development of software as part of a project in the health domain with required research to prepare for an intervention or experiment that produces new knowledge. We want you to do and document and validate the process, such as the research, security considerations, user-involvement, design, implementation, testing and disseminating. E.g. that you have to compare your problem and solution with similar problems and related research (that is why you did a literature review). Prove that you are able to 1) answer a well-defined research question or fulfil an objective by 2) designing a repeatable and valid experiment and 3) explain how the results of the experiment(s) with your software as intervention, actually produced the results or answer.

Yes, your focus should be on answering your research objectives and argue that your answer is sound, novel and correct. Being innovative is a related problem, but much harder, because it addresses relevance and utility, ie that your novel solution is actually improving current practice. (Research can give positive or negative outcomes, equally valid and new knowledge, but not necessarily having utility or effect for anything.) Stick to doing sound (small) research.

Applying AI (reasoning, image processing, generative text models, or black box alchemy) is not particularly innovative, and notoriously hard to validate. You should rather aim for a Minimal Valid Research Contribution, something that is repeatable, understandable, explainable and provides new knowledge.

W.r.t. testing. Do not think about this as “testing functionality”, but rather a part of your experiment design. E.g. an iterated A/B test with some of your fellow students as subjects could let you answer questions about “more effective, easier, more educating, earlier, with higher confidence” if you let them use your software/pilot to solve a (set of) specific problem(s).

Alternatively, after you have tried to recruit participants to test your solution, it is also possible to design and test experiments without users, in which you compare different versions or implementations or algorithms wrt. correctness/precision of outcome, etc.

Again, think of yourself as a research team, with developers, researchers, project managers, information officers, etc. We want you to gain the understanding of professional, ethical, legal, security and social issues and responsibilities, as well as being able to function effectively in research teams to answer a common objective or research question, and be able to communicate the work done and the results effectively.

About the Report

- Min 50 pages, max 100 pages + References + Code + other attachments (e.g. letter to DPO/PVO)
  - If you deliver 50 pages → need to be really concise and relevant content
  - Min 12 pages per person (e.g. for 5 persons → 60 pages)

- Format:
  A4- pages; Font size 11 (Arial); Line space: 1.0; Margins: 2,0 cm

- Deadline: June 3rd 14:00 (noon)

All projects must include these main elements

Patient/health consumer use case

Technology: hardware and/or software

Health care actors and/or system

The report must address these elements

1: A **Project plan**

Including problem statement, literature review and references (5-10 pages)

2: Security, privacy, and ethics

Consideration and acknowledgement

(DPO, Sikt, REK?, GDPR, MDR, Normen, etc.)

3: User-requirement

Survey or study (need acknowledgement)

4: Design

Argumentation for selected design and presentation

5: End-user **interface**

Both for patients and health care personnel (HCP)

6: Technical- and user **tests**

Both patient and HCP

7: Solution for **data transfer and storage**

And/or integration with EHR

8: Dissemination

of the work and its results

Required Content of the report (1/2)

- Project title and first page with authors names, date
- Abstract (can be part of the Dissemination Assignment)
- Table of content
- Background
- Project personnel and their competence
- Problem statement
- Aims
- Methods
- Time plan

Required Content (2/2)

- Security and Ethics
- System specification
- Implementation
- Tests
- Results
- Dissemination
- Discussion and Conclusion
- References
- Attachment

Examples of Table of contents from previous reports,

example 1

Example 1,

(3 project members/ students)

Example 2

Example 2,

(4 project members/ students)

Example 3

Example 3 (3 project members/students)

Example 4

Example 4

(4 project members/students)

List of Figures

List of Tables

Example 5

Table of Contents

Example 5

(4 project members/students)

Content, more specific

- Abstract (part of the Dissemination Assignment)
- Table of content
  - Mandatory for all reports
- Background;
  - About your use case (PCOS/Nutrition)
  - State of the art (literature review, research and technologies/solutions)
  - Stakeholders, and their needs and view (Lecture by Abbot + meeting with clinicians + patients/users)

Content, more specific

- Problem statement
  - What, Why and How (will be covered in lecture on Thursday)
- Aims
  - Overall aim;
  - Specific aims;
- Methods
  - Design methods (paper prototyping?, mock-ups?, programming language, Volere/requirements, etc.)
  - Test methods (incl. recruitment, and systems used)
  - Analysis methods (of results)

Content, more specific

- Plans
  - Work packages (typically 3-5, Work package leaders, tasks)
  - Gantt chart (time)
  - Project personnel and your competence (how your team is able to perform the project, and the division of the work between you
- Security and Ethics
  - Data Security
  - Privacy;
  - Application to UiT's Data Protection Officer / Personvernombud
- System specification
  - Early draft / system overview
  - Requirement specification
  - Final layout of system

Content, more specific

- Implementation
  - Architecture, illustrated with figures,
  - Use of the system, e.g. use case diagram
  - Data structures, databases, flow of data
  - Print screen of all system components
  - Description of system setup / Git frontpage. (Example from Pietro's juice machine: https://github.com/pra008/house-of-carbs)
- Tests
  - System testing:
    - Function tests and/or Test of Performance
  - User testing, e.g.:
    - Questionnaires
    - Interviews
    - Meetings user representatives
    - Analysis of Online patient user groups

Content, more specific

- Results
  - End-user tests (preferably both patients and clinicians)
  - Systems' results, and
  - The final "product"
- Dissemination
  - Popular science article, abstract, poster, other
- Discussion and Conclusion
  - Reflect on your results, how it differed from other systems, what you learned, should have done differently, etc.
- References
- Attachment (Code, questionnaires, abstracts, Informed consent, print screen of the front page(s) of your project in Git, etc.)

Questions or comments?