

REFLECTION

Written by:	Mario Verhaeg
Student ID number:	851210638
Thesis presentation date:	June 30, 2020
Version:	1.04, June 22, 2020
Degree program:	Faculty Science, Open University of the Netherlands Computer Science Master's program
Course:	IM0004 CS Graduation Assignment Preparation IM990C Computer Science Graduation Assignment
Thesis supervisor:	dr. L.W. Rutledge
Second reader:	dr. Bastiaan Heeren

Contents

1	Schedule	2
1.1	Phase 1: Preparation	3
1.2	Phase 2: Research Planning	4
1.3	Phase 3: Research execution	5
1.4	Phase 4: Finalization	6
2	Risk management	7
2.1	Calculating risks	7
2.2	Understanding of related subjects	7
2.3	Availability of sample data	8
2.4	Reliability of tools	8
2.5	Replicating existing work	8
3	Experience	9

1 Schedule

I based the schedule on calendar months and a weekly availability of 17 hours (including vacations). The schedule starts in 2019, week 14 and ends in 2020 week 26. This period adds up to 62 weeks and results in 1054 hours. The combined workload of both the introduction work package (10ECTS) and primary work package (30ECTS) is 1120 hours.

I split the research process into four phases:

1. Selecting and describing the subject and described.
2. Writing the research plan in the second phase.
3. Actual research phase.
4. Finalizing the thesis, preparing the presentation, and giving the presentation.

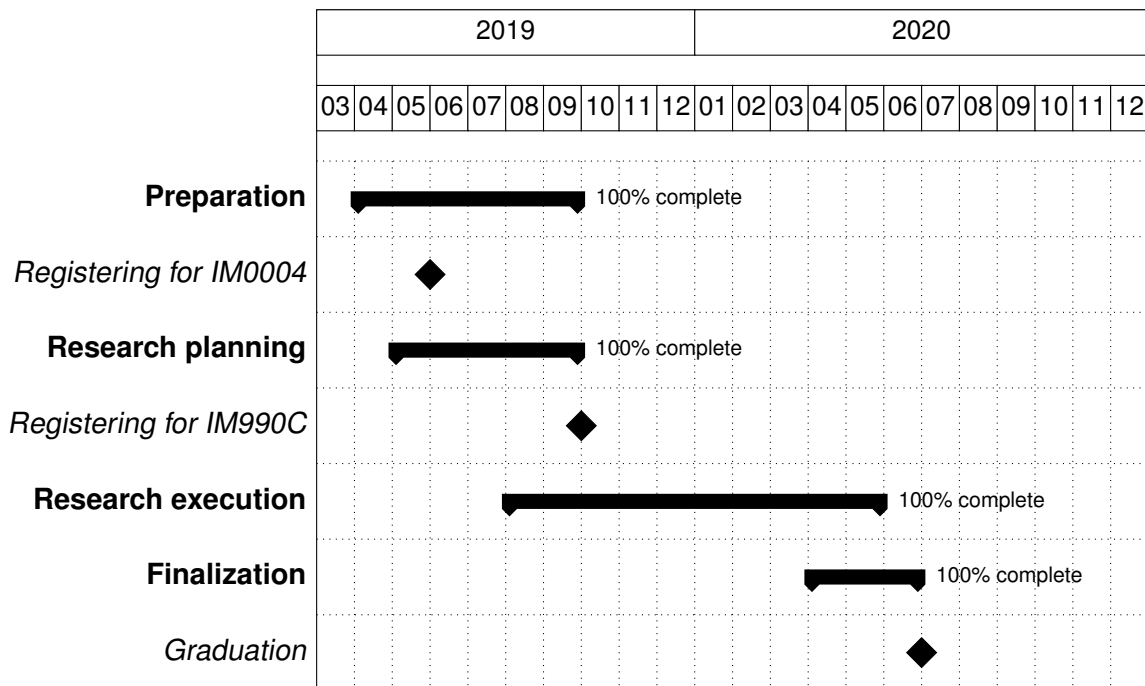


Figure 1: Schedule overview, last update: June 22, 2020

1.1 Phase 1: Preparation

The preparation phase focuses on finding and understanding a research subject. This phase includes a preliminary literature study. Figure 2 shows the schedule of the preparation phase.

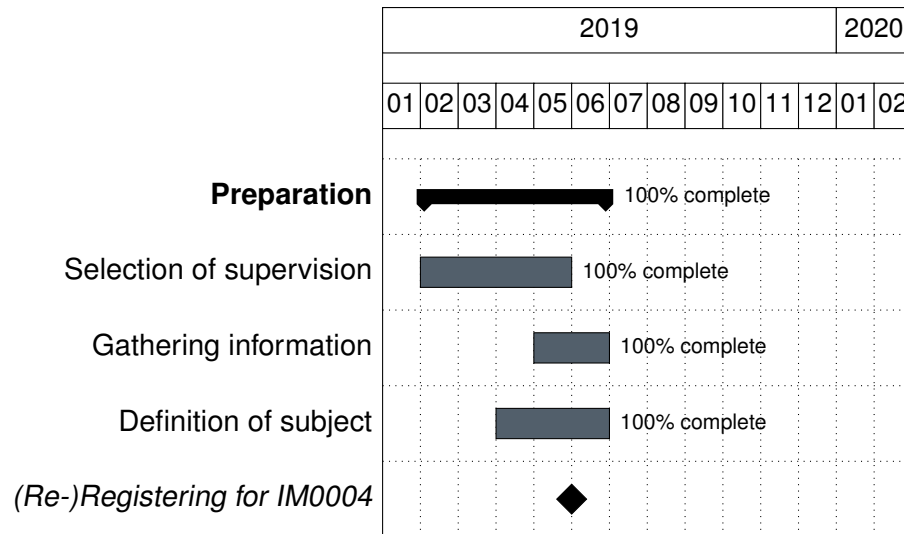


Figure 2: Schedule phase 1: preparation, last update: June 22, 2020

1.2 Phase 2: Research Planning

The planning phase includes a general literature study and selecting the methodology. The goal of the literature study, in this phase, is to avoid double work and ensure the research subject is unique.

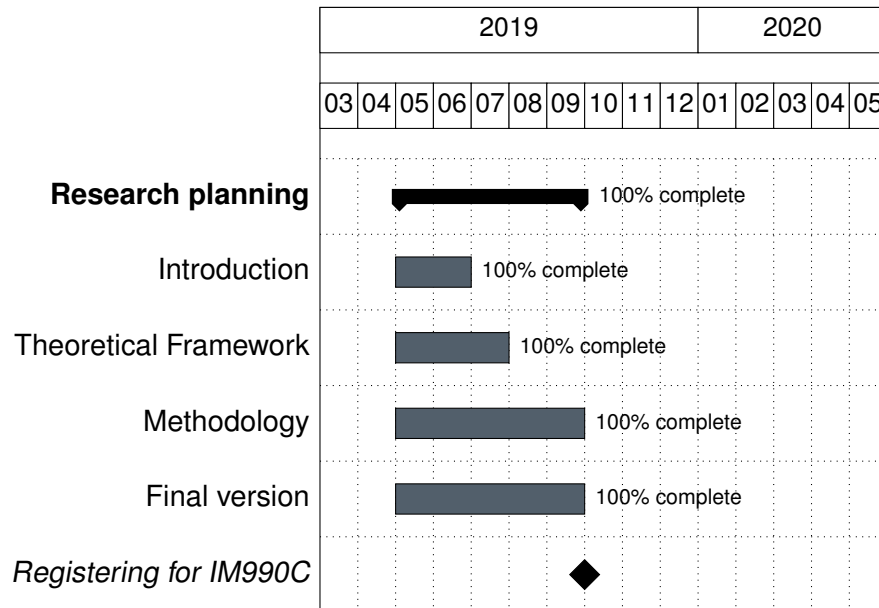


Figure 3: Schedule phase 2: research planning, last update: June 22, 2020

1.3 Phase 3: Research execution

The research execution phase starts with the creation of ontology design patterns. I validate the set of patterns on two domain-specific reference decisions.

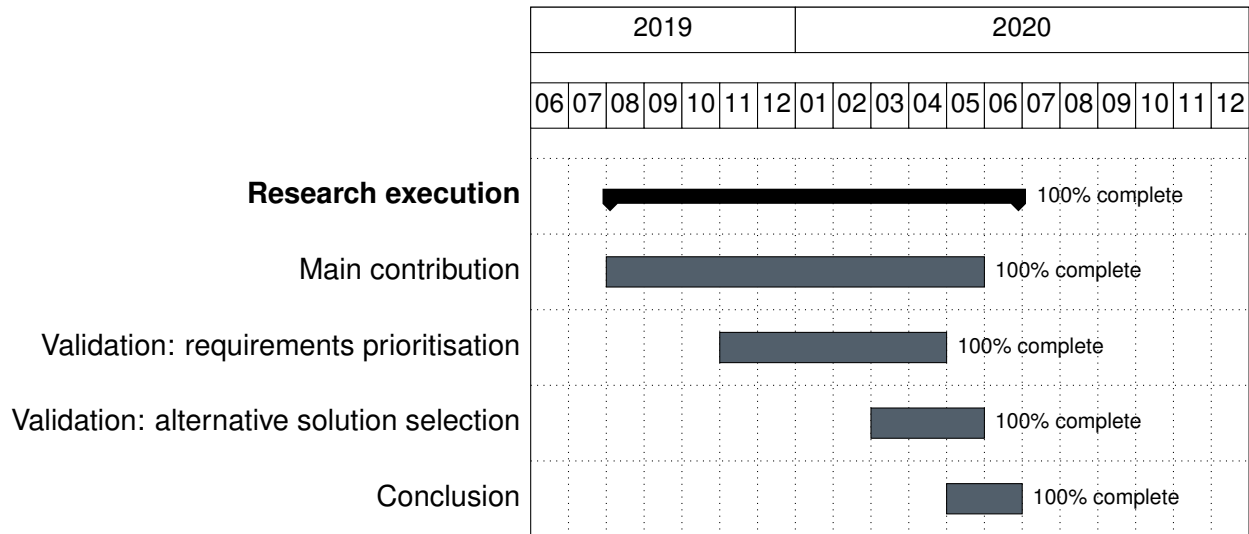


Figure 4: Schedule phase 3: research execution, last update: June 22, 2020

1.4 Phase 4: Finalization

The announcement and planning of the thesis presentation, delivery of the reports and the presentation itself are part of the finalisation phase as well.

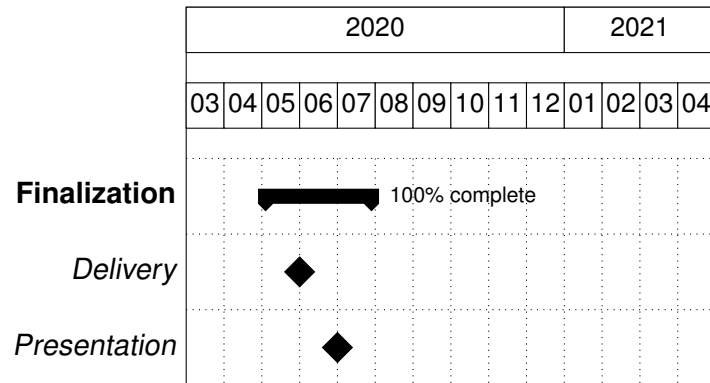


Figure 5: Schedule phase 4: finalisation, last update: June 22, 2020

2 Risk management

2.1 Calculating risks

Risk is a combination of impact I and probability P : $I \cdot P = R$. The tables (table 1 Impact, table 2 Probability) below show the classification of the impact and probability.

Impact	Description
1	Schedule delay of up to 1 month
2	Schedule delay of up to 3 months (one quarter)
3	Schedule delay of up to 6 months (two quarters)
4	Schedule delay of up to 12 months (one year)

Table 1: Definition of impact

Probability	Description
1	1-10% probability of this event happening over the next two years
2	11-25% probability of this event happening over the next two years
3	26-50% probability of this event happening over the next two years
4	51-100% probability of this event happening over the next two years

Table 2: Definition of probability

Risk	Description
1-3	Low risk of failure. No need to mitigate risk. A short delay might be experienced.
4-7	Medium risk of failure. Expects a short (1 month) to medium (3 months). Risk should be mitigated if simple mitigation strategies are available.
8-11	High risk of failure. Expects considerable delays. Risks should be mitigated, even when this takes considerable effort.
12-16	Extreme high risk of failure. Risks should be discussed with the involved stakeholders and mitigated, even when this takes considerable effort.

Table 3: Definition of risk

The combination of impact and probability results in the risk described in table 3. *Both the impact and probability are assigned to a risk-based on personal experience and are difficult to reproduce.* Next to the impact and probability, each risk needs to be assigned with a title, short description, chance of repetition and mitigation strategy. Risks classified with a number higher than 8 are serious and concrete mitigation steps are planned.

2.2 Understanding of related subjects

The initial analysis of related literature indicates that the subject is quite new. If existing materials are understood in the wrong way or their results are unreliable, the materials need to be re-analysed, which can be time-consuming. Finding multiple sources of information confirming the same theory should mitigate this risk.

Impact: 2	Probability: 2	Risk: 4
-----------	----------------	---------

Table 4: Risk of understanding of related subjects

2.3 Availability of sample data

Once the reference decisions and their related constraints are created, the internal validation is planned. The internal validation requires sample data. If sample data cannot be found, it needs to be created based on examples, which are either known in public (deduced from existing case-studies) or based on anonymised samples from a real organisation. Using data from existing use-cases is preferred, as this makes the study easier to reproduce and are less time consuming to process.

Impact: 1	Probability: 3	Risk: 3
-----------	----------------	---------

Table 5: Risk of the availability of data

2.4 Reliability of tools

The study is using several tools marked as *beta*, for example, the SHACL4P Protégé plugin. If the functionality of the required tools does not behave as expected, bugs need to be filed, or alternative tools need to be found. In the worst case, alternative tools are not found, and the tools need to be replaced with manual effort.

Impact: 3	Probability: 2	Risk: 6
-----------	----------------	---------

Table 6: Risk of the reliability of tools

2.5 Replicating existing work

Based on the literature study, there is no indication of any existing work that is replicated, but this risk needs to be considered.

Impact: 3	Probability: 1	Risk: 6
-----------	----------------	---------

Table 7: Risk of replicating existing work

3 Experience

This section describes my personal experience with the different phases of the graduation assignment. It includes a short reflection on the process, the result, the schedule, and the knowledge I have gained.

3.0.1 Subject

I remember the first discussions with Lloyd on my daily challenges in product management. One of the discussions made me think about a situation in which the organisation made a decision that just did not seem to make sense at the time. Could we have influenced the outcome of the decision by using evidence? Could we have influenced the outcome of the decision if we brought more structure into the discussion? These questions drove me towards the combination of product management and decision-making. The initial literature study revealed that I was not the only one interested in this subject. This result suggested I was on the right track.

3.0.2 Iterative approach

I started with an 80/20 focus on product management and decision-making. Lloyd directed in flipping this ratio and generalising my contribution focused on decision-making. Eventually, the product management aspects served as helpful validation scenarios.

I honestly did not expect that the graduation assignment would be so iterative in its approach. I expected a *waterfall* approach, in which the research preparation served as the design of the research and the graduation assignment executed that design. I eventually lost track of the number of changes in the main research question, methodology, and title. This approach allowed us to steer the research based on relevant learnings. The downside of this approach is that the schedule that I initially created was useless. The Gantt charts looked helpful in theory, but their content changed regularly. The approach made it very difficult to plan activities. When the approach is so agile, it might have been useful to also plan in an agile way using sprints of three weeks. Looking back at my process, this is what I did without knowing it at the time. I delivered a, more or less, useful version of the thesis document every three weeks.

3.0.3 Validation

The first 40 versions of this document included three scenarios to validate the decision design pattern: requirements prioritisation, software pricing, and alternative solution selection. When I noticed I needed over thirty pages to describe the first scenario, I knew this was not the right approach. I strategically reduced the length of the first scenario using Lloyd's guidance without sacrificing too much content. Additionally, we decided to remove the software pricing scenario from the scope. Requirements prioritisation and alternative solution selection seemed better suitable scenarios for a Computer Science student. I further reduced the length of alternative solution selection and focused on the difference of the alternative solution selection and requirements prioritisation decisions in the context of this study.

3.0.4 Result

We need to find ways to help decision-makers structure decision-relevant information and allow them to understand the quality of the information in a reasonable time. This challenge will require a continuous stream of research focusing on the information structure, the challenges we can address using this information, and the usability of large volumes of information. I think this study contributes to addressing this challenge. Other researchers can use the results to find ways to make evidence-based decision-making more concrete or can search for concrete tools to bring evidence-based decision-making closer to the decision-maker.

3.0.5 Learnings

I learned a lot from the process and the content of this study. The literature study revealed a lot of interesting materials related to decision-making and product management. This experience helps me to keep consuming scientific materials. The discussions with Lloyd forced me to change my thinking on several occasions. Exchanging thoughts is essential to improve the content and the process continuously. I would like to close this paragraph with the notion that I learned that plans change, and plans should change. They need to evolve based on what we learn.