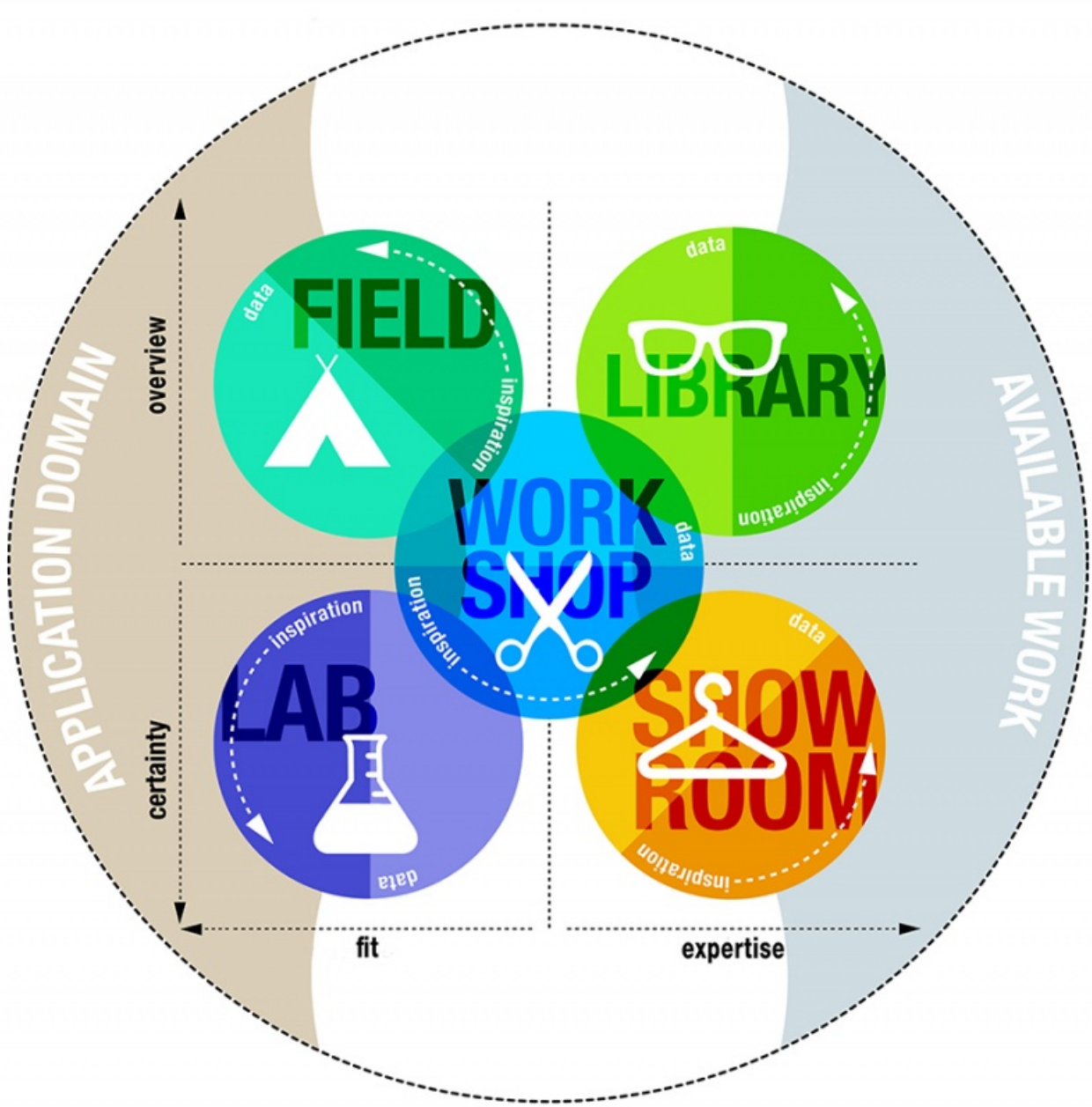
DOT Research Framework

Why is research important for a software engineer?

Research can be seen as discovering answers in a structured way to questions you have when creating a product. Finding answers can take a long time when for example deciding on a best software technique to use by exploring several prototypes or can take much less when finding an answer if a product matches the customers needs by writing and performing acceptance tests.



In semester 3, you are at the level of software engineering where you are no longer expected to imitate or reproduce code for a solution. We want you to discover your own solutions that fits best with what your customer wants or the budget and knowledge that is available. Also your projects are more likely to be complex and need to take into consideration many aspects in them (many stakeholders, complex architectures, multiple

design patters, complex programming, higher quality expectations). You need to convince all your stakeholders that you make the best choices, based on knowledge you have gained in a structured, reproducable manner. This is what is called research.

- *DOT Framework*
- *Research Methods*
- *Methods per Project Phase*

Are there any guidelines that can help you in doing research properly?

Research is different at applied universities (HBO) than at academic universities (WO). To facilitate IT students at applied universities in understanding and applying research, a group of educators designed the DOT framework. It gives structure to your research and provides you with options on how to do research in the software development cycle. Use the DOT framework during your studies.

Aspect	Checking/ Looking up	Looking into	Researching
Researchmethod	Not necessary	Singular	Triangulation
Subject	When do I need to have an internship assignment	Finding relevant IT internship vacancies for next semester within a traveldistance of 30 minutes from home.	Which IT internship vacancy, for next semester, would give me a jumpstart for my ambitions for the start of my career?
Action	Look up the deadline in canvas, semesterguide	Looking up vacancies with parameters for IT, km's and perhaps techniques.	What invironment would suit you best (formal/ informal, commercial focus on IT or staf/ innovative of specialisation of a specific subject)
Sources	Canvas, semesterguide, semestercoach.	Asam, monsterboard, carrieretijger	How will you convince the company offering this internship of your talents?
Goal	A stressfree preperation for the internship	Finding relevant vacancies to suit your requirements.	What are your short term ambitions, based on realistic accomplishments for semester 5.
Risk	Missing the deadline for your internshipproposel	Wasting time on applications that don't suit your requirements and searching for them	Where can you find IT internship vacancies that would give you a jumpstart?
Tracebility	Not necessary	Relevant	Without relevant sources a research has no validity or reliability

How do you formulate research questions?

Examples Scribbr

Research is a question (problem) which you want to answer (solve). Often a research question is quite broad. Then this main question is divided into sub-questions which you can resolve one by one and in this way answer the overall question. The quality of your main and sub-questions is critical for the research success - asking the wrong questions would mean incomplete or invalid research result. Try to use these guidelines when formulating your main question:

- The subject must be worth investigating.
- It should contribute knowledge & value to your project.
- The problem is more complex than to just look it up or look into it.

Characteristics of a good research question:

- The question is feasible.

- The question is clear.
- The question is significant.
- The question is ethical.
- It is an open question.

Is your research work valid and reliable?

A research needs to be valid (it answers exactly your question) and reliable (your answer will be the result even if somebody else does the research using your method). How to achieve this? Be selective in which sources you will use. As they say in Software testing "one is none". So consider if the source you want to use is reliable (or is this simply the opinion of somebody) and is not outdated. If you doubt the reliability of a source you may look for more sources and cross-check them. Don't forget about your blind spot (similar to testing). It is easier to prove that we are right because we want to be right. Try to prove you are wrong, e.g., look for data that disproves your result.