Start date: February 6th, 2017
End date: August 6th, 2017
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1 Research proposition

The research proposition holds a practical or public relevance as well as a theoretical introduction and framework regarding the research topic. Thus, explaining why the research topic is worth investigating for a practical or public cause and also for the domain of communication sciences.

2 Research context and/or case study

After describing the research propositions it is important to look at the context or case study for the research. Thus a description of what is actually needed to execute the research in terms of a target group, sample population, specific requirements of the case study etc..

3 The main problem setting, research questions and/or hypothesis

Deriving from the research proposition an research context the main problem setting can be formulated. In order to specify the main problem setting additional research questions or hypotheses are also addressed in this section.

4 Research design and method(s)

In this section it is important you present a (provisional) outline of the research design. Do the research questions demand a qualitative or quantitative design? Furthermore which applied research methods, such as survey- or interview techniques, but perhaps also card-sort techniques, can be used?

5 Project time table

The project corresponds to a 42 EC studyload, and will officially be performed over the course of six months. The project will start on the 6th of February 2017, and end on the 6th of August in the same year. The project contains three distinct stages: a literature study, a period of hypothesis testing, and an application to a real complex system.

For the literature study, a total of 12 EC or 6 weeks has been reserved. There are two goals in this timeframe: (a) to describe the current state of research on quantifying synergy, complex system resilience, and relations between the two, and (b) selecting a real-life complex system of which to create a synergy profile, and to see if we can use this to explain the observed resilience. The preference in (b) lies in an ecological system of which the resilience is roughly known. The challenge lies in finding a suitable dataset, and determining how to interpret the system in the context of this synergy quantification.

Second, we will take to test our hypotheses in a simulation study. We will systematically generate random systems, with varying degrees of resilience, and examine if there is a relationship with the synergy profile. We will consider both systems the work with discrete probability functions, and continuous functions. The latter is a new development, which is necesarry for application to real-life systems.

Finally, we will take time to apply the same methods of the previous stage to a real complex system. The aim is here to compare our findings to what we know from emperical studies on these systems. For instance, some marine ecosystems have been found to not be resilient to heavy fishing activities on cod. It would be interesting to see if we, based on the synergy profile of this system, would arrive at the same conclusion. If we do, this would be a first step in answering a major unanswered question in ecology: is a highly complex ecosystem more resilient to nudges than a simple one, and why?