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What stakeholders will or will not say: A theoretical and empirical study of topic importance in Requirements Engineering elicitation interviews ☆

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ABSTRACT

Interviewing stakeholders is a way to elicit information about requirements for a system-to-be. A difficulty when preparing such elicitation interviews is to select the topics to discuss, so as to avoid missing important information. Stakeholders may spontaneously share information on some topics, but remain silent on others, unless asked explicitly. We propose the Elicitation Topic Map (ETM) to help engineers in preparing interviews. ETM is a diagram showing topics that may be discussed during interviews, and shows how likely stakeholders discuss each of these topics spontaneously. If a topic is less likely to be discussed spontaneously, then this suggests that engineers may want to prepare questions on it, before the interview. ETM was produced through theoretical and empirical research. The theoretical part consisted of identifying topic sets based on a conceptual model of communication context, grounded in philosophy, artificial intelligence, and computer science. The empirical part involved interviews with Requirements Engineering professionals to identify the topic sets and topics in each set, surveys of business people in order to evaluate how likely they would spontaneously share information about topics, and evaluations of how likely students would share information about each topic, when asked about requirements for social network websites.

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1. Introduction

1.1. Context: Requirements elicitation via interviews

Requirements Engineering (RE) focuses on the elicitation, modeling, and analysis of requirements and environment of a system-to-be, in order to help produce its specification. Requirements elicitation (only elicitation hereafter) refers to activities done in RE in order to acquire information about requirements and the environment of the system-to-be [2–6].

Elicitation often involves communication with stakeholders, through, for example, structured, semi-structured, or unstructured interviews, workshops, and so on [3,5]. Hereafter, we write interviews to refer to any form of direct communication with stakeholders, and which is done in order to elicit information. Interviews provide invaluable information through verbal and nonverbal communication.

Elicitation via interviews is important. Misunderstanding stakeholders, or in some other way missing important information, can result in the specification of the wrong

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system, one that fails to satisfy requirements, and/or is inconsistent with the conditions in its operating environment. For example, misunderstanding what the system should do may result in missing to identify the legislation that applies to the system, and in it not being compliant.

1.2. General issue: how to reveal important implicit information about requirements in interviews?

A difficulty when doing interviews is that the requirements engineers and stakeholders have different backgrounds, experiences of existing systems, and expectations from the system-to-be. They will come into interviews with different assumptions about the environment, requirements, and system-to-be. In itself, it is not a problem that different stakeholders hold different assumptions.

However, it becomes a problem if some of their key assumptions remain implicit in elicitation interviews. If, instead of remaining hidden, these assumptions were known, then this could have helped with, for example, requirements inconsistencies, stakeholder negotiations, or the identification of other requirements, which were not mentioned.

A more technical way to see this is to look at it through the notion of non-monotonic reasoning in artificial intelligence [7–11]: when the requirements engineer is doing elicitation interviews, she is asking questions to the stakeholder; the stakeholder's thinking before answering could be – roughly speaking – seen as an inference that the stakeholder makes on the basis of her defaults (statements that can be rejected when there is new information) and her certain knowledge (statements which remain relevant despite any new information) [9]; the stakeholder's answers are the conclusion of her reasoning process. If we see things this way, then it can be useful for the Requirements Engineering to try to reveal at least some of the stakeholder's defaults, in order to understand the requirements better, discuss other requirements, or otherwise.

This is, for RE research, the issue of how to make sure that elicitation interviews reveal as much as feasible the defaults that may be important for RE? This is not a new research issue. Any contribution on how to prepare elicitation interviews is also inevitably interested in how to use these interviews to elicit as much as feasible relevant information for RE [6,12–15].

However, an approach to this issue that has not received attention consists of trying to understand what domain-independent categories of information the stakeholders tend to talk spontaneously about during elicitation interviews, and which others tend to remain implicit. The latter are the defaults mentioned above. This line of research, we believe, can give interesting insight into categories of information to ask questions about, especially if information in these categories is not spontaneously shared. Conclusions from such a research would suggest domain-independent checklists of topics to discuss during elicitation interviews, which should be helpful in preparing the interviews.

In a summary, the point above is this: if we can get some idea, on the basis of empirical research, about what topics the stakeholders tend to talk about spontaneously in elicitation interviews, and what they tend to leave out, we can suggest a checklist of topics to discuss during interviews, in order to identify defaults that could otherwise have been missed.

1.3. Contributions: checklist of elicitation interview topics, and their relative importance

The contribution of this paper is twofold: (i) the definition, through an exploratory study, of the so-called Elicitation Topic Map (ETM), and (ii) the validation, through a larger scale study, of the ETM for a specific class of system, namely social networks, leading to the ETM-SN, the ETM for social networks.

An ETM is a list of topics to discuss in elicitation interviews, combined with an indication of the relative importance of these topics. ETM-SN is an ETM specialized for requirements elicitation for social networks.

Topic importance reflects our measure of the stakeholders' tendency to share spontaneously information on topics: a topic is more important if we observed, in our sample of stakeholders, that they were more willing to share information about it spontaneously.

This does not mean that less important topics are less important for the engineer: it simply means that fewer stakeholders would spontaneously share information on them; if the engineer needs information on lower importance topics, she will have to be proactive in finding that information (for example, the engineer would need to stimulate stakeholders to discuss those topics).

1.4. Overview of research methodology

The general ETM was produced through three phases of research. It is easier to understand the rationale for them, by starting from the second phase, and then see how social networks fit the picture.

The ETM includes 30 topics. The second phase of research focused on exploring the relative importance of these topics. Their relative importance was estimated with a set of stakeholders, who had somehow been involved in a RE project, of any type. In other words, we were not looking for stakeholders with experience in a particular system class. Subjects were asked to evaluate a set of 30 generic topics. We asked each individual to evaluate, for each topic, if she would share information on it spontaneously, or only if asked.

In order to have the 30 generic topics to evaluate, the first phase of research focused on identifying these topics. We did this through interviews with requirements engineers and business analysts, drawn from five RE and systems engineering projects done in Belgian small and medium size businesses. Projects differed in terms of the number of participants (from 15 to 150) and in terms of the system domain (pharmacology, finance, etc.). To prepare our interviews in this first phase, we surveyed various definitions of the notion of communication context, and identified some important dimensions of context that could be relevant to account for during elicitation interviews.

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