Chapter 13
A Case for the Re-Use of Community Reasoning

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ABSTRACT

In software engineering, the re-use concept is a design principle that improves efficiency, quality and maintainability by ensuring that software artifacts are developed once and re-used many times. In an analogous way, a group’s reasoning can be imagined to be re-used by that or another group to enhance efficiency, transparency and consistency in decision-making. However, the re-use of reasoning is difficult to achieve because group reasoning cannot easily be captured and the way in which a group reasoning artifact is subsequently used is not obvious. This chapter explores the case for the re-use of community reasoning and concludes that individuals can benefit from a representation of a previous group’s coalesced reasoning if the reasoning to be modeled and the scheme to represent the reasoning have been selected to suit the task. The authors contend that specifying the future community likely to re-use the reasoning, called the intended audience, informs a decision regarding whether an exercise aimed at coalescing a group’s reasoning is best performed verbally, in writing or with the use of more structured schemes such as Argument visualization.

INTRODUCTION

In practice, reasoning is rarely performed by an individual in isolation from others but involves the exchange of assertions between participants in a group that Yearwood and Stranieri (2009) call a reasoning community. A reasoning community is identified as a group of individuals connected by their desire to apply reasoning to reach a decision. Members of a reasoning community may or may not belong to the same organisation, community of practice (Wenger 1998) or commitment (Kofman and Senge 1993), hold the same values, aim for the same outcomes or share much else in common except the need to reason toward a solution to a problem.
Each time participants in a community engage in reasoning that leads to a decision, they draw on relevant information and knowledge and engage in communication with others, in a process McMahon (2001) calls cognitive cooperation until, ultimately a decision is reached. The next time a community commences reasoning about a similar problem, background information, reasons and perhaps even the decision adopted by the first community is typically not readily available as a starting point for deliberation. Minutes typically record decisions and do not register the reasons, evidence or dialectic flow advanced to arrive at the decision. As a consequence, the reasoning of one group is not readily re-used by another.

The re-use concept is prevalent in software engineering as a design principle that improves efficiency, quality and maintainability of computer programs by ensuring software artifacts are designed once and re-used many times. In that field, attention is typically focused on the re-use of software, however the collection and organisation of reasons underpinning decisions, known as rationale management, has attracted considerable attention in recent years (Dutoit et al. 2006). Despite its well accepted utility, rationale management is rarely applied in practice. Schneider (2006) calls this the Rationale Paradox and attributes it, in part to difficulties associated with the collection of reasons during decision dialogues.

Reasons are typically generated to support assertions during group decision-making dialogues when the flow of consciousness is focused on the creation and analysis of solutions and not on documenting or recording reasons (Csikszentmihalyi 1990). Further, reasons are difficult to collect because their elicitation often involves the translation of tacit knowledge into explicit knowledge, a process known to be difficult, time consuming and, according to (Nonaka 1991), achieved in practice only when there is a clear social incentive for doing so.

Another explanation for the reluctance a group has to record reasons derives from difficulties in the use of representational formats. Simple transcripts of dialogue are relatively easy to collect but too cumbersome to subsequently to re-use. The many approaches for representing and expressing reasoning can be categorised for the purpose of exploring the case for re-use as follows:

- **Transient**
  - Narrative expressed verbally
- **Permanent**
  - Representations of a single stream of reasoning
    - Classical syllogisms
    - First order logics
    - Concept maps
  - Representations of multiple streams, i.e. group reasoning
    - Narrative expressed in writing
    - Non monotonic logics
    - Argument visualization based on instance argumentation
    - Argument visualization based on group argumentation

Individuals have been reasoning to assimilate and infer new knowledge for thousands of years without any representation or embodiment outside the thinker. New knowledge was expressed verbally and a permanent representation only emerged relatively recently with the advent of writing. Verbal reasoning can be performed in an explanatory cause-effect, quasi-logical form or with the use of a story-telling form. However, regardless of the form, verbal reasoning soon reaches its limit as the concentration and memory of the listener is exhausted. Also, a complex verbal argument can easily involve circular reasoning or fallacies, which may be difficult to detect.

Schmandt-Besserat (1996) argues that writing was invented in Mesopotamia in the fourth millennium BC to create records that enabled traders
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