

# Goal-Oriented Idea Generation Method for Requirements Elicitation

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## Abstract

*This paper presents an extended version of goal-oriented analysis methods where an idea generation method is combined to reinforce the support of the step for identifying sub-goals by a team of stakeholders. To assess our method, experimental results are also discussed.*

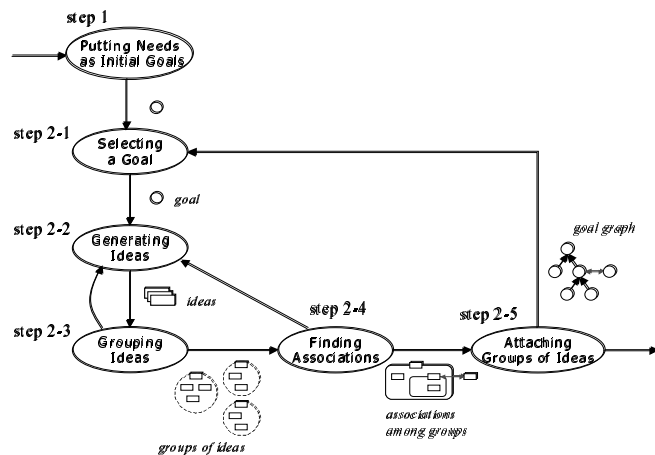
## 1. Introduction

A family of goal-oriented analysis methods such as KAOS[1], I\*[2] and AGORA[3] refines and decomposes customers' requirements as the goals to be achieved, in order to support requirements elicitation. The resulting artifact is an AND-OR graph, called goal graph, whose nodes are elicited goals. However the methods do not contain the supports for facilitating the following activities; 1) activities for refining and decomposing a goal into more concrete sub-goals, 2) collaborative activities by stakeholders to elicit goals and to construct a goal graph. In particular, stakeholders as knowledge source play an important role on eliciting requirements of high quality and all of them should participate in requirements elicitation activities.

In this paper, to solve the above drawbacks, we combine an idea generation method like Brainstorming and KJ Method[4] with goal-oriented analysis, and as a result stakeholders participate in goal elicitation activities so that the wide variety of their knowledge can help the activities.

## 2. Overview of Our Method

The idea generation method is used for the stakeholders to identify sub-goals. The ideas that a stakeholder independently gets into his head by using an idea generation method can be considered as candidates for sub-goals. The stakeholders continue the activities for identifying specific associations or relationships among the ideas. These associations correspond to relationships among goals.



**Figure 1. Activity Flow of Idea Generation Method**

The steps of our proposed method, goal oriented idea generation method is summarized below, as shown in Figure 1. They are performed by all of the stakeholders in face-to-face meeting style. To make these meetings efficient, the facilitator that controls the progress of the meetings including agenda selection is necessary. Usually, an experienced analyst is employed as the facilitator.

### 1. Putting customers' needs as initial goals.

The initial goals are the roots of a goal graph. 2. Repeating the following steps from 2-1 to 2-5 until the sufficient goal graphs are obtained.

All of the stakeholders join in the steps and have discussions in face-to-face meeting style.

2-1. Selecting a goal from the goal graphs or from the set of the goals.

The facilitator selects a goal which the members like to decompose and to refine, from the already elicited goals.

2-2. Generating ideas related to the selected goal.

Each member thinks anything related to the selected goal and makes it concrete as an idea. He or she writes down a generated idea on a paper card (called idea-cards), and comes up with it so that all of the members can read it and (s)he can explain it to them, by pasting up it on a whiteboard, as shown in Figure 2.

### 2-3. Grouping the generated ideas.

The members group the pasted idea-cards by considering which ideas are semantically related to each other. They re-arrange the idea-cards so that the idea-cards belonging to the same group come to be close on the whiteboard, and encircle the idea-cards belonging to the same group with erasable pen. After constructing a group, they consider it as one idea and attach to it a brief description.

### 2-4 Finding associations among the groups of the ideas.

The members find associations among the groups and/or group elements and write down them on the whiteboard.

### 2-5 Attaching the groups of the ideas and their associations to a goal graph.

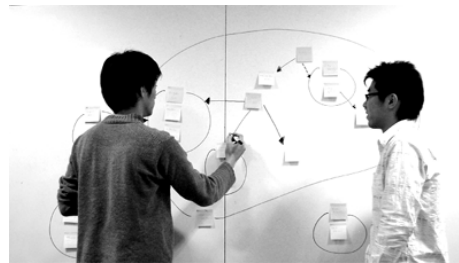
Based on the identified associations, the members select the candidates of sub-goals of the selected goal from the groups and the group elements. Intuitively speaking, the groups or ideas having an association to the selected goal can be its sub-goals.

## 3. Experimental Results

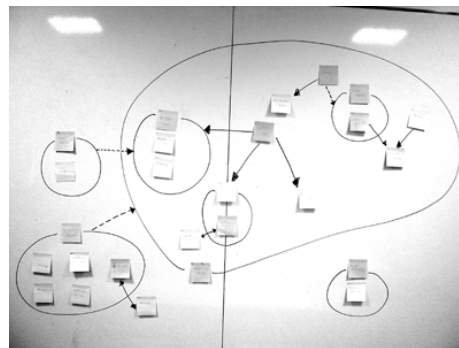
To assess it, we had an experiment that our method was applied to a small project “Developing a support system for a library”, whose members are an analyst as a facilitator, a user and a librarian.

Our subjects had two sessions (65 min. and 37 min.) and elicited totally 38 sub-goals (26 in the first session + 12 in the second) from 64 generated ideas (43 + 21). After the experiment, we had interviews with the participants. The findings from the experimental results and the interviews can be summarized as follows;

- 1) The ideas of the stakeholders that are not the analyst can be directly reflected. In fact, in the second session of our experiment, 7 of the 12 sub-goals resulted from the stakeholders.
- 2) Our method effectively contributes to goal decomposition and refinement activities. Many of the generated ideas directly lead to the identification of goals.
- 3) The goals obtained from the ideas have high quality. During the activities for grouping ideas, it was frequently observed that the stakeholders could find their misunderstandings and tried to resolve them. As a result, the obtained goals were based on the consensus and the agreement of all of the stakeholders.
- 4) The efficient meetings greatly depend on the ability of the facilitator.
- 5) There are some ambiguous points in our concepts, e.g.



(a) Performing Activities



(b) Pasted Idea-Cards on the Board

Figure 2. Photographs of Our Experiment

“goal”.

6) Managing idea-cards including writing associations on a whiteboard is a little bit troublesome.

Although there remains future work such as a supporting tool and more case studies, the experimental results suggested that our method could improve the drawbacks that current goal oriented analysis has.

## References

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