



Goal-awareness and Goal-adaptive Information Presentation to Support Collaborative Learning in Informal Settings

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Theoretical Background

Museums typically provide opportunities for informal learning. Two characteristics of informal learning are important for this study: social influences and self-set learning goals.

Museum visits are *social events*: Visitors often come in groups. In conversation visitors elaborate exhibit information and thereby raise their learning experience.

Theories of information processing and of self-regulated learning show the importance of *goals*: With a goal in mind information is selected in a more goal-directed way, it is elaborated more deeply (also in conversation) and learning is enhanced (cp. fig 1).

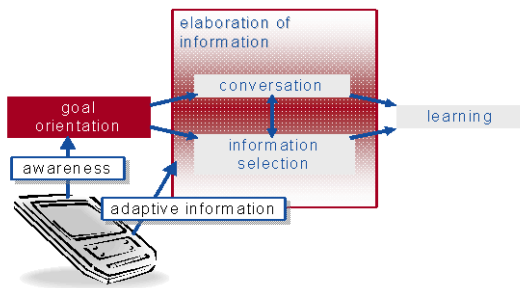


Fig. 1. Technology to support collaborative learning in museums.

In this project, technology is used to enhance goal-orientation in informal learning (fig. 1):

- Shared goals are made aware to visitor dyads.
- Goal-relevant information is presented adaptively.

Research Questions

1. Can awareness of shared goals raise informal learning processes?
2. Does goal-adaptive information further enhance learning?
3. Are there differences in these influences in physical and virtual museums?

Methodology

Material. An exhibition about nanotechnology serves as research setting. A virtual museum – identical in content and complexity to the physical exhibition – was created. For all exhibits, four parallel text sets were designed, providing differing information serving different goals.

Design. Ss are randomized to four experimental conditions (see table 1): Ss in condition 1 and 2 are made aware of their goals prior to their exploration of the exhibition. Adaptive information is presented to subjects in condition 1 explicitly according to their shared goal and in condition 3 implicitly according to their visiting behaviour.

To address research question 3, the study is conducted in three different contexts: In the virtual museum (study 1), in the lab (study 2) and in the real museum (study 3).

Table 1. Experimental design.

	Goal-adaptive information	
	Yes	No
Goal-awareness	condition 1	condition 2
	condition 3	condition 4 (control)

15 dyads of acquaintances per condition are recruited for a study on communication in museums (cover story).

Procedure. First, Ss are familiarised with the technology (graphical hypertext / PDA). Ss in conditions 1 and 2 are then made aware of their shared goals. While Ss visit the exhibition without time constraints, they receive adaptive information on exhibits in conditions 1 and 3 and random information in conditions 2 and 4. After their visit Ss answer a questionnaire on prior knowledge, invested mental effort, their knowledge, and their degree of goal orientation.

Study 1: First Results

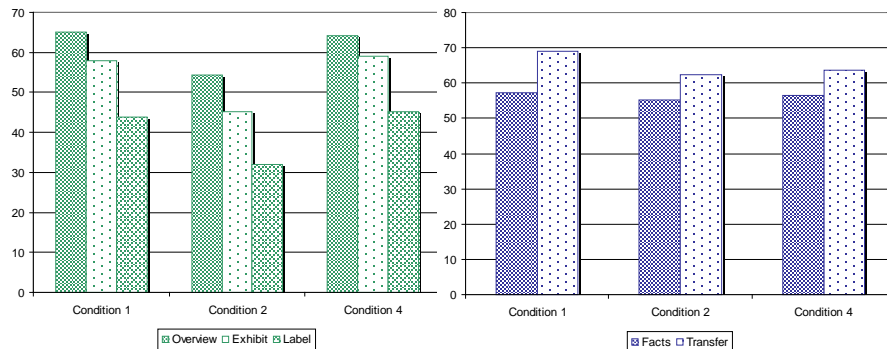


Fig. 2. Percentage of examined pages.

Fig. 3. Knowledge acquisition.

Comparison of *visiting behaviour* in the virtual museum study shows that Ss in condition 2 (goal-awareness, random information) visit less pages (e.g., exhibits) than Ss in condition 1 and 4 (fig. 2). Additionally, Ss in condition 1 (goal-awareness, adaptive information) take less time to select which exhibit to explore next.

Regarding *knowledge acquisition* Ss in condition 1 (goal-awareness, adaptive information) are superior to Ss in condition 2 and 4 regarding their transfer knowledge (fig. 3).

Ss within one dyad converge compared to other dyads, for example with respect to their subjective knowledge (ICC = 0.9, p = .003).

Discussion

Overall, study 1 shows that the combination of both support systems – goal-awareness and adaptation (condition 1) – had an impact on visiting behaviour and learning in the exhibition Nanodialogue: Adaptive technology provides the visitor with goal-relevant information, maintains free-choice in the informal setting, and reduces mental effort needed to find appropriate information. With adaptive technology visitors seem to gain more flexible knowledge which can be transferred to other problems indicating more elaboration of information.

Goal-awareness without adaptive information (condition 2) had no effect on learning. However, these Ss explored less exhibits. This could be due to higher elaboration or due to unmet expectations.

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