



IKNOW '08 – KVD track

Do Visualizations Foster Experience Sharing and Retention in Groups? Towards an Experimental Validation

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Agenda

1. Context

2. Research Design

3. Experiment

Design

Measures and hypotheses

Preliminary results

4. Conclusion

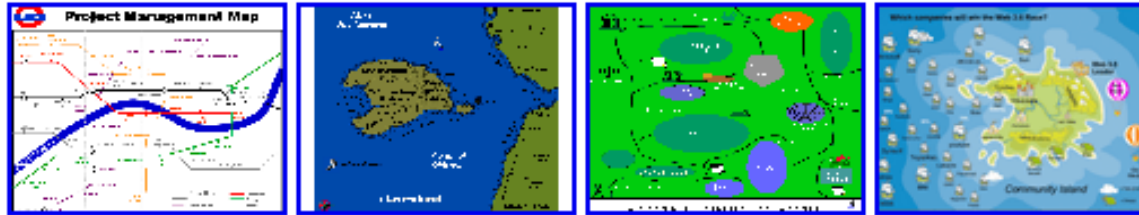
Q&A

1. Context

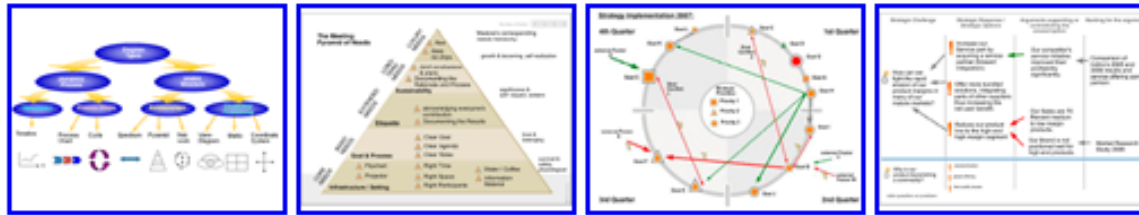
Research question: *does visualization support knowledge intensive group work in organizations?*

- Meetings in organizations
- Not only decision making
- Supported by visualization:
visual metaphors, maps, sketches, diagrams...
- Main focus: computer supported (GSS), face to face

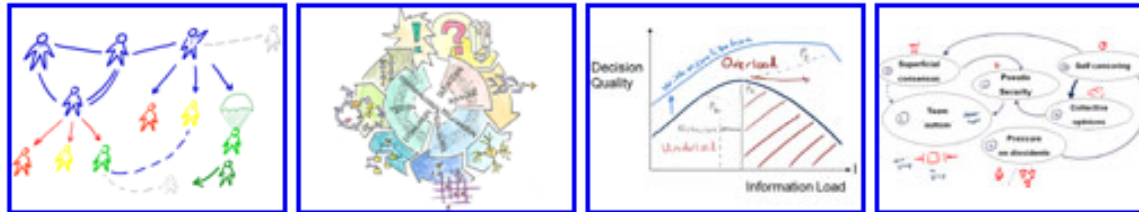
Mapping



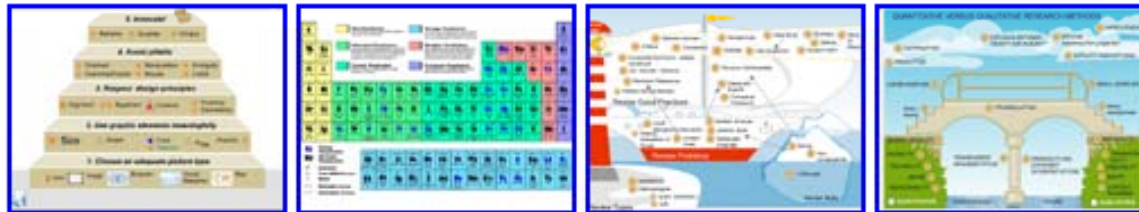
Diagramming



Sketching



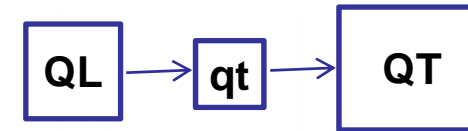
Metaphorizing



Exploring



2. Research Design



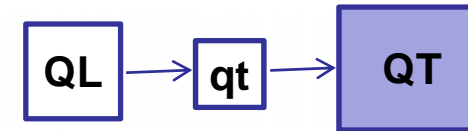
1. Identify **main characteristics of a visualization** mediating collaborative knowledge work
2. **Matching** widely used visualizations in organizations, with typical group activities
3. **Experiment:** compare
 - (I) optimal visualization support
 - (II) sub-optimal visualization support
 - (III) no visualization support

Mixed methods design:

← Qualitative part: broad, understanding the context

← Quantitative part: focused

3. Experiment design



Experiment: 3X2

Groups of 5 managers

Topic:

strategy implementation problems

3 Conditions (independent variable):

- Optimal* visualization support
- Suboptimal* visualization support
- unsupported (no computer, only flipchart)

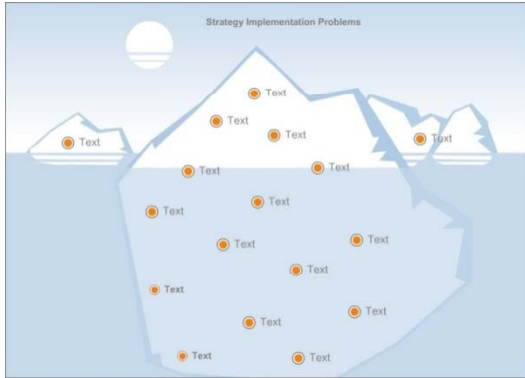
2 tasks:

- knowledge sharing
- evaluation (ranking)



3. Experiment design

Condition 1: optimal visualization support

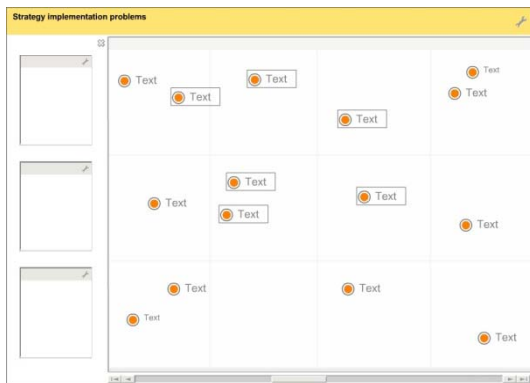


Knowledge sharing: iceber visual metaphor

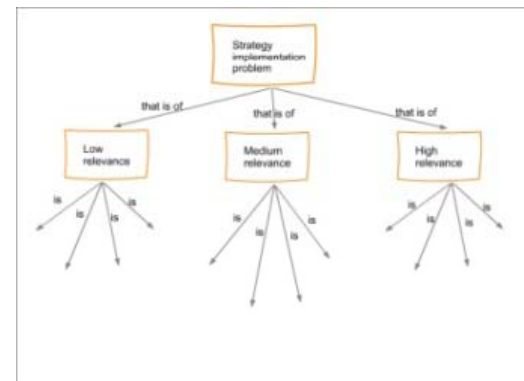


Evaluating options: 2X2 Matrix

Condition 2: sub-optimal visualization support

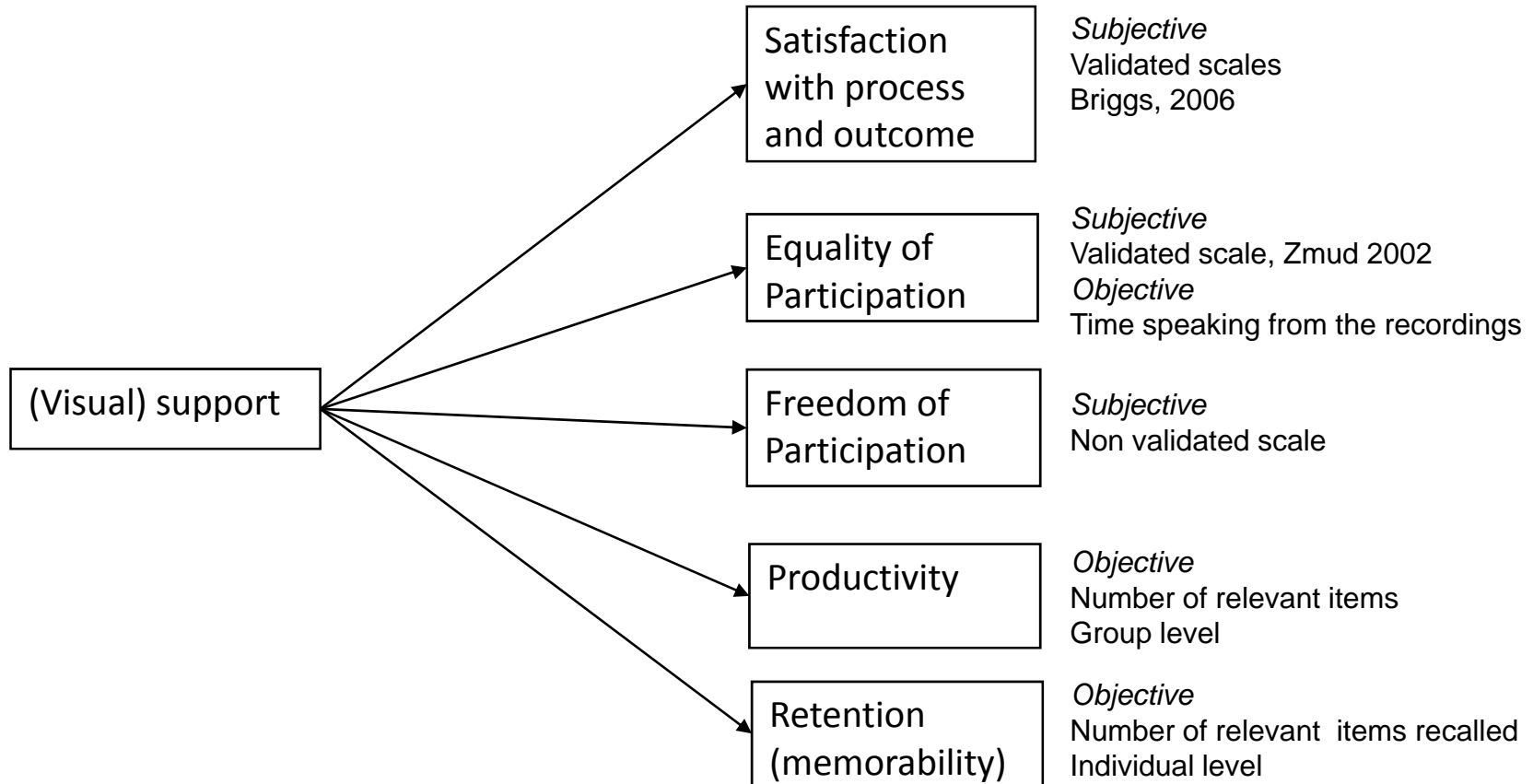


Knowledge sharing: timeline



Evaluating options: concept map

3. Experiment: measures



Control variables: familiarity with topic, familiarity with GSS, like for visualization, comfortable with English, facilitator did a good job, conflict, gender, age, years of experience, mother tongue, facilitator role, group (11)

3. Experiment: hypotheses

H1 Using an appropriate visual support for a task has a positive impact on ***satisfaction*** compared to using no visual support

H2 Using an appropriate visual support for a task has a positive impact on ***equality of participation*** compared to using no visual support

H3 Using an appropriate visual support for a task has a positive impact on ***freedom of participation*** compared to using no visual support

H4 Using an appropriate visual support for the task has a positive impact on ***productivity*** compared to using no visual support

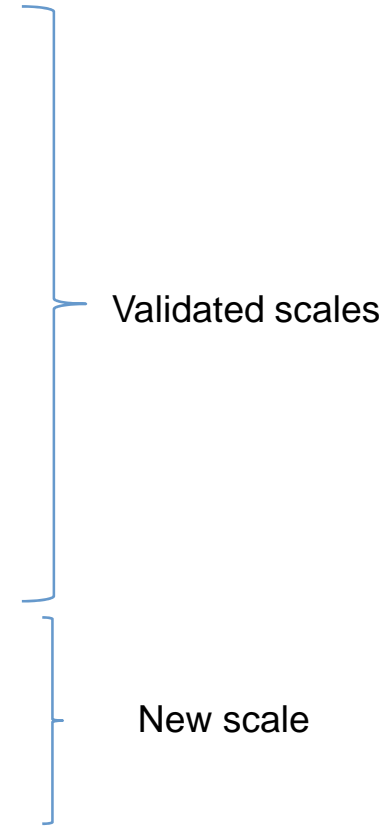
H5 Using an appropriate visual support for a task has a positive impact on ***retention*** compared to using no visual support

Sub-optimal visualization tentative hypothesis:
above the un-supported condition and below the optimal visualization support

3. Experiment: provisional analysis

Partial data: 56 subjects in 11 groups

	Component			
	1	2	3	4
satisfaction process 1	,824	,382	,203	-,020
satisfaction process 2	,825	,348	-,075	-,109
satisfaction process 3	,814	,265	,191	,022
satisfaction process 4	,749	,260	,244	,037
satisfaction outcome 1	,167	,904	-,004	,093
satisfaction outcome 2	,355	,814	-,063	-,049
satisfaction outcome 3	,404	,719	,142	,113
satisfaction outcome 4	,309	,879	,116	,041
participation equality 1	,033	,025	-,107	,944
participation equality 2	,022	,075	,124	,909
participation equality 3	-,079	,036	-,033	,911
participation freedom 1	,469	,069	,730	,082
participation freedom 2	,238	,036	,860	-,007
participation freedom 3	-,016	,068	,913	,016
participation freedom 4	,034	-,004	,887	-,073



Principal component analysis, varimax rotation

3. Experiment: provisional analysis

Partial data: 56 subjects in 11 groups

Factor	Cronbach's Alpha	N of items	
Satisfaction with process	,901	4	Validated scales
Satisfaction with outcome	,908	4	
Equality of participation	,912	3	
Freedom of participation	,894	4	New scale

Reliability analysis

3. Experiment: provisional analysis

Partial data: 56 subjects in 11 groups

Compare means	Satisfaction	Equality of participation	Freedom of participation	Productivity	Recall
Visualization supported condition	5.57	5.60	6.45	16	12.5
Unsupported condition	5.53	5.03	6.05	12.5	8

ANOVA

Effect of visualization (overall)	F(2,51)=0.08 p>.05	F(2,52)=2,62 p<0.5	F(2,52)=2.20 p=.06	F(2,9)=2.56, p=.07	F(2,51)=26.03 p<.01
Planned contrast: visualization supported compared with unsupported		t(52)=2,13, p<.05	t(52)=1.9, p<.05	t(7)=2.26, p<.05	t(7)=7.00 p<.01
Planned contrast: optimal visualization compared with suboptimal visualization		t(52)=-.43 p>.05	t(52)=1.01, p>.05	t(7)=-.20 p>.05	t(7)=-2.72 p<.05

Disclaimer: provisional analysis of partial data!

➔ First experiment indicates positive impact of visualization on group collaboration

4. Conclusion

Next steps

- Collect data for >100 participants
- Future: replicate with variants:
remote (virtual) group work or in a different cultural context

Key insights

- Aim of the study: bridge visualization and GSS studies
- Experimental approach to understand the effect of visualization for collaborative knowledge work
- Preliminary partial results: visualization has a positive impact