

The role of GSS in participatory policy analysis A field experiment

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Abstract

This paper describes a rare opportunity for a field experiment; in this, several forms of evaluation were combined into a (quasi) experimental evaluation design. Two matched and randomized groups of citizens engaged in a debate on the future of their city ('s-Hertogenbosch in the Netherlands) were studied during four meetings of a participatory policy exercise. The intent of our experiment was to test whether the use of a GSS had a positive effect on the quality of the group processes and the quality of group results. We found that process facilitation and time effects have more influence on group processes and outcomes than did the use of a GSS. © 2001 Elsevier Science B.V. All rights reserved.

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1. Introduction

In 1998, the City Council of 's-Hertogenbosch in the Netherlands initiated a participatory policy exercise in which citizens were actively involved in the development of a city vision. In preparation for this initiative, a research team from Tilburg University was invited to facilitate this exercise. By constructing two similar panels of citizens and planning four sequential meetings, policymakers and researchers aimed to actively involve and study citizens in the development of their city vision. It was agreed that, during the citizen panel meetings, it would be possible to experiment with a group support system (GSS). In return, the citizen panel meetings were technically supported by a

GSS and facilitated by two members of the research team. In this paper, we present the design of this field experiment and its outcomes.

2. Participatory policy analysis

Since the 1980s, many Dutch local governments have initiated participatory processes in which citizens, groups, and organizations are involved in debates about the future of their city. Cities in the Netherlands that organized participatory processes are, e.g., Amsterdam, Deventer, and Groningen [23]. This development fits the new role of governments in policymaking processes. In the (old) expert style of policymaking and analysis, policymakers (e.g., local governments) were the central actors in policymaking [11]. Communication with local citizens and organizations was a secondary activity. In the

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(new) participatory style, greater emphasis is put on communication with and interaction between citizens and policymakers [27]. Methods to support interaction and participation in policymaking processes are usually called participatory policy analysis (PPA) [12,16]. PPA can be defined as [21]

“A practical discipline which contributes to policymaking by designing policy-analytical forums, providing favorable conditions for participation and facilitating, and supporting the relevant debate and argumentation within this forum.”

In a historical perspective, PPA can be seen as an answer of (public) policymakers and analysis practitioners to the growing need for participation and interaction in policymaking. Several causes of this need for interaction can be mentioned. First, there is the arrival of the new millennium. For many local policymakers this has led to a desire to develop so-called “future city visions” (city 2000 and so forth). City visions can be considered a form of local agenda setting. These visions focus on many policy areas and are usually developed with input from a variety of local actors such as citizens. Looking from a citizens’ perspective, there are additional reasons why they would like to become involved in policymaking. Thomas [24], e.g., stated that

“When people become more educated, they ask for more involvement in the decisions that will affect their lives.”¹

Dutch policy scientists confirm that there is a growing need for participation and interaction of “ordinary” people, who are increasingly highly educated and show a growing political and social awareness [15,25]. Citizens increasingly seek interaction with governments spontaneously, especially if they are confronted with (potentially) negative side effects. These actions are typically driven by the NIMBY (not in my back yard) effect.

The citizen panel described here developed a future vision of their city in 2010: an agenda setting activity. The aim of the panel was to define central themes (policy problems and issues) policymakers were expected to focus on the development of new policies. After that, however, the city council was to decide

which ideas or themes would be implemented. This means that the influence of the citizen panel was limited to an advisory role.

3. The ‘s-Hertogenbosch citizen panel

3.1. Introduction

A decade ago, ‘s-Hertogenbosch developed its first city vision. One of the lessons from a preliminary evaluation of this city vision was that public participation should be improved [3–5]. “Ordinary” citizens had hardly been involved in the development of the first city vision. There was much internal focus and poor communication in the local government. It was decided that a new city vision could overcome these criticisms and follow a new, participatory approach.

As the total effort in ‘s-Hertogenbosch consisted of several participatory activities in which participants were not always representative of the local population, more effort was made to involve “ordinary” people in the citizen panel. The panel members did not only meet to express their opinions, but also to develop an opinion about the future of ‘s-Hertogenbosch. For that purpose, a set of four panel meetings were organized during a period of 4 months. From the local policymakers’ perspective, this promised to be an innovative and attractive method of involving citizens in policymaking. Because of the experimental character of the citizen panel, however, the expected results of this initiative were unclear. Therefore, it was decided to evaluate the citizen panel changes by measuring progress from the beginning, during the process, and at its end.

3.2. Research model

Since the citizen panel trajectory was supported by several technologies, it was decided to primarily follow the input–process–outcome (IPO) model of Petrovic and Krickl [22] in their analysis of traditionally moderated versus computer supported brainstorming (i.e., the Graz electronic meeting room). Apart from splitting the citizen panels into two groups and four meetings, the evaluation study also allowed us to experiment with technological conditions. In practice, we varied the use of GSS during the four

¹US policy scientists label the growing involvement of citizens in policymaking: *New Public Involvement*.

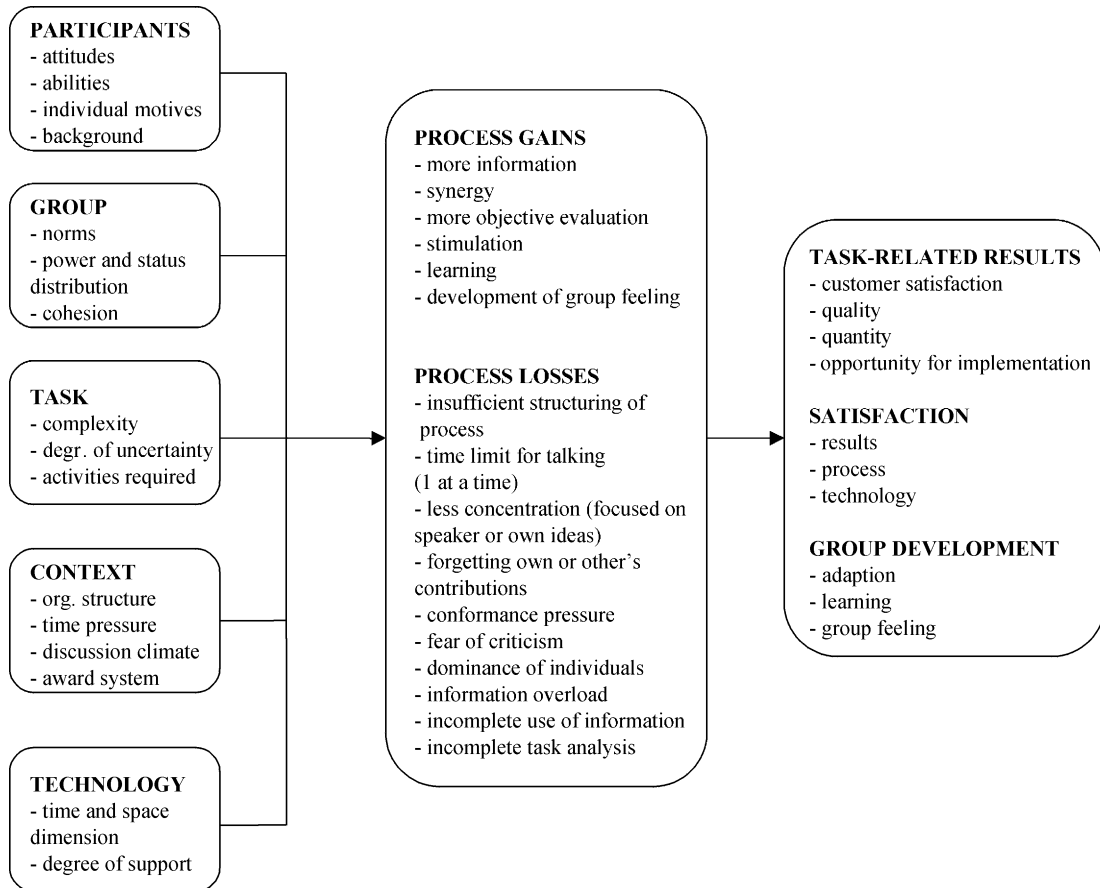


Fig. 1. The IPO model as applied to study the effect of technology support on the quality of group meetings [22].

meetings of the two panel groups. In short, our research design enabled us to analyze the effect of GSS on the group panel processes and the results of citizen panel discussions, and therefore use Petrovic and Krickls' version of the IPO-model to evaluate the complete citizen panel experiment.

As can be seen in Fig. 1, there are three categories of variables in the IPO-model: input, process, and output. The input variables for the 's-Hertogenbosch panel experiment were the participants, group, task, context and technology.

3.2.1. Participants

At the start of the effort, 30 inhabitants from the city were invited to participate in the panel discussion. These citizens were selected from a larger group of

participants in other PPA-initiatives, such as the city debates of 1998. Because of this pre-selection, we dealt with a biased sample of the city inhabitants.² The aim was not, however, to select a fully representative group of inhabitants, but to compose a group of citizens of different age, sex, and occupational status. It appeared that we succeeded to achieve both this variation and representation. Table 1 compares the age–sex distributions of the selected panel members

²A fully random selection of local citizens for public participation in policymaking processes proved to be very difficult. Despite scientific and democratic objections, it was decided to select participants from an already existing database and to approach citizens who are not usually very active in policymaking (e.g., ethnic minorities, adolescents).

Table 1
Composition of the citizen panel participants and the population of 's-Hertogenbosch by sex and age (1 January 1998; percentages)

Age	Citizen panel		Population 's-Hertogenbosch	
	Male	Female	Male	Female
15–29	0	10	27	25
30–44	28	27	32	29
45–59	39	33	24	22
>60	33	30	17	23
Total	100	100	100	100
N	18	12	50933	53966

with the same distribution in the 's-Hertogenbosch population.

- *Attitudes*: Because of their earlier participation in city debates, most of the citizens were strongly involved in the social, political, and cultural life of their city. This was additionally indicated by their over-average memberships of local organizations and other public or local activities.
- *Abilities*: It appeared that some participants were very experienced and used to policy meetings, while others were not used to them. The same applied to their computer skills, which were especially needed when GSS was used during the meetings. In this respect, the group panels can be characterized as heterogeneous.
- *Individual motives*: It appeared that the participants were strongly motivated by being part of an important local political process. This held for all members of the panel. They participated on Saturdays, their leisure time, and this indicates that there were few if any economic or financial incentives.
- *Background*: Relatively many elderly citizens participated. The majority of the participants were male. Thus elder men and women were over-represented. The age group 30–44 was, however, fairly well represented. Other background characteristics also show some lack of randomness. There were several retired employees, students, and housewives. Relatively many participants worked in the non-profit sector (health care, welfare, and education). Only a few worked in the profit sector. Most had lived in 's-Hertogenbosch for many years (from 2 to 68 years). Hardly any ethnic minorities

were represented. All in all, the panel is not a clear representation of the population of the city of 's-Hertogenbosch, but shows differences in various skills and features of the participants.

3.2.2. Group

The citizen panel was split into two comparable groups of equal size. This was done for practical reasons. In the planning stage, it seemed difficult to enhance equal participation within groups of 30. We felt that equal participation would function better with two groups of 15 members. At the same time, this allowed us to follow and compare both groups during the PPA effort and to support them with GSS in turn. The idea behind organizing two parallel groups, meeting at four sequential meetings, was that at each meeting one group was using GSS while the other was using “traditional” discussion tools. In splitting the panel group, we took care of equal age and sex distribution within the groups. Table 2 shows that gender and age were equally divided.

Following the “group” box in the IPO model, we describe the characteristics of the two groups: norms, power and status distribution, and cohesion [13].

- *Norms*: Norms of participants were unknown before the start of the panel discussions. As the process continued, it appeared, however, that group norms gradually evolved during the four meetings.
- *Power and status distribution*: From the beginning, every member participated on an equal basis. Two process facilitators (members of the Tilburg University research team) chaired the meetings of

Table 2
Composition of the two panel groups by sex and age (percentages)^a

Age	Panel group 1		Panel group 2	
	Male	Female	Male	Female
15–29	0	33	0	17
30–44	33	17	22	33
45–59	44	17	33	33
>60	22	33	44	17
Total	100	100	100	100
N	9	6	9	6

^a The citizen panel started with 30 participants (15 participants in both groups). Five participants dropped out, three participants in group 1 and two participants in group 2.

both groups and ensured equal participation. The process facilitators did not know the participants before the start of the panel meetings.

- *Cohesion*: A common characteristic of the participants was their citizenship of ‘s-Hertogenbosch. The panel was set up to be a forum in which “ordinary” people met for discussion and it is therefore a non-permanent organization. Some participants had met on other occasions, but most did not know each other before the start of the panel.

3.2.3. Task

Both groups were confronted with same task: to develop a “picture” of the city of ‘s-Hertogenbosch in 2010 and to provide ideas and issues for policy. In terms of the IPO model, this task has complexity, uncertainty, and several types of activities.

- *Complexity*: The subject of discussion was very broad and abstract. Future developments are hard to predict. Additionally, in some sessions, participants were asked to use a perspective that differed from their personal background. For example, elderly were asked to take the view of the youth and vice versa. To sum up, the tasks can be characterized as complex for non-professional citizens.
- *Degree of uncertainty*: For the participants, it was difficult to decide whether (elements of) their vision would be applied in the actual policy setting

process. This uncertainty was partly reduced by the mayor who personally promised to explain why (elements of) their city vision would or would not be used in future policymaking in the city council.

- *Activities required*: During the panel meetings, the participants were confronted with several activities. To illustrate this, Table 3 presents the agendas of the four meetings.

In the first meeting, both groups brainstormed about themes (divergence) and selected four as input for the development of their city vision (convergence). In the next two meetings, the participants were asked to elaborate the themes (divergence); these meetings had exactly the same agenda. The final meeting was a convergence meeting. Its aim was to create consensus about the group vision based on the selected themes. At the end of this meeting, participants had the opportunity to provide final instructions to the process facilitators for the completion of the city vision that was finally presented to the mayor.

3.2.4. Context

We elaborate four dimensions as presented by the IPO model: the organizational structure, time pressure, discussion climate, and the award system.

- *Organizational structure*: The panel groups had no formal organizational structure. Participants

Table 3
The agendas of the citizen panel meetings

Meeting 1	Meetings 2 and 3	Meeting 4
Opening	Opening	Opening
Four subgroups gather ideas about the city using four perspectives (young, elderly, family with and without children)	Subgroup 1 elaborates theme 1, subgroup 2 elaborates theme 2	Gathering comments on subvisions based on the four themes
Consultation in subgroups about themes to be proposed	Break	Discussion
Selection of four themes	Subgroup 1 elaborates theme 2, subgroup 2 elaborates theme 1	Break
Adjourn meeting	Lunch	Gathering comments on the concept version of the city vision
	Subgroups 1 and 2 present theme 1	Discussion
	Discussion	Lunch
	Subgroups 1 and 2 present theme 2	Finishing city vision (instructions for the process facilitators)
	Discussion	Adjourn meeting
	Adjourn meeting	Speech mayor

cooperated voluntarily and on a basis of equality. Their facilitator guided the process and chaired the sessions. Civil servants were present and could be consulted at any time.

- *Time pressure*: During the effort, time pressure was relatively low. The complete effort took place within a period of 4 months. Each of the four meetings lasted 4 hours. During these, however, participants sometimes experienced time pressure, since they carried out relatively many different and complex activities.
- *Discussion climate*: The process facilitators actively stimulated an open discussion climate. In the opinion of most participants, they succeeded in doing so.
- *Award system*: There was no financial reward for the participants, apart from a small gift at the end. There was a psychological reward, though, which consisted of the personal involvement of the mayor of 's-Hertogenbosch and the feeling of being part of an important local happening.

3.2.5. Technology

Finally, two elements of our research design can be described: the time/space dimension and the degree of support.

- *Timespace dimensions*: In general, a group (decision) support system can be defined as [9].

“An interactive computer-based system to facilitate the solution of unstructured problems by a set of decision-makers working together as a group.”

In this experiment, GSS were used to support the different group activities such as communication and decision-making. A commonly used classification of GSS is based on time and place [19,26], which was originally developed for groupware, it can be shown that our application of GSS is defined by the “same time–same place” category (see Table 4).

- *The degree of support*: Scholars from Tilburg University were asked to facilitate those panel meetings with using GSS, both in substance and methodologically. The GSS system consisted of a local area network of a maximum of 18 laptop computers; it was run with GroupSystems software for Windows (Version 1.1e).

Table 4
Group needs and GSS solutions [2,19]

Same time	Different time
<i>Same place</i>	
Need: Face-to-Face meetings	Need: Administrative, filing and filtering
Copy boards	Shared files
PC projectors	Shift work
Facilitation services	Kiosks
Electronic meeting room ^a	Team rooms
Polling systems	Group displays
<i>Different place</i>	
Need: Cross-distance meetings	Need: Ongoing coordination
Conference calls	Group writing
Graphics and audio	Computer conferencing
Screen sharing	Conversational structures
Videoconferencing	Forms management
Teleconferencing	Group voice mail

^a The electronic meeting room (EMR) was applied in the panel meetings to support the several stages of debate and discussion. The EMR is considered a GSS and includes hardware (computer server, notebooks, beamer, public screen, printer, and network cables) and software (*GroupSystems for Windows*).

4. The experimental design

4.1. Design and data collection

's-Hertogenbosch citizen panel provided a unique opportunity to study outcomes and processes of the panel meetings and to evaluate these using the IPO model. During the four meetings, the two panel groups were supported by GSS in turn. This experimental design especially afforded us the opportunity to study the effect of GSS support on the quality of the group meetings, independent of group, facilitation, and meeting characteristics. We believe that this is an innovative design compared with former research on the effectiveness of group processes using GSS. The aim of our research is to examine empirically whether there is an independent and positive effect of GSS support on the quality of group processes and outcomes of the panel meetings. The core design of the field experiment is shown in Table 5.

At each of the four meetings, the following data were collected:

1. Observations of the group process. These were noted down and coded in observation schemes.

Table 5
Research design field experiment 's-Hertogenbosch

	Meeting 1, 21 November 1998	Meeting 2, 14 December 1998	Meeting 3, 9 January 1999	Meeting 4, 6 February 1999
Group 1 (facilitator x)	Without GSS	With GSS	Without GSS	With GSS
Group 2 (facilitator y)	With GSS	Without GSS	With GSS	Without GSS

2. Questionnaires. These were distributed among all participants and filled out by them immediately after each meeting. A fifth questionnaire was distributed 2 months after the last meeting.
3. Output that was generated on paper by the participants or when using a GSS on file.

The analysis was primarily based on the participant prepared questionnaires. Their judgment indicated their satisfaction with the meeting process, outcomes, and technology. This is a measurement in the “output” box of the IPO model.

4.2. Measuring effectiveness

In order to compare the results of our analysis, we adapted the questions used by Petrovic and Krickl to measure participant satisfaction for their Graz experiment. We replicated their measurement of the three dimensions of participant comfort with the results, process, and technology. The following items were adapted, translated and included in the questionnaire (answer categories: five-point Likert scale).

Attitudes towards process

- I had fun.
- I could present all my ideas.
- I am satisfied with the style of cooperation.
- The abilities of other participants were well used.
- Cooperation was efficient.

Attitudes towards results

- I feel personally responsible for the results.
- I am satisfied with the results.
- The results correspond with my own contributions.
- I endorse the results.

Attitudes towards technology

- I want to do this again.
- GSS helps us find and structure ideas.

- GSS-supported teamwork is better suited to this task than traditional ways.
- The GSS helps us reach our goal.
- The role of the GSS is essential.

5. Hypotheses

Most studies expect GSS to have a positive effect on group processes and results. In our PPA of the 's-Hertogenbosch experiment, we tested this expectation. The subjects of brainstorming and discussion can be characterized as complex, uncertain, and diverse. In principle, if we assume that this complexity of tasks is constant over time (i.e., does not vary between the four meetings) and if we also assume that there is no effect of group or facilitation (i.e., the two groups are equal, in their facilitation, composition, and behavior), we may state the following three hypotheses:

1. *The participants' satisfaction with group **process** is higher in the GSS-supported meetings than in the non-GSS-supported meetings.*
2. *The participants' satisfaction with group **results** is higher in the GSS-supported meetings than in the non-GSS-supported meetings.*
3. *The positive effect of GSS is larger for the participants' satisfaction with group **results** than about the group **process**.*

From recent literature we know that facilitation does make a difference in GSS meetings [7,10,17] and PPA [20]. In our experiment, both facilitators can be characterized as male, age 55 and scholars in policy sciences working at the same department of Tilburg University. In advance, we had some indications that the facilitators differed in their social and communicative skills. However, both met and discussed the tasks and their roles before each meeting. With respect to the four meetings, the complexity of the group tasks

can be considered equal, although some issues were more difficult than others. For the development of group norms (trust, cohesion, and cooperation), face-to-face meetings are very important. From communication science, we know that face-to-face meetings are the richest media for exchanging complex information [14]. They enable verbal and non-verbal communication. In this experiment, GSS only allowed communication using text. This is helpful in carrying out a group task but it is not necessarily suited to developing group processes. Consequently, it may be expected that GSS is better suited to supporting group results than group processes. After all, group processes additionally need rich media such as face-to-face communication.³ Therefore, we expect that the GSS effect is larger for group results than for group processes (hypothesis 3).

6. Results

As a result of our experimental design, we are able to compare groups of observations of equal size with regard to three main conditions:

1. With or without GSS;
2. Groups 1 or 2;
3. Meetings 1, 2, 3, or 4.

In total, the 25 participants who attended four meetings completed 92 questionnaires.⁴ Participant satisfaction with the meeting was measured by five items (rated on a five-point Likert scale) involving process and four items on the results of the meetings. We computed the aggregated mean scores of the respondents for the five group process items and the aggregated mean scores on the four group outcome items. In practice, the individual scores of both the process and outcome items were added and divided by their number. Both sets of items proved to contribute to a reliable scale (process items: $\alpha = 0.82$; outcome items: $\alpha = 0.79$).

In order to test our hypotheses, we compared GSS and non-GSS meetings in two different ways. First, we

³ It should be noted that GSS are increasingly extended with media that enable more and better communication, such as videoconferencing [18].

⁴ A few participants were absent during some meetings. Therefore, we do not have 100 questionnaires.

compared both groups at each of the four meetings, since groups 1 and 2 were supported by GSS during the effort. The disadvantage of this comparison, however, was our ignorance of systematic differences between groups 1 and 2. In deriving our hypotheses, we assumed that no such differences existed, because gender and age initially matched both groups, and both facilitators applied the same techniques. On the other hand, some differences were to be expected, in particular with respect to the social and communication skills of the two facilitators. The second method compared GSS and non-GSS meetings *within* both groups and thus they compared differences between the three sequential pairs of meetings during the effort. This also had major disadvantages, since the four meetings differed in the kinds of tasks that had to be carried out by the participants. Additionally, it could be expected that internal group processes develop over time; this could influence the level of satisfaction. It is known, e.g., that, at the beginning and end of panel sessions, participants are more stimulated or excited compared with the middle of the meeting because of ‘start-up’ and ‘adjourn meeting’ effects [6]. To avoid the disadvantages of both methods, we decided to test our hypotheses by focusing only on the differences in the respondents’ satisfaction between the *second* and *third* meeting of groups 1 and 2 *separately*. We believed that this compromise should neutralize the group and meeting effects from the GSS effects as much as possible and, consequently, take into account the assumptions behind our hypotheses.

The following tables present the results. First, Table 6 shows the average respondents’ satisfaction with respect to the group process after each of the eight meetings.

At first sight, it is striking that the absolute level of satisfaction was high (3.98 on a five-point scale). In contrast with our assumption, groups 1 and 2 showed structural differences in the respondents’ level of satisfaction at each of the four meetings. On average, participants of group 1 were more satisfied than participants of group 2. This difference was particularly large in meeting 3. The level of satisfaction fluctuated for the groups during the four meetings. In the first and the final meetings, the level of satisfaction was highest for both groups, whereas the lowest level of satisfaction appeared in meeting 3 for group 2,

Table 6
Satisfaction of the respondents with the group processes of the meetings (means)

	Meeting 1, 21 November 1998	Meeting 2, 14 December 1998	Meeting 3, 9 January 1999	Meeting 4, 6 February 1999	Total
Group 1 (facilitator x)	4.20 (S.D. = 0.50, $n = 14$)	3.91 ^a (S.D. = 0.55, $n = 11$)	4.16 (S.D. = 0.46, $n = 9$)	4.27 ^a (S.D. = 0.34, $n = 12$)	4.14 (S.D. = 0.47, $n = 46$)
Group 2 (facilitator y)	4.16 ^a (S.D. = 0.56, $n = 10$)	3.72 (S.D. = 0.63, $n = 12$)	3.32 ^a (S.D. = 0.63, $n = 12$)	4.18 (S.D. = 0.52, $n = 12$)	3.83 (S.D. = 0.67, $n = 46$)
Total	4.18 (S.D. = 0.52, $n = 24$)	3.81 (S.D. = 0.59, $n = 23$)	3.68 (S.D. = 0.69, $n = 21$)	4.23 (S.D. = 0.43, $n = 24$)	3.98 (S.D. = 0.60, $n = 92$)

^a Meeting was supported by GSS.

and meeting 2 for group 1. If we try to establish the specific effect of GSS apart from these differences, the following can be concluded. A comparison of the results of meetings 2 and 3, for both groups 1 and 2 separately, showed the clearest positive GSS effect on the level of the respondents' satisfaction with the group processes. In group 1, however, participants were less satisfied with meeting 2 (3.91 with GSS) than with meeting 3 (4.16 without GSS). This falsified our first hypothesis. For group 2, the same result appeared (3.32 with GSS, 3.72 without GSS). This again falsified hypothesis 1. The differences for the two groups were not statistically significant (two-tailed *t*-test). It appears, therefore, that during the middle period of the effort, GSS support was not positively related to the respondents' satisfaction with the group processes. Hypothesis 1 predicted that the GSS effect would be positive for both groups. It appears that just the opposite occurred.

Table 7 provides the results to support our second hypothesis, where the respondents' satisfaction with the group results after each meeting was the dependent variable.

Again, on average respondents were very satisfied with meeting results (3.97 on a five-point scale). As in previous results, members of group 1 were more satisfied with their group results than group 2 at each of the four meetings. For both groups, the general absolute level of satisfaction was highest at the first and last meetings. In group 1, the respondents' satisfaction with the group results was slightly higher in meeting 2 (4.07 with GSS) than in meeting 3 (4.03 without GSS). However, the result was not statistically significant. In group 2, however, participants were, on average, less satisfied with the group results in meeting 3 (3.71 with GSS) than in meeting 2 (3.83 without GSS). This falsifies hypothesis 2. Therefore we conclude that our second hypothesis is not supported by the results.

Our third and last hypothesis predicted that the positive effect of GSS support on the respondents' satisfaction with the group results is larger than the positive effect of GSS support on the respondents' satisfaction with the group processes. However, for meetings 2 and 3, only one out of four cases showed such a positive effect. If we compare the absolute differences between the GSS and non-GSS supported meetings for groups 1 and 2 separately, the results

supported our third hypothesis. In group 1, the difference between GSS and non-GSS supported meetings is positive with regard to the respondents' satisfaction with the group results (+0.04) and negative with regard to the respondents' satisfaction with the group process (−0.25). In group 2, the difference between GSS and non-GSS supported meetings is negative with regard to the respondents' satisfaction with the group results (−0.12), but this (negative) difference is smaller with regard to the respondents' satisfaction with the group process (−0.40). Of course, this interpretation is contestable because the majority of the cases do not show a positive GSS effect, but at least the direction of these differences is in the predicted direction.

To extend our comparative analyses of GSS facilitation, we questioned the respondents about their attitude towards technology (e.g., the support of GSS). These questions were derived from the IPO model. Similar to the previous analysis, the (five) technology items are aggregated to one variable (added and divided by 5) since they form a reliable scale ($\alpha = 0.92$). Table 8 shows the mean scores for the four meetings in which GSS was used.

In general, participants are satisfied with the use of GSS during their meetings (3.42 on a five-point scale). The average level of satisfaction is particularly high in the first and last (fourth) meetings (3.82 and 3.58, respectively). This phenomenon is similar to what was found previously, with regard to the patterns of satisfaction with group processes and group results. Differences between groups 1 and 2 are relatively small. Members of group 1 were more satisfied with the technology in their second GSS meeting than with their first. The opposite is the case for group 2. Once again, this result supports the finding that there is a difference between both groups, not only in their general satisfaction with GSS, but also with regard to the effect of GSS on the respondents' satisfaction.

Apart from this interaction effect of the group and the support of GSS, it appears that the effect of GSS also strongly depends on the meeting. First, in meetings 1 and 4, GSS was additionally used to rank the information gathered (i.e., convergence). This means that group 2 (which started with GSS in meeting 1) used GSS applications extensively during their second GSS meeting. Both groups (and in particular group 2) were less satisfied with the GSS agendas in meetings 2

Table 7
Satisfaction of the respondents with the group outcomes of the meetings (means)

	Meeting 1, 21 November 1998	Meeting 2, 14 December 1998	Meeting 3, 9 January 1999	Meeting 4, 6 February 1999	Total
Group 1 (facilitator x)	4.00 (S.D. = 0.37, $n = 14$)	4.07 ^a (S.D. = 0.20, $n = 11$)	4.03 (S.D. = 0.36, $n = 9$)	4.29 ^a (S.D. = 0.35, $n = 12$)	4.10 (S.D. = 0.34, $n = 46$)
Group 2 (facilitator y)	3.84 ^a (S.D. = 0.91, $n = 10$)	3.83 (S.D. = 0.84, $n = 12$)	3.71 ^a (S.D. = 0.79, $n = 12$)	4.02 (S.D. = 0.48, $n = 12$)	3.85 (S.D. = 0.75, $n = 46$)
Total	3.93 (S.D. = 0.65, $n = 24$)	3.95 (S.D. = 0.62, $n = 23$)	3.85 (S.D. = 0.65, $n = 21$)	4.16 (S.D. = 0.44, $n = 24$)	3.97 (S.D. = 0.60, $n = 92$)

^a Meeting was supported by GSS.

Table 8
Satisfaction of the respondents with technology (GSS) used during the meetings (means)

	Meeting 1, 21 November 1998	Meeting 2, 14 December 1998	Meeting 3, 9 January 1999	Meeting 4, 6 February 1999	Total
Group 1 (facilitator x)		3.02 (S.D. = 1.19, $n = 10$)		3.58 (S.D. = 0.51, $n = 12$)	3.33 (S.D. = 0.91, $n = 22$)
Group 2 (facilitator y)	3.82 (S.D. = 0.97, $n = 11$)		3.22 (S.D. = 1.04, $n = 12$)		3.50 (S.D. = 1.03, $n = 23$)
Total					3.42 (S.D. = 0.97, $n = 45$)

and 3. This may be because in these meetings GSS was only used as an information-gathering tool to a limited extent. Secondly, from observations and interactions during the effort, group 2 proved to be more critical towards GSS, better educated, and more computer literate. This group probably expected more intensive use of GSS. However, the GSS agendas had to be prepared equally for both experienced and non-experienced computer users in order to prevent any thresholds from arising. The relatively advanced experience of group 2 with regard to the use of GSS might explain why the members of this group experienced fewer added values of GSS in comparison with group 1.

7. Discussion and conclusion

7.1. Citizen panels and PPA

In many respects, the use of participatory methods for local governments was a twofold experiment. The shift from an *expert* toward a *participatory* style in policymaking changes the relation between government and citizens. It also has an effect on the internal structure and culture of governmental organizations. Participatory methods and instruments need to be tested for their (potential) contribution to the quality of the policymaking processes. During this experiment, we gained insight into the (potential) contribution of citizen panels to local policymaking processes and how this contribution can be optimized. Several lessons can be learned. First, a panel is a relatively small and inexpensive way to involve citizens in local policymaking. Since it can be considered a success, the local council of 's-Hertogenbosch intends to establish one or more structural citizen panels. It is important that the panel represents the geographical, policy, and people of the city. Secondly, a citizen panel needs good process facilitation. It must be clear which policy-related activities have to be executed and which procedures will be applied. Furthermore, the information needed by the panel members must be accessed easily. Third, it must be clear what will happen to the result of the meetings. In 's-Hertogenbosch, the mayor personally promised to explain which elements of the city vision would be used in the policymaking process. Finally, the attendance of local policymakers during

the meetings enables the citizen panel to consult the local government about issues to be discussed. Civil servants can learn what participation of citizens' means for local policymaking. We conclude that this initiative is a stimulus for PPA and helps civil servants and citizens get acquainted with each other in their new role as part of a new participatory style of policymaking.

7.2. GSS and group processes and results

It appeared that the results do not support our hypotheses (Table 9). In general, respondents of both groups are satisfied with the process and results of all meetings.

All in all, our expectations with regard to a positive net effect of GSS in this PPA effort are not satisfied. Still, we believe that our experimental design, in principle, is innovative and suited to analyze such an effect. The IPO model and the satisfaction items also proved to be suitable. We found, however, that several factors interfere with the effect of GSS-support in the panel meetings.

First, during the experiment it became clear that there were structural differences: the two groups differed in their socio-economic status (i.e., education and income). It appeared that participants with more computer skills were better educated, and more critical of the use of GSS. Some participants explicitly stated that GSS could do more than only brainstorming and voting. Probably, these panel members expected more intensive use of GSS. The facilitators, however, had to find a balance between the design of the GSS-meeting and the computer skills of *all* participants. This is one of the important conditions in working with a GSS with *lay* people. Secondly, participants confirmed that the facilitators and GSS have a strong influence on the group processes. Process facilitation is therefore important in PPA and GSS, or, as Clawson and Bostrom [7] put it:

“It is not likely that a group social technology such as GSS in and of itself will be sufficient to turn meetings into fully satisfying and effective exchanges. Research and field experience indicates that the quality of a GSS meeting is predominantly dependent on the facilitator.”

The question remains, however, why our results do not correspond with those of some earlier researchers.

Table 9
Results of hypothesis testing

Hypothesis	Group 1	Group 2	Conclusion
(1) <i>The participants' satisfaction with group process is higher in the GSS-supported meetings than in the non-GSS-supported meetings</i>	GSS: 3.91, non-GSS: 4.16 (difference: -0.25)	GSS: 3.32, non-GSS: 3.72 (difference: -0.40)	Hypothesis rejected
(2) <i>The participants' satisfaction with group results is higher in the GSS-supported meetings than in the non-GSS-supported meetings</i>	GSS: 4.07, non-GSS: 4.03 (difference: +0.04)	GSS: 3.71, non-GSS: 3.83 (difference: -0.12)	Hypothesis rejected
(3) <i>The positive effect of GSS is larger for satisfaction with group results than about the group process</i>	+0.04 > -0.25	-0.12 > -0.40	Hypothesis confirmed

With regard to group characteristics, Dennis et al. [8] claim that

“The majority of previous laboratory experiments have studied physically and logically small ad hoc groups of *undergraduate students*, without a formal hierarchy, who were unfamiliar with the task domain and the EMS. The majority of field studies have examined physically and logically medium- and large-sized established groups of *managers*, with a formal hierarchy, who were familiar with the task domain and had more experience with the EMS.”

In our experiment, citizens (*lay people*) participated. In comparison with undergraduate students, citizens have less computer skills. In comparison with managers, they have less experience with policy-analytical processes.

To summarize, although our results of testing the effect of GSS on group performance may seem disappointing, we claim that our analysis and research design of the field experiment can be considered as a methodological step forward. This is the case for PPA research as well as GSS research. PPA research usually uses field research methods such as case studies and action research. In GSS research, the emphasis is on laboratory experiments and case studies [1]. From this point of view, we stress that the two approaches can fruitfully be combined as we did in our study.

References

- [1] L. Adelman, Experiments, quasi-experiments and case-studies: a review of empirical methods for evaluating decision support systems, *IEEE Transaction on Systems, Man and Cybernetics* 21 (2), 1991, pp. 293–301.
- [2] R.P. Bostrom, R.T. Watson, S.T. Kinney (Eds.), *Computer Augmented Teamwork: A Guided Tour*, Van Nostrand Reinhold, New York, 1992.
- [3] J.A.W. de Bruin, P.W.D. van Harberden, F.J. Bongers, B. van Bragt, R. van Riel, *Burgerpanels en de ontwikkeling van stadsvisies*, *Bestuurskunde* 7, 1998, pp. 323–329.
- [4] J.A.W. de Bruin, B. Cornelissen, P.W.D. van Harberden, *Dwarskijken, een verhaal over stadsgesprekken*, Department of Policy and Organization Studies, Tilburg University, 1998.
- [5] J.A.W. Bruin, B. Cornelissen, P.W.D. van Harberden, *Terugkijken. Reconstructie van en lessen ontleend aan de eerste stadsvisie van 's-Hertogenbosch*, Department of Policy and Organization Studies, Tilburg University, 1998.
- [6] L. de Caluwé, *Veranderen Moet je Leren*, Delwel Publishers, The Hague, 1997.
- [7] V.K. Clawson, R.P. Bostrom, *The Facilitation Role in Group Support Systems Environment*, ACM, New York, 1993, pp. 323–335.
- [8] A.R. Dennis, J.F. Nunamaker, R.D. Vogel, A comparison of laboratory and field research in the study of electronic meeting systems, *Journal of Management Information Systems* 7 (3), 1991, pp. 107–135.
- [9] G. DeSanctis, R.B. Gallupe, A foundation for the study of group decision support systems, *Management Science* 33, 1987, pp. 589–609.
- [10] G.W. Dickson, J.-E. Lee Patridge, L.H. Robinson, Exploring modes of facilitative support for GDSS technology, *MIS Quarterly* 17 (2), 1993, pp. 173–194.
- [11] W.D. Dunn, *Public Policy Analysis: An Introduction*, Prentice-Hall, Englewood Cliffs, NJ, 1994.
- [12] D. Durning, Participatory policy analysis in a social service agency: a case study, *Journal of Policy Analysis and Management* 12, 1993, pp. 297–322.
- [13] D.R. Forsyth, *Group Dynamics*, Brooks/Cole, Pacific Grove, 1990.
- [14] J. Fulk, C. Steinfield, *Organizations and Communication Technology*, Sage, Newbury Park, 1990.
- [15] A. Geul, *Beleidsconstructie, coproductie en communicatie. Zes beproefde methodieken van beleidsontwikkeling*, Lemma, Utrecht, 1998.
- [16] J.L.A. Geurts, I.S. Mayer, *Methods for participatory policy analysis: towards a conceptual model for research and development*, Work and Organization Research Centre (WORC) Report 96.12.008/3, Tilburg University, Tilburg, 1996.
- [17] T.L. Griffith, M.A. Fuller, G.B. Northcraft, Facilitator influence in group support systems: intended and unintended effects, *Information Systems Research* 1 (9), 1998, pp. 20–36.
- [18] C. Holland, F.J. Bongers, H. Bouwman, *Nieuwe instrumenten voor interactieve beleidvorming. Een verkenning van beleidsinnovaties in bits en bytes*, Senter, The Hague, 1999.
- [19] R. Johansen, An introduction to computer-augmented teamwork, in: R.P. Bostrom, R.T. Watson, S.T. Kinney (Eds.), *Computer Augmented Teamwork: A Guided Tour*, Van Nostrand Reinhold, New York, 1992, pp. 5–15.
- [20] F. Joldersma, Participatory policy making. Balancing between divergence and convergence, *European Journal of Work and Organizational Psychology* 6 (2), 1997, pp. 207–218.
- [21] I.S. Mayer, *Debating Technologies: A Methodological Contribution to the Design and Evaluation of Participatory Policy Analysis*, Tilburg University Press, Tilburg, 1997.
- [22] O. Petrovic, O. Krickl, Traditionally-moderated versus computer supported brainstorming: a comparative study, *Information and Management* 27 (4), 1994, pp. 233–243.
- [23] I.M.A.M. Pröpper, D.A. Steenbeek, *Interactieve beleidsvoering: typering, ervaringen en dilemma's*, *Bestuurskunde* 7, 1998, pp. 292–301.
- [24] C. Thomas, *Public Participation in Public Decisions: New Skills and Strategies for Public Managers*, Jossey-Bass, San Francisco, CA, 1995.

- [25] V. Veldheer, De betekenis van de lokale overheid voor de inwoners, *Beleidswetenschap* 1, 1995, pp. 24–39.
- [26] A. Weatherhall, J. Nunamaker, *Getting Results from Electronic Meetings*, St. Richard's Press, Chichester, 1999.
- [27] C. Woerkum, *Communicatie en Interactieve Beleidsvorming*, Bohn Stafleu Van Loghum, Houten, 1997.



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