

## Analysis of hospital work

***Citation for published version (APA):***

Tuijl, van, H. F. J. M. (1985). *Analysis of hospital work*. Eindhoven University of Technology.

***Document status and date:***

Published: 01/01/1985

***Document Version:***

Publisher's PDF, also known as Version of Record (includes final page, issue and volume numbers)

***Please check the document version of this publication:***

- A submitted manuscript is the version of the article upon submission and before peer-review. There can be important differences between the submitted version and the official published version of record. People interested in the research are advised to contact the author for the final version of the publication, or visit the DOI to the publisher's website.
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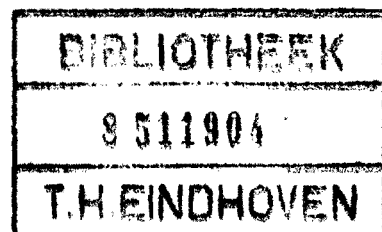
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Analysis of Hospital Work

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Analysis of Hospital Work

Paper presented at the ENOP  
Workshop on Work and Organizational  
Problems in Hospitals

Gregynog Hall, Powys, Wales 25/27 September 1985

## Abstract

The paper concentrates on the relationships between two departments of one particular general hospital: the nursing department at the one hand and the physiotherapy unit at the other. There appears to be a large number of problems in the relationships between these groups. The paper (1) describes these problems and (2) analyzes them in terms of a work group model.

The actual work group structures of both the nursing units and the physiotherapy unit appear to be different from the structures prescribed by the model.

Discrepancies between actual and prescribed structures are held responsible for the problems of nursing units and physiotherapy unit.

The process leading to a solution is described.

## ANALYSIS OF HOSPITAL WORK

### 1. Introduction

Hospitals, like many other organizations, are characterized by their large number of highly interrelated units and departments.

Today, I would like to concentrate on the relationships between at the one hand a group of units, viz. the units of the nursing department, and at the other hand one unit, viz. the physiotherapy unit. I'm not going to talk about the relationships between these units in general, I'll restrict myself to one particular case, which we came across when asked for advice on the problems the nursing department of a medium sized general hospital was fighting. Among other problems, the nursing department had a long lasting conflict with the physiotherapy unit. In fact, it was one of their minor problems. However, the problem lends itself well to illustrate our approach, which I would like to discuss today.

First, I'll give you some information on the units that play a part in this case and on the kind of problems and conflicts they had with one another. Secondly, I'll present some of the details of our analysis of these problems. My third comment will be on the role this analysis played in the process by which solutions were arrived at.

### 2. Nursing units, physiotherapy unit, problems at interfaces

In our ± 350 bed hospital eight nursing units (± 36 beds each) regularly ask for physiotherapeutic treatment for their patients.

The physiotherapeutic unit consists of 9 therapists (including the head of the unit and his assistant) who provides those treatments.

The nursing units were complaining about:

- the number of physiotherapists visiting each nursing unit: in fact, any therapist could be allocated to the treatment of any patient in any nursing unit; no wonder that all kinds of communication errors frequently occurred: who is the therapist of this patient? who has to be informed about changes in the state of the patient? which therapist forgot to leave instructions for the further treatment of this patient? and so on.
- The unpredictability of the therapists' arrival and the duration of their treatments:

physiotherapeutic treatment was normally given between 10.15 and 12.00 a.m. and between 15.15 and 17.00 p.m. Outside these intervals the therapists treated policlinic patients. The problem was that nurses never knew at which exact clocktime (within the appointed intervals) a particular therapist would drop in, nor at which time he would leave again. To make things worse, physiotherapists also visited nursing units outside those intervals, in case they ran out of policlinic patients.

The effect of the two factors mentioned was that regular activities of nurses were very frequently interrupted by physiotherapists dropping in, asking for information, asking for their patients, taking patients away for therapy, giving instructions, leaving notes, and so on.

Loss of time, irritation, misunderstanding and at last an atmosphere of conflict and antagonism were the result.

Of course, the physiotherapists were complaining too, although far less than the nurses. Their most important problem concerned the

- availability of patients:

patients were very difficult to find, they could be anywhere except in bed; if in bed, they were often not immediately available for physiotherapeutic treatment because other treatments had to be finished first.

The physiotherapists only had two options. Either wait or start searching for another patient, most often in another ward, where they would probably be confronted with the same problem.

The complaints of nursing units and physiotherapy unit are summarized in Figure 1.

Evidently, the way in which collaboration of nurses and physiotherapists was organized resulted in an enormous loss of time for the physiotherapists and in very frequent work interruptions for the nurses.

Before we came in, there had been a number of unsuccessful attempts to solve the problem. In fact, the nursing department had layed a few claims and the physiotherapists had categorically turned them down.

The claims put in by the nursing department were:

- we only want to deal with one (and the same) physiotherapist per unit;
- we want to know before hand, at which time a particular patient will get what treatment, so that we can plan our work accordingly.

The answer of the physiotherapists was:

- impossible: we'll lose our skill when we have to confine ourselves to one type of unit, which means one type of patients. Besides, the number of treatments to be given in any particular unit is highly variable. So, the workload of a particular physiotherapist will be extremely high at one day and extremely low at another. Planning is virtually impossible, because you never know how much time a treatment will take. Finally (but never openly stated as an argument) we like our freedom and we won't give it up easily.

### 3. Diagnosis and suggested solution

So, when we came in in order to investigate possible causes of work overload in the nursing unit, there was a serious win-lose conflict between the nursing department and the physiotherapy unit. In terms, borrowed from Thompson & Tuden (1959), we had to do with a Type IV problem That is to say, (1) the structure of the technical problem is not easy to define (there is no clear-cut model from which a solution can be derived) and (2) the groups confronted with the problem evidently have different interests.

In such circumstances, it can be wise strategy to let each group separately arrive at its own diagnosis of the problem and to confront these diagnoses at a later point in time.

So we did, and in diagnosing the problem we made use of a model that is currently being developed in our group. The model is concerned with group structure. It is a contingency model, many of its elements are borrowed from Thompson (1967) and Susman (1976). It is still rather sketchy and we have not solved all our definition problems yet. Nevertheless, as I hope to demonstrate, the model can be very helpful to analyze the problems work groups are faced with, to derive solutions for these problems and to evaluate these solutions in terms of their probable consequences.

I'm going to describe the physiotherapy problem both from the point of view of an average nursing unit and from the point of view of the physiotherapy unit. Both descriptions will follow the main dimensions of the model, so in passing you'll get an impression of both the model and two applications of the model on actual work groups.

Within the space limits of a short paper, it won't be possible to be complete. So I'll restrict myself to the dimensions of the model most relevant to the work groups at hand.

### 3.1. The workgroup model applied to a nursing unit

Remember the problems experienced by the nursing units and attributed by them to the large number of physiotherapists dropping in at unexpected times: communication errors, loss of time, frequent work interruptions, unavailability of patients for regular care or for appointments elsewhere in the organization.

In fact, these problems and complaints made up only the smaller part of a larger list, which further contained problems like:

structural shortage of nursing personnel, large variations in work load, less than acceptable quality of patient care (several tasks regularly had to be neglected), a great many interruptions of various kinds during day time caused by members of various departments (physicians, physiotherapists, the operating room, other nursing units, departments for medical examination and/or treatment, e.g. X-ray examination, and so on), high stress, high absence rates. So the physiotherapists were only a smaller part of the environment of the nursing units. In their own view, the nursing units were surrounded by lots of trouble-makers, intruding at unsuited moments, all making demands on the nurses' time, often at the same time, sometimes incompatible.

Here we run up against a crucial dimension of the work group model, viz. the Environment of the work group. Two aspects of this environment will be mentioned here, viz. environmental uncertainty and environmental complexity, and the first one will be elaborated.

#### Environmental Uncertainty

Work groups continually interact with their environments, that is to say, work groups receive inputs, transform them and deliver outputs. It makes a great difference for a work group whether it has to operate in a stable and predictable environment or in an uncertain, unpredictable environment. The environment of a typical nursing unit is both complex (made up of many different, sometimes interdependent parts) and uncertain:

- there are most often large variations in patient-inflow (i.e. large variations in number and kind of patients admitted from day to day, partly caused by acute admissions);
- there are at the same time, but unrelated to the former, large variations in personnel inflow (both in number and in quality);
- consulting physicians and physiotherapists drop in at unpredictable times;



- time schedules (appointment schemes) of operating units and other units for medical treatment or examination are often untimely changed;
- other nursing units or one's own departments' subunits may ask for assistance;
- family, visitors may ask for information.

These factors taken together made nursing units feel like puppets, connected by means of threads to a great number of environmental units; sometimes torn to pieces, when all pulled at the same time.

How can a unit or work group handle such a high degree of environmental uncertainty? Our model formulates two answers to that question. The first answer reads as follows: Environmental uncertainty can only be handled if the three most important decisions a unit has to take, viz. the decisions as to who is going to do what at which moment, can be revised and attuned to one another from moment to moment in view of the changed circumstances. This requires that all three decisions mentioned are made by one regulatory entity (person or subgroup) which is continually being informed on all relevant ongoing changes.

Looking at our typical nursing unit it immediately strikes that this condition is not met:

- decisions on what has to be done by the unit are mostly made by physicians (e.g. the number and kind of patients to be admitted and the kind of cure or care to be provided to them);
- decisions on when tasks should be performed are very frequently influenced by physicians (e.g. by the time of their rounds), physiotherapists and other departments, such as e.g. the operating unit; the nursing unit itself can only make a few last decisions within the limits set by those mentioned before;
- decisions on who is going to execute the tasks resulting from the "what" decisions of others are for the larger part made by the nursing unit itself (both the long term decision: duty-roster, and the short term decision: daily allocation of tasks).

In addition, any attuning of these decisions to one another is lacking: e.g. the admission of patients is most often regulated without taking any notice of the number of personnel that will be available at the time of admission; neither is the workload provided by the patients who have already been admitted to the units taken into account. The same is true for appointments made by environmental units: the only criterion is availability of the

patient. Information on the availability of personnel at the time of the appointment (to take care of transport or preparations) is apparently not considered relevant.

There is a second answer to the question of how to handle environmental uncertainty. It says that in order to react in an adaptive, flexible way to changing environmental circumstances a unit should not be rigidly subdivided into small subunits, with narrowly circumscribed tasks. The reason is that environmental uncertainty implies that the workload involved in any subset of tasks can vary substantially from time to time. The smaller the subset of tasks and the smaller the subunits charged with these tasks, the larger the risk of overloading one subunit and underutilizing another.

What about this second prescription?

The typical nursing unit in our hospital was rather small, about 36 beds, and, in addition, subdivided into three subunits of 12 beds each. Unit-nursing, a kind of team-nursing, was strongly advocated. So a rather rigid coupling of nursing personnel and beds (or patients) was considered ideal and therefore strived after.

What we have found out so far can be summarized (see Figure 2) as two discrepancies between actual and desirable work group structure; in our opinion, these discrepancies are responsible for the problems of the nursing units.

1. Decisions of vital importance to the unit are dispersed over a large number of persons or units and coordination between those is most often simply lacking.
2. Instead of operating as one large group of multi-skilled personnel that can be flexibly allocated to all kinds of tasks that can arise at any moment, units were rigidly subdivided into subgroups which were at times (because of lack of qualified personnel) staffed with student nurses only.

Apart from this structural analysis, we applied a workload measuring-device. We found out that two units were seriously understaffed (having a workload of about 120%; on the average 5.5 nurses were present, whereas 6.5 were required). No wonder that the problems mentioned by all units occurred far more frequently in those two understaffed units, which were known to the head of the nursing department as her "problem units"..

Before returning to the nursing department - physiotherapy unit conflict, I'll first describe the physiotherapy unit in terms of the model.

### 3.2. The work group model applied to the physiotherapy unit

As you will probably remember, the physiotherapy unit had one main problem. In fact, they had two main problems. The reason for not being aware of the second problem was overcapacity.

The first problem was loss of time, large amounts of time were unproductively spent on walking to and fro the eight nursing units searching for patients available for treatment.

The second problem consisted in a workload unequally divided over therapists.

In the same way as we did above we can try to find the causes of these two problems by analysing work, work group structure and workgroup environment of the physiotherapy unit. We'll confine ourselves to the inflow of hospital patients and leave out of consideration the inflow of polyclinic patients which was dealt with by the unit separately and at different times.

So, confining ourselves to hospital patients, the environment of the physiotherapy unit consists of eight nursing units situated at rather dispersed locations (some in a new building, some in an old one). Requests for physiotherapeutic treatment from each of these eight units varied in number and kind. As we saw before, availability of patients for treatment appeared to be rather unpredictable, because patients frequently were out of their wards for various reasons. Taken together, the environmental uncertainty of the physiotherapy unit was rather high. To handle this uncertainty requires:

1. Frequent attuning of the three central decisions (who is going to do what at which time) to one another, taking into account any change in the relevant circumstances. Looking at the actual work group structure, it appeared that the what decision was made outside the unit by the various physicians who prescribed physiotherapeutic treatment; the who decision was made by the assistant head of the unit and the when decision was made by every physiotherapist himself. These decisions were not attuned to one another.

2. A second requirement of high environmental uncertainty (unpredictability of work-inflow) is a flexible work group structure, that is to say, there should not be a rigid subdivision into small subunits, each responsible for a particular subset of tasks or products. This requirement was fulfilled. There was no subdivision whatsoever; each physiotherapist could be allotted the duty of treating any patient at any place in the hospital.

There is a second aspect of the environment which is relevant here, viz. its complexity. The dispersion of the eight nursing units over the entire hospital makes the physiotherapy unit's environment rather complex. This complexity (contrary to environmental uncertainty) asks for a subdivision of the unit in order to reduce inproductive search time.

What we see here is an interesting phenomenon. There are two opposing forces working onto the unit: one (uncertainty) saying: stay flexible, no specialization, you can't handle inflow variability if you specialize too much; the other one (complexity) saying: split up into different subgroups, a single therapist can't handle all those different locations all by himself. Evidently, the uncertainty force won. Unfortunately, the unit did not succeed in finding an optimal solution, doing both forces justice.

In addition to the environment, work itself plays a central role in the model. It is again uncertainty which is one of the most important aspects of this second dimension.

Physiotherapeutic treatments are not uncertain in themselves, only their duration is often unpredictable: it requires craftsmanship to determine how long a treatment should be continued. This conversion uncertainty implies that only the therapist who is giving the treatment can determine when it is time to stop and to go on to the next patient. Therefore, at least the decision of "when to do what" should be delegated to the therapist himself. As we have seen before, this decision is indeed made by the therapist himself. However, we are again confronted with a dilemma. This time, environmental uncertainty and conversion uncertainty impose different demands on work group structure: Environmental uncertainty asks for the continuous attuning of "what", "who" and "when" decisions, and this can only be realized by one regulatory entity which can dispose of all relevant information. At the same time, conversion uncertainty asks for delegation of at least the "when" decision to each individual therapist. Again, one of the opposing forces won, the latter one, as you will remember.

Summarizing our analysis of the physiotherapy unit (see Figure 3), we can formulate two conclusions:

1. An optimal subdivision of the physiotherapy unit into subgroups which each are responsible for a subset of the nursing units, thereby doing justice both to the environmental uncertainty (variability of inflow) of the unit and to its environmental complexity (eight different locations) would be wise. That means a subdivision into the smallest possible number of subunits, i.e. two. Unproductive search-time will certainly decrease by such an intervention.
2. All information relevant to "who", "what" and "when" decisions should be brought together to a central point where the progress of work can be monitored and necessary revisions of task allocation decisions can be made accordingly. Unequal division of workload over therapists can thereby be avoided.

As was the case for the nursing units, we have a number of discrepancies here too. These discrepancies are, in our opinion, responsible for the problems of the physiotherapy unit.

As mentioned before, both problems were not brought to our attention by the physiotherapists themselves (they enjoyed the luxury of a rather large overcapacity). However, both problems will undoubtedly become acute as soon as this overcapacity will disappear as a consequence of economizing on personnel.

#### 4. From confrontation of diagnoses to solution of the problem

The results of both analyses discussed above were used as starting point for a problem solving group consisting of representatives from the nursing department and the physiotherapy unit. This group was instructed to generate solutions for the problems at the interfaces of nursing units and physiotherapy unit. However, the problem solving group had to stay within the range of possible solutions defined by the problem-analyses based on the contingency model and described above in section 3. Interesting discussions were observed in the problem solving group.

Representatives of the nursing department brought to bear arguments like: "Aha, you physiotherapists are responsible for our environmental uncertainty (as we told you many times before in our own words). Our environmental uncertainty has to be reduced in order to enable us to provide for adequate patient care".

The immediate reply of the physiotherapy delegation ran as follows: "Your work group structure is far too rigid. If you leave that subunit structure and make yourself more flexible you can handle your environmental uncertainty. So leave us alone".

"Now look", the nurses said, "you can solve your own problems and some of ours at the same time by changing your work group structure; so split up your group into a number of subgroups and let each subgroup be responsible for the treatments in some of our units. Besides, you cannot ask us to be more flexible, because adequate patient care requires small groups of patients. So, our work group structure has to be somewhat rigid. And you can enable us to be that rigid by reducing our environmental uncertainty". And so on.

It became abundantly clear that

- (1) the nurses had a problem and the physiotherapists had none;
- (2) the problem of the nurses could - partially - be solved by the physiotherapists;
- (3) the physiotherapists would lose part of their freedom by conceding the requests of the nursing units and, in the short run, they wouldn't win anything of value to themselves;
- (4) the choice between the alternatives "reduction of the environmental uncertainty of the nursing units" and "making the nursing units' work group structure more flexible" couldn't possibly be made at the level of the two parties involved; it is the managing director's responsibility to make clear statements on the goals and missions of the hospital organization. Let me clarify this point. If quality of patient care is a central goal of the organization and if quality of patient care is interpreted as taking care of interdependencies between tasks executed on the same patient, a nursing unit should be allowed to split up into small subunits, each responsible for the total care for a small group of patients. In terms of the model, it is conversion complexity (number of and interdependencies between tasks) that asks for a subdivision of the unit. However, such a subdivision would not put up with the environmental uncertainty of the unit. Therefore, this uncertainty should be reduced, if possible. Otherwise, patient care standards should be lowered.

The problem solving group rapidly discovered that it would never be able to contrive a solution acceptable for both parties and, therefore, the problem was brought to the attention of the board of directors. Happily enough, the board recognized its responsibility and did its duty. It decided in favour of high patient care standards and urged the physiotherapy unit to split up into two groups (see Figure 4). This instruction was worked out by the problem solving group. Each of the physiotherapy subgroups would be responsible for half of the nursing units during a period of three months, thereby reducing the environmental uncertainty of the nursing units. After that period groups would interchange units in order to prevent loss of skill. In addition, in each subgroup one of the therapists was appointed to coordinate activities within his group (i.e. adjusting the "who" and "when" decisions to the "what" decisions). All nursing units would provide him with information on required treatments, patient-availability, and so on, and they would get a rough workplanning in return. Information on treatment progress would be filled in on a special form to be attached to the patient file.

The new structure and work procedures have been implemented only a few months ago. Therefore, it is too early to evaluate the project. However, a reduction of the problems mentioned above (see Figure 1) was reported by both parties from the first day after the introduction of the new structure and work procedures.

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## **PROBLEMS**

### **Nursing units**

**number of physiotherapists**

**predictability of arrival**

**predictability of duration**

### **Physiotherapy unit**

**availability of patients**

Figure 1. Complaints of nursing unit and physiotherapy unit.



# NURSING UNITS

**Environment**

**Desirable Structure**

**Actual Structure**

**uncertain**

**inflow of**

**patients**

**personnel**

**physicians**

**appointments**

**frequent revision**

**and attuning of**

**'what' 'who'**

**and 'when'**

**different persons**

**responsible for**

**'what' 'who'**

**and 'when'**



**lack of attuning**

**no small**

**subunits**



**small subunits**



**Problems:**

**many interruptions**

**large workload variations**

**low quality of care**

**high stress**

**high absence rates**

Figure 2: The model applied to the nursing units, summary of results.

**PHYSIOTHERAPY UNIT**

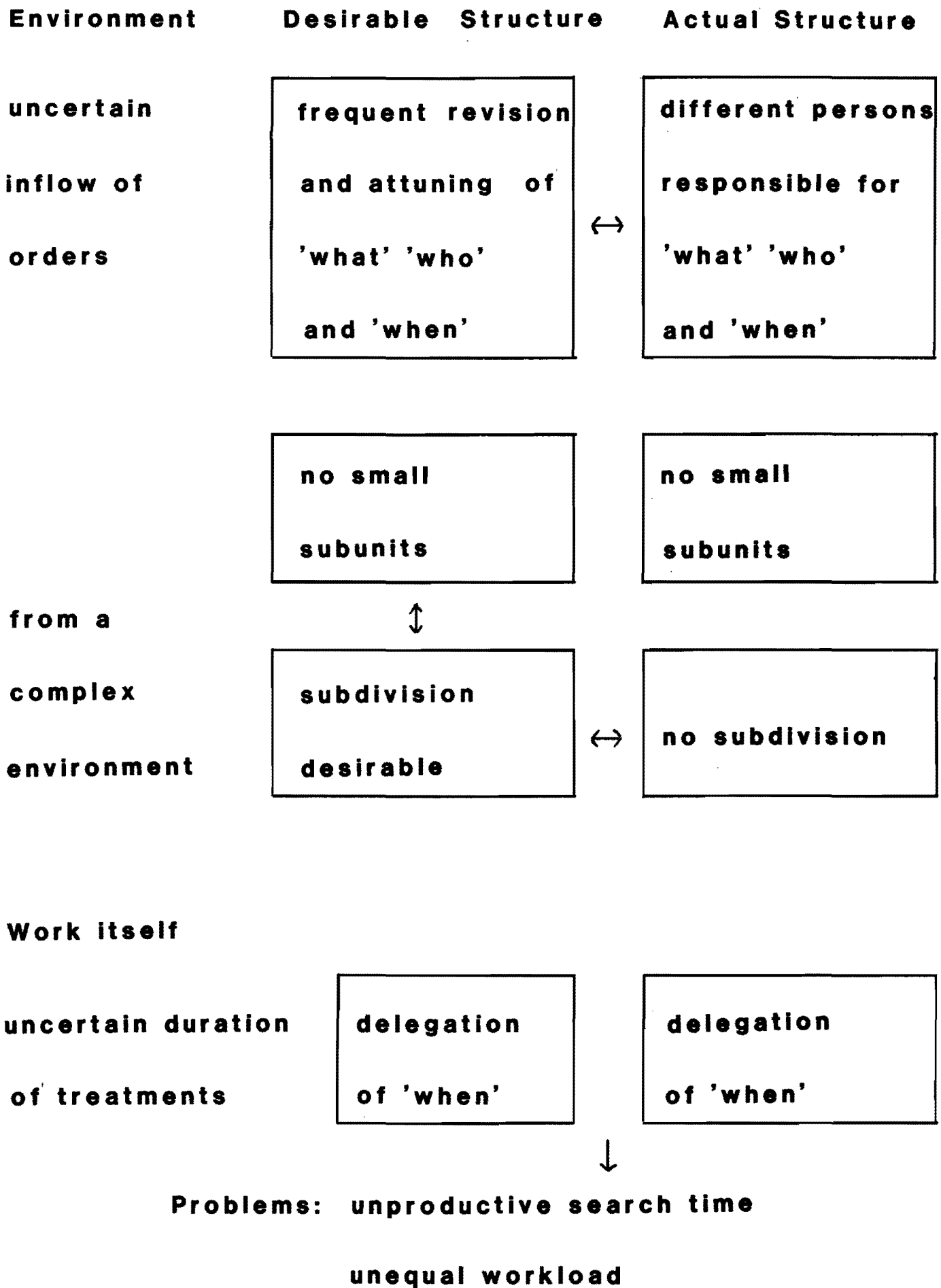
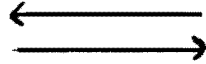


Figure 3: The model applied to the physiotherapy unit, summary of results.

## **Confrontation and Solution**

### **Parties in conflict**

**nursing units**



**physiotherapy unit**

**demands  
to and fro**

### **Next higher level**

**board of directors: high quality**



**small groups**



**reduction of**

**environmental uncertainty**



**subdivision of**

**physiotherapy unit**

Figure 4: The two phases of the problem solving part of the intervention.