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Managing stakeholder expectations in facility management using workplace planning and commitment making techniques

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Abstract

Purpose – To enable facility management to define workplace strategy basing on organizations strategy and operations.

Design/methodology/approach – In facility planning the workplace strategy process is subject to conditions of continuous change and uncertainty. The theory of workplace planning is constructed on the basis of production and commitment making concepts in order to link workplace to organization's general strategy. Workplace planning process includes computer-aided applications for practical work. They measure owner needs such as user functions, geometrical and temporal needs, spatial performance and associated costs, thereby enabling activity-based cost management.

Findings – The customer workplace is linked to a complex social system. Achieving a final commitment of an organization is an iterative process of commitments, withdrawals and new approaches. The workplace planning process displays evidence of supporting group collaboration in terms of fostering stakeholder engagement, developing high quality information, supporting innovation in the owner's functions, and the appropriate sharing of facility spaces among owner groups operating with limited resources. In the project case, the need for space (and life cycle costs) decreased 20 percent. All the activities can still be supported because of improved utilization.

Research limitations/implications – This research is concentrated on workplace needs, use and costs. It does not cover user operations efficiency or costs (like salaries, education etc.)

Originality/value – Workplace planning process and applications have been in practical use for several years. The results have been in concordance with case project findings.

Keywords Customer requirements, Management training, Project management, Finland

Paper type Literature review

Introduction

Traditional programming concepts often identify workplaces in relation to design. Many authors (e.g. Coles, 1990; Lindkvist, 1996) argue that the most significant design

problems are poor briefing, poor communication and problems with client decision-making. Traditional programming concepts, e.g. Problem Seeking (Peña *et al.*, 1987) state that the programmer must separate fact from fiction, find out what is true. Cygnaeus high school, a test case in this article, was initially programmed in the "traditional way". But the investment in workplace was not done. The city just stopped the project and did not give any feedback regarding the development. The programmer pointed out that although he can analyze needs in a logical context, the projects will seldom be actualized based on that program (Whelton, 2004). The workplace is linked to a very complex system; sets of goals, a wide range of needs, the different viewpoints of the owner and user etc. In such complex environment collaboration and commitment forming is needed rather than finding the truth.

By studying the need for facility resources from the perspectives of the company operative management and of company strategic management simultaneously, it is possible to build up a collective group process. In the corporate real estate business, workplace planning is treated as a function of the operational process; use of space is integrated into core business operations. Workplace planning allocates resources in relation to the working environment, its users and organization's strategy (Horgen *et al.*, 1999). The driver of allocation is value for operations and value for strategy.

In facility planning the workplace strategy process is subject to conditions of continuous change and uncertainty. The facility owner has to manage physical facilities to support changing business (product and services) processes and organizational structures. It is imperative that workplace strategy identifies what each stakeholder really wants and needs. On the other hand, it easily leads to numerous specifications and wishes, many of them in contradiction to each other and, when combined, they are generally in serious competition for the resources available.

Workplace planning is a process where valuable requirements for workplace production are determined through evaluating the values of stakeholders against the organization's strategy. The principles and the methods of the theory of workplace planning is described as a steering model of workplace planning. By following this model different types of organizations are able to manage their workplace requirements on the basis of strategic and operational information. Workplace strategy is developed by key stakeholders who have individual needs and values. The steering model is an application of cybernetic closed loop control. The "steersman" is made up by an organized dialogue between strategic and operative management.

This paper presents a case study showing how the workplace planning methodology provides conditions for collaborative stakeholder decision making. The case was selected because it offered the opportunity to compare traditional architectural programming with an alternative workplace planning approach.

Structure of the paper
In the first section the theoretical framework for facility management and workplace production is presented, including production theories, concepts of complexity and concepts of commitment. Providing business with appropriate facilities is production. TFV-concepts of production are introduced and of these three concepts the value generation concept is highlighted in relation to workplace planning. Workplace production is proved to be an inductive complex system in the meaning that there is not a single right answer to the problem but many good and poor answers.

Commitment of participants is the criteria that differentiates the chosen solution from the bad ones and from the other good one. Thus it is a crucial part of the production.

In the next two chapters the theory of workplace planning and a steering model of workplace planning are introduced. The theory links workplace planning to production, not only to construction production but also to the organization's general strategy. The steering model is constructed on the basis of the principles of the theory. If you cannot measure, you cannot manage. Two computer-aided applications are included in the steering model for practical work. They measure owner needs such as user functions, geometrical and temporal needs, spatial performance and associated costs, thereby enabling activity-based cost management.

The workplace planning process has been in practical use for several years. A case study is presented to show how the workplace planning concept led to shared understanding and mutual commitment between owners and users. It also resulted to a remarkable reduction in the use of spatial resources.

Theoretical frameworks for workplace planning
Concepts of production
The concept of value has been studied in production theories. Production theories aim to improve the production process and the value of the product (working environment) to the customer (Koskela, 2000). Historical analysis reveals that three different conceptualizations of production have been used in practice and conceptually advanced in the twentieth century (TFV-concepts):

 (1) production is viewed as a transformation of inputs to outputs;
 (2) production is viewed as a flow, where, in addition to transformation, there are waiting, inspection and moving stages;
 (3) production is viewed as a means for the fulfillment of the customer needs (value).

Workplace planning is strongly linked with value generation for the customer. The concept of value generation focuses on the interaction between a customer and a supplier. It is not the transformation itself that is valuable, but the fact that the output corresponds to the requirements, wishes, etc., of the customer (Koskela, 2000). Value generation is viewed as a process where value for the customer is created through fulfillment of his requirements.

Complexity management
"The result of business is a satisfied customer" (Drucker, 1989). Conceptualization of production must incorporate the customer. Workplace planning is linked to a complex social system. In the initial stage of workplace planning in a multi-user organization the customer is divided into many departments all having an operative responsibility linked to the organization's strategy. These departments compete for the same resources. In the initial stage of workplace planning the outcome is not known, nor is there any quality specification against which success can be measured in a deterministic way. Instead, there are a lot of specifications and wishes, many of them in contradiction to each other and, when combined, they are generally in serious competition for the resources available.

There is much uncertainty and many iterations in the valuable requirements identification. If we combine iterations of valuable requirements identification with the iterations of the layout design, the amount of iterations would expand enormously. It might be asked: could the space for an activity, that in the end proves superfluous, be located in the basement, as in this sketch or on the third floor, as in another sketch? This kind of decision making is very slow and expensive. Complexity is unnecessary if an enormous amount of complex variables that are orthogonal (not having interaction with each other) are combined.

Workplace planning (the identification of valuable requirements in the facility management) does not aim for an optimum because an optimum does not exist in a complex system. It aims for a "good" solution. There are numerous working environment solutions that can be considered acceptable. What is the criteria that differentiates the chosen solution from the bad ones and from the other good ones? It is the commitment of the participants to something achieved. The product workplace planning for the rest of workplace production is the stakeholders commitment. Indeed, stakeholders' commitment to the common values and requirements is an absolute necessity in all production to enable value generation. Thus it is a crucial part of the production.

Is there a framework in which the stakeholders commitment to common values in a specific production case can be achieved? The purpose of the organization is determined by the organization's strategy. The identification of valuable requirements must be done in the context of the organization's strategy.

Concepts of commitment
An actor, e.g. operative or strategic manager, might be committed to a project or organization in four forms or archetypes; affective commitment, continuance commitment, normative commitment (Meyer and Allen, 1991) and instrumental commitment (O'Reilly and Chatman, 1986).

Affective commitment refers to an actor's attachment to, identification with, and involvement within the respective entity (an organization, a project...). Affective commitment may be created or strengthened in the beginning and during the workplace planning. Work experiences are seen to play the most important role in the development of affective commitment toward a commitment target. The following variables have been found to be important: (Meyer and Allen, 1997):

- support and stimulate strategic and operative mangers to participate in decision making;
- decentralize the decision making to the levels where responsibilities are met;
- be transparent in terms of information handling; and
- treat all information equitably, regardless of its origin.

These characteristics must be constructed in an iterative steering model because previously committed stakeholders need an opportunity to commit to common goals.

The theory of workplace planning

The concept

The purpose of the organization is determined by the organization's strategy. The strategy is realized by the operations. The workplace planning theory links workplace planning to the organization's general strategy by combining the TFV-concepts of production (Pennanen, 2004).

Value. A spatial investment in an operation competes for the same resources as the other investments in the operations. Workplace planning brings spatial investments and values concerning the spaces into line with the other factors of production. Workplace planning is a process where valuable requirements for workplace production are determined through observing and evaluating the values of stakeholders against the organization's strategy. The product of workplace planning is the stakeholders commitment to the spatial needs of the operations.

Transformation. The size of a space is dictated by the operations (transformations) taking place within that space and these operations can be decomposed to sub-processes which are also operations.

Flow. Spaces are the scene of a temporal flow of operations and non-use time. The number of spaces is due to the temporal utilization of the spaces.

The principles

Spatial investments in operations that are not needed for the organization's strategy are not value-adding and therefore are waste.

Spaces are the scene of a temporal flow of operations and non-use time. The operations are value adding whereas the non-use time is not value adding to the strategy. Non-value adding time is waste and should be reduced or removed. Temporal waste can be removed by following these principles:

- Combine diverse activities into the same working environment.
- Plan spaces to be flexible enough to support diverse activities.
- Combine similar activities of separate operational departments to same environment.

If waste of spaces unneeded for operations and waste of non-use-time can be reduced, more resources would be available for other investments, spatial or non-spatial.

The value of a spatial investment in an operation cannot be predicted based on the initial information, decision making is linked to complex economic-technical-social systems. Commitment to common values can be achieved via iterative steering concepts of complex social systems.

The steering model of workplace planning

The steering model is a mode of action that systemizes the organization's decision-making actions, produced information and specific methods in accordance with workplace planning theory. By following this model different types of organizations are able to manage their workplace requirements on the basis of strategic and operational information.

The structure of the steering model
The steering model for workplace planning is an application of cybernetic closed loop control (Figure 1). Workplace planning is resource allocation in relation to the working environment, its users and organizational strategy. In the initial stage of workplace planning, there are many stakeholders, values, specifications and wishes. Most of them can be considered "right" or "entitled to". Many of them are in contradiction to each other and, when combined, they are generally in serious competition for the resources available (Pennanen, 2004). In such conditions of inductive complexity, management cannot be based on a simple model that measures the outcome to the requirements since there is not a single required state. Instead, an indirect closed loop control with feedback can be used when controlling complex systems (Ashby, 1956).

Even though in strategic workplace management there is no one correct answer, there are certain limitations on decision making that can not be exceeded. The most important points are economic and temporal limitations. The system needs a damped feedback system to keep it in balance. New viewpoints and creative ideas will be welcome if they produce new alternative solutions feasible for business. In the steering model the input data are wishes and wants of the customer operations. The feedback is spatial resources and life cycle costs traced back to the operations. This information enables activity based costing.

Closed loop management systems support and stimulate strategic and operative managers to participate in decision making. Thus the iterative dynamic system also supports participants' affective commitment to common goals.

Controlled system. The organization must be organized for workplace planning so that strategic decision makers and operative decision makers ("collecting points for decisions") are represented and identified. They will represent the whole organization during the dialogue and value generation.

Disturbance. Disturbance comprises everything that causes complex variation in the workplace planning. Disturbance is normally linked to:
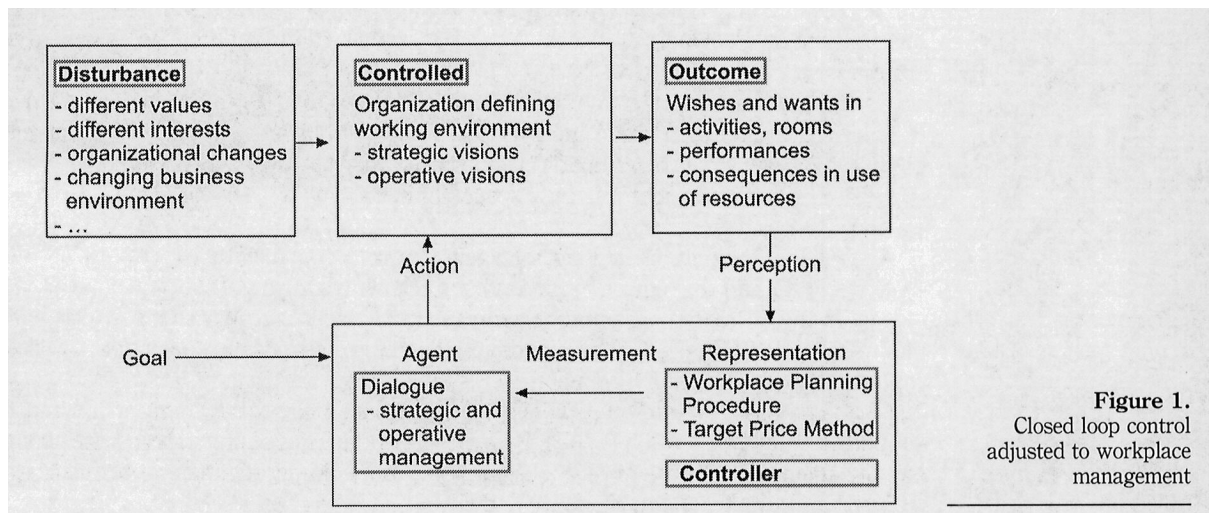

Figure 1.
Closed loop control
adjusted to workplace
management

- different values of the stakeholders;
- organizational changes; and
- changing business environment.

Controller. The controller is built up of the dialogue between strategic and operational management and two mathematical models to create feedback information for dialogue, namely The workplace planning procedure and the target costing method.

Dialogue. Dialogue is the steersman which is responsible for the actions. In transparent dialogue, strategic and operational management examine the workspace environment from their own positions. Operative management looks for functional rooms for the operations they are responsible for. Strategic management maps the activities that the business idea requires. Achieving final commitment of an organization is an iterative process of commitments, withdrawals and new approaches. Dialogue is a way to find new approaches and to stimulate managers to transparent decision making.

The workplace planning procedure and target costing method. The controller consists of a representation of a controlled system. The representation is composed of two mathematical models:

(1) the workplace planning procedure; and

(2) the target costing method (Haahtela, 1980; Pennanen *et al.*, 2005).

In the workplace planning process the client does not dictate the spaces and areas that he or she requires but describes the activities that he or she needs. The workplace planning procedure supplies dimensions for the working environment and lists it as spaces required.

The target costing method calculates the budget based on the rooms and the requirements for those rooms. The target costing method is a mathematical model that creates the link between the requirements the client sets on the rooms and the possible distribution of elements + use of resources connected to running costs (energy, cleaning...).

As the applications uses only client activity information as initial input, and the spaces, utilization degrees and life cycle costs are the outcome, the facility manager knows who or what activities use a certain space, why they use, why it is that size and is there temporal resources left in a space. This information enables activity based costing.

Agent. The dialogue is led by an agent, a professional with experience of the steering model and the required procedures. The agent is aware of the goal. The agent compares the current representation with the goal and suggests actions which will minimize the differences between them. Therefore purposeful behavior by the controller is represented by an agent.

Goal. The goal is based on a client's business plan. The spatial environment must support the corporation's basic idea. Before the workplace planning process, the client and the agent describe the most important goals of the corporation (e.g. core activities required and constraints in economy and time).

The workplace planning procedure
The workplace planning procedure is a web-based application programmed in Haahtela-group. Wide applicability of the workplace planning procedure requires a theory of spatial requirements, which adequately describes the variability in the usage of space. The horizontal geometric quantification can be made accurately with the help of the following factors:

- The activity bill programmed for the sector.
- The time strain of activities and targets for the use of time in the space.
- The geometry of the people working and the objects to be placed in the space.

Consider an education institution that operates in a teaching facility. The Activity bill is a description of the core and supporting activities that are employed to ensure that the organizational goal is fulfilled. The core and supporting function take form in operations, e.g. teaching, research and catering functions. These operations occupy a space or a part of a space for a unit of time. An expected level of temporal efficiency for the space affects the quantity of spaces and the flexibility of functions requiring the use of the space. The operating degree specifies how flexible the space needs to be. Low operating degrees provide good flexibility but require extra spaces to accommodate the strain. The size of the space is due to the internal functions, a student require $1.2\,m^2$ for working and a car needs $23\,m^2$ for parking.

Cygnaeus High school Jyväskylä
General background
The City of Jyväskylä is located 300 km north of Helsinki in Central Finland. It is a regional city with a population of 250,000 inhabitants. The public entity, the City of Jyväskylä, is responsible for developing and managing real estate to support its public customer base in the city. The leader of the "Investments and Maintenance" division of the Real Estate group oversees the project development process. In this case their customer is the Cygnaeus High school in Jyväskylä which requires facility changes to support increased education demands and to improve functionality of the existing structure.

The client-based project stakeholders broadly consist of the City of Jyväskylä, the Department of Education, and Cygnaeus High School teaching staff and students. The city is the ultimate decision maker in terms of sanctioning the project for further development. The city normally works with the Department of Education and they plan the city's education facilities. In education projects, the real estate group first discusses with the department their needs and then makes preliminary plans. The closest client representative in this case is the school principal. The preliminary plans go to the board of education which decides whether to continue development.

The Cygnaeus High School project definition process
In 1997 the City Real Estate Group began the project primarily due to a renovation need. The existing building was built in the 1960s and the existing school did not support user capacity or perform functionally. The department of education also initiated a strategic planning study for a central high school. The city council made a decision to establish a large high school on the present building site based on their forecasts for education.

The first preliminary plan started in 1997. The city originally hired a local architectural firm to perform programming services for the school. The city wanted a visualization to understand the site, so a massing model and design schemes were developed.

The city had their own cost estimators assess the program. It was deemed too expensive and was not used or developed any further.

A new program development started in 2002. The second and third versions were a continuation of the first version from 1997. The results again were similar in that the project scope exceeded available resources. The project was again put on hold.

Employing the Haahtela workspace planning process
In 2003 the Haahtela group was finally brought into the process when the project reached a stalemate. They met with Haahtela and then decided to make a test case to use the workplace management system for this project, as it was the biggest investment project for the school system and it badly needed resolution. Haahtela began to implement their process by gathering information that was then used to build the initial workplace models and to begin a series of communications with the teaching staff at the school. The focus of discussion was on the activities to take place in the facility's spaces.

The discussions provided Haahtela with new information to develop their workplace model. The states of the workplace needs are measured by first defining a list of user functions and activities with operations management. The workplace planner then defines temporal and geometric needs for the facility operations. This leads to a definition of the working environment which includes room schedules, performances, details on the potential for use and spatial utilization degrees. Space utilization is a primary indicator of space performance. Low utilization of space often becomes an indicator to discuss in needs analysis meetings. The solutions are budgeted and associated costs are traced the back to activities through the use of activity-based cost management.

There were a lot of comments by the teachers concerning almost every specialised classroom. The importance of specialised subjects was raised. For example, the principal informed Haahtela that Cygnaeus High School emphasized the importance of music teaching in their teaching curriculum. In the first calculation only one music-teaching area was deemed necessary with maximum utilization. The principal wanted more flexibility and lower utilization. Therefore a second music space was allocated.

Haahtela then presented their space model to the teachers and administrative staff at the high school at an Operations and User Workshop in Jyväskylä. A set of new issues was raised based on the feedback from the presentation. After discussion and changes there was an initial agreement on the space program needs.

Strategic project meeting
Once Haahtela had consensus on operational needs, they were in a position to approach strategic stakeholders with new information at a strategic client meeting in Jyväskylä city. At this meeting the principal said that workplace planning program was acceptable with minor corrections and they, the teachers accepted it. They said they would prefer program version 3 that had a spatial area of 6,926 net m^2. The city

management had Haahtela make a suggestion on how the school program could be reduced further without losing functions and activities. Haahtela had prepared a program version 3.1 (space size: 6,089 net m^2) prior to the meeting.

The city proposed a target cost that would make the project feasible for further development. After much discussion the city and school agreed. The group negotiated a target between versions 3 and 3.1. This decision to create a target allowed the project to progress. The city left it to Haahtela to work with the school groups to make the necessary spatial changes without losing user functions. Haahtela agreed to work with the school operation stakeholders to establish a revised program based on this agreed target.

Operations workshops
Haahtela arranged a final workshop with the teaching group leaders to make the necessary changes to the workplace. In this meeting the group had a clear target; i.e. a mean value target of program versions 3 and 3.1 which meant achieving 6,508 m^2 net area of program space. In this meeting Haahtela had to allocate spatial resources to the user activities.

Haahtela began the workshop by examining spaces with low utilization. They initiated a dialogue about an auditorium space for 217 students (273 m^2 in version 3.1). Haahtela recognized that the need for an auditorium for education is low (2 per cent utilization) and in return it uses a lot of resources. The principal responded by saying that he wanted to use the facility space for large groups undertaking final examinations before graduation. Smaller groups need too many teachers for supervision which then disturbs educational operations during the exam period. Examinations use few temporal and a lot of spatial resources. Equally there is a high priority for this need. Then an architect on the Haahtela team informed the group that he had experience with flexible classroom design in another school facility. In his experience, that facility invested in portable walls with good sound insulation and it enabled the school to create one big area from three 80 m^2 classrooms when needed. The idea of specifying adaptable classrooms was accepted.

The discussion moved on to other core business activities, computer teaching, music education, biology education etc. Haahtela then moved the group discussion to the issue of support activities such as food service. Once the first iteration was completed midway through the workshop, the principal recapped their decisions:

- The need for the auditorium was replaced with flexible spaces.
- The music education areas were planned for smaller groups.
- Half of the biology education hours originally planned in the biology area were transferred to a normal lecturing space.
- Half of the education hours originally planned in the computer areas were transferred to a normal lecturing area. The rationale for this decision was that in five years the school could provide certain classrooms with wireless internet technology.

The following changes to supporting and other operational activities were agreed on at this stage:

- One tutor would have to be added to the education staff to support operations.
- Shelf storage was reduced to 10 m/teacher.

- The kitchen was planned for "line distribution" capability and a smaller eating area.
- Finally a shower/dressing area for teachers was planned.

Haahtela transferred the measurement data to the web-based workspace planning system and then printed the results for review with the representatives. The workplace plan was named Version 4. Table I shows a tabular output of information generated. The table defines the space, the number of users, square footage and the degree of utilization. Life cycle costs were calculated by target costing method for activity based costing.

The new workplace planning calculation (version 4) resulted in a new net area of 6,104 net m^2. The result was closer to version 3.1 and the group found that approximately 400 m^2 could be added to the program and still achieve the negotiated target. Haahtela initiated a new set of dialogues to allocate this space. After further discussion the group and the principal made new decisions to reach the final workplace planning (version 4.2):

- Examination areas were needed in the natural science education areas.
- Stores for student instruments were added to the music area.
- Two normal classrooms were planned to support larger groups and to add flexibility (32 pupils $>>40$).
- The vice-principal's room was planned to have a meeting area for four persons.
- A waiting area close to teachers, tutors and administration was planned for students.

Core activities	Amount	Unit	Useable area (m^2)	m^2/unit	Utilization (%)
Spontaneous studying/sch senior high school (650,0 stud)					
Individual work					
Team work, 19 stud	1	Pcs	31.7	31.7	73
Team-work/individual work, computers, 6 stud	1	Pcs	16.3	16.3	73
Senior high school mandatory courses/sch senior high school (650,0 stud)					
Senior high school optional courses/sch senior high school (650,0 stud)					
Drawing classroom, 40 stud	1	Pcs	112.7	112.7	23
Storage for drawing classroom	1	Pcs	14.5	14.5	46
Darkroom, 5 stud	1	Pcs	7.0	7.0	29
Music classroom, 40 stud	1	Pcs	113.3	113.3	66
Music classroom, 20 stud	1	Pcs	62.6	62.6	31
Storage for music classroom	1	Pcs	37.0	37.0	37
Clay and design classroom, 11 stud	1	Pcs	22.2	22.2	27
Drawing teachers' room, 1 pers	1	Pcs	11.0	11.0	23
Studio for music classroom	1	Pcs	37.0	37.0	37
Storage for music instruments	1	Pcs	18.1	18.1	37

Table I.
Workplace room schedule – select output

Case study discussion
The Haahtela workplace planning system recognises that facility owner organizations are complex, and owner groups often operate in isolation from each other. The workplace planning system brings fragmented owner groups together in a shared forum to discuss their needs and values. The iterative problem solving approach is interactive, with the owner groups providing frequent feedback.

The groups communicate primarily through a workplace planning language. The workplace planner facilitates these dialogues where common needs and the means to share resources are identified. He manages this process through understanding the operations of the owner groups and then representing their needs in a workplace model. The workplace planner uses spatial performance measurements to identify project constraints and to seek means of resolving the needs within these constraints.

Managing self-organizing strategies
Project stakeholders try to promote their own interests when engaged in project definition. This case study revealed the inability of traditional programming to reconcile the self-interests of stakeholders. Initial attempts at project definition ended in stalemate and the project stalled due to excessive costs.

Multiple core interests of the stakeholders had to be integrated in the workplace planning process. School operations management was concerned about developing a learning environment. The Department of Education was concerned that the regional education strategy would be fulfilled through this project. The city executive was concerned that their resource allocation supports the city's development strategy. The city real estate group was concerned that their budget allocation would be met. The workspace planner was concerned that the workplace performance was adequate developed to support the project budget and the user needs.

Initially strategic management and operations management did not understand each other's interests, nor how to align those interests. This group behavior inevitably came into conflict with the fact of shared resources (money; perhaps space). These interest groups had to align with the global workplace strategy and satisfy their interests within the larger environment in which they operate.

Groups organize around self interests. A change in one part of the system affects the other interacting agents in the system. For example, the city follows its real estate policy and strategy, and the High School follows its education policy and strategy. Brought in after the initial failure, Haahtela had to engage the stakeholder groups and re-define the project mission statement. It is hardly surprising that the workplace strategy changed after Haahtela's intervention; indeed, it seems appropriate to say that there was no one strategy previously.

In general, the self interests of stakeholder groups are discussed through the medium of the workplace planning process. The workplace information is the basis for discussion. The planner relates how workplace information directly affects stakeholder interests. The workplace planner can only ask about stakeholder interest and how it influences the workplace planning model. The process of inquiry leads to new and very fast information which can change the workplace model or perhaps change the stakeholder's perception of need, e.g. by creating new ways for the stakeholder to function in the workplace.

The perspective of teachers and administrators changed over time as they came to understand, or perhaps better, as they created the real vision for the project. For example, the initial vision of a standard renovation project changed to a vision of student learning in the next century. The Haahtela management system facilitated the emergence of this shared vision.

Steering the problem
Figure 2 shows how the workplace planner steered the group dialogues toward a negotiated program target for the Cygnaeus High School. The overall objective was to reduce the space program to work within a strict budget. To achieve the intended space target, the planner initiated a cycle of client dialogues and workplace measurement. Through operations and workplace redesign, along with measurement of the decision impacts, the group finally converged on solutions that were satisfactory to all stakeholders.

Once the workplace planner identifies constraints with the group, this triggers a subsequent search to work with the constraint. The search process typically extends across the boundaries of the organization horizontally and vertically, and also external to the organizational boundary. The workplace planner facilitates this group process when discussing possible changes in organizational function and workplace strategy.

Normally the workplace planner uses a combination of approaches to reduce the overall space quantity. The decision process may be difficult to steer precisely towards an exact target, given the unpredictability of the group's feedback on a specific space issue. In this case (see Figure 2, version 3 and version 4), the workplace planner and the group made significant changes to individual workspaces. When the workplace
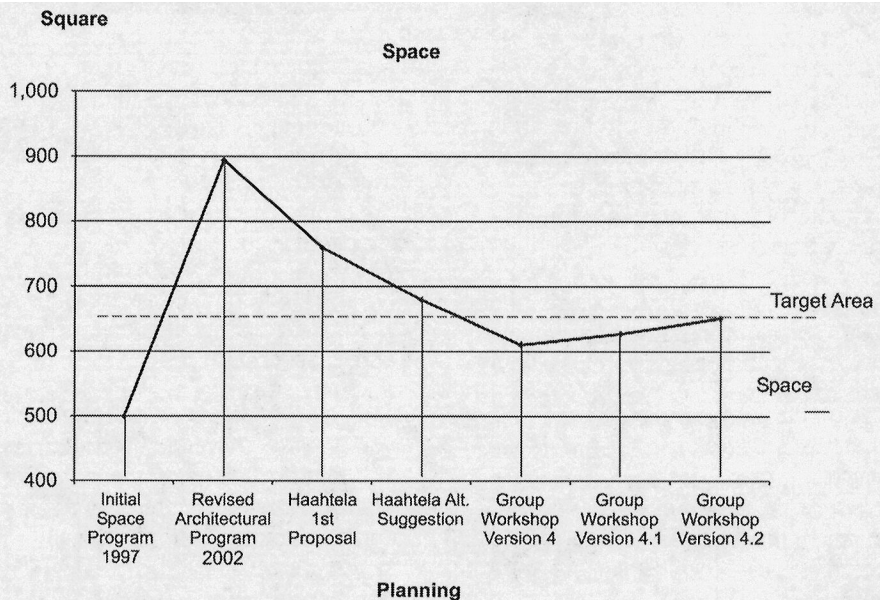

Figure 2.
Cygnaeus High School
space developments

Source: Whelton (2004)

planner made a calculation of the total workplace, they found that they were below the intended target, and subsequently made new changes to increase the space quantity.

Table II associates problem-solving strategies with the change in square footage. The selection of the approach is dependent on the nature of the problem and the preferences of the stakeholder groups. Use of these strategies creates greater understanding of the problem.

Conclusions

This paper presented a theory of workplace planning and a steering model to support the management of the facility planning process. The theory links workplace planning to production, not only to construction production, but also to the organization's general strategy. This perspective on workplace planning is understandable since a workplace affects productivity, while the working environment represents a large share of the use of resources. Space expenses (investment + maintenance costs) vary normally from 5 to 30 per cent of all expenses of the organizations. Indeed, workplaces are a significant investment in an organization's strategy (Pennanen, 2004).

The customer workplace is linked to a complex social system. The proposed steering model is based on dialogue between strategic and operational management. It is an application of closed loop control which operates on rapid feedback between stakeholders. The process encourages learning, group working and transparency. Achieving a final commitment of an organization is an iterative process of commitments, withdrawals and new approaches.

This paper describes the Haahtela workplace planning process (Pennanen, 2004) through a project case, the City of Jyväskylä Cygnaeus High School (Whelton, 2004), which illustrates the adaptive management principles by which Haahtela create effective workplace planning statements. The Haahtela workplace planning system is

Outcome of group workshop	Problem solving strategy	Changes to functions and workplace Core activities	Supporting activities
Version 4	Reduce drivers	Removed an auditorium space for 217 students	Reduction of storage space
	Combine activities	Specified adaptable wall structures to support	Omitted food preparation
	Change space layout	Changeable functions and student numbers	Changed dining arrangement
	Relocate activities	Transferred teaching functions to general classrooms.	Reduced number of children in kindergarten
Version 4.1	Increase drivers	General classroom sizes increased to support larger group sizes	Increased storage area for music
	Change space layout	Examination areas added to natural science laboratories	Student and teaching waiting areas increased
Version 4.2	Change space layout.	Increased size of general classrooms to support larger group sizes	

Table II.
Cygnaeus High School workplace program changes

designed to measure owner needs such as user functions, geometrical and temporal needs, spatial performance and associated costs. The process seeks early and frequent feedback from facility owner groups to establish new information about the state of needs and values. The feedback is based on focused dialogue with the stakeholder groups and the workplace planner.

The process displays evidence of supporting group collaboration in terms of fostering stakeholder engagement, developing high quality information, supporting innovation in the owner's functions, and the appropriate sharing of facility spaces among owner groups operating with limited resources. The Haahtela workspace planning process produced a program that met the strategic goals and financial constraints of "strategic" management, while also generating a consensus regarding spatial requirements and space usage on the part of "operational" management by group dialogues. The need for space (and life cycle costs) decreased 20 per cent. All the activities can still be supported because of improved utilization. Because commitment was achieved, the investment process was started immediately after workplace planning.

Key elements in the Haahtela process that account for its success are:

- The workplace planning process demonstrates effective group learning in that it engages the client groups to first reflect on their needs, and then generates alternative means of fulfilling their needs.
- Stakeholders' power has been linked to accountability (ABC-management). When deciding whether an activity deserves spatial investment, it is necessary to know if the activity can afford it.
- Close alignment between the needs analyst (in this case, the workplace planner) and project management is necessary to steer the creative process of purpose development.
- New understanding of a stakeholder's own purpose and the purposes of their project counterparts can be developed using participative group methods.
- Innovations in the workplace can develop along with new collaborative partnerships among project stakeholders.
- Stakeholder needs and values along with the product specifications (concept solutions) undergo parallel changes, so to create alignment and subsequently a feasible project.

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