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A Theory of Workplace Planning: General Principles Management Steering Model

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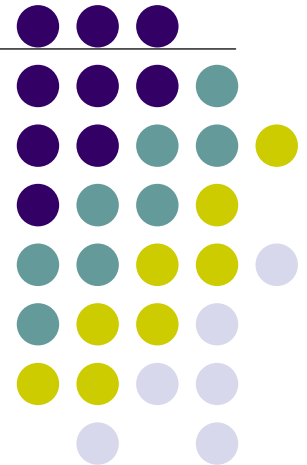
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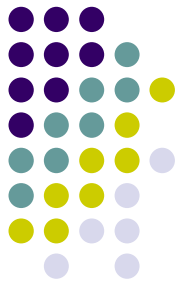
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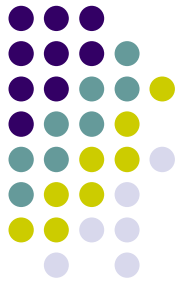


Workplace Planning and Lean Construction



- To Build a Building that is not actually needed is Waste
- Interest on the Customer
- Another perspective in TFV- concept
 - Not construction process...
 - ...but customer's production in the working environment we produce

Workplace planning

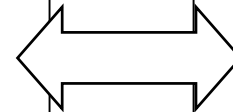


- Workplace Planning
 - Allocating resources in relation to the working environment, its users and organizations strategy
 - Workplace planning is valuable requirements identification for production
 - Workplace planning incorporates the client to the production
- Support Tools
 - Workplace planning procedure
 - Target Costing

Client Facility Management Strategies and Workplace Planning



- Why Workplace Planning ?
 - Changes in Customer environments
 - business environment is changing
 - business strategy is changing
 - Products, services in turn are changing
- Increased Focus on the Workplace
- Benefits of Workplace Planning Strategies?
 - workplace efficiency and productivity improvement
 - access to and maintenance of a qualified workforce
 - cost reduction of a working environment
 - workplace expenses vary from 10 to 30 % of all expenses



- Project Definition
 - Client Purpose
 - Needs & Values
- Challenging the present use of workplaces
- Understanding Client's Production
 - Production theories
 - concepts of complexity
 - concepts of commitment making



The Client

Old beliefs about facility users

- “Give them a candy and they want more”

Today’s reality and trends

- Human organizations are exceedingly complex systems. Eliminating complexity would mean eliminating the Client
- Organizations tend to localize and minimize information demands by decentralizing decisions (to the customer interface). Numerous decision makers.
- Important decisions are made in strategic level but most of the decisions are made by operative management

Production theories



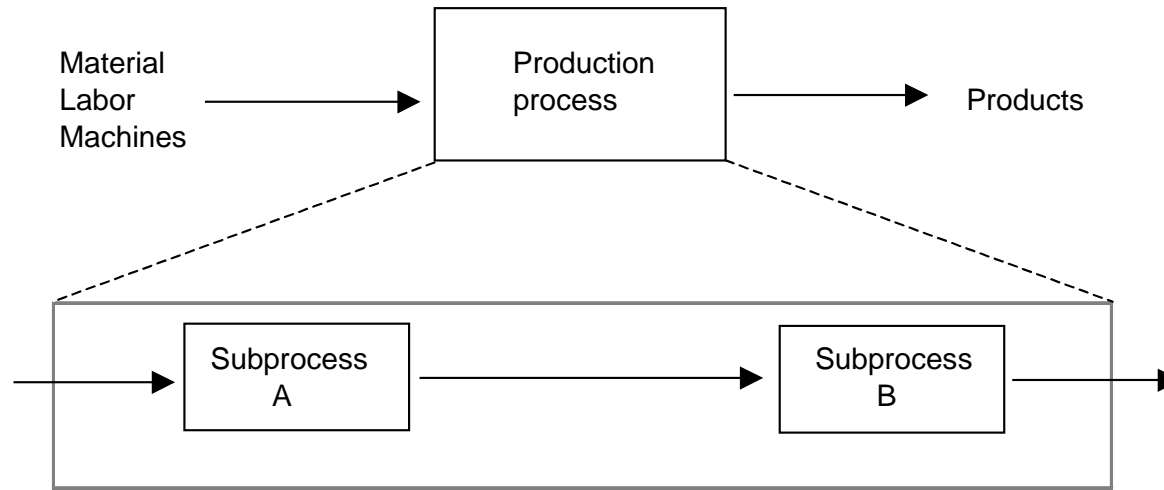
Historical analysis reveals that three different conceptualizations of production have been used in practice in the 20th century

- ⚙ the transformation concept
- ⚙ the flow concept
- ⚙ the value concept



Transformation concept

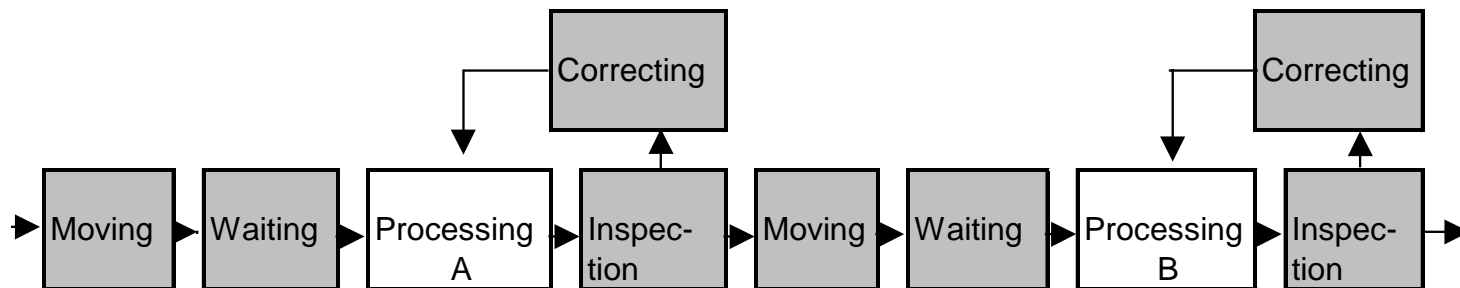
- Managing whole production is managing subprocesses.
- The cost of total process can be managed by managing the cost of each subprocess.
- The value of output is associated with the value (or costs) of inputs to that process





Flow concept

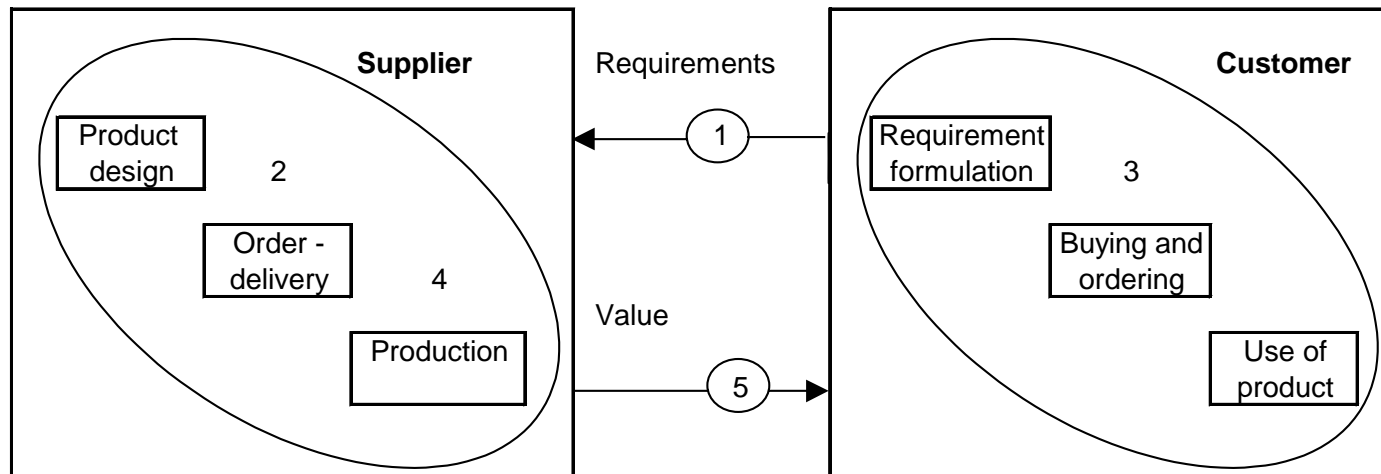
- ⚙ value adding operations
- ⚙ non-value-adding activities, such as moving resources, waiting before transformation and inspection after transformation
- ⚙ non-value-adding activities have also been considered as waste
- ⚙ time is considered as one the inputs of the production





Value generation concept

- It is not the transformation itself that is valuable, but the fact that the output corresponds to the requirements, wishes, etc., of the customer
- the value of the product can be determined only in reference to the customer. “The result of business is a satisfied customer”



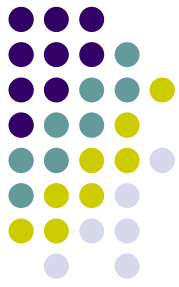


Complex requirements of the stakeholders

- In the value generation concept of production the client requirements are condensed into a specification

In real world...

- The customer is divided to many departments, all having an operative responsibility linked to the organization's strategy
- Actually in the initial stage of workplace planning there are a lot of specifications and wishes,
 - many of them in contradiction to each other
 - they all can be considered to be "right"
 - when combined, they are generally in serious competition for the resources available

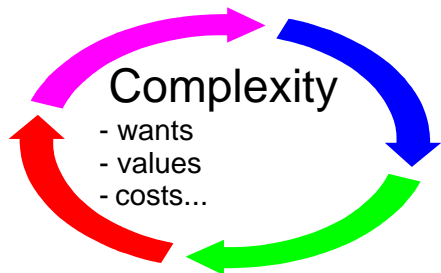


Unnecessary complexity

- There is much uncertainty and many iterations in design
- There is much uncertainty and many iterations in workplace planning
- If we combine workplace planning and design, the amount of iterations would expand enormously
- Complexity is unnecessary if variables that are orthogonal are combined; it is wise not to do workplace planning and design at the same time

Workplace planning

- strategy
- operations
- people

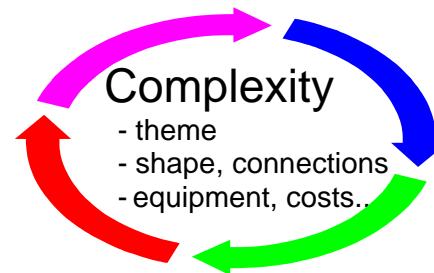


Outcome

- commitment to what is required
- spaces, performances
- budget, time table...

Design

Commitment to what is required



Outcome

- design solution
- commitment to what customer gets

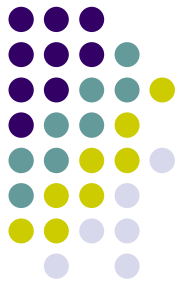
Complexity management; internal customer relationships of construction



- Workplace planning meets and accepts the complexity of the client
- The rest of the construction production can be considered as a customer of the workplace planning
- Next internal customer will be design
- Vague requirements of the stakeholders harm design (and production)
- Design (and production) require reduction of uncertainty regarding stakeholders' requirements

- Workplace planning is valuable requirements identification

Commitment is the product of workplace planning

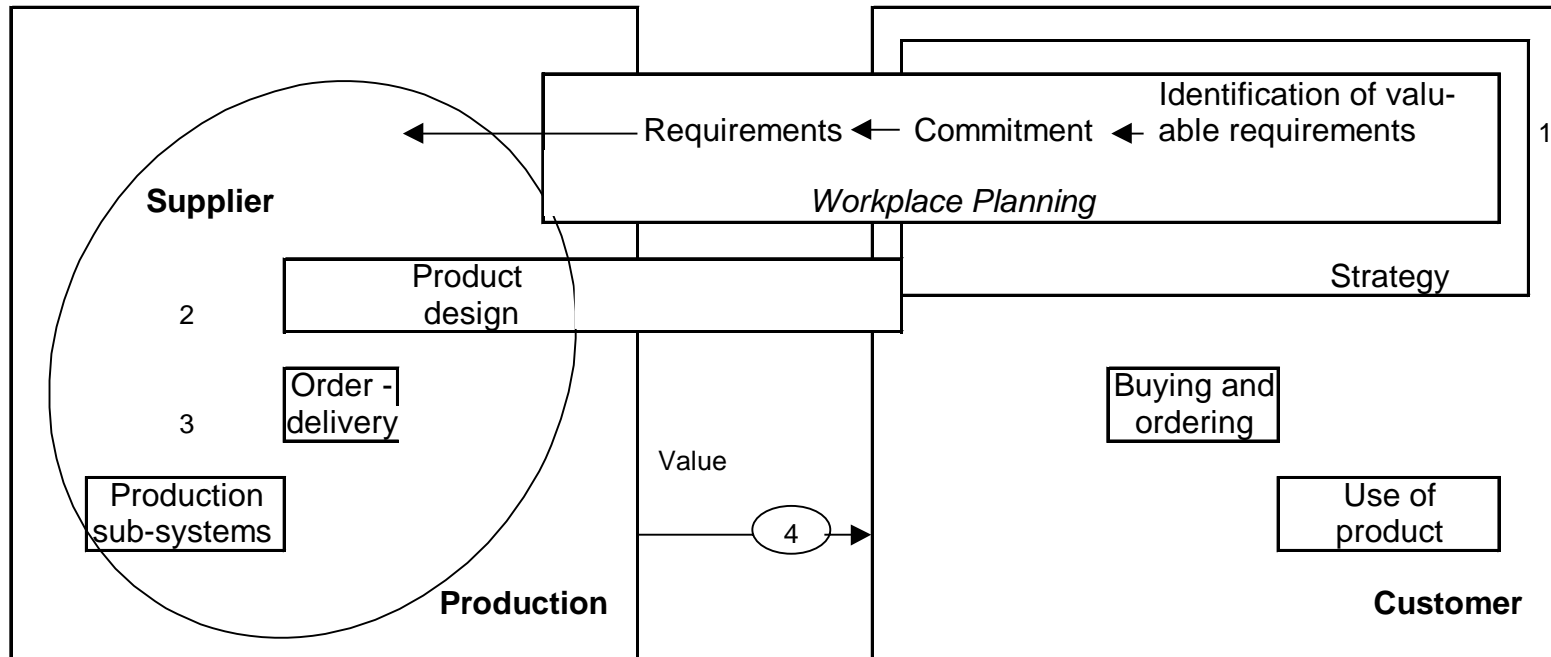


- Workplace planning does not aim for an optimum, it aims for a “good” solution.
- Workplace planning is allocating resources in relation to the working environment, its users and organizations strategy
- What is the criteria that differentiates the chosen solution from the bad ones and from the other good ones?
 - It is the commitment of the stakeholders to something achieved. The product of workplace planning for the rest of production is the stakeholders’ commitment
- The common framework for commitment making process is the business strategy
- Stakeholders commitment is an absolute necessity in all production to enable value generation.

Customers participation to the production



- **Suggestion:** workplace planning is part of production process
- **Fact:** Workplace planning is mainly carried out under the direct control of the customer
- **Definition:** The customer communicates with the production parties
 - The customer stakeholders commit to the production requirements by evaluating potential values to customer strategy
 - Product of workplace planning is the stakeholders' commitment



Concepts of Commitment



- Affective commitment
 - Refers to an actor's identification to and involvement within an organization, a project etc.
- Continuance commitment
 - Refers to awareness of the costs (financial or non-financial) associated with leaving (e.g.aborting a project)
- Normative commitment
 - Reflects a feeling of obligation to continue membership with organization, project etc. Lasts until the “debt” has been paid. (Army)
- Instrumental commitment
 - good behavior is rewarded and bad is punished



Affective commitment

To support the stakeholders' commitment process, the steering model of workplace planning must:

- support and stimulate strategic and operative managers to participate in decision making
- decentralize the decision making to the levels where responsibilities are met
- be transparent in terms of information handling
- be fair regarding equitable handling of information

Commitment process

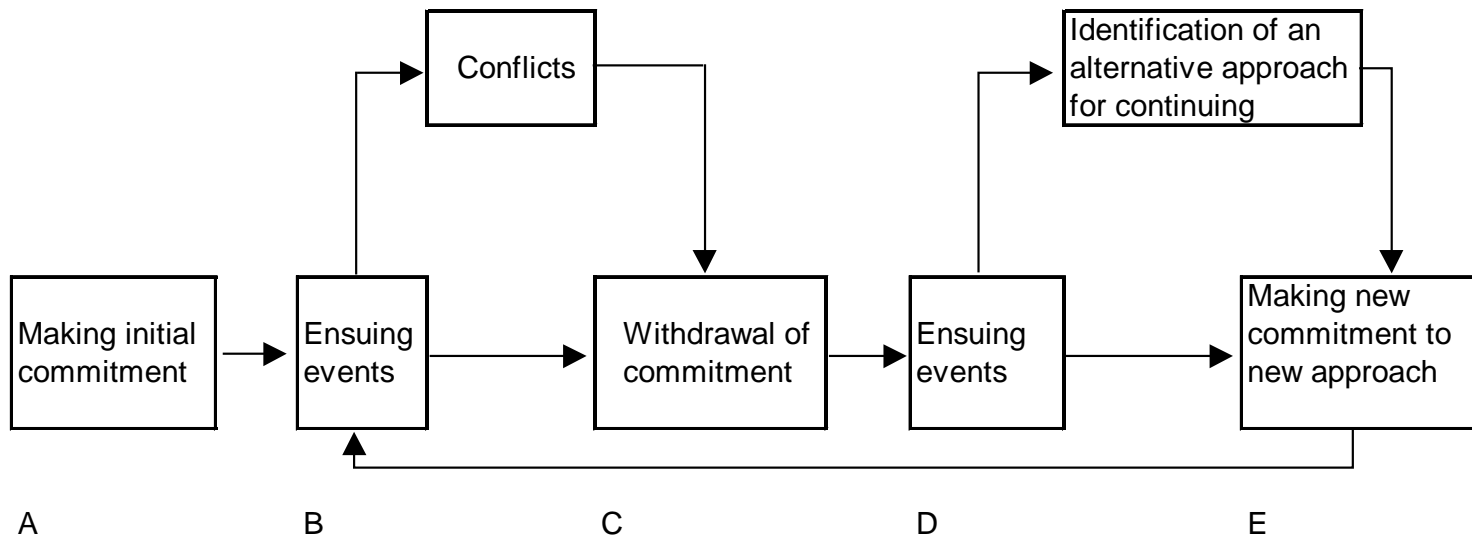


- The individual stakeholders are committed to their various different goals during the initial stage
- There may be conflicts between goals
- To find a new target for mutual commitment, new approaches must be identified.
- Achieving a final commitment of an organization is an iterative process of commitments, withdrawals and new approaches.



Dynamic commitment model (skip)

Achieving a final commitment of an organization is an iterative process of commitments, withdrawals and new approaches.



The Theory of Workplace Planning



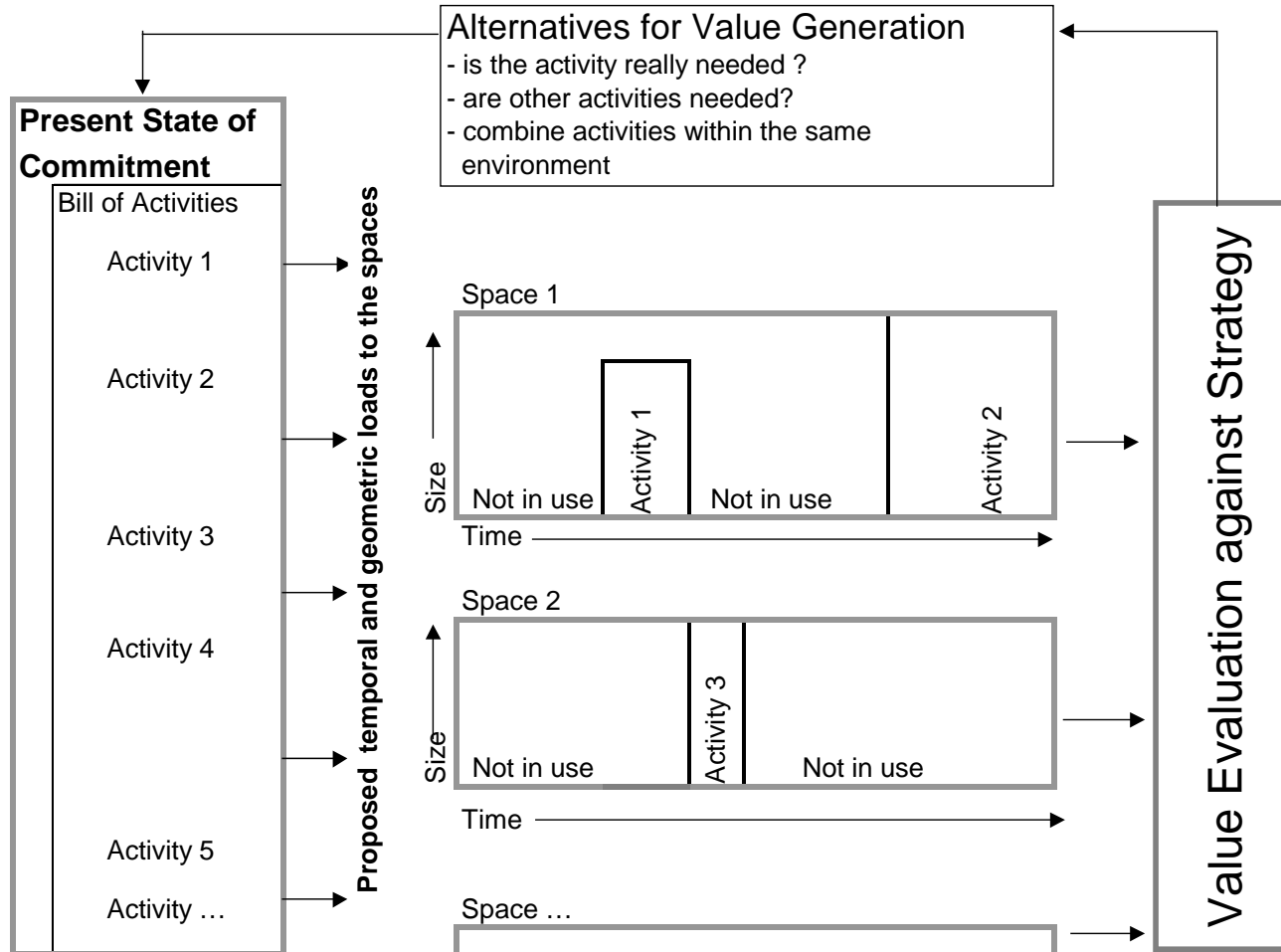
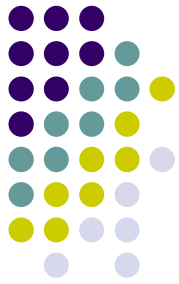
- A spatial investment in an operation competes for the same resources as the other investments in the operations.
- Workplace planning is a process where valuable requirements are determined through evaluating the stakeholders' values against the organizations strategy (value concept).
- The size of the space is dictated by the operations taking place within that space (transformation concept).
- Spaces are the scene of temporal flow of operations and non-use-time. The number of spaces is due to the temporal utilization of the spaces (flow concept).
- The needed operations and operation time is value adding, whereas non-use-time is not value adding
- If waste of spaces unneeded for operations and waste of non-use-time can be reduced, then more resources would be available for other investments, spatial or non-spatial.

The Theory of Workplace Planning



- Links Workplace Planning to customer strategy
- Commitment is the product
- Stakeholders' commitment to common values
- Achieved via iterative steering and learning concepts.

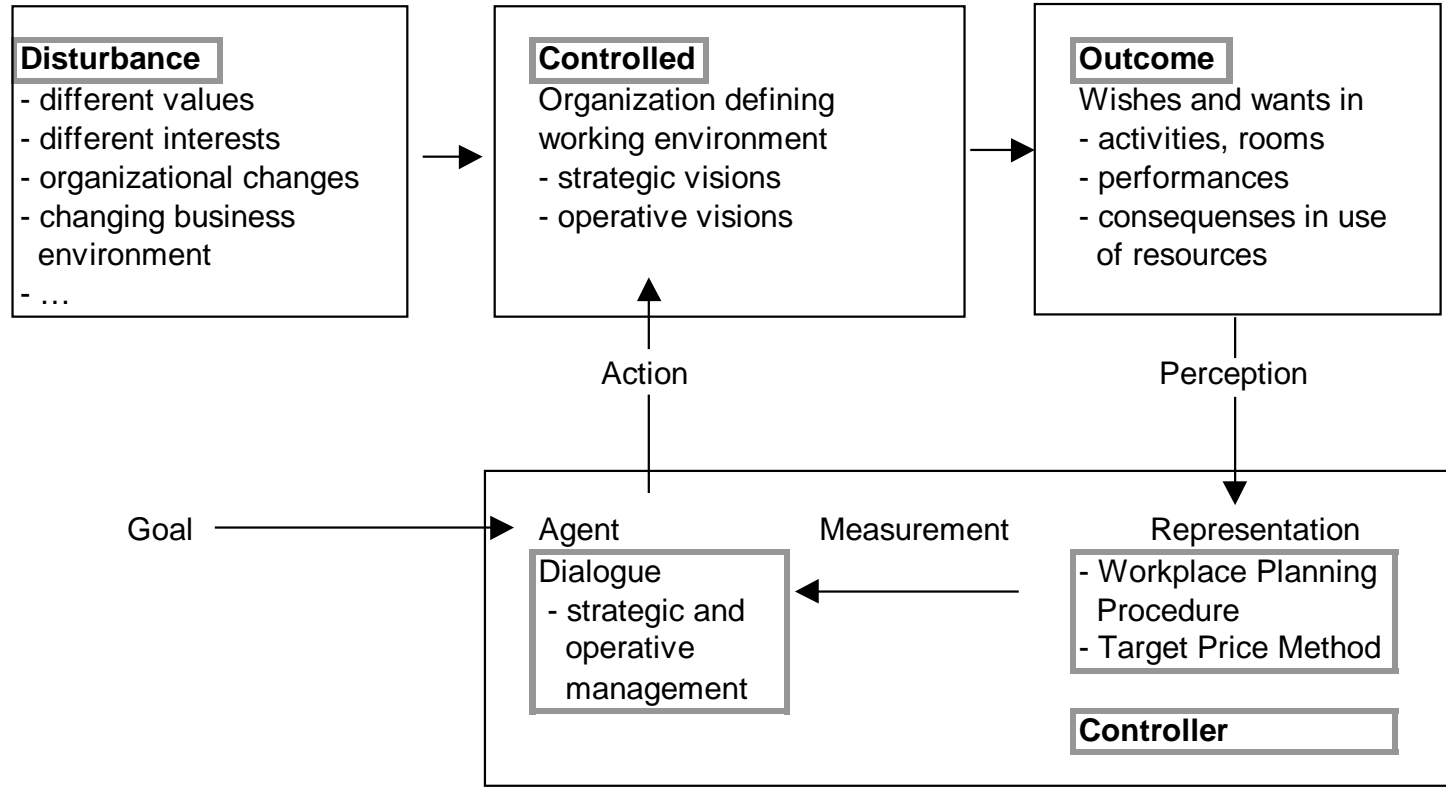
Workplace Planning Theory





Complexity management steering model

- Closed loop control; measurement and feedback



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A Case Study in Workplace Planning: Fostering Collaboration and Learning in Project Definition

Michael Whelton, Ph.D.

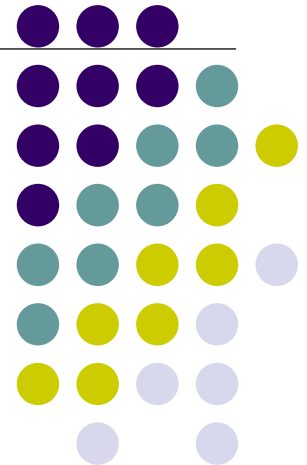
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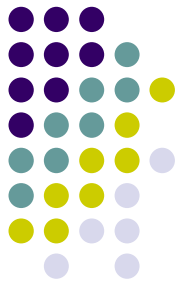




Process Stages

- Interviews of Strategic and Operative management
 - Identify activities (Core Activities vs. Supporting)
 - Define drivers
- Desired state measurement
 - spaces
 - utilization degrees
 - Life Cycle Costs
- Combining power and accountability
- Organizing Dialogue and Allocation

The Steering Model of Workplace Planning



DIALOGUE



Translations
Transparency
Collaboration
Group learning



Activities as Realization of Business

Core activities

- automotive learning
- spinal cord injury rehabilitation

Supporting activities

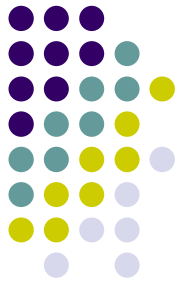
- meetings
- catering

Activities as Working Environment

Catering

- goods entrance
- food preparation
- food delivery
- eating
- personnel dressing

The Case: Cygnaeus High School Renovation



The Stakeholders:

The City Department of Education

- Coordinates the Education Policy in The City of Jyväskylä

City Real Estate Department

- Responsible of building, renovating, leasing, owning and maintaining the High School property
- The Department of Education pays rent per square meter for using buildings

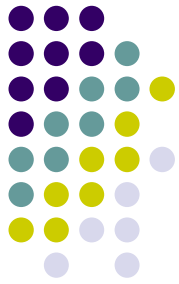
Principle and teachers

- Responsible of education in practice

Students

- Their learning is the core value
- Represented by Student's association

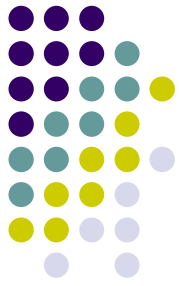
History before workplace planning



Architectural program 2002

- room schedule, sketches...
- The extent was 8 150 m², would have led to 800 000 €rent/year
- The project was cancelled

History before workplace planning



Stakeholder's feelings after failure

- City Department of Education found that the high rent would risk the City policy of education
- The principal felt that those in the City don't understand the role of school
- The Real Estate organization felt that the programmer had little control over the budget and wishes
- Teachers felt that they have a strong vision what they need but city is not collaborative
- The Real Estate organization felt that they have a “policeman role”. They only could say that things were too expensive and could not see how to reduce. They felt that the school was not very collaborative
- The architectural programmer felt that cost estimations are used against him

Employing Haahtela Workplace planning process 2003



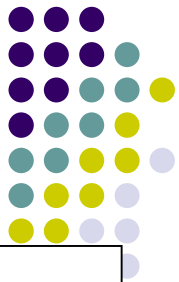
Defining input information for modeling

List of activities (with principal city management of education)

- core activities (students learning actions)
- supporting activities (teachers preparing work, catering)
- activity drivers
- temporal and geometric needs for facility operations



WOP: Activities



Haahtela

IT Headquarters

CORE ACTIVITIES

- [Personnel, landscape and teamarea](#)
- [Customer service](#)
- [Applications testing Workplaces](#)
- [Consultants workstations](#)

SUPPORTING ACTIVITIES

- [Office supporting activities](#)
- [Entrance activities](#)
- [Computer servers and switchboards](#)
- [Marketing, public relations](#)
- [Education](#)
- [Computer support workshop](#)
- [Storing activities](#)
- [Meetings activities](#)

Functional sectors	Driver	Group size	Unit
<input type="checkbox"/> IT Headquarters	400	1	pers
Total	400		pers

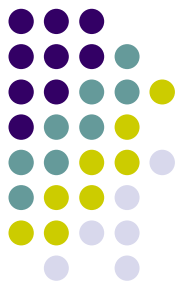
Activity	Driver	Group
<input type="checkbox"/> <input type="checkbox"/> Applications testing Workplaces	24,0 workplace	1,0
Sub-activities		
	Driver	Group Load
<input type="checkbox"/> Business dep. Workstation in landscape	6,0 workplace	1,0 1,00 persons
<input type="checkbox"/> Export dep. Workplaces in a landscape	6,0 workplace	1,0 1,00 persons
<input type="checkbox"/> Development dep. Workplaces in a landscape	12,0 workplace	1,0 1,00 persons

Activity	Driver
<input type="checkbox"/> <input type="checkbox"/> Food and eating activities	200,0 persons
Sub-activities	
	Driver
<input type="checkbox"/> <input type="checkbox"/> Gen Eating in dinig-room	100,0
<input type="checkbox"/> <input type="checkbox"/> Gen Food servery	100,0 persons
<input type="checkbox"/> <input type="checkbox"/> Cooking	200,0

Default value



WOP: Activities



Haahtela

Vuosaari Lutheran Church

Home Church

CORE ACTIVITIES

- [Church ceremonies](#)
- [Children activities](#)
- [Young Youth Work activities](#)
- [Youth Work Activities](#)
- [Young Adult Activities](#)
- [Adults and Family activities](#)
- [Church Social Work](#)
- [Church ceremonies](#)
- [Church social work, group events](#)
- [Adults and Family activities](#)
- [Minister and priest-on-duty](#)

SUPPORTING ACTIVITIES

- [Office supporting activities](#)
- [Entrance activities](#)

Functional sectors	Driver	Group size	Unit
<input type="checkbox"/> Church	30000	1	member
Total	30000		member

Activity	Driver	Group	Load	Factor
<input type="checkbox"/> <input type="checkbox"/> Church ceremonies	7,0 services	30 000,0		
Sub-activities				
<input type="checkbox"/> <input type="checkbox"/> Mass	2,8	30 000,0	1,00 event	3,00 h
<input type="checkbox"/> <input type="checkbox"/> Baptizing	1,4	30 000,0	1,00 event	2,00
<input type="checkbox"/> <input type="checkbox"/> Weddings	0,7	30 000,0	1,00 event	3,00
<input type="checkbox"/> <input type="checkbox"/> Burial services	0,7	30 000,0	1,00 event	2,00
<input type="checkbox"/> <input type="checkbox"/> Other events	0,4	30 000,0	1,00 event	2,00
<input type="checkbox"/> <input type="checkbox"/> Concerts	1,1	30 000,0	1,00 event	3,00
<input type="checkbox"/> <input type="checkbox"/> Preparin masses	7,0	30 000,0	1,00 event	1,00
<input type="checkbox"/> <input type="checkbox"/> Chorus events	1,3	30 000,0	1,00 event	3,00

Activity	Driver
<input type="checkbox"/> <input type="checkbox"/> Children activities	34,0 actions /week
Sub-activities	
<input type="checkbox"/> <input type="checkbox"/> Evening Day Care	8,5
<input type="checkbox"/> <input type="checkbox"/> Sunday school	4,4
<input type="checkbox"/> <input type="checkbox"/> Day Care	25,5

WOP: Sample activities



Core activity: Optional courses

Driver: 650 students

Sub activity: Physics learning

Driver: 300 students

Load: 3 courses, 38 hours/ course

Desired learning environment:	groups	share of the load
- general lecturing	200 stud	10 %
- studying in natural science classroom	32 stud	50 %
- studying in it-class	32 stud	40 %

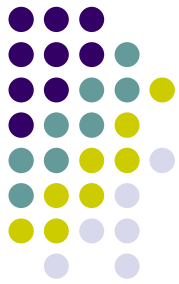
Sub activity: Reference library

Driver: 13 000 volumes

Load: 0,025 m/volume

Desired working environment:	groups	share of the load
- magazines	landscape	not handled
- volumes on shelves	landscape	100 %

Wop converts activities to spaces



Laboratory environment						
<input type="checkbox"/>	Drawing classroom, 13 stud	1	Pcs	41,3	41,3	27%
<input type="checkbox"/>	Motion analysis class, 20 stud	1	Pcs	179,8	179,8	23%
<input type="checkbox"/>	Physiotherapy class, 20 stud	1	Pcs	144,0	144,0	21%
<input type="checkbox"/>	Clinical ward class, 15 stud	1	Pcs	72,7	72,7	17%
<input type="checkbox"/>	Acute ward class, 15 stud	1	Pcs	80,0	80,0	26%
<input type="checkbox"/>	Polyclinic ward class, 15 stud	1	Pcs	64,1	64,1	7%
<input type="checkbox"/>	Operation theatre, 15 stud	1	Pcs	36,2	36,2	7%
<input type="checkbox"/>	Maternity ward class, 15 opisk	1	Pcs	47,7	47,7	16%

In the Case of Arcada the health sector labs were deemed to be in poor utilization. The total usable area of the labs was 666 m2.

If the Polyclinic ward class door was opened 100 times in daytime, in 73 times the space would be unused.

Clinical ward class		Pcs		
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Cupboards	7,50
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Working at workbench	15,00
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sleeping, much circulation	5,00
		Pcs		
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Rocking chair	2,00
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Washing hands	3,00
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sitting	10,00
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sleeping, much circulation	
Polyclinic ward class		Pcs		
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Cupboards	7,50
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Working at workbench	15,00
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sleeping, much circulation	4,00

Strategic management asked for better utilization

Actions survey:
The internal functions in Clinical ward lab, Polyclinic ward lab and Maternity ward lab are similar.

Target Price method: Converts spaces and their performance to money



MEETINGS

Cloak room	6,0	1,0	6	1 307	7 842
Foyer	16,0	1,0	16	1 380	22 081
WC	5,0	2,0	10	2 876	28 764
Meeting room	14,0	3,0	42	1 316	55 284
Meeting room	25,0	2,0	50	1 374	68 701
Meeting room	37,0	2,0	74	1 336	98 838
Cafe	29,0	1,0	29	2 044	59 271
Cafeteria kitchen	9,0	1,0	9	1 689	15 202
Corridor	50,0	1,2	61	1 333	81 294
Stairs	20,0	0,8	15	1 405	21 074
Services					

Adjust the required performances by the classification of requirements.

■ Meeting room

2. Internal climate

Temperature °C

Controlling the temp. ▾

Thermal load W/m²

Air inlet l/sm² Controlled supply air

Controlling moisture ▾

Re-use of air % inlet

Exhaust l/sm²

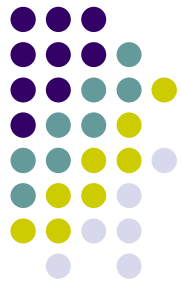
Heat recovery, efficiency ratio %

Jatkuva alipaineinen ilmanvaihto

Local air exhaust pc

1. Size and shape
- 2. Internal climate
3. Sound insulation
4. Lighting
5. HVAC- equipm.
6. Electric equipm.
7. Furniture, fittings
8. Partitions inside
9. Load, durability
10. Connections
11. Finishing

Target Price method: Converts spaces and their performance to money



Foyer	16,0	1,0	16	1 380	22 081
WC	5,0	2,0	10	2 876	28 764
Meeting room	14,0	3,0	42	1 316	55 284

Temperature °C
 Controlling the temp.

Temperature °C
 Controlling the temp.

Sound insulation of walls dB
 Sound insulation of doors dB

Sound insulation of walls dB
 Sound insulation of doors dB

Better internal climate controlling

Better sound insulation

17 % higher investment

Foyer	16,0	1,0	16	1 380	22 084
WC	5,0	2,0	10	2 877	28 766
Meeting room	14,0	3,0	42	1 550	65 093

Workplace Information Produced for Dialogue



- A list of user functions and activities
- Temporal and geometric needs for the facility operations which includes:
 - room schedules,
 - performances,
 - details on the potential for use
 - spatial utilization degrees.
- Life Cycle Costs. Associated costs are traced the back to activities (ABC)

Teachers meetings 6.3-15.4 2003



Teachers were asked to acquaint themselves with the representation in advance (WOP is a web application)

A lot of decisions, two examples

- only one music- teaching area was deemed necessary with maximum target utilization (75%). Cygnaeus school emphasizes music teaching. More flexibility and lower utilization was required. > *Action: a second music space was allocated*
- Teachers wanted to split pupils into two classes after half an hour, two rooms for one session. > *Action: Principal said that such low utilization would not be wise*

Corrected representation (version 3) was 6 926 m² and 670 000 € rent/year.

A day before Strategic project meeting 15.4.2004



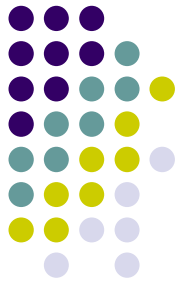
- A day before City department of education asked workplace planner to prepare a suggestion on how the program could be further reduced without losing activities. > *Action: Haahtela prepared a version 3.1 by optimizing all the utilization degrees close to target utilization (sometimes by combining diverse activities within same spaces. 6 089 m² and 580 000 €/year.*

Strategic project meeting 15.4.2004



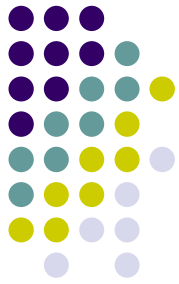
- Included principal, vice-principal, city real estate management, city department of education, workplace planners
- All stakeholders said that they can understand the information of both the representations
- Principle said that both versions are possible, but, of course, they prefer version 3.
- After much discussion the target was agreed between versions 3 and 3.1
- The city left Haahtela group to work with school groups to make changes without losing user functions

Operative managers meeting 6.5.2003



- **Workplace planner:** The need for an auditorium is very low, 2 % utilization. Auditorium uses a lot of resources.
- **Principal:** It is true. It is needed for final examinations before graduation. Smaller groups need too many teachers for supervision.
- **Workplace planner:** Examinations use few temporal but many spatial resources
- *> action: we will invest to portable walls with good sound insulation. We can combine three 80 m2 classrooms for such occasions. Auditorium will be removed*
- decisions on computer classrooms, teachers workplaces etc. etc.
- *Version 4: 6104 m2, 400 m2 below target. We can add activities.*

Operative managers meeting 14.5.2003



- *Sample examination activities were added in natural science spaces*
- *Student band instrument storing was added in music environment*
- *Vice principal will have a 4 people meeting possibility in his room*

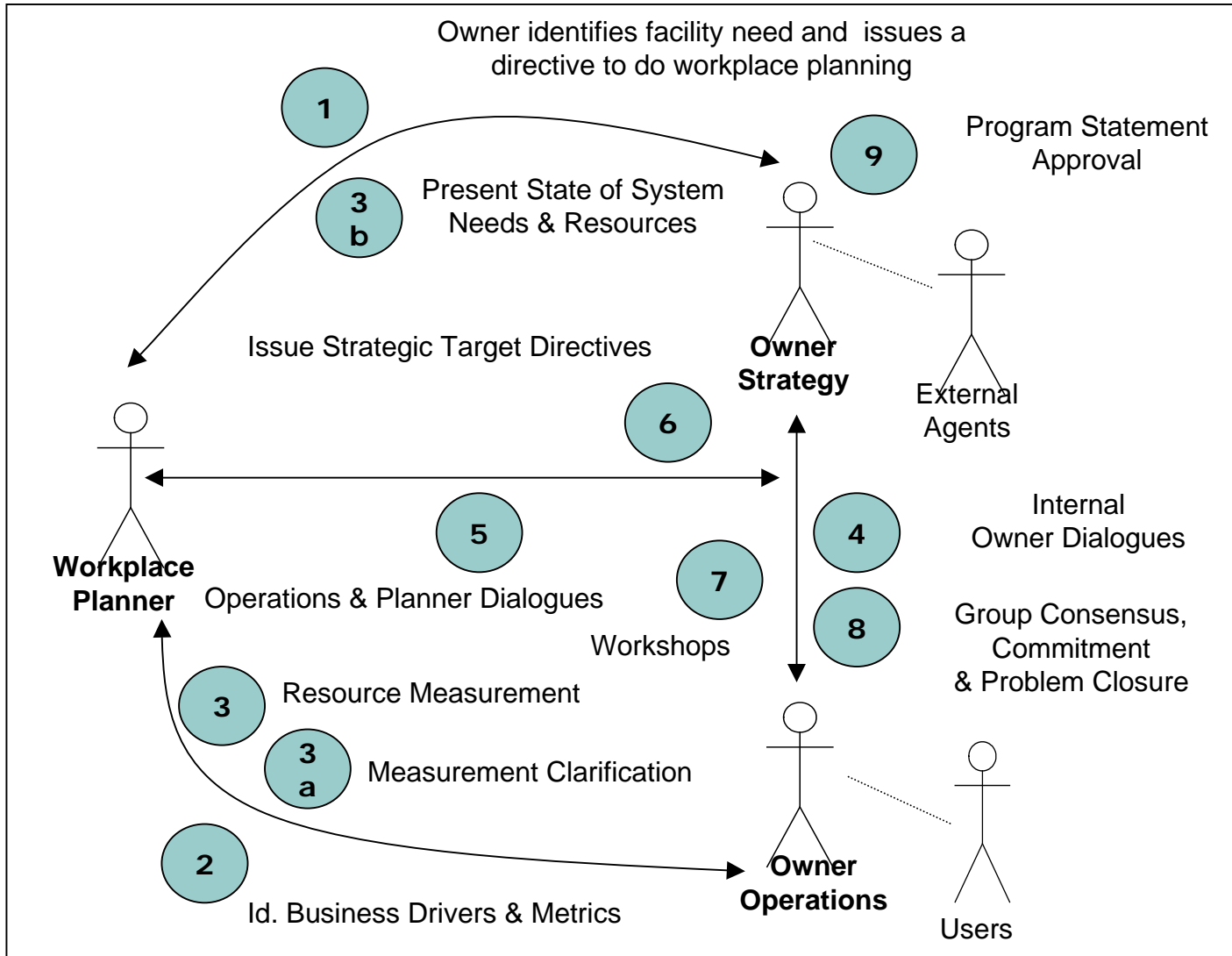
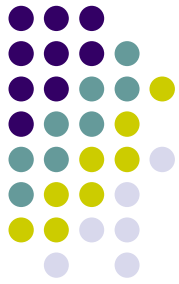
Commitment 14.5.2003



Version 4.2 was accepted

- City real estate organization accepted the budget (8 020 000 €, Vat 0%)
- City real estate organization calculated the rent. City department of education accepted the rent
- Principal and teachers accepted the spaces and the performances
- All agreed that architectural design could be started

Process Phases

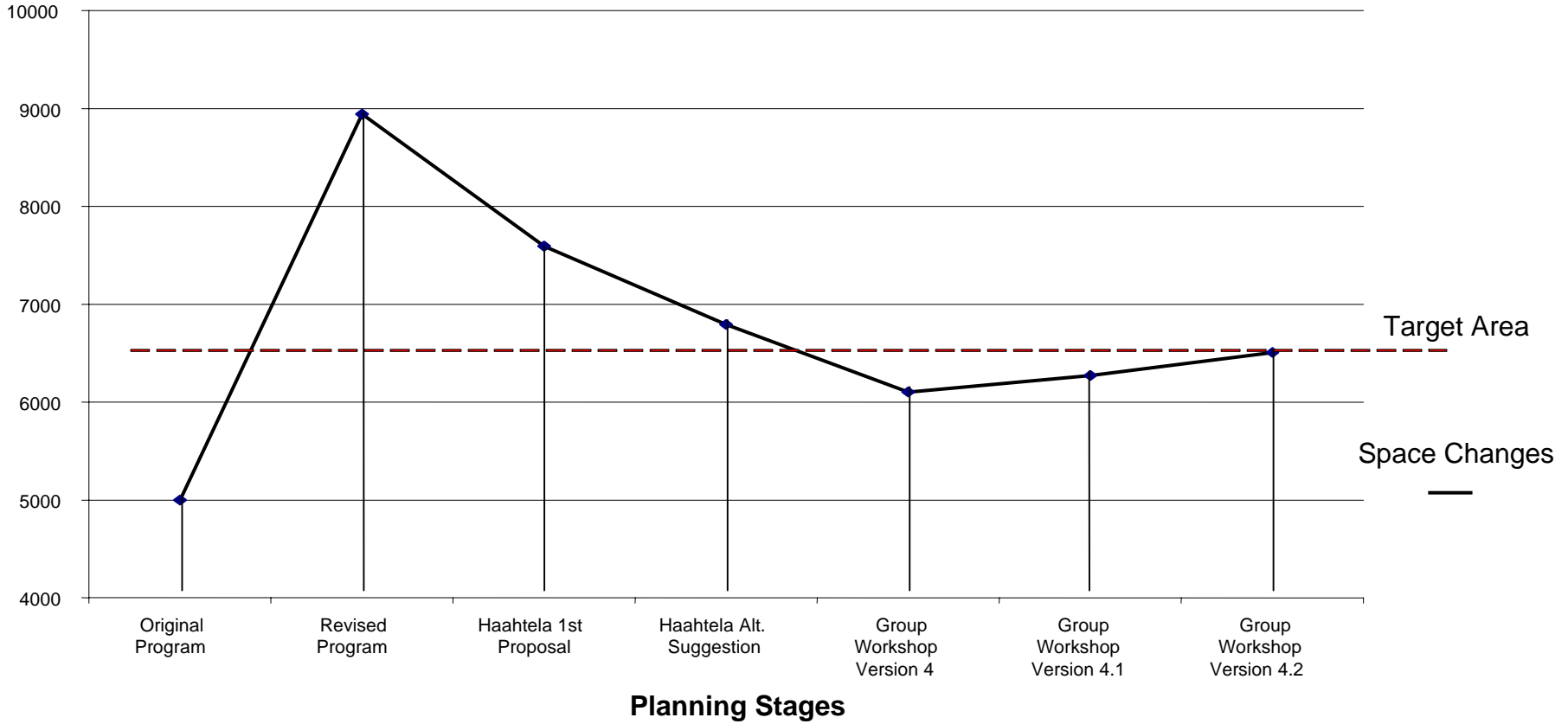




Steering Example

Square Meters

Space Targets

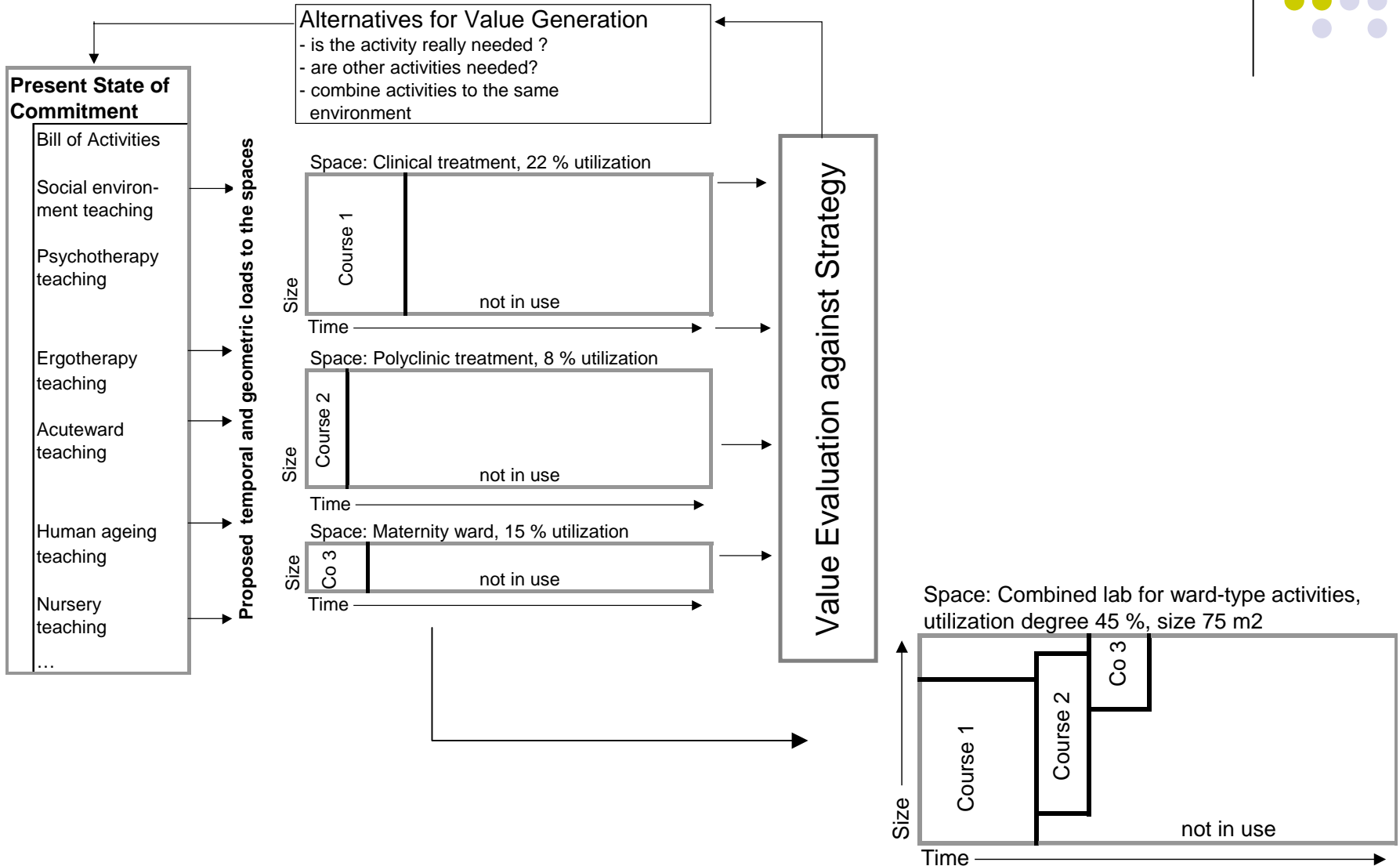
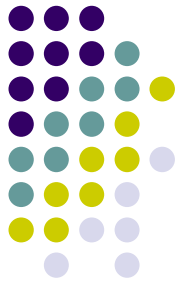


Workplace problem solving strategy

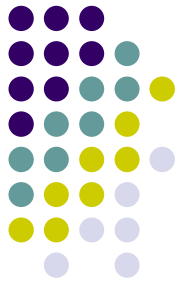


- Is the Activity really needed ?
- Are other Activities needed ?
- Relocate and Combine Activities to same Environment ?
- Make more flexible

Value evaluation

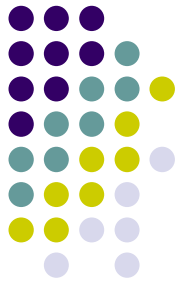


Findings from Haahtela



- Evidence of Collaborative Capabilities
 - Acknowledges self organizing groups and change in owner/user environment
 - Produces High Quality Information
 - Operational functions and user activities
 - Spatial performance
 - Costs
 - Facilitates a shared problem solving space and a common working language
 - Promotes learning through measurement, feedback & dialogue
 - Promotes stakeholder transparency, trust & commitment
 - Creates innovative outcomes in the workplace design and client organization

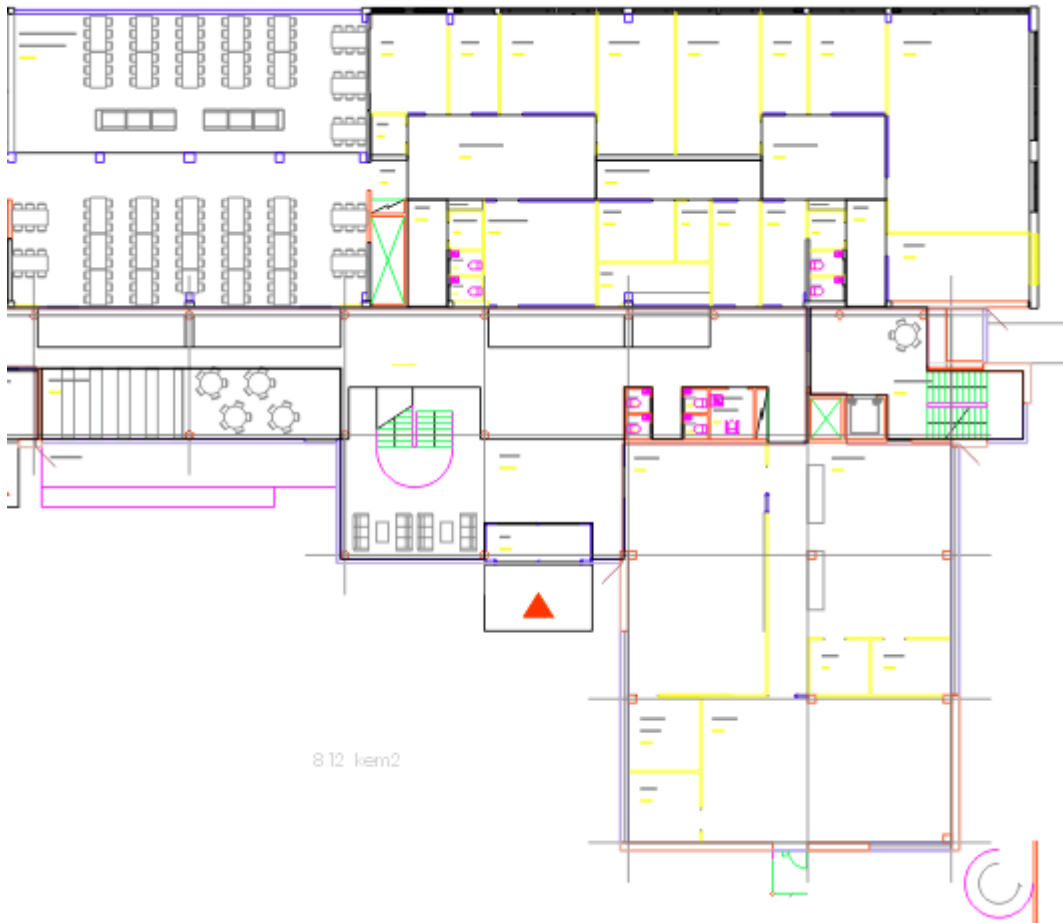
Collaborative Decision Making



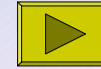
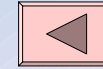
- In all Examples the decisions were taken by the client during the group dialogue.
- Dialogue was steered by:
 - Knowledge of the functional drivers
 - Knowledge of the utilization degrees
 - Knowledge of the costs of workplaces
- Problem solving resources are used more efficiently as:
 - Applications allow frequent and rapid calculation of space geometry, and performances.
 - More time is allocated to “what-if” scenarios and opportunity finding
- Information is standardized across all organizational units
- Cross-organizational interaction and dependency is better understood



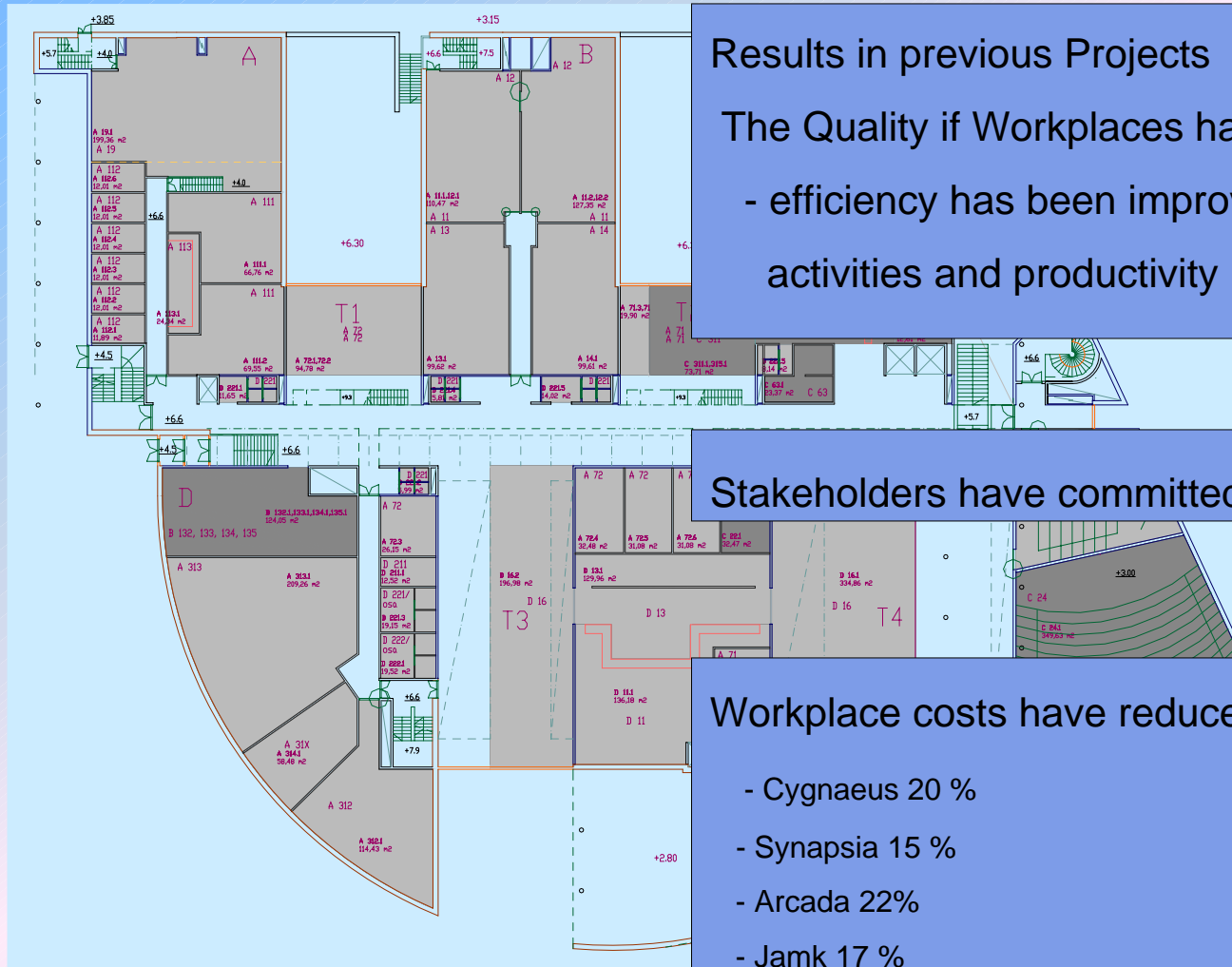
Now: Design is completed



Still within the target



RESULTS IN WORKPLACE PLANNING



Results in previous Projects :

- The Quality of Workplaces has been improved
- efficiency has been improved without losing activities and productivity

Stakeholders have committed to common goals

Workplace costs have reduced:

- Cygnaeus 20 %
- Synapsia 15 %
- Arcada 22%
- Jamk 17 %

Workplace planning and architectural quality – Synapsia Rehab Center

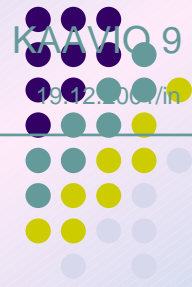
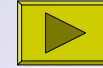
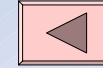


It is possible to deal with client values, user activities and \$ during workplace planning and also create best architectural value, too.

This building was named “one of the best pieces of Finnish architecture during 1998...2002”.



Thank You!

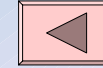


WORKPLACE PLANNING MANAGEMENT; Means

Combine activities to same workplaces

Define workplaces to be flexible:

In previous example the possible actions in new lab were planned so that it enables all activities



WORKPLACE PLANNING MANAGEMENT; Means

Combine activities to same workplaces

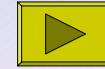
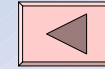
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Find synergy among departments:

In Police Security Department and Investigation Department the interrogations were held in officer's rooms. Interrogation workplace utilization was poor.

It was decided to centralize interrogations in "interrogation hotel", close to main entrance and police jail. Utilization can now be planned. Officer's workplaces were planned more flexible in landscape area



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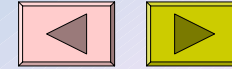
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Arcada Polytechnics have TV activities. TV- studio was found to be too expensive compared to activity income. Workplace Planning agent was asked to look for similar existing environment. Near-by University of Art and Design Helsinki can offer time in their TV studio. Lighter multimedia studio was planned to Arcada.



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Is the Activity really necessary?

Are other activities needed?

In Neuron research center it was decided that Sauna- activities is not as important to core activities as time-difference laboratory.