Research Based Decision Making in Architectural Programming of Workplaces: Case of Pamlico County Government Offices, North Carolina

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1. INTRODUCTION

Social, economical and technological developments in the recent decades, especially in the early days of the twenty-first century have consistently revealed the importance of knowledge as a base for decision-making processes. The ever-increasing dependence of productivity and competitiveness on knowledge in many fields has resulted in perception of knowledge as a commodity itself (Castells and Hall 1994). Consequently, the emphasis on knowledge generation has been identified by extensive research based applications in many fields and many societies.

Within the field of architecture, knowledge generation and knowledge-based practices have started to be complementary to decision making and design processes especially in the last decades. The connotation of architecture with “art and design” has been accompanied by increased knowledge generation efforts, which has also brought architecture a connotation with “science”. The resultant forces have complemented the term “architecture as art” with another: “architecture as a knowledge-based tool” (Toker and Rifki 2001).

2. ARCHITECTURAL PROGRAMMING

Architectural programming forms an important practical part of the efforts for the objective of architecture as a “knowledge-based tool”, which is also complemented by architectural research in the scholarly realm. Increasingly being accepted as an integral part of the architectural design process, architectural programming has become an important element of contemporary architectural practice.

Architectural programming is an essential tool for decision-making in contemporary architectural practice, and is an integral part of architectural design in various contexts. A review of related literature reveals that architectural programming is composed of three major phases (Duerk, 1993; Pena, 1987; White, 1972; White, 1991). While various authors have adapted different terminologies, these three main phases can be clearly identified in literature.

The first phase is characterized by information gathering about the “facts” of the project about various issues: the site, users, culture, behavior patterns of users, preferences, environmental history and many potential other “facts” according to the project context. In other words, the first phase is mainly composed of information gathering and evaluation about the existing situation. The second phase in architectural programming is basically composed of the identification of “goals, needs and requirements”. Similar to the first phase, the identification of goals, needs and requirements is based on different issues as they arise within the project context. Finally, the third phase consists of the production of design recommendations, design issues, or generally, pointers for design decisions, based on the first two phases (Duerk, 1993; Pena, 1987; White, 1972; White, 1991).

3. WORKPLACES AS KNOWLEDGE-BASED TOOLS

The twentieth century has formed a scene for the development of workplaces through many attempts to architectural programming as a decision-making tool. While the needs and requirements of workplaces have been increasingly different for different work sectors and work patterns, it has been increasingly clear that architectural programming is a major tool for design and decision making for workplaces (Toker and Rifki, 2001).

As increasingly complex and different requirements for various work patterns arose, different information gathering techniques have been integrated to the design process (Duffy et al. 1998; Worthington 1997). In addition to the developing information gathering techniques, the number and variety of issues to be considered have also increased, based on the results of extensive research in this area (Wineman 1982). Some main issues can be exemplified as the increasing use and development of information technologies in workplaces, issues of environmental comfort, ergonomics, compliance of spatial configuration with work patterns, and satisfaction of users with the workplace. In this respect, workplaces constitute a major field of application for architectural programming and "architecture as a knowledge-based tool" (Toker and Rifki, 2001).

4. THE CASE OF PAMLICO COUNTY GOVERNMENT OFFICES, NORTH CAROLINA

A recent project undertaken by the authors constitutes an effective example of architectural programming for workplaces. In fall 2000, the County Manager of Pamlico County, North Carolina contacted the authors for a programming study of the county government offices. Pamlico County Government offices are currently located in town of Bayboro, NC.

The departments of the County are scattered around the town, occupying buildings that have been designed for various purposes in various time periods. A common feature of the buildings occupied by the County is that, they were designed in general for purposes other than workplaces. One exception within these is the Courthouse building, which was custom designed in early twentieth century, and its annex custom designed in sixties. Both blocks of this building reflect the characteristics of the period they were designed in. Therefore, two initial points that existed were the location of departments and the characteristics of the buildings occupied by them.

4.1. Methodology

The project was handled within a three phase framework, parallel to the major approaches existing in the related literature as discussed above:

1. Understanding and evaluating the existing situation;
2. Identifying future workplace needs and requirements;
3. Generation of design recommendations and alternatives for long-term decision-making strategies

While the first two phases of the project were oriented towards information gathering, the third phase was oriented toward knowledge-based decision making.

4.1.1. Information Gathering

The first phase of the project consisted of information gathering and evaluation about the existing situation. Within the efforts to understand and evaluate the existing situation, three main issues were considered: *interdepartmental interactions*, *workplace satisfaction* and *environmental comfort*.

Interdepartmental interactions were examined in order to evaluate the relative distance of the buildings occupied by departments according to each other. An "interactions log" were developed, and distributed to all employees in each department. The employees kept a log of all interdepartmental interactions for a sample week. The typical business week was selected according to the interviews held with the County Manager and Board of Commissioners in order to avoid misleading responses. Based on the "interactions log", data about the frequency, type and direction of interdepartmental interactions were gathered. The four main interdepartmental interaction types considered were: face-to-face interactions, telephone calls, e-mails and faxes.

Workplace satisfaction was examined based on the compatibility criteria of work patterns / practices of departments and spatial configuration of their workplaces. An instrument was developed, on which all employees from all departments were able to evaluate their workplaces according to their work patterns and daily practices. The evaluation was considered in thirteen subheadings: Support for work and productivity; Appropriateness for work; Privacy; Distraction from work; Proximity to colleagues; Ease of contact in office; Enhancement of communication; Noise level (from office environment); Personal comfort; Attractiveness; Size and area; Furniture; Overall satisfaction.

Environmental comfort was evaluated based on the personal responses of all employees from all departments. An instrument was developed on which the employees were able to evaluate the physical comfort levels of their workplaces. Environmental comfort was evaluated through fourteen subheadings: Temperature in winter; Indoor air quality in winter; Lighting in winter; Daylighting in winter; Temperature in summer; Indoor air quality in summer; Lighting in summer; Daylighting in summer; Noise from environmental control systems; Degree of control; Frequency of control; Control improvements; Environmental issues; Overall satisfaction.

The second phase of the project consisted of information gathering about the future workplace needs and requirements of departments. For this purpose, a new instrument was developed based on an extensive review of literature about workplaces. Various workplaces of different work patterns from different sectors were examined, and a typology of workplaces was constructed. Twelve types of individual and common workplaces were identified as significantly common examples, along with two meeting – oriented types. All the types were three-dimensionally modeled using computer-aided design software, and two images were generated (an overview and a close-up) for each type. An example of these types is provided in figure 1.

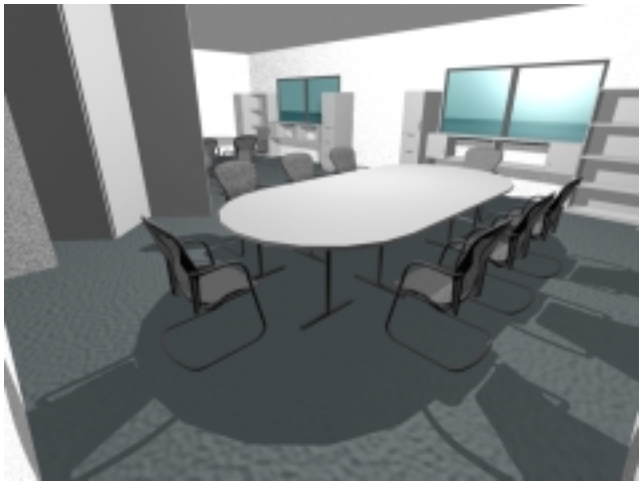


Figure 1. One of the types that was included in the instrument.

Specifications of these workplaces (i.e. floor area, objectives, potential uses) were provided to each department along with the three-dimensional images. Using this instrument, each department head was requested to identify the number of employees in their departments, their job titles, and the appropriate workplace type for each of these job titles, based on their everyday practices. Consequently, the workplace needs and requirements for all departments and their employees were identified.

4.1.2. Towards Decision Making

In the **third phase** of the project, the efforts of the team were oriented towards generation of design recommendations and alternatives for long-term decision-making strategies. A three-step procedure was undertaken, and this procedure is still under progress.

In the first step, department specific design recommendations were generated based on the evaluation of existing situation for each of the departments. Information that was gathered about interdepartmental interactions, workplace satisfaction and environmental comfort was evaluated. For interdepartmental interactions, the frequency, type and direction of interactions were compared to the distance among departments in pairs. Through an analysis of all the combinations of pairs, it became apparent that interdepartmental interactions did not form a basis for a relocation decision for any of the departments. An example of interaction – distance comparison is provided in figure 2.

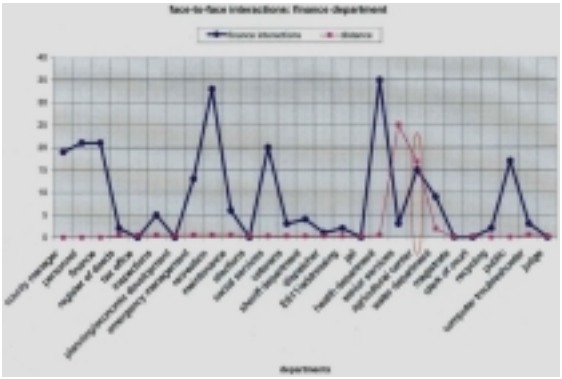


Figure 2. Face-to-face interdepartmental interactions between finance department and all other departments vs. distance.

For workplace satisfaction and environmental comfort, the data gathered was analyzed for each of the departments under each subheading, and department – specific design recommendations were generated based on this information. An example of workplace satisfaction and environmental comfort evaluations are provided in figures 3 and 4 respectively.

Figure 3. Workplace satisfaction: "support for work and productivity" as rated by all departments.

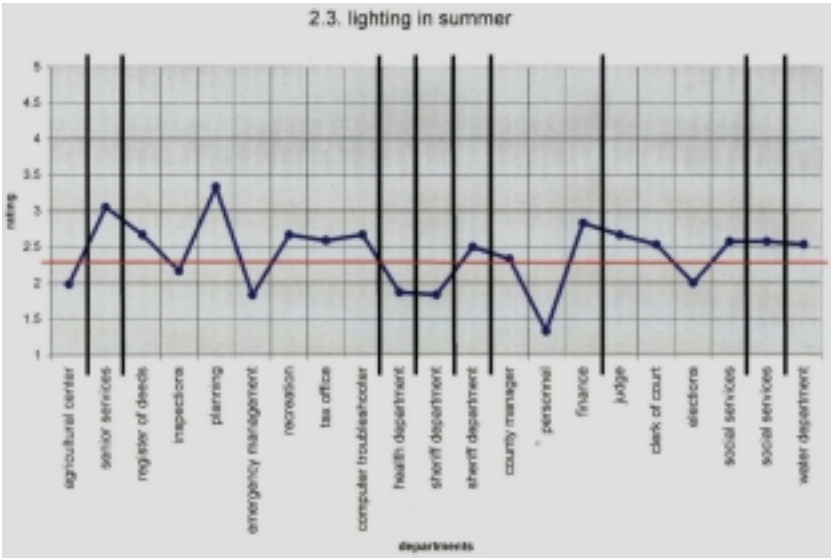
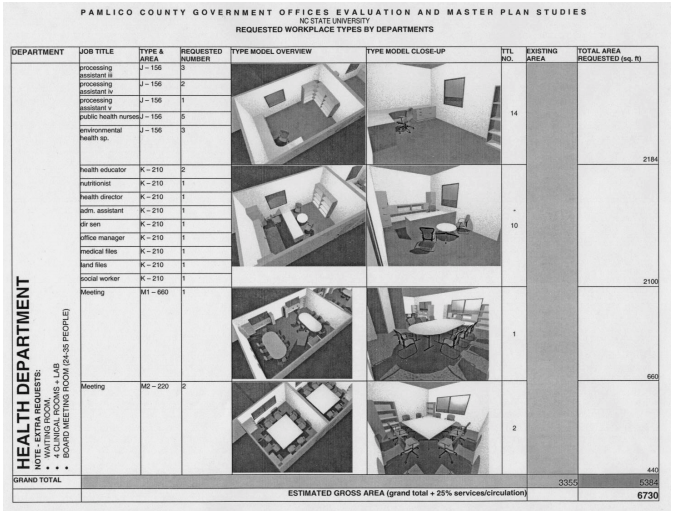


Figure 4. Environmental comfort: "lighting in summer" as rated by all departments.

In the second step, department specific workplace requirements were identified based on the information gathered in the second phase of the project. For each of the departments, specific charts were prepared that identified all job titles, the number of employees with these jobs, the required type and number of workplaces for each job, existing floor area of the whole department, and estimated net and gross area requirement for that department. An example of these charts is provided in figure 5.



PAMLICO COUNTY GOVERNMENT OFFICES EVALUATION AND MASTER PLAN STUDIES
NC STATE UNIVERSITY
REQUESTED WORKPLACE TYPES BY DEPARTMENTS

DEPARTMENT	JOB TITLE	TYPE & AREA	REQUESTED NUMBER	TYPE MODEL OVERVIEW	TYPE MODEL CLOSE-UP	TTL NO.	EXISTING AREA	TOTAL AREA REQUESTED (sq. ft)
HEALTH DEPARTMENT NOTE: EXTRA REQUESTS: • WAITING ROOM • 4 CLINICAL ROOMS + LAB • BOARD MEETING ROOM (4'=35 PEOPLE)	processing assistant iii	J – 156	3			14		2184
	processing assistant iv	J – 156	2					
	processing assistant v	J – 156	1					
	public health nurses	J – 156	5					
	environmental health sp.	J – 156	3					
	health educator	K – 210	2			10		2100
	nutritionist	K – 210	1					
	health director	K – 210	1					
	adm. assistant	K – 210	1					
	dir sen	K – 210	1					
	office manager	K – 210	1					
	medical files	K – 210	1					
	land files	K – 210	1					
	social worker	K – 210	1					
	Meeting	M1 – 660	1			1		660
	Meeting	M2 – 220	2			2		440
GRAND TOTAL							3355	4384
ESTIMATED GROSS AREA (grand total + 25% services/circulation)								6730

Figure 5. Workplace needs and requirements: health department.

Within the same step, the existing floor areas and required floor areas (net and gross) were also compared by means of graphs. Based on these comparisons, those departments with excessive need of extra floor area were identified, in order to inform the County Government about those departments with most "urgent" needs. An example of these comparison charts is provided in figure 6.

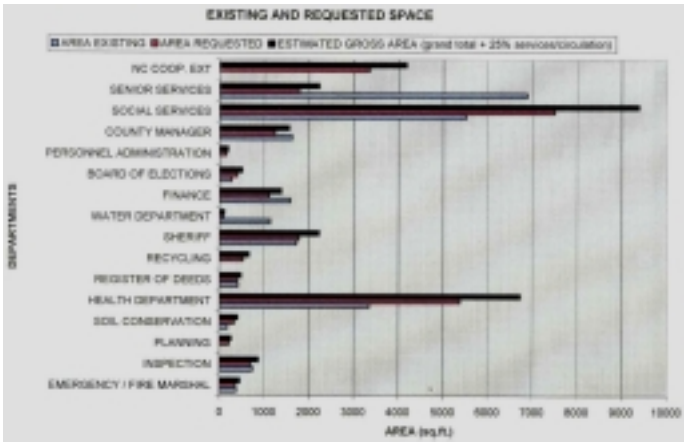


Figure 6. Floor area requirements compared: all departments.

The third step of the last phase of the project is still under progress. This step complements the department-specific design recommendations by focusing on the long-term urban scale decisions. Therefore, recommendations and alternatives that are being generated in this step focus on urban scale and long-term decision-making alternatives as opposed to department scale recommendations. The programming team is currently working on two major long-term strategies within this step. Both alternatives have been developed in the light of information gathered and interpreted in the first two phases. The first alternative focuses on the possibility of consolidation of all departments within a single "government block". While this alternative currently under consideration can be graphically represented as in figure 7, it must be noted that it is still under evaluation of the programming team in terms of issues such as work patterns, environmental comfort, and urban and local sustainability (i.e. traffic, solar control, effects on surrounding blocks, etc.).

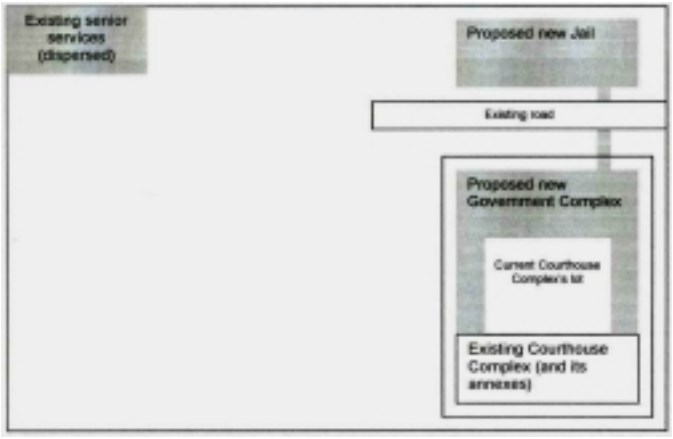


Figure 7. Phase 3, step 3: alternative 1 – consolidation of departments.

The second alternative focuses on the possibility of leaving the majority of departments in their current locations, but by following the department-specific recommendations generated in the first step (workplace satisfaction, environmental comfort recommendations) through minor modifications. This alternative also includes the possibility of the relocation of two largest departments with highest floor area requirements and lowest evaluations in terms of workplace satisfaction and environmental comfort. Such a relocation is currently envisioned in a new building in the current courthouse complex's block in this alternative. This alternative can be graphically represented as in figure 8, and similar to the first alternative, is under evaluation of the programming team under the same criteria.

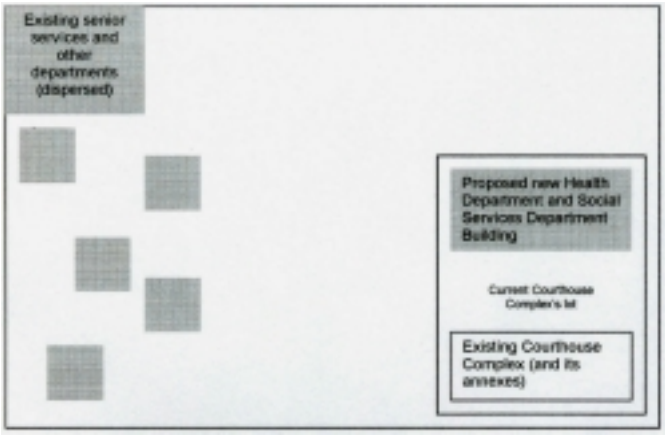


Figure 8. Phase 3, step 3: alternative 2 – dispersed locations for departments.

4.2. Methodological Implications

Throughout the whole process of this project, frequent visits to the town of Bayboro, as well as feedback meetings with the County Manager and Board of Commissioners were realized. Starting with the launch of the project, it was made clear to the County Manager, Board of Commissioners and Department Heads that this was a knowledge-based decision-making process. In the subsequent meetings this issue was consistently emphasized, and the process was graphically represented to them as in figure 9.

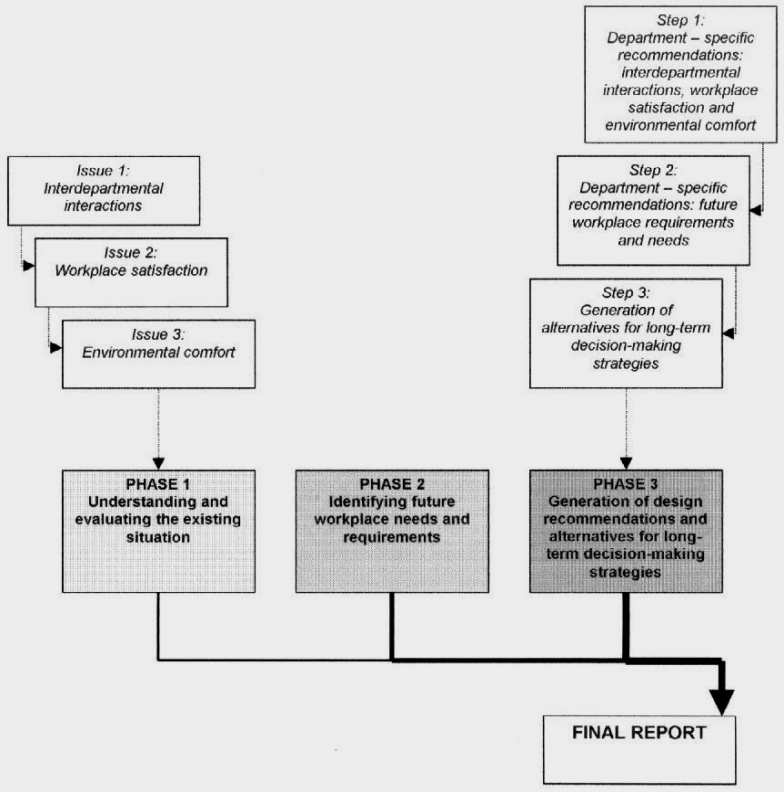


Figure 9. The project process.

Frequent feedbacks and active communication with the County Government has resulted in accurate results and increased satisfaction of the "end-users". It was observed that such efforts not only made the efforts of the team legitimate in the eyes of the user group, but also has resulted in clear and accurate recommendations.

5. CONCLUSIONS

The project is envisioned to end by the time this paper is presented in ARCC Research Conference. A final report will be produced, in which department-specific recommendations as well as long-term decision making strategies will be elaborated. The main objective of the programming team is to provide the County Government by a final document, by which they can communicate their needs and requirements to future decision makers (architects, city planners and policy makers) clearly and effectively.

The conclusions that can be derived from such a case study are threefold. First, forming the architectural programming process, systematic information gathering and consequent decision-making results in accurate results both for the users and future decision makers. Second, such efforts not only provide accuracy, but also provide a medium of clear communications between professionals and user groups. Third, such a clear communication medium provides the users with good understanding of issues at stake, and results in a productive collaboration between users and professionals for the good of the project.

As a result, it is our belief that such knowledge-based efforts must be increased in architectural design processes. A broad framework for architectural programming to be used in workplace projects can be proposed as in figure 10.

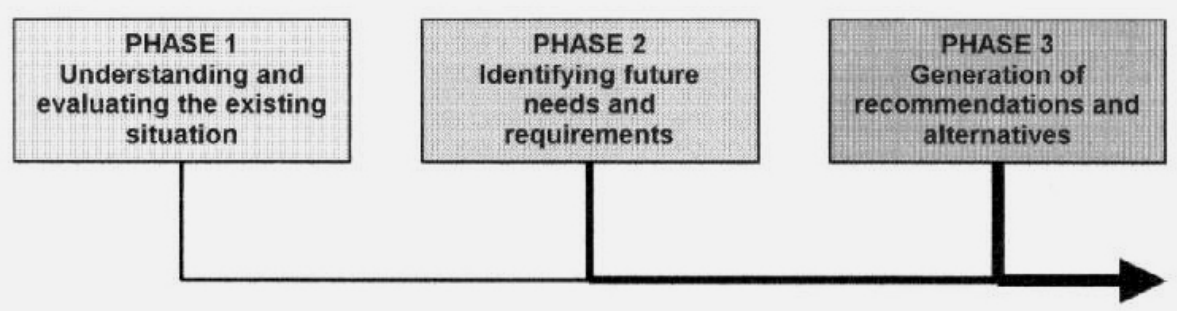


Figure 10. A broad framework for architectural programming of workplaces.

This framework can be modified based on the specific conditions of the project context. However, it must be emphasized here that knowledge-based processes have a great ***complementary*** potential for architectural design towards providing satisfactory results for both design professionals and users, as well as towards providing a legitimization of the products of architecture. Therefore, it is our belief that architectural programming forms an important part of the building process from the start to the end, but is itself complementary to the design process.

6. REFERENCES

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