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PHILOSOPHICAL FOUNDATIONS AND METATHEORETICAL CONSIDERATIONS FOR CREATING FRAMEWORKS TO COLLECT FACILITY PROGRAMMING INFORMATION

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Abstract:

This study attempts to provide theoretical guidance to scholars who collect facility programming data. To facilitate the organization of their efforts and to enable them to become more efficient data collectors, we begin by developing philosophical and metatheoretical foundations that help create concrete theoretical levels and the related models, research designs, and protocols required for efficient data collection. Activity Theory and systems thinking permit the elaboration of the concept of activity within a dynamic and hierarchical organization. Specifically, sociospatial reality is viewed as a continuum starting with building users moving toward their goals, followed by activities for achieving these goals, identifying user needs that emerge in the process of these activities, and concluding with built environment structures that provide for and satisfy these needs. Because facility programming situations and projects are very different, we offer general guidelines intended to assist programmers develop both project specific frameworks and research designs.Together these methodological foundations ground our framework in the reality of sociospatial relationships and provide guidelines for collecting relevant and usable information for supporting decision making during the facility programming design process.

Keywords:

facility programming, philosophy of programming, philosophical foundations of programmatic research, methodology of programmatic research, framework building

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Introduction

This study attempts to provide methodological and theoretical guidance to scholars and facility programming researchers to help them better organize their efforts and to become more efficient in data collection. Specifically, we propose philosophical foundations and metatheoretical considerations that will guide the development of theoretical frameworks that in turn will inform the development of research designs and the collection of data. Because facility programming situations and projects are very different, we offer general guidelines intended to assist programmers develop both project specific frameworks and research designs.

We begin this study by conceptualizing at an abstract level of social reality. Next, we systematically develop more concrete levels of thinking and model-building. Our project's foundation is grounded in the belief that research designs and data collection procedures are enhanced by particular epistemological and methodological views that privilege theoretical thinking. Accordingly, our first task is to develop philosophical and metatheoretical foundations that will serve as guiding beacons for developing more concrete theoretical levels and the related models, research designs, and protocols required for efficient data collection. As such, this study presents the foundational stage of our project.

Before we continue, we first need to explicate our understanding and interpretation of the most important relevant conceptualizations and terms that will help us communicate the scope and breadth of this stage of our project, the boundaries of our problem area, and the delimitation of possible solutions. To do this, we begin by reviewing the concepts of facility programming and programming as a research activity. After this brief introduction, we present the results of our research on relevant theoretical resources.

What is facility programming? Programming is a pre-design activity that involves social science research skills and architectural design expertise (Duerk, 1993; Palmer, 1981). Programming services are delivered mostly by architectural firms, although there are many other types of providers. Defined in simple terms, programming is about developing a document that informs architectural designers about building user behaviors, needs, and preferences. The design program includes both social information about the building users and a list of spaces with required physical features (Cherry, 1999; Duerk, 1993; Palmer, 1981; Pena and Parshall, 1977; Preiser, 1985a, 1985b, 1993; White, 1972).

However, programming does much more, as it also tries to describe the desired range of human and social needs that a building must satisfy in order to support and enhance the performance of human activities (Cherry, 1999; Duerk, 1993; Moleski, 1974; Lang and Moleski, 2010). Programs also describe those environmental conditions that are supportive and responsive to the users' activity patterns.

Moleski (1974) writes that facility programming formulates the requirements that satisfy the needs of users, the goals and objectives of each user group, and any issues that are to be resolved. He also believes (Moleski, 1974; Lang and Moleski, 2010) that the program is based on the investigation of organizational, social, and individual aspects of human behavior, the organizational policies that control organizational life, and the physical, psychological, sociological, and cultural attributes of the

users. Lang and Moleski (2010) further state that the study of behavior patterns and the explication of the behavioral needs of users are necessary steps in the process of formulating design requirements and for specifying the components of the physical environment. Moleski (1974) also emphasizes the importance of correctly translating user behavior information into programmatic requirements. Following Moleski's way of thinking, we join the scholars who emphasize that programming is about translating organizational structures and operations into explicit requirements for the design of the corresponding environments (Davis and Szigeti 1979).

Programming as Research: The Role of Theoretical Frameworks. From a process perspective, programming has an extensive research component. It involves data collection, analysis, organization, communication, and evaluation (Palmer, 1981; Duerk, 1993; White 1972). The information gathering phase also necessitates the well-planned collection of information that relies on formalized methodology.

In most cases, research presupposes elaborate theoretical models and frameworks that function as lenses for selecting only task-relevant information (Jabareen, 2009). This strategy saves researchers both time and resources, and also reduces informational overload and noise. A theoretical framework guides the programmer on where to search and what to seek. It makes the research effort more focused and efficient. This focus on the most important research issues and aspects contributes to the more effective use of limited resources for collecting programmatic information (Jabareen, 2009).

The role of theoretical guidance in research is perceived differently by depending on the paradigmatic viewpoints used. Logical empiricists tend to rely more on inductive thinking, while phenomenologists explicitly recommend to "bracket out" assumptions, preconceptions and past experience. Yet, one can argue that although theoretical models and frameworks may limit the heuristic potential of researchers, it is also true that they focus the research effort during the data collection stage and provide an interpretative background during the analytical stage. Such guidance is particularly practical when research requires a thorough and holistic inquiry into complex situations, such as in facility programming.

Programming also involves examining a broad spectrum of phenomena and aspects that span entire social units (Duerk, 1993, White, 1972). Often the effort is so extensive that it is easy to leave various facets unexplored. However, programmatic inquiry should not expend resources on irrelevant aspects of the phenomena studied. Instead, the search should be narrowed down to those facets that both interact and interrelate to the specific phenomenon being examined. These demanding requirements for both scope management and aspect selection necessitate the use of some type of guiding framework to keep track of the type and scope of information that is to be collected.

What is a framework? Simply stated, we view a framework as a way to organize and understand prior research on a particular phenomenon. In addition, we interpret framework to mean the systematic representation of a phenomenon that guides future research on this event. Such a conceptual framework is a theoretical product that will embrace the constituent components of said phenomenon, as well as the interrelationships between its various elements (Jabareen, 2009). We explicate our interpretation of framework in order to clarify the target area of this study, and to provide

a focus for our contemplations regarding the metatheoretical considerations for developing such frameworks. Consequently, throughout this study we refer to the role of theoretical frameworks.

In Search of Theoretical Resources

Our literature review indicates that only a very small number of publications examine frameworks for collecting programming information. Furthermore, most of these publications are from the 1970s. Although this research made important contributions to the field of environment and behavior studies, these studies require important revisions. To assist with these updates, we will extend our reviews to include a number of other disciplines as we search for precedents and prototypes that might assist us with improved framework building.

In Search of Precedents: Selected Frameworks for Collecting Programming Information

Publications that focus on facility programming are usually presented as either case studies or pragmatic guidebooks and textbooks. Thus, frameworks for collecting programmatic information are not always presented as metatheoretical and methodological tools. However, a small number of helpful resources were located, several of which we review below.

For example, Sanoff (1989) categorized a number of frameworks according to different facets of the development process such as site analysis, legal and code content, building type features, market research and user needs, functional demands, future uses, feasibility and finances. We believe that the most useful frameworks include either the “activity” framework (Sanoff, 1977), people/activities/relationships framework (Pena and Parshall, 1977), or the person/purpose/behavior framework (Wade, 1977). The Davis framework (see Sanoff, 1989) focuses on procedural issues rather than the substantial requirements of data gathering. Meanwhile, White (1972) offers an extensive list of categories that programmatic research should consider. All of these, to some degree, can be considered as early building blocks in the framework building effort.

Pena and Parshall’s (1977) research contributed a useful two dimensional matrix. The first dimension lists function, form, economy, time, and energy, while the second includes goals, facts, concepts, and needs. The information from all of these categories leads to the formulation of design problems. Preiser (1985a) presented the program as a translation of the mission and objectives of an organization, groups, and individuals, into activity-personnel-equipment relationships and performance language. We view these categories as the core of a programmatic framework. During the 1970s and 1980s, Preiser (1978, 1985b, 1993) also edited a number of books with programming case studies. Many of these studies contain implicit frameworks for collecting information, but all stop short of explication. Even so, we found this repository of knowledge very useful for both developing future programming frameworks and for making a case for the necessity to develop explicit frameworks for contemporary programming related data collection.

Davis’ (as cited in Palmer, 1981, p. 162) contribution to framework building is in the sociospatial area. He views a building as a crystallization of the social organization it contains. For him, a decision about a building is an implicit decision about the organization and a decision about the organization

is an implicit decision about the building. He describes the program as the simultaneous specification of the social organization and its spatial requirements. He believes that programming is more than just specifying user needs as it may completely redefine the flow of (work) activity and the nature of the (work) groups. Because programming has the potential to provide better and more productive environments, it may be viewed as an opportunity to redefine and improve the organization itself.

Walter Moleski's Contributions as a Stepping Stone

An overview of the framework. We review and expand Moleski's conceptualization of the sociospatial reality because it comes very close to Activity Theory thinking, employing the word "activity" in a number of ways, and offers a link between traditional behavior setting thinking and Activity Theory. Moleski's initial (1974) framework, later elaborated with Lang (Lang and Moleski, 2010) focuses on the description of organizational activities as a basis for developing performance requirements. Moleski (1974) creates and uses "the activity site" concept to study the behavior-environment interface, analyze behavior, and to present a rationale for developing performance requirements. For Moleski, an activity site is a physical area within the organizational boundaries in which a prescribed activity regularly occurs. The activity site concept binds together organizational activity systems with the organizational space in which they happen. Moleski depicts social organization as a patterning of activity sites that are organized at three levels: the task level, the social level, and the organizational level. His model of the sociospatial reality also articulates three aspects of description: behavioral (activity), sociospatial, and physical; all of which are further articulated according to his three levels of the social organization. The following sections will elaborate these levels.

The behavioral aspect. This aspect is articulated at the task, social, and organizational levels. At the task level activity description is elaborated according to type and level of activity, level of thinking, level of routines, level of attention, orientation of the performer, and volume of work. The behavioral aspect also includes the social level. At the social level, activity is described in terms of social interaction, such as the amount of social structure and formalized roles, interaction related to the task, communication networks, level of supervision, and place of the group within the larger setting (i.e., social focus of the performers). The organizational dimension is further subdivided into value system, norms, outcome of the activity (e.g., basic versus support activities), type of reward system, and type of authority system. Here, Moleski introduces several considerations about the links among different activities. These include communication network, work flow, material flow, paper flow, status, power, and compatibility among activities.

The sociospatial aspect. This aspect of the framework encompasses sociospatial performance descriptors. Moleski presents the performance descriptors as elements which define the performance of the environment in terms that have both physical and social connotations. For him, this aspect is related to several concepts about the level of personal control in environment: privacy, interaction, distancing, closeness of the setting, restrictions to entrance into the setting, and interference with other activities. There are also several concepts about the communicativeness of the environment: explicitness of messages, power cues, perceptual stimulation, and clarity of messages. Interdependence of the settings and their adaptability to changes in activity patterns are also listed along the sociospatial and sociomaterial performance requirements. These two

categories differ considerably from the rest because they do not directly refer to the individual experience in the environment. Rather, they focus on operational and organizational level issues.

The physical aspect. The physical aspect is articulated into four groups of features. First are the large-scale elements: size, positioning of settings, visibility, physical definition of space, communication networks/linkages, and boundary characteristics. Second are the smaller elements: arrangement of equipment, organization of work areas, control of circulation and traffic, location of individuals, and location of social spaces. Third are the elements that give a physical setting its overall character and mood: lighting, color, materials, texture, and style. The fourth area of features is communication media (signage): graphic material, status cues, symbols, and image.

We refer to Moleski's conceptualization of sociospatial reality as an important stepping stone and a bridge between existing theoretical developments and the Activity Theory approach described herein. Moleski's emphasis on behavior and activity helps us connect existing systems theory research with the activity theory conceptualizations that we develop later in this study.

In Search of Precedents: Moving Beyond the Area of Environment and Behavior Studies

Our literature review found a limited number of studies that explicitly present frameworks on facility programming. In response, we expanded our search to several related fields that might offer productive insights, including: management, organizational design, job design, organizational behavior, strategic planning, personnel management, human relations, psychology of work and organizations, corporate culture, leisure and recreation management, and leisure and recreation programming. Even this expanded review was unable to find materials helpful to framework building. However, this review did expand our theoretical horizons and also reveal the potential that some of these fields could offer to this project.

For example, we determined that the fields of organizational studies and corporate culture are very promising areas with respect to facility programming. Organizational studies allow us to view the people to be housed by a facility as a holistic, integrated social unit. This way of thinking is more strategic and holistic than those used by other areas that instead focus on isolated social variables (Borkowski, 2015; Burke, 2014). Managers are also more apt to think in terms of the (organizational) environment (Burke, 2014). As such, the theory of organizations provides a possible framework for structuring our research efforts. In addition, the field of corporate culture is an important compliment to organizational studies and offers the tools for understanding the specifics of the organizational sub-populations (Cameron and Quinn, 2005).

Activity analysis in leisure and recreation programming initially seemed quite promising, with respect to facility programming. However, a more focused analysis of these studies revealed that while Activity analysis in leisure programming provides material on the psychological and sociological aspects of events and activities, it remains mostly experiential and follows everyday rationality and habitual ways of organizing our everyday life (Sylvester, Voekl, and Ellis, 2001). That said, leisure and recreation programming provides examples of how people and activities are connected through goals and objectives (DeGraaf, Jordan, and DeGraaf, 1999). Recreation programming is much more systematic and user based than the field of facility programming (Rossman and Schlatter, 2008). In this field, the development of goals and systems of activities are based on user need research. This approach stems from the tradition of marketing research and

studies on the organizational design of entertainment and leisure organizations. Leisure and recreation programming can serve as examples of areas where systematic planning of activity systems are valued and institutionalized (Rossman and Schlatter, 2008).

Our review of several other areas brought mixed results. Human kinetics and occupational therapy may be useful at the level of human factor engineering, but these fields do not contribute enough to the development of an overall framework of sociospatial situations. Instead, they mainly analyze activity by way of its motor components, with emphasis on anthropometrics and biodynamics (Thomas, Silverman, and Nelson, 2015). Job analysis and work analysis provide sophisticated methods for studying operations and activities, but again, mostly at the microlevel (Brannick, Levine, and Morgeson, 2007; Wilson, Bennett, Gibson, and Alliger, 2012). The core of ergonomics and human factor studies focus on the microlevel, dominated by psychological issues. Macroergonomics relies on inductive approaches to organizing information collection or frameworks tailored to a strong interest in operations improvement and organizational design (Hendrick and Kleiner, 2005).

After reviewing these research fields and the theoretical materials they present, we came to the conclusion that the conceptualizations and frameworks of social entities designed for application in various social disciplines are different from the frameworks we need for "sociospatial" research. In the social disciplines, social phenomena and processes are abstracted from their real settings as only the “social” component is considered. The presumption is that space is a factor with relatively limited influence. Researchers in these fields use this methodological approach to reduce information “noise” and “contamination,” to manage the volume of information about social components, and to make their theoretical frameworks more streamlined and comprehensible.

In the field of programming, however, the purpose and priority of research and data collection are peoples’ interactions with the physical environment (Duerk, 1993, Preiser, 1985a, 1985b). Social phenomena are studied in relation to sociospatial interactions. In this case, “noise” and “contamination” are caused by too *much* social information that has little to do with the physical environment. Many aspects and elements of social entities can be abstracted and disregarded as these do not breach the wholeness and systemic nature of the social phenomena studied. The aspects selected for examination should not only comply with the principle of economy of effort, but they should also preserve the holistic nature of the object of study and should bring enough information for making design decisions. In the next section we attempt to link the theoretical conceptualizations reviewed above with relevant methodological considerations.

Some Methodological Considerations about Framework Building

We use the term “methodological” to mean methodology of theorizing rather than methodology of field research and research designs. Successful intellectual effort of any kind requires a well-thought out methodological apparatus (Jabareen, 2009). Even when working at the philosophical level we apply a particular way of thinking, which is a methodology of theorizing. In this section, we will discuss some general issues related to framework building and then tie these to programmatic research. The ideas presented below are grounded in the philosophy of science and in our literature review. They have emerged in the process of reflecting on the limited application of existing

theoretical resources, the nature of models and frameworks, and the extant situation of several research domains that we have already analyzed.

The linear tendency in human thinking and the multidimensional nature of the real world present a problem for framework building (Jabareen, 2009). It is impossible to model any real phenomenon without missing some of its complexity. Each model is capable of showing one or at most only a few aspects of social reality (Jabareen, 2009). As such, modeling the social organization will not yield a "mental picture" of all aspects. Since each modeling act is capable of "embracing" only a limited portion of the phenomenon, careful methodological consideration may at least save us the trouble of modeling aspects that bear little or no significance to study goals. Hence, study goals should direct which aspect deserves consideration. Everything else should be "stripped," abstracted, or discarded; as these aspects likely only contribute to informational noise (Jabareen, 2009).

Following the principle of parsimony (Epstein, 1984), scientists only consider those aspects that define the wholeness of the phenomenon and aspects related to their research. Thus they may intentionally skip entire areas of the object of interest in favor of others (Jabareen, 2009). The academic orientation of basic social research and the narrow specialization of the applied social sciences lead to the formulation of problems that rarely consider the spatial aspects of social phenomena. This is particularly true for organizational studies, theory of activity, and the like. The resulting models are devoid of the spatial aspect. Such models are idealized and vague, in the sense that many dimensions of reality are abstracted, particularly the spatial dimension. Existing models of social organizations, groups and human individuals are created for the solution of social science problems. This restricts their applicability to only pure social problems and programs. Phenomena that possess a complex sociospatial nature could barely be described with the help of such social models. Stated another way, existing social theories do not possess the relevant conceptual resources, perspectives, or potential required for bridging information gaps.

For example, the field of organizational studies unites the efforts of scientists in economics, management, sociology, psychology, and cultural studies (Borkowski, 2015; Burke, 2014). The methodological potential of all these disciplines is focused predominantly on management issues, and space is viewed as one of the many resources and instruments for increasing productivity. The goal structure of organizational studies is dominated by issues such as productivity, efficiency, effectiveness, and resources (Cummings and Worley, 2001). The problem areas studied focus on concepts such as goals and objectives, means, decision making, and control (Borkowski, 2015; Burke, 2014; Cummings and Worley, 2001). The major themes examined typically stem from problems of organizational structure, personal management, staffing, leadership, job design, matching, and performance appraisal (Borkowski, 2015; Burke, 2014; Cummings and Worley, 2001). Furthermore, organizational structure is designed regarding operational efficiency and personnel management. Operational schemes are constructed with attention to technological imperatives, devoid of any considerations for the spatial dimensions (Cummings and Worley, 2001). The application of such a framework to facility programming would require extensive revisions, and still it would not cover the spatial and the sociospatial aspects as needed for programming.

Since the models and categories designed for researching the social aspects of reality do not work well, they are unhelpful for research in the fields of environmental design and programming. When attempting to understand sociospatial entities and relations, the deficiencies of pure social

conceptualizations become obvious. It is very difficult and/or even impossible to relate social science concepts to programming research. This ineffectiveness stems from the very nature of the social science categories that were constructed without prior consideration of spatial relations and implications.

When criticizing existing conceptual resources, we have to keep in mind that any scholarly development relies heavily on its conceptual heritage (Kuhn, 1962). That is why when working in the area of sociospatial interactions we can use the accumulated theoretical and methodological potential of the social sciences, their principles, and conceptual systems. This is a natural way to develop a new discipline or interdisciplinary domain. This approach helps us use theoretical structures that have already been accepted and supported elsewhere. In fact, there are few scientific fields where theorists start from scratch and develop conceptual structures in entirely new ways. The conceptual legacy of social science disciplines deserves to be analyzed in terms of appropriateness to the study of sociospatial phenomena.

The basic social science models, although abstract and devoid of spatial dimensions, can nevertheless assist in conceptualizing social aspects of sociospatial phenomena. The major problem here is to reduce information noise and to select only those assumptions, models, and concepts that are pertinent to sociospatial analysis. One way to achieve this is to find the intersection of the “social” and the “spatial.” However, to do this it is necessary to discover the linking mechanisms; as those phenomena that play the linking roles are the ones that will provide a better understanding of the environmental interactions and their effects. This assumption provides guidance in our quest for a productive methodology that can lead to the relevant conceptualization of sociospatial interactions and the subsequent phenomena.

Selecting an Approach

Methodological reflection helps scientists control the development of their conceptualizations (Jabareen, 2009; Staubmann, 2006). It also assists readers to understand the underlying logic of theoretical structures. By explicating the philosophical assumptions and the basic methodological principles of a study, scientists take control of the research process and allow for external inspection and discussion (Jabareen, 2009; Staubmann, 2006). The selection of paradigmatic context and methodological considerations is a necessary stepping stone in the process of framework building.

The methodology for framework building elaborated in this paper is based on systems thinking and the Activity Theory approach. Systems thinking provides a general attitude towards the nature of the world (Luhmann, 1995, 2012), while the activity perspective provides content-specific knowledge. When combined, these two perspectives yield a systemic conceptual picture of the world that is written in activity terms (Kuutti, 1996, 1999). Below we review both of these approaches.

Systems Thinking

This section presents selected information about systems and system thinking. Systems thinking and systems approaches can be applied in different content areas (Bedny and Karwowski, 2007; Fararo, 2001; Luhmann, 2000). Systems thinking usually generates methodological scaffolding for

organizing complex content material into facets, domains and levels. Systems thinking postulates *interrelatedness and interdependence* among the objects in the world and it fosters the goal of seeing complete entities rather than fragments (Bedny and Karwowski, 2007). Therefore, a system can be described in terms of its elements, the interaction processes, and the relationships among the elements (Bailey, 1994, 2001; Bohm, 2002; Luhmann, 2000). Each element in the system can be described in terms of the other elements or in terms of the interaction processes. This presupposes the possibility of describing each element in several terminological languages and allows for making methodological choices to determine which theoretical domain to use to describe an element and to formulate a particular problem (Bailey, 1994; Bedny and Karwowski, 2007). Many problems become solvable by restating them in new terminological language.

In this way, the elements of a system can be conceptualized as connected via many different structures (Luhmann, 1995, 2012). Thus, the system possesses not only one structure, but a multitude of structures. Even when we describe only one structure at a time, the consistency of such an abstracted structure is provided by referring to the other structures that are beyond theoretical interest at any particular moment. However, different analytical approaches to discerning the system will produce different analytical images.

The elements of any system are organized into hierarchical patterns and can be conceived as located on *different levels* (Luhmann, 2012). The whole system and each of the levels are subjected to different forces and display different patterns of behavior. Hence, we can conceptualize them as being governed by *different natural laws* (Luhmann, 2012). The elements, the processes of interaction, the relationships, and the laws for each level of organization of the system are different. The understanding of each level requires a different conceptual apparatus. The understanding of the whole is an important prerequisite for the understanding of the parts (Bohm, 2002). Similarly, the understanding of the parts contributes to the reconceptualization and detailing of the image of the whole (Altman and Rogoff, 1987; Luhmann, 2012).

The sociospatial system has *two major subsystems*: the sociocultural subsystem and the built environment subsystem. The systems approach to the sociospatial reality implies several other ideas. These include interaction as a *linking mechanism* that interrelates the two subsystems; the emergence of links (relations); and the *effects* that each of the subsystems create in regard to the other. Systems thinking helps us to envisage the existence of people in built environment as a sociospatial system.

The Activity Theory Approach

Activity Theory is the primary approach that shapes the underlying philosophy of this study (Bedny and Karwowski, 2007; Engestrom, Miettinen, and Punamaki, 1999; Lektorskii, 1990; Nardi, 1996). Activity is one of the basic categories of the social sciences and an important content area for building representations of the social world (Engestrom, Miettinen, and Punamaki, 1999). In a general sense, activity is conceptualized as a purposeful behavior that is constituted by a number of processes ranging from perception and cognition to social interaction and communication. Below we briefly present several principles of Activity Theory that are both fundamental and relevant to our study.

The first principle of Activity Theory postulates that people exist in the process of their activities (Bedny and Karwowski, 2007; Niit, Heidmets, and Kruusvall, 1987). According to the second principle, human beings are active subjects that shape social reality. The concept of subject is similar to the concept of social agent or actor. Subjects interpret their social environment, set goals, and plan strategies to achieve these goals (Bedny and Karwowski, 2007; Engestrom, Miettinen, and Punamaki, 1999). In the course of their actions, subjects respond to the changes in the environment by adapting their goals, strategies and action plans (Bedny and Karwowski, 2007; Niit, Heidmets, and Kruusvall, 1987). The activity approach conceptualizes the human individual as an active, teleological, and conscious being (Engestrom, Miettinen, and Punamaki, 1999).

The third principle of Activity Theory presents activity as a medium that binds together all elements of social reality (Bedny and Karwowski, 2007; Lektorskii, 1990). In the process of activity, a number of relationships emerge. These may be relationships between subjects and between subjects and objects. The activity nature of social relations makes the analysis of human activity and social processes a basic prerequisite for the analysis of social phenomena (Bedny and Karwowski, 2007). In this regard, the social reality and its units can be analyzed in terms of the activities in which social subjects exist, or stated differently, in terms of the activities that bind them together. So, the social organization can be presented as an activity system, and the small group can be understood by analyzing its activities and social interaction (Bedny and Karwowski, 2007; Engestrom, Miettinen, and Punamaki, 1999). The core of the Activity Theory approach is that the social world may be understood by studying social activity, while individuals are understood by studying their activities.

The fourth principle of Activity Theory postulates that physical objects, including buildings and interiors, acquire social meaning in the process of activity. In the course of activity, physical objects become instruments, means of action, resources, and goals of planned action, constraints, or signs (Bedny and Karwowski, 2007; Lektorskii, 1990). Physical objects are assimilated or incorporated in the action into at least one of the roles listed above (Lektorskii, 1990; Nardi, 1996). These roles establish social meanings and constitute the functions of objects. Thus, a building becomes a school only if children study there. Otherwise, it could just as easily be an office or a town hall.

Selected Framework Building Ideas from Activity Theory Perspective

Following the above description of various conceptual approaches, we have developed and pragmatically selected methodological ideas that can become instrumental in building the future framework. Our intent is to prepare for substantiating the framework building work by referring to axiomatic and widely accepted ideas from Activity Theory. The next section presents a number of Activity Theory conventions and assumptions that we envision forming the conceptual foundation for a future framework for collecting programmatic information.

The Subject—Object Vision of the Social World

From an Activity Theory perspective, the most abstract model of social reality is one interpreted in terms of subject and object (Lektorskii, 1990). The subject and object exist and interact in the process of activity. Thus, activity is the major linking mechanism (Lektorskii, 1990). In the processes of activity, relationships between the subject and the object emerge and a whole is formed. Thus, the subject

modifies the object, and the object influences the behavior of the subject (Bedny and Karwowski, 2007; Engestrom, Miettinen, and Punamaki, 1999; Lektorskii, 1990). This is a typical representation of object-related activities (Kruse and Graumann, 1987; Lektorskii, 1990; Niit, Heidmets, and Kruusvall, 1987). The object is a schematic representation of the outer world of the individual, and at the most abstract level of thinking, it encompasses the environment as well.

The concept "subject" stands for any social unit that exerts a conscious effort directed at the object (the environment) (Lektorskii, 1990). The subject could be exemplified by individuals, groups, or organizations (Lektorskii, 1990). Subjects can be reinterpreted using a number of other terms, such as actors, agents, or users. All these terms belong to different conceptual and terminological systems, but what they all have in common is that they represent the notion of "subject." From an activity perspective, subjects (individuals, groups, communities, society) may also be interpreted or analyzed in terms of activity (Engestrom, Miettinen, and Punamaki, 1999), while activity may be analyzed in terms of its subjects, processes, and objects (Bedny and Karwowski, 2007).

The subject—object model can be translated in more concrete terms by substituting users for the subject, and built environment for the object. The linking mechanism is exemplified again by human action and social interaction. Thus we are able to conceptualize the subject-activity-object relationship. Such a substantive interpretation is the first step towards a more developed representation of the sociospatial reality.

The use of activity as an explanatory category allows us to see human beings as conscious actors, or agents, that formulate goals (Lektorskii, 1990). Agents achieve these goals through a series of actions, and experience a need for particular conditions in the process of these activities (Lektorskii, 1990). Some of these conditions are provided by the built environment. In this way, we can construct a relational sequence of users-user goals-user activities-necessary conditions to perform these activities. The built environment provides these conditions. This idea fosters a basic "activity" understanding about the functioning of the sociospatial reality, interactions, outcomes, and the chains of relations that link all subsystems and their components into one holistic entity (Bedny and Karwowski, 2007). This vision of the nature of the social world becomes an underlying assumption that directs the inquiry and the analytical efforts in the pursuit of understanding the sociospatial phenomena. The next section explains how some of these interactions are related.

The Subject—Object Continuum of Interactions

After substituting building users for subjects/agents and built environment for the object, we produced the first axis or dimension of the sociospatial system, which is *users—goals—processes/activities—necessary conditions—built environment*. This chain of relationships can also be presented in this way: building users formulate goals, and then they pursue activities that lead to the achievement of these goals. In the process of these activities, building users develop needs for particular conditions that are supplied by the built environment (Wade, 1977). This axis provides the basis and the major direction for developing and structuring the conceptual units that describe the sociospatial reality and will become the major components and categories of our future framework. Below, we present brief descriptions of each component of the subject—object continuum.

Users may be conceptualized in several ways. Building users may be viewed as human individuals, or personalities; users that exist in groups; and users that constitute social organizations. Individuals,

groups, and organizations (and communities) form three levels in the basic conceptualization of the "subject" category or subsystem. In a more detailed analysis, users are also viewed in terms of different interest groups, groups with different levels of involvement in environmental interactions, and with different positions in the facility development process.

"User goals" (in our approach) relate users and activity processes. User goals are concepts about what the social agents strive to achieve. Agents construct systems of activity in order to achieve their goals. The structure and details of the activity systems depend on the ways agents see as appropriate and convenient for achieving their goals.

Activities and processes are the ways users exist and relate to the world (Lektorskii, 1990). "Activities" link subjects, processes, and objects in one system (Bedny and Karwowski, 2007; Lektorskii, 1990). Compared to the concept of behavior, activity allows for a deeper analysis of human action and social structures (Niit, Heidmets, and Kruusvall, 1987). "Activity" can be represented as a system of actions. According to Kruse and Graumann (1987), the concept of action implies a more active relationship between subjects and their social and material environment. Action is goal directed, meaningful, and systemic (Kruse and Graumann, 1987).

The term "necessary conditions" used in this study stands for the support needed for maintaining both human individuals and group structures in the process of activity. Necessary conditions can be of a very different nature and form a very wide range of options. Some of them are provided by the physical environment, while others have a social nature and emerge from the social environment. We also can conceptualize these necessary conditions as both human and social needs.

The built environment encompasses the organization of materials into structures, the organization of space, and building systems. It can also be viewed on several levels, such as urban, facility, interior, and even furniture pieces. In architectural science, detailed analysis and description of the built environment is considered. Each different scale and type of built environment will require adjustments in the content and relationships in this framework for collecting programmatic information.

Once again, our goal is to model the "social" in regard to the "spatial." As such, the proposed sequence "subjects-goals-activities" can be viewed as the core of a model of the social subsystem. The concept of necessary conditions will link the social subsystem with the spatial subsystem (the spatial means for providing support). If we view "necessary conditions" in terms of functions of the built environment rather than spatial elements, then the conditions can be conceptualized as part of the social subsystem. This is a way to present how the social subsystem relates to its physical environment. If the necessary conditions are conceptualized as attributes of social organisms rather than the environment, then such an approach justifies studying social "organisms" for the purpose of facility development.

We presented the subject-object continuum of interaction as a lateral or horizontal cross section of sociospatial reality. Below, we consider a vertical cross section of the organization of the sociospatial phenomena.

Additional Aspects and Considerations

Hierarchy of Levels. The notion of a hierarchical structure of the social world relates systems thinking and content areas. This way of representing social reality is employed in several disciplines: sociology, management, organizational behavior, human relations, and work analysis (Bedny and Karwowski, 2007; Brannick, Levine, and Morgeson, 2007; Fararo, 2001; Luhmann, 2000; Wilson, Bennett, Gibson, and Alliger, 2012). In the field of Environment and Behavior, the idea of hierarchical organization is promoted by Wapner (1987) in his organismic-developmental systems perspective. Many authors in the Environment and Behavior field who employ system thinking use this notion for explaining the hierarchical organization of social reality.

We conceptualize the sociocultural subsystem and the organization of subjects/users in terms of the hierarchy of levels—individuals, groups and organizations/ communities (Borkowski, 2015; Wapner, 1987). The tentative differentiation of levels such as "individual," "group," and "organization" is based on the specific ways these social entities function. Each of these levels is characterized by different types of processes, structures, and regularities (Wapner, 1987). The interrelation among these levels is dynamic, emergent, and contingent upon situational circumstances. The levels of organization are hierarchically "nested." Each higher level affects the functioning of lower levels and in turn, depends on the balance of functioning at the lower levels (Wapner, 1987). From a methodological perspective, these levels can be examined by using different conceptual approaches and terminological systems.

We further juxtapose or apply the subject-object continuum to each of three levels (individual, group, organization) of social reality that are most relevant to the organization of space in a single building. This conceptual move leads to the creation of three different modifications of the subject-object continuum by juxtaposing each of the subject-object components over each of the layers. As a result, we create a matrix organized in three levels or planes. Each component of this framework develops its own nature and specifics depending on its functional type and the specifics of the layer in which it is situated. In addition, the components are strongly influenced and shaped by their immersion in a specific cultural environment.

Shaping the Activity Components: Culture. The Activity Theory approach to social reality presupposes the specific conceptualization of other fundamental social phenomena. Culture is a method and technique for doing things, a way of conducting an activity, a way of organizing, and a way of keeping and enforcing values and norms (Rapaport, 1977). In Activity Theory, culture is viewed as an attribute and a dimension of activity (Engestrom, Miettinen, and Punamaki, 1999; Lektorskii, 1990). The activity perspective on culture allows us to see culture as a "form-giver" that shapes activity components and activity patterns. A way of doing things may also be interpreted as a system of consistent choices (Rapoport, 1977). From this perspective, the specific way of doing things (Rapoport, 1977), the consistency of the outcomes, and the characteristics of the activity forms are conceptualized within the framework of "culture." Thus, the activity approach "infuses" culture in each activity component (Lektorskii, 1990).

Concluding Remarks

This paper makes multiple contributions to the methodological and theoretical layers of facilities programming. We began by proposing that facility programming data collection be treated in ways similar to social science field research. Consequently, we postulated the need for theoretical guidance in both research design and information collection. Based on the Activity Theory approach and systems thinking, we brought forward a number of ideas, considerations, and guidelines for framework building within facility programming. We suggest using Activity Theory and systems thinking as a general methodological platform to conceptualize the more specific components of the programming research design. We propose that when creating the required theoretical framework, sociospatial reality should be conceptualized as a continuum starting with building users moving toward their goals, followed by activities for achieving these goals, identifying user needs that emerge in the process of these activities, and concluding with built environment structures that will provide for and satisfy these needs. To assist with this process, we organized building users into three levels: individuals, groups, and organizations/communities. Ultimately, we argue, the specifics of each component areshaped by culture.

These methodological foundations will guide the development of a framework for data collection and will lead to detailed descriptions of framework components and the relationships among them. In the next phase of this project, we will explicate the spatial dimensions of the social phenomena. That research will ground this framework in the reality of sociospatial relationships and will provide guidelines for collecting relevant and usable information for supporting decision making during the design process.

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