The Articulation of Project Work: An Organizational Process

Author(s): Anselm Strauss

Source: *The Sociological Quarterly* , Summer, 1988, Vol. 29, No. 2 (Summer, 1988), pp. 163–178

Published by: Taylor & Francis, Ltd.

Stable URL: https://www.jstor.org/stable/4121474

# THE ARTICULATION OF PROJECT WORK: AN ORGANIZATIONAL PROCESS

Anselm Strauss*

*University of California*

This article offers a theoretical framework or model for understanding how work within projects is articulated. A distinction is drawn between articulation of work and a more inclusive *organizational process*, termed the "articulation process." The theoretical model includes several related concepts that pertain to numerous interlocking and sequential elements of the total work. These include work processes, types of work, and interactional processes. The model avoids assuming a tightly integrated organization of work; rather, it represents an extension of the negotiated order approach to organizations. A discussion of variations in projects revolves around two important dimensions of projects. The article closes with a discussion of extreme disruptions in project work flow, as well as some general considerations about the importance of focusing on articulation in organizations.

This article provides a set of related concepts for understanding how the work within projects is articulated. Projects characteristically have narrative histories: they evolve over time. While that evolution may entail the alteration or elaboration of the original goal or goals, the work and the work itself and the work relationships of project members do develop over time. Hence their efforts to achieve and maintain the "fitting together" of their work are permeated by temporal considerations. Any analysis of "fitting together" must take that temporality into consideration.

Although project participants may be relatively unreflective about how they get their work done, we must develop a theoretical framework to understand analytically this *organizational* process. Such a model would bring together as many as possible of the interlocking and sequential elements of the total project work at every level of organization.

The model should not fall into the trap of assuming too much integration on the

*Direct all correspondence to: Professor Anselm Strauss, Department of Social and Behavioral Sciences, University of California and Tremont Research Institute, San Francisco, CA 94143

part of the project's organization. Some projects are organized very loosely; consensus on their goals or means of reaching goals is far from complete. (Nor should we be concerned with the project's efficiency or efficacy, except to make the actors' estimates of these features part of our data.) At the heart of this examination is the assumption that the organizational process *is* a process: contingencies and outcomes of responses to contingencies are central. To borrow Everett Hughes's expressive phrase, organizations are "going concerns" (1971): They are constructed by their members, in the face of whatever contingencies may exist to hinder or impede the organization's existence and to affect the directions of members' organizational efforts. This assumption commits us only to asking questions about the degree and nature of a project's integration, not to integration itself. In short, this article addresses—to yet another aspect of "negotiated order"—specifically how organizational process contributes to project order.

Therefore, this organizational process and the phenomena that constitute it will be the main topics of the article; I shall refer to them collectively as an *articulation process*. Analytically it is useful to distinguish this process from articulation *work*, which is one of its constituent elements. The latter term refers to the specifics of putting together tasks, task sequences, task clusters—even aligning larger units such as lines of work and subprojects—in the service of work flow. The overall process of putting *all* the work elements together *and* keeping them together represents a more inclusive set of actions than the acts of articulation work.[1]

Even in the literature on organizations and organizational theory, there is a dearth of analysis about how work in general is articulated within organizations. yet pragmatically we all define some situations as displaying failures of articulation, in such terms as "Things are going wrong." One could fill a library with descriptive writing about successful or disastrous projects or with prescriptive writing about setting up smoothly functioning business and industrial work organizations, but description and prescription are quite different from analyses of the articulation process. I take this gap in the literature as a mandate to address the following issues: What kinds of concepts do we need to analyze the articulation process? How might the constituent elements of the process relate to each other? If we can achieve some grasp of those issues, and fashion an effective theoretical scheme, we could focus attention on the articulation process and its subprocesses and thus provide a better explanation of them and their effects.

One condition must be stated, however: the theoretical scheme presented here applies only to *project* articulation. (Other models probably are needed to analyze the articulation process for lines of work and for encompassing organizations, as well as for interorganizational relationships.) The scheme contains no elements that readers will not recognize readily, but illustrations will be given occasionally. The paper begins by presenting the general features of the theoretical model, and then discusses some variations among projects according to specific characteristics, such as whether they are routine or novel undertakings. The article closes with a discussion of extreme disruptions in the project's work flow.

## PROJECT ARTICULATION
### Properties of a Project

The *Random House Dictionary* defines "project" as follows: "1. something that is contemplated, devised, or planned; plan, scheme; 2. a large major undertaking, especially one involving considerable money, personnel, and equipment; 3. a specific task of investigation, especially in scholarship."

In common parlance, a "project" is perhaps closest to the second definition, except that many projects are relatively small and do not involve quite as many resources as this definition suggests. Denotatively, one can point to projects such as scaling Mount Everest, getting the American hostages out of Iran, developing a foot-powered airplane to win a prize for being the first to fly in this way over the English Channel, engaging in a research project, organizing a special celebration for a voluntary association, or putting the first man on the moon in competition with the Soviet Union.

These projects have diverse properties, such as difficulty, scope, specificity or number of goals, and degree of consensus on the goals. Each project is sited within a different structural context. The enterprise may be only a one-time project, or it may be followed by related or alternative other projects. (In the case of research and development, it may lead through a series of projects to something more permanent.) All projects, however, have common properties such as a goal, a temporal flow, assembling and maintaining resources, a number of necessary tasks, and a termination. (Two major sets of differences and their implications for project articulation will be discussed later.)

What at the very least must be taken into account in seeking to understand project articulation? The initial problem is the great diversity of types of projects; yet some general features of the articulation process can be isolated. Because every project has a temporal flow, it makes sense to begin by thinking chronologically about the initial phases of the project.

### The Generative Idea, Reactions to It, and Initial Planning

Each project, as defined by its initiator(s), must begin with a vision—an image, an idea, a notion—of what can, might, or should be done. Because the vision does not yet constitute reality, or even necessarily a sense of how to make the vision into reality, the initiator (whether more like a dreamer or a planner) must consider ways and means of implementing the vision; otherwise disruptive problems will haunt the entire project. What is required to attain the goal? What modes of action, what types of work or sequences of tasks, what resources?

One of the immediate implementing issues is to obtain relevant persons' reactions and agreement to the generative idea. This step may be necessary even before one thinks about implementation, even if the initator has no doubts about the value of the feasibility of the idea. The initiator may need to hear the reactions of a superior, of allies necessary to get the project off the ground, or perhaps of subordinates who will bear much of the responsibility for carrying out parts of the

project. Another possibility is to carry out the project subrosa and present it after achieving some results; then, if one is rebuffed, one may even leave the organization and set up another organization to carry out the project, as some computer wizards have done.

## INTERACTIONAL PROCESSES

Directly into the project's work flow, even from its beginning, additional processes enter. I call them "*interactional processes*" because interaction is central to them. These include persuading others (such as a company president), teaching relevant others about the value or feasibility of the project, or negotiating some exchange that will make the project seem worthwhile to them. At least two other interactional processes may be involved, even at this early phase. The first is manipulation (such as not revealing everything about the goal or plan); the second is coercion or the threat of coercion. These interactional processes are essential to articulating people's work and getting the work done despite the inevitable impediments to the work flow, even when major disturbances arise.

### Work Processes and Types of Work

In thinking about how to reach the project goal(s), the initiators must consider money, personnel, skills, sites, equipment, schedules, time, participants' commitments, and so on (Gerson 1976). In short, they must think about achieving and maintaining a flow of resources. For these considerations they may be able to draw, at least in part, on standard operating procedures (SOP). They also begin to envision (or are forced to envision) the work itself, some of its component tasks, and who will do what tasks in what division of labor. They may (and should) also consider what motivations they can tap to involve participants in the project and to keep them committed to it—whether on the basis of money, idealism, or obligation or whatever.

I shall use the overall term "*work processes*" for these essential processes. They include (1) insuring the flow of resources, (2) making arrangements about the division of labor, (3) matching workers' motivations with tasks, and (4) supervising delegated or assigned responsibilities for task performance. Delegated, assigned or agreed-upon responsibilities almost always permit some degree of discretion, just as they entail accountability for task accomplishment. Even so, some individual or some organizational body still has the authority and the associated responsibility for supervisory monitoring and assessing, and (if necessary) for rectifying.[2] Perhaps "supervision" can be conceived analytically as a suprawork process, overseeing the other three processes. In any event, these processes are basic to the articulation of project work.

Understandably the interactional processes discussed earlier (such as negotiation) are important to the operation of these work processes. If resources are needed, for instance, there may be negotiating for funds; manipulation or coercion may be employed to obtain the most skilled work force available for what higher-ups consider a vital crash-program project. Interactional processes are the strategic

means by which the work processes are started, maintained, strengthened, and supported. Without interactional processes, in short, the work processes would not proceed—at least not for long. As Hughes (1971) so clearly saw, work rests ultimately on interaction.

Involved in the project planning are an envisioning and implementing of tasks. However, these are not self-contained: they are linked in series, sequences, clusters, and series of clusters. Tasks also pertain to *inclusive types of work*; each project undoubtedly includes more than one type. In hospitals, for instance, the care of each patient involves several types of work: clinical safety, machine, sentimental, comfort, and body (Strauss et al. 1985). To climb a mountain, the team does not merely carry out tasks; it purchases and maintains supplies and equipment, gathers information about the entire trail, engages in public relations, follows safety procedures on the trail such as preventing and minimizing accidents, and keeps financial accounts. These types of work are broken down by project members into tasks and task clusters, divided them among themselves, and articulate the performance of the tasks. The tasks must also be related properly to the relevant work processes. Minimizing accidents, for instance, depends not only on proper surveying of terrain and climate but on proper equipment, including the purchase of even the manufacture of specially designed gloves; on a well-thought out division of labor involving recruitment of trail specialists (especially skilled, for example, at ice climbing, and at reading regional weather); and on careful, flexible rearrangements of labor as needed to meet contingencies.

## Disruption, Contingencies, and Altered Arrangements

Assume that a project is getting nicely off the ground, recruitment is proceeding, requisite information and funding are under control, and so forth. Assume too that no unexpected contingencies are arising, or at least none that cannot be handled easily. Assume, finally, that the principal participants have engaged in similar projects in the past, so that they can use their previous experiences and perhaps their skills, allies, and other resources. They are building these resources into the standard operating procedures. This situation does *not* mean that no contingencies will arise to disrupt the work; when these do, the disruption must be handled so that the flow of work is brought back under control. Sometimes minor contingencies necessitate "making do" in order to carry out the task or job; later, rearrangements may be thought through and instituted. If the rearrangements require major changes in resources, division of labor, or supervisory relationships—that is, in the work processes—the articulation process will then become painfully explicit to some of those who are involved in the upheaval.

Even when a project team is highly experienced and when the project is not especially novel, contingencies will arise. Some will be anticipated; these often can be managed easily when they do appear. Unanticipated events, however, affect the course of the project, at least temporarily delaying or hastening its progress or affecting the direction (Zeldenrust 1986). If that occurs, the disruption is perceived as at least partly threatening the project. In that case some combination of processes goes into effect. Rearrangements and explicit articulation of work processes and

work types or tasks are required; the degree of specificity depends on the *conditional contingencies* now existing.[3]

## Interactional Alignment

To understand how work is fitted together, we must consider at least two additional elements. The first is the subprocess of *interactional alignment* (Blumer 1969). The accomplishing of tasks requires the alignment of workers actions: that is, the process by which workers fit together their respective work-related actions (Corbin and Strauss 1988). Even when a task is carried out by a single worker, it usually involves some interactions before and after to articulate it with the other specific tasks on which it depends or which depend on it.

The organization of the project influences the probability that disruption in interactional alignment will occur and affects the severity, the duration, the strategies used to overcome it, and the impact on other aspects of project work. Other influences are the relation of project organization to the larger organization within which it is embedded, as well as larger structural conditions. In addition, ideological and status bases enhance alignment or increase the probability that it will be disturbed. As analysts, we need to focus on the negotiation, persuasion, and other processes that usually become explicit after disruptions have threatened the articulation of the work flow, the interactional alignments on which this flow is based, and thus perhaps even the basic organization of the project.

## Subprojects and Their Articulation

A second element that complicates the articulation process is that many projects, unless perhaps they are very small or very simple, involve subprojects. Consequently it is necessary to articulate the work of these subprojects with each other as well as with the primary project. In a study of a large-scale artificial intelligence research program, Leigh Star (1986) notes that the project leader allowed a great deal of freedom to the several researchers, each of whose subprobjects was expected eventually to further the main research program. (The program's specific directions were not explicit; only the ultimate goal was clear.) This open-ended and (not incidentally) well-financed situation created problems in articulating some of the subprojects with the main project. Star notes: "Several people in the AI Group talked about a process of work where one researcher would carve out a problem, work on it alone for a while, then 'restore' it to the mainstream work of the project." Yet restoring an individual's work to the mainstream of the project also helps *create* the direction and future content of mainstream work. The achieving of this restoration can become difficult when articulation work is delegated, distributed and tacit, and when discretion is large. Joanne Fujimura (1986) also illustrates how subprojects must be articulated with the larger research program in order to be successful; they also must be articulated with sources of resources, whether internal or external to the laboratory or even to the encompassing organization. Her discussion of this point makes it clear that this vital organizational work was accomplished through interactional and work processes.

### Articulating Work at Various Project Levels

Who is responsible for articulating all this work? As an overall *process*, articulation takes place everywhere, at every site where some aspect of the project is being carried out. Everyone has formal or informal responsibility for fitting together some aspect of the work, however minor it may be. In being held accountable for given project areas, types of work, tasks, tasks sequences, and task clusters, everyone is explicitly or implicitly given more or less discretion within the overall articulation process (Star 1986). Some people are actually assigned to coordinate certain aspects of project functioning; thus we might regard them as doing explicit articulating work. In contrast, secretaries on research projects are commonly regarded as invaluable, if usually unsung, heroic coordinators who do a great deal of implicit articulation work. So perhaps we should distinguish between explicit and implicit articulation work.

To repeat the point previously made, everyone at every level contributes to the overall process of fitting together the project's work, whether or not the project is hierarchized clearly and whether it has a loose or a tightly integrated structure. The same articulation process, and the subprocesses integral to it, apparently occur in every project.

## TWO MAJOR DIMENSIONS OF PROJECTS

Various aspects of this general process are likely to appear with different saliencies in different projects. Each project's major properties, as noted earlier, represent contextual conditions that will affect how the flow of work is instituted and maintained. Let us examine briefly two important properties that occur in every project.

Projects can be located along routine-to-nonroutine and simple-to-complex continua. The routine-to-nonroutine continuum includes such subdimensions as a project path that has been traversed frequently, clear and anticipatable steps, experienced workers, an established division of labor, stable resources, and strategies for managing expected contingencies. The simple-to-complex continuum includes such subdimensions as many types of work, many workers and many types and levels of workers, a complicated division of labor, variable workers' commitments, possibly more than one explicit project goal, and a complex organizational context for the project.

Combining these two major dimensions allows us to locate any specific project under study on a two-dimensional graph. Use of such a graph may help the researcher to understand how work is fitted together, repeatedly, in the evolution of a project. Thus, a routine *and* a simple surgical operation and a patient's recovery would be pictured on the graph as (1). That project, however, may turn out to be not at all routine; medical complications may arise, followed by an increasing number of ad hoc interactional alignments and even end in "getting out of hand" and becoming what my colleagues and I term "a cumulative mess" (Fagerhaugh and Strauss 1977; Strauss et al. 1985). Such cumulative messes (whether in hospital-based projects or in industrial or other organizations) can be pictured as moving from position (1) to position (2). By contrast, an innovative engineering project

SIMPLE          COMPLEX

|  | 1 |  |
| ROUTINE | 1 |  |
| NONROUTINE |  | 2 |
|  | 3 | 4  5 |

Figure 1.    Two Major Dimensions of Projects

that successfully developed the first human-powered airplane to fly across the English Channel began as a nonroutine endeavor, but its organization was not very complex (3). President Carter's attempt to get the American hostages out of Iran was both nonroutine and quite complex (4). Much more complex and fully as problematic was the project sanctioned by President Kennedy: eventually—and quickly—"to place a man on the moon" (5). In each of these projects it is not difficult to imagine how these combined dimensions affected the articulation of the work.

Let us examine two cases in greater detail. The first is a routine surgical procedure: the successful replacement of a smashed hipbone, plus the high successful postoperative treatment and guidance of the patient back to "complete recovery." This is now a relatively standard type of project. The operation itself is rather complex, requiring many resources, but the whole procedure and follow-up treatment are fairly nonproblematic. Thousands of such operations have been performed. The techniques and postsurgical procedures are well-known, widely disseminated, learned, and used.

The steps of the operation for any given patient are visualized clearly beforehand, including the X-rays which help to specify details of the hip damage. The division of labor involved at each step of the operation is clear. The material resources—equipment, anesthetics, drugs—are also standard. Possibly disruptive contingencies derived from external sources (such as sudden electrical failure) or internal sources (such as unexpected features of the patient's hip structure), although not expected, can usually be managed by experienced surgical teams. (There is an electrical backup system anyhow.) Precisely because there are known procedures for handling these disruptions, they do not develop into genuine crises; as is likely in more problematic projects. The postoperative steps are equally well laid out, but with almost a totally different set of experienced workers and types of tasks; although the required resources are different, they are standard for the total work.

This kind of project—successful treatment of a particular patient—does not usually encounter many snags. (If it does, it moves from routine to less routine and becomes somewhat more complex.) The project is quite complex, however, in view of

the complexity of surgical techniques and the varieties of potential medical complications. Complexity is also increased by the variety of specialists involved in the total project, by the organization of the many (though routine) steps in treatment, and by the organizational context within which the work is articulated.

If everything goes more or less according to expectations, neither staff nor patient will complain about "lack of coordination." It may seem to the actors themselves that the coordination is automatic (though they may be unable to say how it happens), but it rests on the past history of equipment development and on experiences with equipment, drugs, procedures, carryingout the tasks, and appropriate training. The articulation also rests inevitably on a past history of negotiations, persuasions, searching for usable resources, and the like, which can be unearthed by the researcher only if he or she delves into the history of the hip replacement surgery. (Such a history can be seen vividly in the making in the first heart machine surgeries, with all the associated politicking.) In short, for standard, relatively routinized projects the overall articulation process goes on rather invisibly, although minor disruptions in carrying out particular tasks make the articulation temporarily visible.

When a patient's illness is expected to be routine but unexpectedly becomes "problematic," we can see these dimensional conditions at work in the resulting evolution of the medical project. Descriptively, the juggling of treatments is apparent to everyone as alternative procedures and medications are tried, but then we note the development of side effects and efforts to suppress or mitigate them. New medications are employed to that end; trial-and-error guesswork increases; additional diagnostic tests are used; one specialist after another is consulted as the guiding physician seeks supplementary counsel or calls for new specialists because additional symptoms are appearing. Analytically, we can observe the impact of a whole series of contingencies, increasing disturbances of the work flow, and ad hoc work arrangements, and highly visible interactional processes. As tempers flare, patience grows thin, frustration mounts, and ideologies clash, the work alignments become anything but effective, at least in the eyes of growing numbers of participants in the "cumulative mess" drama (Fagerhaugh and Strauss 1977).

On a larger scale, Cornelius Ryan's *A Bridge Too Far* (1984) presents a detailed picture of the dramatic and fatal project in which the Allies attempted to pierce German defenses during the last days of World War II. We observe the same efforts to keep the project work flowing toward the stated goal, the same ongoing general articulation process, the inexorable movement toward the kind of cumulative mess described above. However, the military project was awesomely complex, and was attended by heroic efforts at every level as it moved toward its disastrous end. All along the course of such projects the participants are aware that their work is going (or has gone) awry; they make considered, though often desperate, efforts to rectify at least their own "piece of the action."

## EXTREME ORGANIZATIONAL DISRUPTION

This situation leads to the final point of this article: the partial or complete breakdown of projects, and how articulation appears as that is occurring (see Fujimura

1986). All projects have the potential for breakdown and repair; moreover, some degree of monitoring and rectifying of the fitting together of work is likely to be occurring at every phrase of a project and at various levels of project organization. In short, articulation work is carried out in the face of potential organizational breakdowns in the ongoing project. What that specific work will be, and by whom and when it will be done, necessarily depends on the nature of the given project and on the contingencies that the project engenders and encounters.

I shall give two examples of these phenomena. The first shows how contingencies internal to the project are handled (although more encompassing organizational sources are sometimes involved) in a fairly routine but not altogether routinized type of project. The second case will illustrate external contingencies in the life of a highly problematic and complex project.

## Internal Contingencies

The first illustration again concerns routine surgery, but in this case it emphasizes disruptions in work flow and what effect they may have in such a project. First, however, we must note that hospital personnel can hardly organize their patient care according to any model of industrial production (although recent governmental regulations are attempting to force hospitals in that direction). This is because in industrial production work the following conditions obtain (Gerson 1977): (1) products are uniform and the number of models is limited; (2) goals are clear-cut and unambiguous; (3) task components of production are known, predictable, and unambiguous; (4) decision making is minimal, as it is guided by the goals; and (5) evaluation of work processes is regulated and unambiguous. If we consider, as in the earlier example, that management of each patient's illness is a project, then (as in an automobile maintenance and repair shop) the types of damaged products are diverse and the outcomes are often unpredictable and difficult to evalute. This is true particularly as a damaged product (the patient) ages and body parts and systems become even more damaged. Moreover, patients are not inanimate objects; they are integral to treatment and may be a source of disruption. Other sources of potential disorder also exist of course.

Even in managing a relatively routinized surgical procedure, a number of potential disruptions flow from the need to articulate various work processes that pertain to controlling clinical hazard. These processes include monitoring, assessing, and rectifying. In addition, several pertinent lines of work exist: not only clinical safety and comfort work, but also maintaining the identity of all persons involved and preserving interactional orderliness. In addition, there are many kinds and levels of workers, much of whose work overlaps, and many sources of hazard, whose interaction may be unknown, predictable, or ambigious.

Consider now the handling of respiratory infections that are likely to develop in a patient who has had certain types of routine surgery, unless he or she is "managed" carefully. In the postoperative phase, prevention of respiratory infections is a major responsibility of the nurses. They help and encourage a patient to cough up phlegm and to take deep breaths at regular intervals, and sometimes to use a simple

inspirator gadget. These tasks are relatively straightforward, and much of this preventive work can be done by the patient.

What, then, must be articulated in these uncomplicated tasks? Although the work is simple, a patient often finds it difficult because taking deep breaths, particularly when combined with coughing up phlegm, can be quite painful during the postoperative period. To perform the preventive tasks, nurses must coordinate them with the comfort tasks; they must schedule the preventive work at a time when the postoperative pain is not at its peak. Because the patient's cooperation is essential, the nurses must carry out a set of informational tasks during the preoperative phase. They must inform the patient that although the preventive tasks may increase discomfort, it is extremely important to carry them out. The nurses also teach the patient how to do them. Staff members generally believe that the preoperative phase is the appropriate time to give this information, because directly after the operation a patient is often heavily medicated and thus unable to absorb the information. To prevent respiratory infections, a nurse must assess the patient's potential for developing them: criteria include age, type of surgery, and general cardiovascular status. These assessments will determine how frequently and how vigorously the preventive tasks are performed. Specific signs and symptoms must also be monitored to determine whether the current preventive tasks need to be altered.

None of this work is considered especially complicated, but in the postoperative phase it can become readily disrupted for several reasons. First of all, diverse uncontrolled contingencies may disrupt the work order, not only then but throughout the procedure and thereafter. Often information is not given to a patient: the nurse may forget this responsibility under the pressure of other tasks; the procedure may be an emergency surgery, so there is little time to give information; or the patient may not be alert because of his or her illness. Because of this failure to inform, the patient later may resist the tasks of coughing and deep breathing, especially because these can be uncomfortable.

Second, this preventive work is linked with comfort work. Thus, disruption in assessing, monitoring, or preventing pain can disrupt the safety work. Unexpected pain-medication allergies, including nausea, can also occur; these can disrupt fluid and electrolyte balances. In such a case, additional assessing, monitoring, prevention, and possibly rectification are required. In addition, the physician's assessment of a patient's pain may be inaccurate, so that the prescribed medication does not control the pain.

In short, the management of comfort and safety work involves overlapping levels of work: the physician's (or physicians'), the nurses', and probably the patient's as well. Articulation of comfort work requires exchange of information among all these levels. If the patient cannot be persuaded to perform the preventive tasks and is predisposed to respiratory infections, both respiratory machinery and medication may be used to loosen phlegm and facilitate deep breathing. This altered work necessitates the attendance of a respiratory therapist, whose task performance must then be aligned continually with the work of all the others. A nurse's pain tasks, however, may not be synchronized well with the therapist's clinical tasks

because the former was delayed by caring for another patient. Still other instances of articulation are required if the machine fails.

If a patient develops a respiratory infection in spite of everything, the physician must reassess and alter treatment plans. That step affects the alignment of safety work performed by personnel at the task level. Furthermore, a patient may develop distrust of the staff; this reaction requires rectification of the damaged interaction. Thus even these relatively routine medical projects contain a potential for disruption of safety work.

### External Contingencies

The second illustration suggests external contingencies in an impossibly problematic situation. In *The Last Battle*, Cornelius Ryan (1966) describes the dramatic but hopeless defense of Berlin during the closing days of World War II. A desperate Hitler and his high command turned reluctantly to an experienced, brilliant field general (whom they did not trust, however) to hold the city against the massive Soviet assault. The general could barely hold his forces together because of many macro structural and organizational contingencies; these were added to all the largely unforeseeable contingencies that arose from a contest against a similar project undertaken by the enemy. The German forces were weak, the men were at the end of their tether, morale was low, material resources were lacking, and the German headquarters double-crossed their commanding general both in the flow of resources and in the information that he asked for repeatedly.

The general's articulation strategies were brilliant, but of course he failed to hold the city. Yet he attained his own private goal of holding out as long as possible and with the least possible destruction to the city and its civilian population. He succeeded by devising strategies that involved enormous effort, experience, and ability at maneuvering in order to obtain, maintain, and use limited resources. At the same time he expanded his own activities in the division of labor, kept extraordinarily tight control over the delegation of duties to subordinates, and operated cleverly to conceal much of what he was doing from the German high command.

Any analysis of Ryan's account would profit by focusing on such details of the total articulation process, and on the interplay of extreme military disruption with the articulation of efforts to keep the work flowing in the service of the general's private goal. The same is true of any research into the occurrence and handling of disruptions that drastically affect project work—and thus the project itself.

### SUMMARY

The general organizational process that underlies the carrying out of projects is termed "the articulation *process*." This process is distinguished from articulation *work* (or more accurately, perhaps, the articulating of work), which is one of its constituent elements. "Articulation work" refers to the specific details of putting together tasks, task sequences, task clusters, and even the work done in aligning

larger units such as subprojects, in order to accomplish the work. By contrast, "articulation process" refers to the overall organizational process that brings together as many as possible of the interlocking and sequential elements of the total work, at every level of organization—*and* keeps the flow of work going. (Whether or not it goes smoothly and whether or not it is effective may be perceived quite differently by various participants.)

A theoretical scheme or model for studying this articulation process in *projects* was outlined and discussed. The scheme incorporates the varieties of specific articulation work, but emphasizes the overall organizational process. Briefly, the scheme revolves around: (1) *work processes* (discovering and maintaining appropriate resources; devising and maintaining a division of labor; matching tasks and workers' motivations; supervising delegated tasks); (2) *types of work*; (3) *interactional processes* (including negotiating, persuading, educating, manipulating, and coercing); (4) all these elements occurring at every organizational level; (5) and interactionally requiring continual *alignment*; (6) although the specifics of the articulation process vary according to the properties of projects (including whether they are more or less routinized and more or less complex). (7) In addition, *unanticipated contingencies* inevitably affect the functioning and articulation of these routines.

I suggested that this process model is useful in understanding the ongoing efforts at articulating the work of projects, regardless of the diversity of the projects. Because projects differ in their specific properties, however, I noted two major dimensions along which projects might be located according to their relevance to the specifics of project articulation. One dimension is the routine-to-nonroutine continuum; the second is the simple-to-complex continuum. In these terms, any project can be located approximately on a two-dimensional graph. I presented an extended example of a project that is both routine and relatively complex, with emphasis on the implicit articulation process that tends to become more visible to the project members when work flow is disrupted. In the final section of this article, I described and discussed analytically two instances of extreme disruption of work flow, which threatened even the continuation of the project and its pursuit of stated goals.

Why should such a model be useful? As stated earlier, two consequences might be (1) the focusing of researchers' attention on the articulation process and its subprocesses, and (2) as a result, better explanations of how these processes affect the organization of work in projects (and in their encompassing organizations, if they take place within organizations). The model can force us to focus more systematically on the varieties of articulation work and on their contribution, in concert with the overall process, to the life of given diverse projects. Of course this is often done descriptively. Perhaps it is also done systematically, but with different terminology, although there seems to be little research on organizational or task "coordination" or similar phenomena. I suggest that regardless of what kinds of work or organizations the researchers are studying, this process model can raise many *specific* questions about the implicated work processes, interactional processes, types of work, interactional alignment, contingencies, and the like, while requiring also that they carefully scrutinize articulation itself as a basic organizational process.[4]

This specificity requires that both macro and micro elements be linked analytically; one set is not to be used merely as a backdrop for the other, or even ignored entirely. That is, we must examine not only how particular tasks are "coordinated" but how various levels of project work are linked, how projects link with each other, and how projects are aligned with other organizational units. Eventually we will know whether *project* articulation—with its dominant temporal features—differs as an organizational process, and in what ways it differs from the articulation of the work of larger organizational units (lines of work, departments, divisions, the total organization). The theoretical scheme offered here should be a step in that direction.

This approach need not at all commit us to a view of organizations and the work within them as tightly integrated. The opposite has long been assumed by some social scientists, especially the interactionists (Hughes 1971; Blumer 1969), although in recent years organizational theorists have increasingly adopted a less conventional perspective on organizations (Goodman, Pennings and associates 1977). What we wish to know, following the processual model, is how organizations manage to achieve the degree of articulation they do, and what their members must do to maintain it. We also wish to know what happens when that degree of articulation is estimated differently by different participants, with different stakes and influences in the definitions. As I remarked at the beginnings of this article, examining and researching articulation is very much an aspect of studying "negotiated order."

## ACKNOWLEDGMENTS

## NOTES

1. I have written about articulation work previously, with a focus on types of work required to keep task performances in alignment (Fagerhaugh, Strauss, Suczek, and Wiener 1986; Strauss 1985; Strauss, Fagerhaugh, Suczek, and Wiener 1985). Recently, several researchers influenced by those publications have written specifically about articulation work done in research laboratories (Bendifallah and Scacchi 1987; Clarke 1986; Fujimura 1986; Gerson

1985; Gerson and Star 1986; Star 1986). For related conceptions, see also Becker (1982) and Gasser (1983). These studies have been concerned mainly with what hospital personnel or research scientists must do to implement their respective projects (caring for patients, carrying out experiments and programs), including the necessary articulation work; they also focus on sources of disruption that can slow down or otherwise complicate these enterprises. These studies also focus somewhat on the articulation work that is necessary for aligning project work with the work of people at various levels of organization (laboratory, company or university, other laboratories, foundations).

2. For a discussion of discretion with respect to articulation, see Star (1985).

3. Cf. Bendifallah and Scacchi's (1987) findings: when individual researchers in a computer laboratory encounter scarcity of resources, they either negotiate to obtain these resources or "accommodate" altering their next steps in some degree.

4. For the concept of "basic social process," see the extended discussion in Glaser (1977).

## REFERENCES

Becker, H. S. 1982. *Art Worlds*. Berkeley: University of California Press.

Bendifallah, S. and W. Scacchi. 1987. "Understanding Software Maintenance Work." *EEE Transactions on Software Engineering* 13: 311–323.

Blumer, H. 1969. *Symbolic Interactionism: Perspective and Method*. Englewood Cliffs, NJ: Prentice-Hall.

Clarke, A. 1986. "The Emergence of the Reproductive Research Enterprise, 1900–1940: Biological, Medical and Agricultural Work in the United States." Ph.D. dissertation, Department of Social and Behavioral Sciences, University of California, San Francisco.

Corbin, J. and A. Strauss. 1988. *Unending Work and Care: Management of Chronic Illness at Home*. San Francisco: Jossey-Bass.

Fagerhaugh, S. and Strauss, A. 1977. *The Politics of Pain Management*. Menlo Park: Addison-Wesley.

Fagerhaugh, S., A. Strauss, B. Suczek, and C. Wiener. 1987. *Hazards in Hospital Care*. San Francisco: Jossey-Bass.

Fagerhaugh, S., A. Strauss, B. Suczek, and C. Wiener. 1986. "Chronic Illness, Medical Technology, and Clinical Safety in the Hospital." Pp 237–270 in *Research in the Sociology of Health Care: The Adoption and Social Consequences of Medical Technologies*, vol. 4, edited by J. Roth and S. Ruzek. Greenwich, CT: JAI Press.

Fujimara, J. 1986. "The Construction of Doable Problems in Cancer Research: Articulating Alignment." Revised version of paper presented at the tenth annual meeting of the Society for the Social Studies of Science, Rensselaer Polytechnic Institute, Troy, NY: October 24–27.

Gasser, L. 1983. "The Social Dynamics of Routine Computer Use in Complex Organization." Ph.D. dissertation, Department of Information and Computer Sciences, University of California, Irvine.

Gerson, E. 1976. "On Quality of Life." *American Sociological Review* 41: 793–806.

————. 1977. "Rationalization and Varieties of Technical Work." Unpublished paper, San Francisco: Tremont Research Institute.

————. 1985. "Articulation Work." Memo, November 27. San Francisco: Tremont Research Institute.

Gerson, E., and L. Star. 1986. "Analyzing Due Process in the Workplace." *ACM Transactions on Office Information Systems* 4: 257–270.

Glaser, B. 1977. *Theoretical Sensitivity*. Mill Valley, CA: Sociology Press.

Goodman, P., J. Pennings, and Associates. 1977. *New Perspectives on Organizational Effectiveness*. San Francisco: Jossey-Bass.

Hughes, E. 1971. *The Sociological Eye*. Chicago: Aldine.

Ryan, Cornelius. 1966. *The Last Battle*. New York: Simon and Schuster.

_____. 1984. *A Bridge Too Far*. New York: Pocket Books.

Star, L. 1985. "Articulation Work and Discretion: A Preliminary Report on Fieldwork at an Artificial Intelligence Lab." San Francisco: Tremont Research Institute.

_____. 1986. "Problems of Due Process in Open Systems." Memo, February 12, San Francisco: Tremont Research Institute.

Strauss, A. 1985. "Work and the Division of Labor." *Sociological Quarterly* 16: 1–19.

Strauss, A., S. Fagerhaugh, B. Suczek, and C. Wiener. 1985. *The Social Organization of Medical Work*. Chicago: University of Chicago.

Zeldenrust, S. 1986. "Strategic Action in the Laboratory: (Inter)organizational Resources and Constraints in Industrial and University Research." Paper presented at the 10th annual meeting of the Society for Social Studies of Science, Rensselaer Polytechnic Institute, Troy, NY, October 24–27.