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Rethinking Occupational Structure

The Case of Web Site Production Work

Amanda Kidd Damarin
Georgia Institute of Technology

This article addresses the structure of occupations in flexible work settings by examining the case of Web site production. Web work does not exhibit traditional occupations: Rather than falling within bounded task jurisdictions, Web jobs and careers involve fluid combinations of multiple task sets. Furthermore, workers identify less with particular specialties than with Web production as a whole. Fluid jobs allow workers some autonomy in production, but little control over the wider organization of work. This suggests that flexibility may generate new occupational structures and new contradictions for workers, but comparison with prior research suggests that occupations have never been entirely uniform.

Keywords: *occupations; flexibility; autonomy; careers; World Wide Web*

> I never really know [how to describe what I do] because I've never had like a proper role. . . . It depends on who's asking but I usually say something like "I do product development for the web" . . . most people don't know what a business analyst is, or an information architect . . . I used to sometimes say I'm a web producer because people knew what that was—that's the kind of role that does a lot of different things. Or I'll just say what I do, I won't say what I am, maybe I'll just say I do business analysis and project management, or I do web design and whatever. That's why [my freelance web design business] was so easy because if you asked me what I did I could say "I create websites for artists," and that was the end of the conversation.
>
> —Rachel

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Rachel had spent 7 years working on the Web but still had difficulty finding a name for her labor. Her dilemma is not atypical for her industry, and in the course of describing it she foregrounds some common features of Web work and worker identities. The Web was relatively new; she has difficulty explaining her work to others. Moreover, the descriptors she chooses for herself are multiple (she mentions not one but seven different titles), multivocal (some refer to "a lot of different things"), contingent ("it depends on who's asking"), and processual rather than fixed ("I'll just say what I do," not "what I am"), reflecting the fact that the tasks involved in creating Web sites are multifaceted and ever changing.

Web production exemplifies many of the flexible practices that researchers have identified in recent years as potentially constitutive of a new paradigm for organizational, industrial, and labor arrangements. Truly a postindustrial undertaking, it employs digital tools (computers, code, software, the Internet) to create "virtual" information-based products and services, including Web sites and Web applications. Web work is custom work that usually takes the form of projects; tasks vary with the nature of the final product and its stage of completion. It is often carried out by "network" organizations (Powell, 2001) comprising outsourcing ties among individuals and firms. Although some Web firms have traditional bureaucratic structures, many—particularly smaller firms and those affiliated with the "new media" industry[1]—allocate projects to fairly autonomous teams of employees and contractors and exhibit the relatively low hierarchies and intense collaboration characteristic of "postbureaucratic" organizations (Heydebrand, 1989). Web employment is characterized by contingency: It includes freelancers, solo entrepreneurs, and "permanent" workers who move frequently among employers.[2] Finally, Web production firms have consistently emphasized innovation in Web site design and applications (Girard & Stark, 2002; Indergaard, 2004).

Industries that share these and other hallmarks of flexible production have been scrutinized by researchers concerned with their organizational forms and consequences for worker skills and autonomy. One issue that has not received much sustained attention is the role of occupations in flexible settings. Elsewhere in the literature on work, occupations are seen as an important mechanism for labor allocation and control, labor market coordination, skill assessment and transmission, and for the formation of workers' identities and careers. However, as the passage above suggests, occupations in the Web field and other flexible production settings may not be stable or coherent. Accordingly, when research on flexible production addresses occupations at all it tends to do so ambiguously, with authors pointing alternately to their increasing or declining salience.

Here I provide empirical insight into the occupational arrangements of flexible industries by examining the case of Web site production work in New York City between 1993 and 2003. Based on an inductive analysis of 60 Web workers' employment histories, I argue that Web work challenges existing understandings of occupations as "things of boundaries," or stable task jurisdictions belonging to well-demarcated groups of workers (Abbott, 1995). Instead, Web work has what I have termed a "modular" occupational structure, in which distinct sets of tasks are not permanently assigned to workers but rather mixed and matched in the composition of jobs and in the contents of careers; workers identify less with particular task sets than with Web production as a whole. This structure has important consequences for the degree of autonomy workers possess. Furthermore, these findings, in conjunction with previous research on other industries, suggest that occupations may take a variety of forms in flexible settings and elsewhere.

Occupations and the Changing Organization of Work

Although the term is sometimes used in a merely classificatory sense (e.g., U.S. Bureau of Labor Statistics, 2005), *occupations* are generally understood as a mechanism for dividing, allocating, and directing labor (Abbott, 1988; Barley, 1996; Scott & Lammers, 1985; Simpson, 1985; Stinchecombe, 1959; Van Maanen & Barley, 1984). According to Abbott (1995), our ideal-typical understanding of occupations "includes three things: a particular group of people, a particular type of work, and an organized body or structure, other than the workplace itself" (pp. 873-874). The groups of people in a given occupation may be distinguished by their specialized skills, credentials, common experiences and culture, and/or by their gender, race, or class background; the bundles of tasks they perform may be defined by their products, tools, activities, clients, and/or organizational locations, among other things. Groups of workers are linked to sets of tasks and jobs through the nonworkplace structures Abbott noted, such as professional organizations, craft unions, and more informal occupational communities. These bodies develop customs, regulations, and credentialing systems that facilitate the transmission and evaluation of skills within the occupational group, so that members can coordinate their own day-to-day production work. They also maintain occupational boundaries, protecting workers from labor market competition and their tasks from encroachment by other occupations. Thus, in the dominant ideal-typical concept of the occupation, workers and jobs are divided into more-or-less mutually exclusive groups and bound together through

monopolistic jurisdictional claims. With the exception of ongoing disputes and day-to-day blurring or "assimilation" of tasks (Abbott, 1988), occupational boundaries and attachments are stable across time and organizational settings.

Occupations are often contrasted to organizational mechanisms for configuring and allocating work, and particularly to bureaucratic structures (Althauser & Kalleberg, 1981; Barley, 1996; Barley & Tolbert, 1991; Hoff, 1999; Scott & Lammers, 1985; Simpson, 1985). In organizations, work is allocated and directed by hierarchical command rather than by worker groups. The division of labor is less social and horizontal than technical and vertical; production knowledge and control, which largely belong to workers under occupational systems, is here the property of organizations and is encoded in their procedures and technologies. Workers do not have exclusive monopolies on given tasks; their security, mobility, and identities derive from loyalty to their employers rather than from affiliation with occupational groups. Hence, occupations and bureaucratic organizations are understood as opposed and competing mechanisms. To date, many researchers have concurred that occupations were the dominant form of work organization in the past; however, that beginning with the rise of large, multidivisional firms and Fordist mass production, they were increasingly absorbed into and supplanted by bureaucratic structures. Although a few professions and crafts have retained occupational forms, most have succumbed in some degree to organizational control (Abbott, 1989; Leicht & Fennell, 1997; Whalley & Barley, 1997).

Today, however, organizations are themselves changing, with potential consequences for the future of occupations. Work arrangements in a number of industries are shifting from ostensibly "rigid" bureaucratic and Fordist structures toward the more "flexible" forms typified by Web production. At the industry and firm level, these changes include movement from standard to specialized and custom products and from mass to small-batch or project production; from fixed machinery to programmable technologies; from vertically integrated, monopolistic corporations to networks of small firms that cooperate and compete; from the production of physical commodities to the provision of information and services; and generally toward new emphases on innovation and quality (Heydebrand, 1989; Jurgens, 1989; Piore & Sabel, 1984; Wood, 1989). At the level of work and employment, the most widely noted trends involve a dramatic shift in organizational structure and control (Appelbaum & Albin, 1989; Burris, 1988; Hecksher, 1995; Heydebrand, 1989; Jurgens, 1989; Piore & Sabel, 1984; Powell, 2001; Smith, 1997; Wood, 1989). As Vallas (1999) noted, "analysts

have come to view traditionally bureaucratic patterns of workplace hierarchy as all but obsolete" (p. 69). Rather than the bureaucratic hoarding of control at the top, there is a flattening or delayering of hierarchies and a diffusion of knowledge and responsibility reaching as far as the lower levels of the shop floor. In addition, flexible organization often includes the implementation of participatory work teams, sometimes merely as symbolic gestures (e.g., "quality circles") and sometimes with real autonomy and discretion over processes and products. Organizations are often characterized by intense collaboration among levels and functions; bureaucratic rules orientation is replaced with informalism, substantive rationality, and neo-patrimonialism. Cooperation is seen by some as cause and consequence of a new alignment between worker and management interests; workers are urged to "adopt the point of view of managers, to move away from the 'hourly' perspective" (Smith, 2001, p. 64). However, this alignment differs from the exchange of loyalty and security that characterized the bureaucratic era, as the long-term employment that sustained that accord is often replaced by contingent labor.

What is the role of occupational structures in these flexible work organizations? The existing literature has not addressed this question systematically, and it seems to point in two divergent directions. These are best seen in terms of a widely noted distinction between "functional" and "numeric" flexibility. *Functional flexibility* refers to "the ability of employers to redeploy workers from one task to another" (Kalleberg, 2003, p. 154); associated practices include employee participation schemes, cross-functional work teams, multiskilled work, and abandonment of narrow job classifications. *Numeric flexibility*, by contrast, refers to "the organization's ability to adjust the size of its workforce to fluctuations in demand" (p. 155) by using contingent labor, including temporary workers, freelancers, staffing agencies, highly mobile employees, and other forms of employment that depart from the full-time, permanent model. The dilemma in conceiving the role of occupations is this: Functional flexibility creates hybrids and weakens boundaries among traditional bundles of tasks and workers, suggesting the demise of the occupational form. Thus, Smith (1997) noted that new organizational practices call for "the blurring of occupational distinctions" (p. 322); Heydebrand (1989) reported "weak, permeable boundaries between cognitive categories, spheres of competence, hierarchical levels, and social roles" in postbureaucratic organizations (p. 345). Numeric flexibility, on the other hand, is associated with a resurgence of occupations that had been fragmented under organizational control. In this view, viable work arrangements require structure(s) that can match individuals to jobs, facilitate skill

transmission, encourage worker commitment, and erect barriers to protect them from competition (Althauser & Kalleberg, 1981; Bridges & Villemez, 1991). When long-term employment is the rule, the bureaucratic mechanisms of internal labor markets serve these functions; in fields characterized by contingency and numeric labor flexibility, well-defined occupations such as those of the crafts and professions should rise to take their place. Thus Tolbert (1996) argued that "as organizations become less important in defining career pathways and boundaries, occupations will become increasingly *more* important" (p. 332).

Hence, the growth of flexible work organizations appears to have contradictory implications for the future of the occupational form. This contradiction is only intensified by indications that some employers use functional and numeric flexibility at once (Kalleberg, 2003; Smith, 2001) and thus contribute, at least in theory, to the revival and the decline of occupations. This is, in fact, the case in the Web production field, which is characterized by contingent employment and by flexible job definitions. Hence, the first set of questions to be addressed here centers on the nature of occupations in Web work. Do Web occupations exist? Do they match the ideal-typical model found in the literature? How are Web tasks and Web workers differentiated, and how are groups of workers and tasks linked?

After describing the occupational structure of Web work, I take up a second line of inquiry by using it as an empirical window into ongoing debates about the consequences of flexible production for workers. Here, the literature is characterized by two polarized positions, often referred to as the "neo-" and "post-Fordist" approaches. In the more optimistic post-Fordist view, new practices such as decentralization, cross-functional teamwork, and employee participation empower workers and upgrade their skills; because they are engaged in the design and the execution of tasks, as well as troubleshooting and innovation, workers require significant autonomy and both manual and mental skills (Appelbaum & Albin, 1989; Burris, 1988; Heydebrand, 1989; Piore & Sabel, 1984; Powell, 2001). Empowerment and upskilling may lead to new patterns of worker commitment based on a "community" of purposes or interests among employers and employees (Hecksher, 1995). Thus, flexible work organization is depicted as a true departure from the hierarchical controls and rationalized, routinized labor that prevailed under industrial mass production. By contrast, the more pessimistic "neo-Fordist" approach does not see flexibility as a break with the past; instead, hierarchical control and rationalization are perpetuated and even enhanced with the aid of new technologies and organizational forms (Appelbaum & Albin, 1989; Dohse, Jurgens, & Malsch, 1985; Shaiken,

Herzenberg, & Kuhn, 1986; Simpson, 1985; Smith, 1997; Vallas, 1999; Wood, 1989). Where post-Fordists see broadened responsibilities as an advance, neo-Fordists point to their potential for labor intensification without meaningful skill improvement. Similarly, the neo-Fordist approach to programmable technology, decentralization, and teamwork does not emphasize empowerment, but rather new and hidden forms of managerial control over workers such as computer monitoring, peer pressure, and ideological manipulation. "Community" among workers and employers is at best illusory and at worst a subtle form of labor control. Furthermore, neo-Fordists are more likely to emphasize contingent work and numeric flexibility as sources of job insecurity and labor market discipline, whereas post-Fordists tend to downplay this factor.

This debate has itself been subjected to critique, opening the way for a more nuanced understanding of flexibility and its consequences. Many criticize "one path" theories that see flexibility as resulting in a single organization of work, whether it is viewed positively or negatively: Multiple forms of flexibility may be found within the same societies, industries, and even firms (Heydebrand, 1989; Smith, 1997; Vallas, 1999; Wood, 1989). Some also point to variation in the effects of flexibility initiatives, which may have unintended consequence (Hecksher, 1995) or may be "double-edged swords" that bring new opportunities and new constraints at once (Smith, 2001, p. 86; see also Appelbaum & Albin, 1989; Powell, 2001). The empirical research on which the flexibility debate draws has also come under scrutiny. Vallas (1999) noted that flexibility studies use inconsistent methodologies and units of analysis, making them difficult to compare. In addition, studies cover a limited range of work settings: Most examine industrial manufacturing, with fewer on service industries or nonunion workplaces (Smith, 1997; Vallas, 1999).

This last point is particularly important here, as Web site production involves skilled technical and creative work, performed in nonunion workplaces by workers who deem themselves professionals. Exploration of Web workers' experiences can thus add to our understanding of the consequences of flexibility in an underresearched setting. Here I address this issue by focusing specifically on the impact of Web work's occupational structure: Do workers view its flexible division and allocation of labor positively or negatively? Does the Web occupational structure enhance their autonomy or subject them to new forms of control?

Below I outline my data and methods and then present my findings, using data from interviews with workers first to explain the occupational structure of Web work and then to assess its impact on their autonomy. The

significance of these findings, including their persistence and generalizability, is taken up in the discussion and conclusions.

Method and Data

New and changing work activities are often difficult to study because they are not well reflected by existing data sources and lack the coherent institutions and cognitive categories that facilitate data collection. In the current case, the situation was further complicated when preliminary research revealed that Web workers move rapidly among very diverse organizations; ethnographic study of even a few Web companies might not yield comprehensive findings about the overall division of labor or the long-term experiences of workers. Given these challenges, I devised my research strategy by following Appadurai's (1986) injunction, in an essay on the study of commodities, to "follow the things themselves," for "from a methodological point of view it is the things-in-motion that illuminate their human and social context" (p. 5). To illuminate Web labor arrangements,[3] I "followed" Web workers across diverse organizations and over time by collecting their employment histories, a strategy that has been used in some other studies of changing organizational and career structures (Burchell, 1993; Paterson, 2001; Stovel, Savage, & Bearman, 1996). The 60 work histories I draw on here were gathered through resumes, in-depth interviews, and questionnaires.

The population of workers targeted for study was defined with a number of goals. To examine the role of technology in shaping occupational arrangements, I focused on workers with hands-on Web production experience. To concentrate on a single set of technologies and tasks, I excluded workers who were affiliated with new media but whose jobs did not include Web work. Furthermore, Web production has clustered in a number of regional centers with distinctive characteristics (Christopherson, 2002; Indergaard, 2004); I chose to eliminate regional variation and to focus on work within a single set of organizational and labor market networks by interviewing only workers with Web experience in the New York City metropolitan area.[4] Within the resulting target group, I sought workers with heterogeneous backgrounds and experiences. Random sampling was impossible because of the lack of a comprehensive list of area Web workers to serve as a sampling frame.[5] Instead, I used a quota framework designed so that the final sample would be evenly divided by sex, by period of entry into Web work (early, growth, boom), and among four broadly defined Web occupations I identified in preliminary research. Participants were recruited via advertisements posted to industry listservs and Web sites (total 39 participants), through personal networking at new media

industry events (16 participants), and through snowballing from personal friends and workers already recruited (5 participants).[6] Some workers initially expressed interest but later declined to participate, mostly for reasons of time constraint; of all who expressed interest, the participation rate was 75%.

Characteristics of the resulting sample are found in Table 1. Two other studies report demographics for New York new media workers; these suggest that my sample slightly underrepresents some racial and ethnic minorities, while it more seriously overrepresents young workers and workers with bachelor's degrees (Batt et al., 1999; New York New Media Association [NYNMA], 2000). However, both studies are problematic as points of reference because they include non-Web and nonproduction workers, who may be demographically different from my target population. Thus, it is difficult to know precisely how well the sample reflects the larger population of New York City Web production workers. Nonetheless it is a diverse group, consisting of permanent employees, freelancers, and entrepreneurs who performed different types of Web labor for many types of firms and who experienced quite varied levels of employment stability and success.

Participants' resumes were requested on initial recruitment; these were used to verify fit with sampling criteria and to begin sketching out a rough employment chronology. The interviews themselves lasted anywhere from 1½ to 4 hours, depending on the complexity of the participant's work history and his or her time constraints. Most were held in person; in seven cases, interviews were conducted by telephone with former New York City Web workers who had since moved away. All but one interview was tape-recorded for later transcription[7]; in addition, after each interview I recorded selected work history information for immediate use. Interviews were held between June 2002 and August 2003.

Interview questions focused first on the details of the participant's employment trajectory and second on capturing subjective reflections on Web work and the new media industry. I asked for information about each employer listed on the resume (industry, dates of employment) and about each individual job (dates, title, major tasks, hiring mechanism, whether standard or contingent). If the participant had done freelance work, I gathered parallel information on up to five "gigs." In addition, I solicited in-depth information about two selected jobs or gigs: department name, function, size, and demographics, detailed job contents, tools used, whether job was project oriented, whether it involved supervisory responsibility, and how the job changed while the worker held it. Additional employment history questions focused on what the worker had done prior to—and in some cases after or during interruptions in—his or her Web career. Toward the end of each interview I asked more reflective questions such as how

Table 1
Sample Characteristics, $N = 60$

Characteristic	*n*	%
Sex		
Male	33	55
Female	27	45
Race		
White	51	85
Asian	7	12
African American	1	2
Hispanic	1	2
Other	0	0
Age (in 1999)		
Younger than age 30 years	29	48
30-40 years	24	40
Older than age 40 years	7	12
Education (in 1999)		
Bachelor's degree	56	93
Master's degree or higher	21	35
1st Web job		
Early (through 1994)	16	27
Growth (1995-1997)	26	43
Boom (1998-2000)	18	30
Bust (2001 on)	0	0
Employment (Web only)		
All/most permanent jobs	20	33
All/most freelancing	4	7
Freelancing and permanent	36	60
Ever (co-) founded business	11	18

participants got interested in doing Web work, whether they wanted to do it in any particular setting, whether they brought a particular philosophy or style to their work, how they thought *success* was defined in their field, and how they felt about their careers and futures. Potential problems with selective recall bias were reduced by studying workers' resumes beforehand and having them on the table during interviews; this allowed me to clarify inconsistencies on the spot. The timing of the interviews was also helpful: They fell fewer than 10 years after the most distant events in workers' Web careers and took place during the industry downturn when many were updating their resumes and had their employment information fresh in their minds.

To save valuable interview time and blunt some potentially sensitive questions, additional information was solicited via a questionnaire that participants

were given at the close of the interview and asked to return by mail. Questions covered personal demographic and background information, use of industry and/or professional associations and media, educational details not contained in the resume, and salary levels for two selected jobs. The response rate for the questionnaires was 83%. In addition to the 60 work histories collected in this manner, this article draws on background data from interviews (recorded and unrecorded) with 16 additional Web workers and other industry participants, from field observations and informal interviews conducted at 43 new media and other relevant business events (June 2000 to October 2002), and from several Web- and industry-relevant listservs, Web sites, and print publications.

This article grew from a problem that emerged early in the interviewing process: It became clear that occupational quota sampling was impossible because many participants did not fit into a single occupational "box," and many of their jobs defied occupational categories as well. This discovery prompted revisions to sampling procedures[8] and an increase in the detail level of interview questions about job contents. It also prompted curiosity about whether occupational categories could be meaningfully ascribed to Web work at all. Thus, the article follows grounded theory principles (Strauss & Corbin, 1998) in that analysis and theorizing follow directly from the data and problems encountered therein. However, data analysis is not limited to qualitative interpretation of interview transcripts. The Web production field is heterogeneous; individual experiences and reports only grasp a fraction of it. The structures that I identify here were suggested in interview narratives but became clearly visible only when data were coded so that jobs and careers could be compared across workers, organizations, and time. Hence, simple quantification was an important part of the analysis, which involved going back and forth between patterns found in quantitative summary tables and interview passages from workers whose jobs and careers did and did not fit those patterns. The interview passages and in-depth descriptions in this article were chosen for their value as nonidiosyncratic, richly detailed illustrations of how general patterns manifest themselves in concrete jobs and careers.

The Occupational Structure of Web Production Work

Web site production work has involved numeric flexibility in the form of contingent and mobile labor, as well as functional flexibility in the form of multifunctional, collaborative teams. Both of these forces are reflected in

its occupational structure, which differs from the ideal-typical model outlined above. In the latter, tasks and jobs are divided into jurisdictions that belong permanently to fixed groups of workers; jurisdictions are fairly similar across organizations and over time. Hence, individual jobs and individual workers can belong to only one occupation at a time. This is not the case in the Web production world, where jobs often combine tasks that workers consider to be different in function and skill, where task combinations vary across jobs, and where many workers switch back and forth among different types of tasks as they move from one position to the next. At first it might seem that Web work lacks occupations entirely; however, I argue that this is not the case. Instead, it exhibits what I have termed a "modular" occupational structure. Web occupations are modular in the sense that production efforts as a whole are differentiated into a number of basic, standard task sets (the "modules," though participants usually call them "roles"); these modular roles are combined in different ways in the particular jobs that make up Web teams and organizations. Individual jobs can encompass either one or several roles at a time, and the allocation of roles to jobs is not uniform or stable but instead depends on factors such as the requirements of particular projects, managers' organizational choices, the skills of available workers, and in some cases, negotiation among workers themselves. Furthermore, workers may specialize in a single role or develop skills and credentials in many roles. Thus, although Web production does exhibit distinct types of work that have their own identities, these do not constitute exclusive jurisdictions; the distribution of roles among jobs and workers shifts across firms and projects.[9] To illustrate this structure, I begin by outlining the various Web production roles and how they are differentiated by workers and firms, and then show how roles are combined in jobs and in individual work trajectories. I then suggest that in this highly flexible field, workers' employment qualifications, loyalties, and career plans are often oriented not to any particular role, but to Web production and the web community as a whole.[10]

The Web Work Roles

The shared categories of tasks and skills that constitute the Web work roles were identified using Web job descriptions drawn from interviews, resumes, and help-wanted advertising.[11] The roles are summarized in Table 2, which also serve as a key to the codes I use to identify them later in the analysis. Web design involves the selection of the Web site's colors, typefaces, and page layouts, including design of functional elements such as

Table 2
Web Work Roles

Role	Central Responsibilities	Code
Web design	Creates visual "look and feel" of Web site	DESIGN
Information architecture	Designs site structure, navigation, usability	IA
Content production	Creates, selects, edits site contents	CONTENT
Site building	Codes, repairs, updates Web pages	BUILD
Programming	Creates Web applications, databases	PROGRAM
Coordination	Organizes team efforts, client contact	COORD

menus and links. The main goal is to create a visually appealing "look and feel" for the Web site, one that is consistent with the site sponsor's brand identity and that promotes (or at least doesn't constrain) the site's usability. Usability itself is the province of *information architecture* (IA), which involves assessing how sites will be approached by end users, mapping elements onto different pages and sections, and deciding how these will be linked through navigational tools. The core of the IA role lies in structuring sites so that their elements are accessible and can be navigated intuitively. These elements—text, images, video, sound, functionalities, and information—are the focus of the content role. Content work may center exclusively on the editorial functions of selecting and modifying site elements; however, it can also include their actual creation, through writing, shooting video, scanning graphics, and so on. The goal of content work is to create and select elements that further the purpose of the Web site—to inform, entertain, advertise, facilitate transactions, and so on—by providing users with information and/or capturing their interest.

When plans, designs, and contents are in place, they must be put on the Web, the task of the *site building* role. Builders use HTML and other languages to code Web pages, upload files to servers, and amend or repair them when necessary. Their primary goals are to make sure that Web sites function well (i.e., with no errors) and that code is written efficiently (so it does not take up too much server space or download time). Site building and Web programming emphasize site implementation; however, while builders create Web pages, programmers use a different set of languages to create Web applications and databases (e.g., transaction functions, content management systems). Programmers share with builders the goal of writing correct, clean code; however, they also attempt to create new types of Web applications and functionalities. A final role—the least hands-on of those

examined here—is that of coordination, which centers on organizing and concerting the efforts of the rest. Coordinators ensure that early stages of production are completed in time for later stages to begin, that workers have needed resources and inputs, and that client demands are met or negotiated and adjusted.

These six major categories of specialized Web production work are distinguished by workers and firms in a variety of ways. The roles entail different approaches to the Web site, with divergent criteria of worth (Girard & Stark, 2002): for example, designers value visual appeal while IAs advocate for usability. The roles are also understood to focus on different regions of the Web site's topography. Sophisticated Web sites comprised a "front end," consisting of all the elements that end users interact with, and a "back end," containing the databases and code that enable the site's applications to function. The back end is the province of programmers; the rest of the roles are concerned with the front end. This division cross cuts another broad distinction in the skills the roles require: Builders and programmers are "technical," while designers, IAs, and content workers are "creatives." The roles are also distinguished to some extent by the software packages, programming languages, and other tools used in carrying them out, although some tools overlap multiple roles. Still, each role has a characteristic output or "deliverable"; IAs, for example, provide site documentation and "wireframes" or bare-bones diagrams, while coordinators make schedules and plans. The roles can also occupy different temporal stages in site production processes. Workers in Web agencies speak of sites being "architected" and then going "into design;" when a design is selected, they go into "build" and are finally tested, debugged, and launched.

Finally, the roles sometimes constitute elements in inter- and intra-organizational divisions of labor. When sites are built through outsourcing networks, the roles may be divided among organizations: One firm is the lead design agency, another is lead programmer, another "owns" the project in that it coordinates the rest and interacts with the end client. Teams of freelancers who build sites collaboratively often adopt similar structures. Within firms, the roles can encompass whole jobs or even whole organizational divisions—there are junior designers, senior site builders, and IA departments. Thus, in some cases separate workers or groups of workers perform separate roles. However, this division of labor is by no means the rule: The roles are also often frequently combined such that several of them are performed together by the same person. In the following sections, I show how the roles are combined in individual jobs and in workers' job trajectories.

Role Combinations in Jobs

Workers' detailed descriptions of their jobs reveal that many encompass multiple roles and that role combinations vary from one job to the next, depending on characteristics of the projects and organizations in which work takes place. A first example comes from Jewel, who performed a variety of front-end Web roles throughout her career; here she describes her first Web job in a small print graphic design firm that was trying to move into Web production. The company included an owner, a secretary, a full-time and a part-time salesperson, and a print graphic designer; Jewel, hired as a "Web master," was its first and only Web worker. Her tasks included building Web sites for clients and working on an internal site through which the company would sell greeting cards and photo collages. She explains the creation of that site:

> [The owner] had the concepts but I was visualizing his concept and making it. . . . He said to me "okay, let's have holiday cards, let's have sports cards . . . " and then I designed all that. But he came up with the text. . . . Basically [it was] his idea, I realized it . . . I did the architecture and the construction . . . the pictures, collages, all that you see I did. . . . Even those order forms, that much I can program.

Here a single person creates and selects images (content and/or design) and architects, designs, and builds "all that you see" on a Web site; only ideas, needs, and minimal text are provided by a separate individual. This scenario is typical for workers who are the only Web employees in non-Web firms, as is the case here; however, it is also frequently found among freelancers who create sites for small, non-Web organizations. The combination of three or four roles in a single Web job is necessitated simply by the fact that workers are soloists, producing entire sites by themselves.

In a second example, role combinations do not result from soloist work; Web production is performed by a team. Bill, whose role-spanning Web career ultimately came to emphasize design, had joined the "Electronic Media Division" of a magazine publishing firm with an ever-expanding Web site. The division grew from 6 to 20 employees during his tenure; however, at minimum it always contained a designer, an online editorial director (the most senior position), a "production person" (site builder), a copy editor (content), a product manager (coordinator), and a salesperson; programming was done by a separate team. He described his "Web design" job, and the workings of the team in general, as follows:

> It was "what's the best Bill can do with it?" A lot of people had ideas . . . it was a very evolutionary thing. [One] editorial director . . . was very open to "let's see what we can do—go ahead and push it, show me what you want to do next" . . . [I did] a little bit of everything. I was sort of a jack-of-all-trades. I did ad banners. I wrote blurbs for the home page, because I had an editorial background, so I got to edit a little bit too. I worked on the directory structures for the programming we were doing. I tweaked the code that we got from our developers. Because it was a small team, you had the ability and the necessity to do a lot. . . . My job was just figuring out the best way to present things. . . . So it's disingenuous to say, "oh, I was worried about the maximum usability." It's not that. It's how can we make this . . . a nice place to visit, with good information.

Bill did design, IA, and a bit of site building, project management, and content work. This role combination was not simply a product of structural necessity. Unlike the soloist case, the team had the numeric capacity to divide labor more finely and rigidly than they actually did; it was small; however, this gave workers the necessity and the ability to "do a lot." Rather than being built into the organizational structure, role combinations were fostered because they were understood to promote product quality ("my job was just figuring out the best way to present things") and new ideas ("push it, show me what you want to do next"). This scenario, in which divided labor is possible but rejected in favor of collaborative, role-spanning work thought to produce innovative, high-quality sites, is found in the interactive departments of some non-Web firms and some Web design agencies.

In a final example, a division of Web production labor is accomplished through interorganizational outsourcing arrangements; however, role combinations still prevail. Julia, who had begun her Web career as the Web master for a legal nonprofit, moved to a cultural nonprofit that was developing a large, database-driven informational Web site focused on a geographic region. The organization had outsourced all of the database, programming, and site-building work to one firm and visual design to another. The in-house Web team consisted of six people, all "producers" or "associate producers." As a producer, Julia's primary responsibility was generating content for the site: writing, repurposing the nonprofit's print materials, and searching the Web for content the site could link to. However, this was not her only role. Of design, she said "[we outsourced] the bulk of it, and when it came down to just little graphics and subsequent page layouts. . . . I was the person who was doing that." In addition, "the [site-] building was completely outsourced, but when we [had] small changes. . . we would just use what was already up and just tweak that."

Furthermore, all the producers were heavily involved with the site's IA. She explains:

> We worked with the programmers on different drafts of it. So we had an idea of how we wanted a certain hierarchy to happen, they would come back and give their feedback, we'd go back, they'd send us documents with flowcharts of how they thought we composed the information and we'd look and say okay well maybe this wouldn't work. . . . We really worked with the back-end people, the program side, because they were building the databases.

Finally, Julia also performed a coordination role when, after launching its main Web site, the nonprofit started creating subsites. She coordinated others' efforts on one of these: it "was kind of my project, from beginning to end, building another site essentially . . . I worked with the same developers . . . and a freelance designer, put it together, and then launched that." In fact, the only Web role this interviewee never played during her job was programming.

Here we see that divisions of labor, even interorganizational ones, do not necessarily lead to single-role jobs. First, the flexibility of Web technology makes it possible for workers from one firm to continually add to and "tweak" other firms' finished work, so that roles are never fully divided along organizational lines. In addition, when complex Web tasks call on multiple roles, assigning those roles to different firms or departments may result in intense collaboration and blended roles rather than rigid divisions. Furthermore, the production, launch, build-out, and maintenance phases of the Web site life cycle may each call on different configurations of skills, and jobs that extend across more than one of these stages often combine multiple roles over time. Thus, like Web sites themselves, divisions of Web labor are not permanently fixed. Although this case involves outsourcing ties among multiple firms, similar combinations are found when divisions are intra-organizational, for example, among departments or individuals.

In these examples we see two types of jobs that involve role combinations. The first is soloist site creation; the second involves workers who are part of teams that combine roles to facilitate innovation, complex collaborative projects, and change in Web products and production processes. Both types of combined-role jobs are fairly common in Web work. To account for them, it is necessary to add a seventh category to the specialized roles listed in Table 2; I have dubbed this category a "generalist" role, borrowing a term from some of my interviewees. However, of course, not all Web jobs involve combinations; some positions are confined to a single role. An

extreme example was offered by Anne, who described a company where she had interviewed for an IA job:

> Their approach was that the salespeople, the account reps, would have the meetings with the clients, and they would determine all the clients' requirements, and they would write them up and they would hand them to me. And then . . . I would draw story boards, I would make site maps, and I would do process flows, and I would hand them to the graphic designer and wait for the next batch of papers to be handed to me.

Although her career was becoming specialized in IA, Anne rejected this compartmentalized job, claiming that it sounded "awful" and "boring"; in addition, under these arrangements she would be "designing in a vacuum" and "you can't do usability in a vacuum, if you've never met the users . . . it made no sense whatsoever." Still, despite such objections from staff, many of the Web agencies and consultancies that grew large during the industry boom did attempt to erect steep boundaries between different roles. Thus, it is difficult to generalize about the contents of Web jobs. Web labor has not been comprehensively and consistently divided; however, it has not always entailed role combinations and generalist work either.[12] Instead, roles have been divided or added together to form jobs that vary in configuration across different projects, project stages, and organizations.

Role Combinations in Web Work Trajectories

Given the prevalence of role combinations in Web jobs, it is not a surprise that Web workers' employment trajectories span multiple roles as well. Web workers tend to jump frequently from job to job, from employer to employer, and from permanent employment into freelance work and back again. Amidst all this movement, many of them shift the focus of their job functions at least once. To examine these shifts in more detail, I used the six specialized work roles in Table 2 and the generalist role to code workers' first, middle, and most recent Web jobs.[13] (An "Other" category was also used to capture nonproduction jobs held during workers' Web careers.) The results are shown in Table 3. Here, the first three columns contain the primary roles of the first, middle, and recent Web jobs; reading across the rows, one can see different patterns in the three roles. The number of workers sharing a pattern is shown in the fourth column. The patterns have been grouped according to the number of role changes they include, which range from none to two; the number of workers in each is listed as the "n" for that group.

Table 3
Workers' Roles in First, Middle, and Recent Web Jobs

First Job Role	Middle Job Role	Recent Job Role	# Workers
No role change (one continuous role), $n = 19$			
GENERAL	GENERAL	GENERAL	6
DESIGN	DESIGN	DESIGN	4
CONTENT	CONTENT	CONTENT	4
PROGRAM	PROGRAM	PROGRAM	2
COORD	COORD	COORD	2
BUILD	BUILD	BUILD	1
One role change (two different roles), $n = 25$			
GENERAL	IA	IA	5
CONTENT	IA	IA	2
CONTENT	COORD	COORD	2
GENERAL	[a]	GENERAL	3
[b]	CONTENT	CONTENT	2
COORD	COORD	[c]	2
PROGRAM	[d]	PROGRAM	2
Miscellaneous combinations			5
Miscellaneous combinations including OTHER			2
Two role changes (three different roles), $n = 11$			
Miscellaneous combinations			5
Miscellaneous combinations including OTHER			6
Fewer than three Web jobs			5
Total			60

Note: COORD = Coordination; IA = Information architecture.
a. Design for one worker, content for another, coordination for the third.
b. Generalist, design.
c. Generalist, content.
d. Building, coordination.

Using this summary of workers' trajectories, we can see that 19 of them—almost one third of the sample—have stayed within the same role throughout. This group consists of specialists: Distinctions among Web roles have served as boundaries for their careers over time. Although specialists exist in almost every role,[14] it is worth noting that the most popular specialization is in multiple-role or generalist work. In addition, 25 workers have changed roles at least once, and 11 have switched at least twice; together these groups make up 60% of the sample. Some of these changes may be interpreted as false starts in which individuals who began in one

type of work found they were more suited for another. However, a substantial minority switched twice, and it is in this group that we see the most movement in and out of nonproduction Web-related jobs (those coded "Other"). These workers' trajectories are characterized by circulation among roles.

Thus although some Web workers do specialize, the prevalence of "specialties" in generalist work and of movement among different types of work suggests that like Web jobs, Web work trajectories are not confined to single roles. In fact, my interviewees spoke about their Web production abilities less in terms of narrow expertise than as a group of "competencies" or "skill sets" that they would accumulate and combine to fit into different project teams and work settings. They have navigated the diverse, flexible world of Web work by developing not only the depth but also the breadth of their skills.

Web Workers' Qualifications, Commitments, and Careers

Existing scholarship suggests that stable affiliations between workers and either employers or occupations are necessary to viable work arrangements, as it is organizations and occupations that provide criteria for matching workers to jobs, structures for career building, and foci for worker loyalty. From this standpoint Web production presents an enigma. Most workers are not permanently attached to employer firms. Furthermore, as we have just seen, their attachments to particular occupational roles are multiple and changing. Thus it remains to be seen what organizes their qualifications, loyalties, and careers. My data suggests that these functions have been performed by workers' attachments to the Web itself and to the industrial community that surrounds it.

First, the employment qualifications cultivated by Web workers and sought by employers have emphasized general or multiple skills and affiliation with the Web industry. Although it is certainly the case that some employers and jobs have required role-specific competencies, many workers in the current sample obtained positions based on the basic and/or broad skills and experiences such as ability to code HTML, prior hobbyist or school Web experience, general knowledge of Web applications and business, or prior employment in Web roles other than the one(s) at hand.[15] Furthermore, hiring credentials often centered less on skill qualifications than on workers' "fit" with employer or client organizations. *Fit* sometimes referred to workers' ability to get along with others or in a particular culture; however, often it indicated their membership in the Web community,

signified by HTML ability, referral by an another member, prior work in well-known Web firms, ability to talk about the old days, or demonstrations of true belief in the Web's potential. Despite its clear subjectivity, *fit* was named by many of my interviewees as the single most important factor in Web hiring. Thus, although the Web work roles have provided an established framework for defining and discussing jobs, job qualifications have often centered less on roles than on general facility with technology and community.

Workers' commitments and identities have a similar emphasis. Some Web workers do identify primarily with their occupational roles (e.g., as designers or information architects); however, for many the first commitment is to the Web itself—to expanding it, improving it, and finding new uses for it—and to those undertaking in similar efforts. Concrete evidence of this can be found in workers' engagement with industry and professional associations and media. Respondents to my questionnaire reported involvement with general Web and new media groups (e.g., the NYNMA) far more frequently than they reported involvement with role-specific ones (e.g., the American Institute for Graphic Arts); similarly, they consumed far more publications focused on general new media and "new economy" issues (e.g., *Wired*) than publications focused on specific roles (e.g., *ContentWire*).

However, the strength of workers' identification with the Web as a whole—over and above particular roles—is seen most clearly in their conceptions of their past and future work trajectories. Careers have often been understood as progressions of jobs within a single occupation such that workers who change occupations simultaneously change careers, and vice versa (Spilerman, 1977). Web workers, however, often switch from role to role and still understand themselves to be pursuing the same Web-based path. Bill, who had risen to a senior position through successive role, job, and employer changes and who was preparing to go to business school, explained his prior and present moves:

> I left editorial and went into design because I discovered I had more fun putting the site together . . . than [updating content]. And I happened to find a designer job at a dream company, [it] was just too good to pass up, so I talked my way into it and then discovered I had a flair for it. . . . As far as image goes, I didn't really make a name for myself until I was doing design, so that's pretty much what I am . . . I'm writing the book chapter [on usability]—even though it's not what I expected to do. . . . But I want to even grow past all of that, too. So who knows where I'm going to go next? I'm happy to leave it nebulous. . . . I just want to open the doors, I want to see where I pass through.

Although happily "nebulous" about his future, Bill is committed to the Web and Internet:

> I'm very much entrenched in the Internet. I've been doing it since I got out of school; I think I know it as well as anybody out there. I've made a name for myself. I don't know where I'm going to take all of that, but I definitely want to continue with it. . . . I'm very much an Internet professional, in a good way.

Similarly, Rachel aligned herself not just with the Web but with a particular Web application, content distribution systems.[16] She had worked with such systems in previous jobs as a site builder, generalist, information architect, and in some business roles. Following a layoff and some freelancing, she had just landed a new job when I interviewed her. She resisted the notion that her future constituted a "career" at all, instead describing a disjoint series of desirable experiences and accomplishments:

> I like all this, and I'd like to keep doing it. . . . I'm very fortunate that . . . I'm still in the content distribution space . . . I'm actually tackling the exact problems that I've been chewing on for the past four years. . . . So I'm here, this is what I want to be working on . . . in whatever capacity . . . I'd like to have the decision-making capacity that I used to have . . . but it's not a career goal, it's kind of like I want to tackle this problem and this is what I need to do it. . . . I'm excited about entrepreneurship . . . I want a family so I kind of picture that I'll . . . have enough legitimate experience . . . [to] be a management consultant, and set my own hours and things. . . . Oh, I'd like to be published, I see myself writing. . . . You know, maybe I'll get more technical. . . . Maybe once I get all this management stuff out of my system . . . then I'll become more interested in technology and start learning how to program. . . . But it's not really a career thing, it's more like I want to learn how to paint, you know.

Clearly, Rachel doesn't see her future in terms of any particular type of work—she wants to explore entrepreneurship, business consulting, writing, and technology. Some Web workers do pursue particular roles over time, aspiring to greater expertise, authority, or compensation in a single line of work.[17] However, many, like the two quoted here, see particular roles less as primary work identities than as incidental performances within the larger project of working on the Web. Some workers aim to take on new skills and roles simply because they want to, whereas others do so to make themselves more marketable. Either way, they cast their lots not with particular occupations or

employers but with Internet and Web technology itself, and thus with the new media industry as a whole. The Web operates as a boundary object, "plastic enough to adapt to local needs and the constraints of the several parties employing [it], yet robust enough to maintain a common identity" (Star & Griesemer, 1989, p. 393); it provides the coherence necessary to coordinate workers' efforts but allows their experiences and goals to be diverse.

Flexibility, Modular Occupations, and Worker Autonomy

In sum, the division and allocation of Web labor diverges from that of ideal-typical occupational arrangements, in which jobs and workers are divided into well-bounded, exclusionary groups. Web production is instead characterized by a modular occupational structure: Differentiated work roles are combined in configurations that vary across different projects and organizations, yielding fluid job definitions and "portfolio" careers that mix many types of work (Menger, 1999). This structure is congruent with the numerically and functionally flexible allocation of labor that characterizes Web production as a whole. Hence, it provides an opportunity to explore workers' experiences with flexible production practices and to address ongoing debates over the impact of such practices on workers' autonomy.

The modular organization of Web production work appears to be parallel with flexible practices widely reported in manufacturing, such as the combination of previously distinct jobs, job rotation, and cross-training. In the dominant neo-Fordist view, these are understood to provide workers with few new skills or wage increases and further to require the relaxation of union-enforced job definitions that have been valued as means of protecting them from managerial whim, work intensification, and substitution by less-skilled labor (Dohse et al., 1985; Shaiken et al.; Smith, 1997; Wood, 1989). Thus, functionally flexible jobs are often seen as a mechanism by which management has wrested important controls over labor intensity and job security away from workers. In Web production, the flexibility of the modular occupational structure raises similar concerns. However, workers evaluate these concerns differently, in part because the modular roles also afford them greater autonomy in their concrete production activities than is typically found in manufacturing settings. The resulting tradeoffs are best seen by examining how the modular roles affect the balance of worker and client and/or employer control first at the level of the labor process and then at the level of overall work and employment arrangements.

Web workers' comments on their production experiences reveal that many of them appreciate having broadly defined, fluid jobs. Above we saw Jewel, a soloist, proudly explain how she individually "realized" a site concept and created "all that you see." When role-spanning jobs are part of collaborative teams they are often valued because they afford opportunities to contribute to multiple aspects of large, complex projects. Glen, though fairly specialized as a programmer, still viewed jobs where he "only saw a piece" of a project because of rigid occupational boundaries as inferior to those where he engaged with multiple roles through collaboration with others. Describing one such experience, he relished his opportunity

> to be involved from the very beginning, to actually help create the vision, and see these visions go, these projects go, from day one through their entire life, [which is why this] is probably the most satisfying project I've worked on.

From these statements, it appears that the functionally flexible jobs enabled by the modular structure give workers some autonomy in their concrete labor activities. They are not free to do just as they please; their work is shaped by established production standards and by team negotiation, as well as by employers and clients. Nonetheless, role-spanning jobs usually involve loose supervision and give workers a wide scope of input into projects, contributing to a sense of personal efficacy which they seem to value greatly.

There are clear limits to this autonomy, however. Although generalist and role-spanning Web workers may control much of their own production activity, the overall organization of work is determined largely by managers or, in the case of freelancing, by clients. Managers decide which projects will be taken and which rejected with little input from production workers. In theory, freelancers can choose their projects; in practice, their ties to clients determine the opportunities they can pick from. Managers and clients also control the assignment of tasks, through deciding which will be performed in-house and which outsourced, and through assigning individual workers to particular departments, teams, or roles. Most important, in designing their organizations, employers determine the overall structure of work. They decide whether workers will be grouped primarily in functional departments or cross-functional teams, whether production will be more linear or more collaborative, and hence also whether the work roles will be treated as modular entities or as conventional occupations. When modular arrangements are chosen, employers usually decide which roles will be combined in single jobs, which ones separated, and how flexible these arrangements will be. Clients exercise much the same control in selecting

types of labor sources to contract work to. Thus even though many Web workers experience autonomy in their concrete labor, it is managers and clients who, through their authority over the meta-organization of work, determine how much autonomy different groups of workers will have and how great the scope of their contribution will be.

The result is that managerial metacontrol imposes limits on workers that are at odds with their own sense of efficacy: They often feel that they know the Web better than their superiors but lack the authority to organize work in a way that would benefit themselves, their companies, and the future of the Web as a whole. This is evident in worker complaints concerning managerial decisions about project choices and staffing but manifests itself with particular clarity when workers criticize employers' misuse or nonuse of the modular roles. For instance, Alyssa, whose career featured IA, site-building, and generalist roles, complained about a position in a firm producing Web-based seminars:

> We were very siloed. The IA [was seen] as the person who only does this one activity, rather than seeing there's a broad range of activities I'm skilled in and talented enough to do, and that would help the business . . . [there were] these sort of barriers in place. . . . We were purposely kept out of anything else.

It is important to note that Alyssa is discussing a job from which she was subsequently laid off. In her view, employers who treat work roles as specialized occupations create artificial "silos" around workers; this hurts the company by failing to capture workers' full skills but also hurts workers by preventing them from realizing their efficacy and by making them expendable.

A similar argument was made by Steve, who had IA and generalist experience, in discussing a Web agency where he was first permanently employed as an information architect, then laid off, and then rehired as a freelancer:

> It's specialized now. In the day, they wanted you to do everything. . . . They wanted to know that at 4 AM when you're trying to hit this deadline, that they can be like, "Steve, we need you to code this page . . . " [The employer] got a lot more for [its] money back then because you had a lot wider range of knowledge. Now you can just argue that those skills are just more focused and specialized . . . [When I was laid off] what they told me was, "As we see it, IAs are only needed on a project-to-project basis, and when we have no project going on, there's nothing for you to do" . . . So it's really kind of frustrating, now that I am tagged and titled with "specialized," I'm only an IA? Even though I have this background of doing all these other things.

Here too, narrowly bounded jobs are seen here as artificial: Steve complains that he is "tagged and titled" as specialized despite his broader skills. Furthermore, narrow jobs are not linked to stable employment; rigidly specialized workloads are in fact too light ("there's nothing for you to do"), leading to sporadic assignments and expendability. Both workers instead associate role-spanning work with security, as it represents ongoing value to the firm. Many Web workers, like those quoted here, believe that functionally flexible jobs can serve to align their employers' interests in efficient, high-quality production with their own interests in exercising multiple talents and in maintaining stable employment. However, conventionally bounded occupations fail to realize this alignment, resulting in a lose–lose situation; hence they are seen as artificial products of managerial illogic.[18]

Thus, in keeping with research on flexibility in manufacturing, it appears that Web work's modular, blended roles may contribute to labor intensification (coding at "4 AM"). That this was rarely an object of complaint in my interviews is partly attributable to Web workers' belief that periodic long hours are inevitable in deadline-driven project work. However, in contrast to the manufacturing literature, Web workers do not see bounded jobs and occupations as a source of control or permanence, but rather quite the opposite. The fact that Web workers balk at narrow jobs while factory workers resist fluidity suggests, first, that the impact of various occupational forms on workers' control may depend on the type of labor involved. Second, it suggests that regardless of occupational form, it is the simple fact of managerial power—to reconfigure, add, and externalize jobs—that is the root of worker powerlessness and insecurity.

Web workers' experience of disjuncture between their autonomy in production and their lack of control over how production is organized has been a source of frustration; however, it has not yet led them to create any effective mechanisms for compelling firms to act in their interests—or in firms' own interests, as perceived by workers. This is unsurprising; autonomy, real or imagined, frequently prefigures consent and accommodation (Burawoy, 1979). However, in the Web case, contradictions between autonomy and constraint have resulted in a litany of diatribes about managerial decision making, often posted to listservs and Web sites designed for such purposes (e.g. netslaves.com, fuckedcompany.com). It has also contributed to workers' high rates of mobility: Many exit their employers in hopes of finding better conditions in other firms, in freelancing, or in entrepreneurial ventures. The latter consequence is nicely captured in a Anne's description of why she and her colleagues, laid off from a series of failing Web agencies, chose entrepreneurship: "We'll just form our own company and we'll do it ourselves, 'cause we could hardly do worse than our last employers have done.'"

Discussion

Contrary to existing theories that view flexible production as leading to either the demise or the resurgence of traditional bounded occupations, I argued here that it may instead result in an alternative occupational form. Web work's modular occupational structure rests on fluid, role-spanning jobs and careers, often oriented to the Web as a whole rather than to particular specialties or employers; it produces a contradictory blend of autonomy and limitation for workers. What remains to be seen is whether this structure is limited to the case Web production or generalizable to other lines of work. Furthermore, because the data used here to describe it were collected during the Web industry's formative years, there is some concern that it may be fleeting, and that its fluid work roles will harden into bounded occupations over time.

Evidence from studies of other industries and lines of work should allay some of these concerns. Although none describe precisely the same structure outlined here, its core ingredients—persistently fluid job definitions—are found in a variety of areas. Role-spanning jobs and deployment of workers across different types of tasks have been identified in a number of settings undergoing flexibilization. Some of these are, like Web production, fields that combine creative and technical work; mixed roles are found in computer programming, sound engineering, and the nonunionized upper reaches of the motion picture industry, where they are accompanied by hallmarks of flexibility including customization, rapid technological change, outsourcing, and declining levels of vertical integration (Baker & Faulkner, 1991; Christopherson & Storper, 1989; Kealy, 1979; Kuhn, 1989; Pettigrew, 1973). Flexibilization can lead to mixed roles in manufacturing, as we have seen; in managerial work, role-spanning jobs are found in firms shifting from bureaucratic to team-based structures (Hecksher, 1995).

It is possible to conclude that fluid jobs and careers exist primarily in flexible industries; however, other findings suggest that role-spanning work has existed, at least in some degree, before and beyond such contexts. Furthermore, these findings reveal that many forces generally thought to lead to occupational specialization and boundary making—generally those stemming from managerial and worker efforts to control various aspects of work—are often more equivocal than they at first seem. First, managerial control aimed at improving efficiency may result in either bounded or fluid work roles. Rationalization as described by Braverman (1974), in which efficiency is achieved through ever-more minute divisions of labor, clearly fragments and fixes job contents and inhibits role-spanning work: As Stone's (1975) historical account shows, rationalization in the steel industry turned

independent craftsmen with general knowledge into "semiskilled" laborers whose specialized training equipped them to perform only a single job. However, efficiency efforts need not follow the Bravermanian model: Research on nursing and midwifery in Britain shows that managers may also use control to achieve efficiencies by combining previously distinct work roles into single jobs (Harvey, 1995). Second, managerial efforts at coordination can lead to bureaucratic structuring, which inhibits fluidity; for example, Blau (1984) showed that despite workers' widespread belief that specialization "kills creativity," growing architectural firms addressed coordination needs by creating specialized departments and jobs (p. 58). However, coordination problems may also be resolved through nonbureaucratic control mechanisms, especially in smaller firms; Kelley's (1990) study of machining occupations found that small firms often relied on informal cooperation and communication, which facilitated flexible role combinations.

Finally, worker efforts to gain control of their employment security and workplace status can have diverse consequences. In some cases, workers stake out jurisdictional claims over particular tasks and bar others from encroaching on them, resulting in rigidly bounded jobs, careers, and occupations. This process has yielded divisions between market researchers and general marketers and between psychiatrists and neurologists (Abbott, 1988), and producing fixed job definitions in many unionized settings. However, monopolistic competition and boundary taking are not the only routes to security and status. Rather than barring outsiders from their tasks, workers may enroll others in their projects and problems to secure their work, expand their influence, and increase their professional stature. This strategy was pursued by geneticists in creating the "interdiscipline" of genetic toxicology, which they share with biologists, public health scientists, environmentalists, and others (Frickel, 2004). Thus, although it is certainly the case that control efforts have fragmented many once-broad occupations into fixed specialties over time, the opposite trend can also be found. We can not assume a priori that the fluidity of the Web work roles is an idiosyncrasy or that the roles will necessarily become bounded occupations over time.

However, what of Web workers' responses to the modular occupational structure? Is their largely positive evaluation of role-spanning jobs and careers—though not of all aspects of managerially imposed flexibility—echoed by workers in other settings with similarly fluid roles? Here evidence is mixed. Much research on manufacturing has found predominantly negative attitudes toward new flexibilization measures; for instance, in a study of the introduction of "just-in-time" inventory systems and robotic technology to an automotive plant, Shaiken et al. (1986) found workers

complaining of loss of control over the pace of their work. Others, however, have discovered a variety of responses to flexibility, even within the same industries and/or firms. Vallas's (2006) study of five paper mills found that the implementation of new technologies, quality initiatives, and teamwork schemes was met with straightforward resistance among workers in more routinized jobs and/or in older plant areas, and with greater (if not uncritical) participation among workers in higher skilled jobs and newer production settings. This suggests that Web workers' generally warm reception of their flexible jobs and careers is not entirely unexpected. Web workers are viewed by themselves and others as highly skilled; their labor often comprises complex, unique projects that are difficult to rationalize, so that much work involves "potentially ambiguous situations" requiring analytical insight (Kuhn, 1989, p. 278). Flexible, role-spanning jobs may, in manufacturing work, result in labor-intensifying combinations of rationalized tasks; the same practices, when found in the Web production and other highly skilled work, may afford real (though limited) opportunities for creativity, influence, and professional advancement.

Furthermore, workers may also embrace or reject fluid jobs and flexibility in general for reasons extrinsic to the tasks and skills involved. Web workers' loyalty to the Web as a community and a project, and their criticism of firms for carrying out this project poorly, echo the sentiments of workers in other quite divergent flexible settings. Their descriptions of their relationships with employers and clients evoke the "community of purpose" that Hecksher (1995) described among professional managers and postbureaucratic firms, in which "individuals with commitments" to certain products or projects find the potential for realizing those commitments in the "missions" of employer organizations (pp. 145-146). It is interesting to note that Web workers' motives also evoke Smith's (2001) findings from a far less optimistic situation in which blue-collar workers in a declining mill accepted managerially imposed flexibility to save their employer, their jobs, and, in a one-company town, their whole way of life; they had embraced a "community of fate," seeing their own futures as enmeshed with those of the mill and its management. Web workers have similarly seen themselves as sharing a common fate with each other and with firms: Web production has always been seen as an exciting but risky venture in which individual workers' and firms' futures are tied to the success of the whole. These similarities in the subjective attitudes of such disparate groups suggest that acceptance of flexibility may rest in part on participants' commitment to the uncertain future of something beyond particular firms or occupations, such as a product, technology, or community. Further

research would be required to see if flexible practices fare as well among those committed primarily to workplace-level structures that do not portend grave risks or golden opportunities. Overall, it appears that the fluidity of the Web work roles and Web workers' generally warm responses to them are generalizable to other industries and lines of work. By extension, the ideal-typical bounded occupation may be empirically common; however, it is not inevitable.

Conclusions

This article makes several contributions to existing research on flexible production and on occupations. First, it contributes to the former by focusing on the understudied question of how flexible practices—numeric and functional—intersect with occupational structures, and by providing an empirical case that illustrates one possible outcome. Furthermore, it complicates sometimes simplistic debates over whether flexible work reduces or enhances worker autonomy by illustrating that workers may have significant control over concrete labor processes while lacking authority over the larger structures in which labor is embedded. In addition, it adds to the growing body of empirical research on flexibility in nonmanufacturing settings.

To research on occupations, this article contributes an empirically grounded analysis of an occupational form that differs significantly from the ideal-typical model found in much previous literature. The argument is not that the modular structure outlined here is the only alternative. Indeed, existing findings make clear that pure ideal-typical occupations with well-defined groups of workers and stable work jurisdictions are rare in the empirical world, which is instead characterized by fuzzy and fluctuating distinctions among categories of workers and tasks. However, much research on occupations, focused on topics such as skill shifts, gender differentials, or mobility, ignores this fuzziness or discounts it as residual static. Categories are assumed to be fixed or deliberately held constant (Abbott, 1993), and so there is little exploration of occupational structure per se. Here, having used empirical deviation as an indicator of one alternative structure, I suggest that there may be others. Occupations in general remain task-based mechanisms for dividing labor; however, there may be several ways to allocate task sets among jobs and workers and, accordingly, many occupational forms of work control.

This argument for diversity is congruent with some of the broader lessons that have emerged from the flexibility debates. Many authors concur that

flexibility implies no single template for work arrangements but instead may generate many different structures (Heydebrand, 1989; Smith, 1997; Vallas, 1999); some have added that this heterogeneity is nothing new, as Fordist organizational structures were never as rigid, uniform, or universal as the literature sometimes suggests (Wood, 1989). To apply these insights to the study of occupations in flexible and Fordist settings, we require further research that is focused explicitly on occupational structuring and that eschews the use of a priori classifications in favor of more inductive methods which allow for the possibility of multiple forms. An inductive approach to the impact of occupational structures on their incumbents is also warranted; after all, one worker's prized task jurisdiction may be another's artificial and constraining "silo."

Notes

1. The new media industry uses interactive digital and telecommunications technologies (the Web, CD-ROMs, wireless, others) to create products and services centered on content, including information, interaction, entertainment, and transactions (Bram & DeMott, 1998). New media firms and closely affiliated "dotcoms" account for a substantial portion of Web employment; however, Web work has also occurred outside these contexts, for example, in traditional media and advertising firms, universities, law firms, nonprofits, and even small neighborhood businesses.

2. The Web workers in the current sample changed employers (including stints as self-employed freelancers) about every 1.4 years. Their mobility among employers and in and out of full-time freelancing was shaped in part by the turbulent "boom" and "bust" in new media and dotcom labor demand during the period under consideration.

3. The larger research project that gave rise to this article aimed at examining, in qualitative detail, the organization of work, labor markets, and careers in an emerging flexible industry.

4. Hobbyists with no paid Web experience were also excluded. Many members of the sample had held jobs in excluded categories; however, their careers featured hands-on, paid Web production work in New York City as well. New York City's Web production field was chosen for study because of its fit with project goals and its convenience.

5. The Web production field lacks unions and hence union membership lists. Web firms' employee lists exclude freelancers and Web workers in non-Web organizations. Many workers forego industry and professional association memberships because they are expensive; the authors of a prior survey of association members conceded that their respondents were not representative of New York new media workers as a whole (Batt et al., 1999).

6. The last method was used mostly to recruit workers in hard-to-find quota categories.

7. One participant was uncomfortable with tape-recording, so I relied on extensive note-taking and follow-up e-mails.

8. Revisions to sampling procedures included (a) expansion of occupational categories (described below) from four to seven, (b) counting occupational roles of workers' first, middle, and most recent Web jobs rather than workers themselves, and (c) relaxation of sampling goals from equal to adequate representation of roles. In the end, generalist jobs are best represented (47 of 180 first, middle, and recent jobs) and site-building jobs worst (7 of 180).

9. The modular occupational structure described here bears some resemblance to widely noted "modular assembly" practices found in the auto industry and elsewhere (Abreu & Ramalho, 2003; Fredriksson, 2006): both involve the decomposition and recombination of production processes, and both are associated with flexibility, industrial networks, and often-complex coordination. However, the automotive "modules" are specialized production units (divisions, firms) dedicated to producing a single type of subassembly for mass-customized products. By contrast, the Web work modules are specialized task sets; productive units (individuals, divisions, firms) combine and change task sets to create unique-customized products. Hence Web work often entails functional flexibility at the job level, while there is little evidence of this in auto work.

10. I focus on Web production tasks only. The workers I interviewed also engaged in clerical, managerial, and entrepreneurial work and work in "host" occupations (Menger, 1999) such as teaching. The latter tasks do merit attention; however, I sidestepped them here so as to depict the organization of production work more clearly.

11. Although the roles have changed over time, a detailed history of how each one emerged is beyond the scope of this article. The descriptions I offer here capture them in a fairly mature state, during the industry's 1999-2000 peak.

12. Detailed analysis of 40 job descriptions from 20 workers reveals that when only primary tasks are considered, 65% of jobs focus on a single role. When all tasks are included only 5% are confined to a single role.

13. The most recent Web job was either the worker's job at the time of the interview or the last Web-related job held. The middle job was the median position in the worker's Web career; if the career held an even number of Web jobs, the lengthiest of the two middle jobs was chosen. Jobs included permanent positions and freelance stints; the latter were coded with a primary role that characterized most of the gigs they included.

14. The exception is information architecture; this was the last role to emerge as a distinctive form of work, and specialized positions were not available to most of my workers when they first began their Web careers.

15. The prominence of general skills has roots in an early lack of role credentialing mechanisms, in ongoing labor shortages, and in need for autonomous learners who could keep up with change rather than narrow expertise. Over time the labor force gained experience; employers could choose individuals with established skills in one or more roles. Thus, qualifications became less rudimentary without necessarily becoming narrowly specialized.

16. Content distribution systems are Web applications designed to disseminate information (press releases, stock quotes, course syllabi, etc.) to designated end users.

17. Programming appears to be an especially specialized exception to the otherwise modular structure of Web work. On many Web projects, programming is done by a separate team or organization, making combinations with other roles less likely. Programmers are less likely to engage in other roles during the course of their careers: 42% of all careers that contain programming jobs contain only programming jobs, compared to 22% for content and 28% for design, other popular specializations. Finally, programmers are less attached to Web work: many happily took non-Web programming jobs during the industry decline, unlike others who struggled to stay with the Web. This suggests that programming is more bounded, or more continuous with itself than with other aspects of Web site production.

18. Some workers who were unemployed at the time of their interviews offered a contrasting view: They felt discouraged by advertisements for positions with highly idiosyncratic role combinations that did not match their skills and appeared to believe that less fluid job definitions would enhance their employment prospects.

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Amanda Kidd Damarin is an assistant professor of sociology in the School of History, Technology, and Society at the Georgia Institute of Technology. Her research focuses on changing work practices, organizations, markets, and inequalities, with an emphasis on theory.