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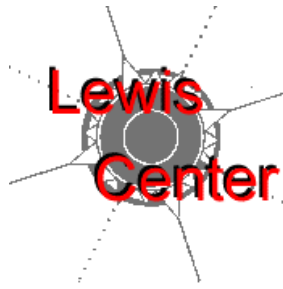
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Patterns of Employment in Southern California's Multimedia and Digital Visual Effects Industry: The Form and Logic of an Emerging Local Labor Market

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Working Paper #24 in the series

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Abstract

The paper opens with a brief description of the multimedia and digital visual effects industry in Southern California. The specifications of a questionnaire survey of two select groups of workers in the industry are delineated.   The survey results show that workers in the industry are predominantly young, white, highly educated and well remunerated. Patterns of space-time filtering of individuals into the local labor market are investigated. These individuals originate for the most part outside of Southern California, but once employed in the industry and the region they tend to become locked in to the local jobs system. The sectoral and occupational distribution of workers is described, with particular reference to a core group of multimedia and visual digital effects employees. Workers are shown, too, to be highly organized in overlapping professional networks which function as important sources of information, know-how, and employment contacts. The paper ends with a brief allusion to the need for more research on processes of worker acculturation.

<u>Introduction</u>

Since the 1980s, the multimedia and digital visual effects industry has grown at an extremely rapid pace in the state of California. It is found in two main geographic concentrations in the state, namely, the Bay Area and Southern California (principally in Los Angeles County), with the latter region now moving rapidly into a position of dominance, not only in California, but probably in the world at large.

In its narrowest sense, the multimedia industry can be said to consist of firms that produce two characteristic outputs, namely, compact disks and materials for diffusion over the web. These outputs can then be further categorized depending on their substantive content, e.g., games, interactive stories, educational and self-help materials, business aids, advertising, and so on. In this sense, the multimedia industry is currently materializing at a point of convergence of all media (visual, textual, and audio) around interactive, digital methods of presentation. However, the industry can be defined in a somewhat wider sense so that it includes not only the activities indicated above, but also all forms of digital enhancement of conventional media, and, in particular, a wide range of computerized approaches to graphic design. It is this larger conception of the industry -- i.e., the multimedia <u>and</u> digital visual effects industry -- that will predominate in the present study. Applications of computer graphics, particularly in the fields of animation and special effects, have developed apace in recent years, and Hollywood feature films and television programs now routinely depend on ancillary high-technology image-processing operations for their commercial success (PMR 1997).

The remarkable dynamism of Southern California's multimedia and digital visual effects industry is, of course, closely related to the region's overwhelming and long-standing importance as a center of the entertainment industry. As such, Southern California represents the country's most densely developed concentration of specialized workers in such domains as story-writing, visual dramatization, and scenario production. It is a place, too, where multimedia content providers can always find a ready supply of subcontract services in film and video production, photography, graphic art, script-writing, musical composition, acting and voice-over, and so on. Even so, and in view of the recent mushrooming of the multimedia industry in the region, many firms are currently reporting an acute shortage of workers with computer graphics skills and other forms of multimedia expertise.

The precise size of the multimedia and digital visual effects industry in Southern California is extraordinarily difficult to calculate in view of the fact that there is no generally agreed upon definition of just what the industry is,[1] or how it might be distinguished from functionally adjacent sectors like motion picture production, publishing, software services, and so on. In an earlier study (Scott 1995), I suggested, on the basis of the narrow definition of the industry provided above, that there was in 1995 something of the order of 188 multimedia establishments in the entire area of

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[1] The industry is not currently recognized in the Standard Industrial Classification.

Southern California south of and including Santa Barbara. However, according to the broader definition of the industry (i.e., including all forms of digital visual effects), the number of establishments in the region can be provisionally estimated at 382. The median size of these establishments is roughly ten employees. The total number of employees in the industry is quite unknown and would be extremely difficult to assess without more complete information on the frequency distribution of employment by establishment. For comparative purposes, it may be useful to note that total employment in Los Angeles County in SIC 781 (motion picture production and services) was 129,863 in 4,416 establishments according to the 1994 edition of County Business Patterns.

My specific objective in the present paper is to describe the shape, form, and emergence of the local labor market for multimedia and digital visual effects workers in Southern California. In this regard, I shall, in the first instance, be systematizing and commenting on a large body of survey data about a new and important sector of employment whose lineaments have hitherto remained largely unexplored. In so doing, I shall, at the same time, be pushing forward on a more general line of research concerned with patterns of space-time filtering of workers through urban production systems and associated questions of the social structure of local labor markets in metropolitan environments (Scott 1984, 1992a, 1992b). In general, the present investigation seeks to complement the existing literature by offering a number of additional empirical insights into the operation of local labor markets as complex subsystems within dense spatial agglomerations of economic activity and concomitant regional economic development processes (Scott 1995, 1997).

An Empirical Framework of Investigation

The study of local labor markets is almost always greatly hampered by a dearth of pertinent statistics. It is usually quite difficult to find information about the personal and occupational characteristics of workers on an individual basis, especially for cases where there is a requirement that the data be coded, in addition, by location and sector of employment. Obviously, the best way to obtain micro-data of this sort is by direct questionnaire methods, which, however, even under the best of circumstances, are invariably expensive and time-consuming. A particular problem in the present context is actually identifying a target population of individuals to be surveyed, and this all the more so, as noted, because there is no official designation of the multimedia and digital visual effects industry as such. Even when the definitional problem is resolved, the major obstacle of actually delivering questionnaire forms to workers remains. One possible line of attack is to distribute questionnaires to workers at their place of employment, but this approach runs up against the difficulty of securing firms' cooperation; and it is, in any case, subject to peculiar biases because this method typically results in returns being clumped by firm -- a problem that is exacerbated when only a few firms can be induced to participate in the survey, above all when some of them are unusually large in size (Scott 1992b). The alternative method of surveying workers at their place of residence faces the even more daunting problem of constructing at the outset an unbiased list of home addresses. A third approach, which I have used with some success in the past (Scott 1984, 1992a), is to gain access to potential respondents through employee organizations, such as unions or guilds,

though again strong biases may be expected to enter into any resulting survey when these organizations account for only a fraction of all employees in the selected industry.

Unfortunately, there is no organization in Southern California that claims or even seeks to represent all multimedia and digital visual effects workers in the region; and there is none that comes close to embracing a majority of these workers. That said, there are various interest groups in the region whose members are either employed in the industry or are actively seeking jobs in it. Two of these interest groups are of particular significance here, both because they are fairly large in size and because, taken together, their membership appears to provide a fairly good representation of employment structures in the industry. Each of these groups is a local chapter of a wider international society. They are:

- *IICS (International Interactive Communications Society).* The objectives of IICS are to provide information, professional support, and skills development for individuals across the spectrum of the interactive arts and technologies business. Its membership is recruited broadly from professionals in multimedia, computing, telecommunications, education, on-line services, media, publishing, and entertainment. In total, the IICS has 34 individual chapters throughout the world. When this study was initiated in the summer of 1996, the Los Angeles chapter had a membership of 612.

- *SIGGRAPH (Association of Computing Machinery's Special Interest Group on Computer Graphics).* Like IICS, SIGGRAPH is dedicated to providing information, professional assistance, and training, but to a rather more narrowly defined membership. This is focussed primarily, but not exclusively, on computer graphics specialists. There are 26 chapters of SIGGRAPH worldwide. The Los Angeles chapter had 820 members when this project started.

Despite the fact that IICS members are drawn from the entire spectrum of occupations in the industry (including business and financial operations, production management, writing, and so on), while SIGGRAPH tends to be rather more technically oriented, there is some overlap of membership between the two. Neither of the two organizations provides an exhaustive or unbiased window onto local labor markets in the multimedia and digital visual effects industry, but combined together they probably yield as comprehensive a picture as it is possible to obtain at the present time with limited resources. The advantage of basing the study on two different but complementary organizations is that the information they offer provides a degree of focus that would otherwise assuredly be lacking if we looked only at one of them in isolation from the other.

With the full cooperation of the officers of the local chapters of IICS and SIGGRAPH, an identical questionnaire was mailed to all members over the second half of 1996. The total number of responses received back from IICS was 171 (a response rate of 27.9%) and from SIGGRAPH 159 (a response rate of 19.4%). These response rates are fairly representative for this kind of survey, though the sharp and statistically significant difference between the two rates obtained here remains inexplicable. In the absence of any definitive information on the social characteristics of the underlying population of workers, we have no way of assessing what specific biases may exist in the

questionnaire returns, though it is probably safe to assume that bias of some sort is present. Accordingly, the results reported below need to be treated with due caution. In view of this warning, I shall refrain in this study from premature generalization of the survey results. Even so, the results, taken simply on their own terms, tell us much about at least significant fractions of the labor force in this burgeoning industry and its associated employment structures in Southern California, and they are generally consistent with information gathered in a parallel series of some twenty-five face-to-face interviews with representatives of multimedia and digital visual effects firms in the region.

A Concise Geographic and Demographic Profile of Questionnaire Respondents

In Figure 1, I have mapped out the residential locations of all questionnaire respondents together with a set of isolines indicating the generalized spatial pattern of the digital visual effects industry in Southern California. The residences of questionnaire respondents are depicted individually in Figure 1. Any given isoline in this figure represents a locus of points with identical levels of accessibility to establishments in the multimedia and digital visual effects industry. Accessibility is defined here as d_j^{-1}, where d_j is the distance from any arbitrarily given point to the jth establishment in the industry. The analysis was restricted to just Los Angeles and Orange Counties (which between them account for a total of 311 establishments), with address data for individual establishments taken from the list presented in the appendix to Scott (1995).

Figure 1 clearly highlights the locational build up of the multimedia industry in and around Santa Monica and the western part of the City of Los Angeles, together with an axis that extends eastward and northward through Hollywood and Burbank and then turns back toward the west through the San Fernando Valley. A very minor outlier of the industry can be observed in Orange County to the south. The figure reveals the existence of a remarkable spatial correspondence between the distribution of respondents' residences and the general locational structure of work places. This same observation is corroborated by questionnaire data which indicate that the median commuting time for IICS respondents is 15 minutes, and that the median commuting time for SIGGRAPH respondents is 20 minutes. In fact, this kind of tight spatial relationship between employment places and the residential locations of workers is a persistent feature of local labor markets in the large metropolis, even in Los Angeles which is often (mistakenly) seen as being a more or less fluid commuting shed across its entire extent. The correspondence is magnified in the present instance by the fact that the demographic features of questionnaire respondents match closely to the generalized social profile of the residential neighborhoods of the western reaches of the Los Angeles metropolitan area.

Questionnaire respondents can be represented, for the most part, as a rising cohort of young, successful professionals, in which women play a noticeable and presumably increasing role. A total of 39.9% of IICS respondents and 29.1% of SIGGRAPH respondents are female. As shown by Table 1, most of the individuals who returned a questionnaire are in their thirties, the median age being 39 for IICS and 37 for SIGGRAPH respondents. Both groups, in addition, are overwhelmingly dominated by whites, with Asians, Hispanics and African-Americans representing disproportionately

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small percentages of all respondents (Table 2). Annual salaries are high; the median salary for IICS respondents is $55,000, and for the more technically oriented SIGGRAPH respondents it is $70,000.

Table 1. Age of questionnaire respondents.

Age	IICS (percent)	SIGGRAPH (percent)
20 - 24	0.6	2.6
25 - 29	8.5	14.1
30 - 34	20.1	28.2
35 - 39	22.6	18.6
40 - 44	19.5	13.5
45 - 49	16.5	9.6
50 - 54	4.3	7.1
55 - 59	4.9	2.6
60 - 64	2.4	1.9
65+	0.6	1.9
Number of usable responses	164	156

Table 2. Racial and ethnic characteristics of questionnaire respondents.

Racial/ethnic category	IICS (percent)	SIGGRAPH (percent)
White	92.4	88.0
Asian	1.3	7.7
Hispanic	4.4	1.4
African-American	1.9	2.8
Number of usable responses	158	142

Only about a quarter of all respondents were actually born in Southern California. The remaining three-quarters were, for the most part, born not only outside of the region but also outside of the state. Of IICS respondents, 6.1% were born in a foreign country, with the corresponding figure for SIGGRAPH respondents being 21.2%. Most of these foreign-born came from Asia, Canada, and Europe. The relatively high proportion of foreign-born in the work-force is no doubt in part a reflection of the reported shortage of workers with computer graphics skills in both California and in the country at large (see also the section below on spatial mobility).

Employment and Recruitment Patterns

The sectoral distribution of employment. A classification of individual sectors in which questionnaire respondents are employed is laid out in Table 3. This classification is quite consistent with the broader definition of the multimedia and digital visual effects industry offered in the introduction to this paper. A clear majority (79.0%) of all questionnaire respondents are employed in a core group of sectors, with the balance being employed in sectors that are at best only marginally connected to the multimedia and digital visual effects industry (see Table 3).

Table 3. Sectors of employment of questionnaire respondents.

Sector	IICS (percent)	SIGGRAPH (percent)	Combined (percent)
Core sectors:			
Multimedia	42.4	12.6	27.6
Motion pictures/TV/video	11.1	14.0	12.5
Special effects	0.0	20.3	10.1
Animation	7.0	17.5	9.1
Software design	5.6	5.5	5.6
Multimedia consulting & training	6.9	1.4	4.2
Advertising	5.6	2.1	3.9
Telecommunications	2.8	2.1	2.5
Graphic design	2.1	2.1	2.1
Printing and publishing	2.8	0.0	1.4
	------	-------	-------
	80.0	77.6	79.0
Other sectors:			
Education	8.3	4.9	6.6
Defense industry	2.1	9.1	5.6
Legal services	2.8	0.7	1.8
Health services	0.7	2.8	1.7
Miscellaneous	6.3	4.9	5.6
	------	-------	-------
	20.2	22.4	21.3
Number of usable responses	144	143	287

Core sectors are multimedia (in the narrow sense), motion pictures/TV/video, special effects, animation, and so on. Note that the IICS respondents are heavily concentrated in the multimedia sector as such, whereas SIGGRAPH respondents tend to gravitate more to a nexus of sectors involving motion pictures, special effects, and animation, where their high levels of computer graphics skills are in particularly high demand at the present time. Other (non-core) sectors of employment reported by respondents are education, the defense industry, legal services, health services, and miscellaneous industries. Even in these non-core sectors, however, respondents tend to occupy jobs that in one way or another involve multimedia skills and techniques.

There is some filtering of individuals from non-core sectors to core sectors, with education and the defense industry being the most common points of origin. Thus (combining data for both IICS and SIGGRAPH), 30.8% of the 26 respondents who reported that their job previous to the current one was in education, shifted into core multimedia and digital visual effects sectors, as defined. The corresponding figure for the 12 respondents whose previous job was in the defense industry is 25.0%. While these figures are small, they nevertheless suggest that the Los Angeles area, as a whole, probably has important reservoirs of experienced potential job-seekers ready to move into the multimedia and digital visual effects industry. The questionnaire data indicate that once individuals are employed in core sectors, any subsequent job shifts tend to be virtually entirely within the core.

Employment, occupations, and computer skills. Almost all questionnaire respondents are currently employed in full-time jobs (Table 4). A very significant

Table 4. Some general employment characteristics of questionnaire respondents.

Variable	IICS		SIGGRAPH	
	Value of variable	Number of usable responses	Value of variable	Number of usable responses
Percent employed	94.7	168	98.0	158
Percent employed full-time	85.8	163	96.6	146
Percent working freelance	20.3	157	7.3	155
Median length of time with current employer (years)	2.0	148	2.0	140
Median length of time engaged in multimedia work (years)	3.0	161	4.4	148

number (20.3%) of IICS respondents are engaged in freelance activities, whereas only 7.3% of SIGGRAPH respondents are so employed. The much higher percentage of SIGGRAPH respondents occupied in regular salaried employment can no doubt be explained in terms of the demand for firm-specific human capital in the motion picture, special effects, and animation industries (in which SIGGRAPH respondents are mostly employed), where firms like Disney Interactive, Dreamworks, Sony Pictures, and Warner Digital insist upon high levels of intrafirm team-work and product designs that are safeguarded by copyright and trade-mark provisions. Such firms are thus likely to prize a captive labor force that can be socialized and supervised more easily than free-lance workers can. For both respondent groups, the median length of current job tenure is two years. IICS respondents claim to have been employed in the industry as a whole for 3.0 years, while SIGGRAPH respondents claim to have been employed for 4.4 years. In addition, over their entire employment experience in the multimedia and digital visual effects industry, IICS respondents have worked for an average of 2.82 firms, and SIGGRAPH respondents have worked for an average of 3.4 firms. These figures suggest that there is some modest, but not excessive, employment instability in the

industry. The occupational characteristics of questionnaire respondents are laid out in Table 5. Detailed descriptions of typical occupations in the multimedia and digital visual

Table 5. Occupations of questionnaire respondents.

Occupation	IICS (percent)	SIGGRAPH (percent)
Owner/senior management	24.8	7.3
Business/financial/sales	18.5	4.7
Production/direction	26.1	20.7
Programming/technical support	12.1	25.3
Animator/graphic designer	7.0	38.0
Writer	5.1	0.7
Other	6.4	3.3
Number of usable responses	157	150

effects industry can be found in Regan and Associates (1997) and Vivid Studios (1995).   The only occupation noted in Table 5 that requires further commentary here is the production/direction category, which refers to occupations (at various levels of seniority) where the main responsibility for design, organization, and execution of multimedia and digital visual effects work (including web-site construction) resides. Specialized programming and animation/graphic design occupations, however, are broken out as distinctive categories in their own right in Table 5. In practice, there are rarely sharp divisions of occupational function in the multimedia and digital visual effects industry, and the information laid out in the table needs to be interpreted with a high degree of flexibility.

For the most part, the data arrayed in Table 5 are unsurprising. Most workers in the industry are engaged in central production, direction, programming, animation, and graphics occupations. A distinction between IICS and SIGGRAPH respondents that is becoming increasingly evident as the present discussion moves forward also emerges.   The former group is patently more entrepreneurial and business oriented, in the sense that it is marked by a relatively high proportion of owners, managers, and individuals in business/financial/sales occupations, whereas the latter group is much more focused on technical occupations like programming, animation, and graphics. This distinction between the two groups of respondents may be elaborated in terms of their differential command of computer skills. Almost two-thirds of all respondents indicated that they had some computer programming proficiency, with the two most commonly known languages for IICS respondents being HTML (39.2%) and Lingo (22.8%), and for SIGGRAPH respondents, C/C++ (40.1%) and HTML (37.0%). HTML is a widely used low-level language for building web pages; Lingo is a medium-level programming language with applications in the areas of both graphics and business; and C/C++ is a fundamental, high-level programming language. Once again, then, the two groups emerge with significant overlap, but with IICS veering to the less technical, and SIGGRAPH to the more technical side of the industry.

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Spatial mobility and job recruitment. As I have already intimated, most of the questionnaire respondents were born outside of Southern California. Even more significantly, roughly half of all respondents received their highest level of education outside of the region and, for the most part, outside of the state. Furthermore, 3.8% of IICS and 6.1% of SIGGRAPH members were educated in a country other than the United States. These data signify, once again, that the multimedia and digital visual effects industry in Southern California is highly dependent on human capital imported from outside the region. Nevertheless, once they enter the Southern Californian labor market, workers in the industry tend to become quite rooted in the region. Thus, of all respondents (i.e., the majority) who stated that their current job is not the first job they have ever held, as many as 83.0% indicated that the previous place of employment was located in Southern California.

Job recruitment patterns in the multimedia and digital visual effects industry are displayed in Table 6, and they are much alike for both groups of respondents. Observe

Table 6. Method of recruitment of questionnaire respondents to their current jobs.

Recruitment method	IICS (percent)	SIGGRAPH (percent)
Friends or organizational contacts	37.2	43.3
Contact initiated by employer	22.7	23.9
Contact initiated by employee	12.7	14.2
Advertisement	17.3	9.0
Job fair	1.8	5.2
Employment agency	8.2	2.2
School placement	0.0	2.2
Number of cases for above variables	110	134
Number of founders of firms or self-employed	28	11
Number of usable responses	138	145

that the data in the main body of the table are defined as percentages of employed workers only (i.e., excluding founders of firms and the self-employed). By far the greatest proportion of all workers in the industry are recruited either on the basis of information provided by friends or organizational contacts, or by means of direct communication between the employer and the prospective employee.   This observation is consistent with other studies of recruitment patterns, where it has been found that most information about job openings travels in one way or another by word of mouth (Granovetter 1974; Scott 1992a). Advertising also accounts for a modest share of actual recruitment in the industry, with a perhaps anomalously high frequency among IICS respondents.

Education, Training, and Professional Organizations

Education and training. Table 7 reveals that the majority of questionnaire respondents have attained high levels of educational qualification. Most respondents have at least a four-year college degree, with significant numbers also having acquired master's degrees. About half of all

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respondents graduated with their highest degree in 1985 or later. The educational majors completed by questionnaire respondents are laid out in Table 8. If we gloss over the by now familiar differences between IICS and SIGGRAPH respondents, the data presented in Table 8 indicate that most of them have

Table 7. Highest level of education attained by questionnaire respondents.

Level of education	IICS (percent)	SIGGRAPH (percent)
High school	0.6	3.2
Two-year college	7.2	12.3
Four-year college	38.6	49.0
Master's degree	45.2	27.7
Doctoral degree	8.4	7.7
Number of usable responses	166	155

Table 8. Educational majors completed by questionnaire respondents.

Major	IICS (percent)	SIGGRAPH (percent)	Combined (percent)
Film, theatre, TV, broadcasting	27.5	13.4	20.7
Graphics, computer graphics, animation	3.8	25.5	14.2
Business	20.6	6.7	13.9
Engineering, mathematics, science	6.3	19.5	12.6
Computer science	5.0	14.1	9.4
Fine arts, architecture	6.3	12.1	9.1
Social sciences	10.0	4.0	7.1
Liberal arts, languages	9.4	3.4	6.5
Education	5.0	0.7	2.9
Law	4.4	0.0	2.3
Medicine, health care	1.9	0.7	1.3
Number of usable responses	160	149	309

received educations that are highly appropriate for careers in the multimedia and digital visual effects industry. Well over fifty percent of them majored in such fields as film, graphics, business, and computer science, while significant numbers of the rest majored in engineering, fine arts, social science, and liberal arts. Educational pathways into the industry are thus multiple, but nevertheless rather clearly focused on the artistic, business, or technical skills most in demand by employers.

There is also a remarkable wealth of relevant educational and training establishments in the region. Of those respondents who took their highest degree in Southern California, as many as 34.0% graduated from the University of California - Los Angeles, followed by the University of Southern California (13.9%), California State University - Northridge (9.0%), and Art Center Pasadena (5.0%), (see table 9). The remainder graduated from some 24 different colleges and universities scattered throughout the region.

Table 9. Educational institutions from which questionnaire respondents obtained their highest degree (Southern Californian institutions only).

Educational institution	IICS (%)	SIGGRAPH (%)	Combined (%)
University of California, Los Angeles	34.6	33.3	34.0
University of Southern California	15.4	12.1	13.9
California State University, Northridge	7.7	10.6	9.0
Art Center Pasadena	0.0	12.1	5.6
California State University, Fullerton	1.3	6.1	3.5
Pepperdine University	6.4	0.0	3.5
California State University, Los Angeles	3.8	1.5	2.8
University of California, Santa Barbara	3.8	1.5	2.8
Loyola Marymount University	3.8	1.5	2.8
California Institute of the Arts	1.3	4.5	2.8
University of California, Irvine	3.8	0.0	2.1
California Polytechnical Institute, San Luis Obispo	1.3	3.0	2.1
California State University, Long Beach	3.8	0.0	2.1
San Diego State University	2.6	0.0	1.4
Santa Monica College	0.0	3.0	1.4
Brooks Institute	1.3	1.5	1.4
University of Redlands	1.3	1.5	1.4
California State University, San Bernardino	1.3	0.0	0.7
University of California, San Diego	1.3	0.0	0.7
California State University, Dominguez Hills	0.0	1.5	0.7
Whittier School of Law	1.3	0.0	0.7
Antioch University (Los Angeles)	1.3	0.0	0.7
California Institute of Technology	0.0	1.5	0.7
Riverside Community College	1.3	0.0	0.7
Saddleback College	0.0	1.5	0.7
Mesa Community College	0.0	1.5	0.7
Claremont Graduate School	0.0	1.5	0.7
Southwestern University	1.3	0.0	0.7
Number of usable responses	78	66	144

In addition, 70.2% of IICS respondents and 55.3% of SIGGRAPH respondents indicated that they had taken at least one part-time course in multimedia or computer techniques since graduation. The lower figure for SIGGRAPH respondents is no doubt a function of their already relatively high level of technical expertise upon graduation. The institutions providing the part-time courses taken by respondents are exhibited in Table 10. Respondents were asked to name these institutions in an open-ended fashion, and the answers are arrayed in Table 10 simply by number of mentions, i.e., without any attempt to correct for multiple mentions by any one respondent. Some of the institutions noted in

Table 10. Institutions (in Southern California only) from which questionnaire respondents have taken part-time courses in multimedia techniques, arranged by number of mentions.

Institution	IICS	SIGGRAPH	Combined
Colleges, universities and professional schools:			
University of California, Los Angeles, Extension	36	57	93
Learning Tree University	3	4	7
Art Center Pasadena	4	1	5
University of California, Irvine	3	2	5
New Horizons	2	2	4
California State University, Long Beach, Extension	0	4	4
Santa Monica College	0	4	4
Orange Coast College	0	2	2
The Learning Annex	0	2	2
Mount Sierra College	0	2	2
California State University, Northridge	2	0	2
University of Southern California	0	2	2
West Coast University	2	0	2
Miscellaneous colleges, universities, etc.	21	18	39
In-house training or product vendor programs:			
Silicon Studio	14	4	18
Alias	5	0	5
AVID	0	2	2
Microsoft	0	2	2
Miscellaneous in-house training or product vendor programs	15	13	28
Professional associations (including user groups):			
American Film Institute	12	23	35
SIGGRAPH	9	0	9
IICS	2	5	7
Los Angeles MacIntosh Users' Group	2	3	5
Society of Motion Picture and Television Engineers	0	2	2
Women in Film	0	2	2
Director's Guild of America	0	2	2
Miscellaneous professional associations	3	9	12

the table are conventional colleges and universities, others are private establishments providing in-house programs or vendors offering special training, and yet others are professional associations of different kinds (including unions and guilds). The miscellaneous categories shown in the table represent bundles of institutions that received only one mention each. The information in Table 10 informs us that there are a rather surprisingly large number and diversity of possibilities for part-time training in the multimedia and digital visual effects industry in Southern California, with the University of California at Los Angeles again leading the way.

The abundance of educational and training opportunities offered in the region for those seeking careers in the multimedia and digital visual effects industry suggests that there is a significant degree

of institutional responsiveness to the current high demand for relevant skills and aptitudes in Southern California. If there is a labor shortage in the industry at the present time, this is perhaps less a function of the absence of basic instructional infrastructures than it is a consequence of the sudden recent surge in the demand for appropriately trained labor. The danger in responding to this shortage by increasing the number of educational and training programs in the region is that it is apt to result in a long-term over-supply of labor. The main objectives of policy in this regard should not be so much to expand the number of programs as to improve the quality of those that exist, while ensuring that minority groups are able to gain better access to them.

Professional organizations. Questionnaire respondents were asked to list in open-ended format all the professional associations, unions, and guilds to which they belong. The answers to this query are tabulated in Table 11, which is arranged simply in terms of the number of times each organization was mentioned.

Table 11. Affiliations of questionnaire respondents with professional associations, guilds, and unions, arranged by total number of mentions.

Association, guild, union	IICS	SIGGRAPH	Combined
SIGGRAPH	18	-	-
IICS	-	8	-
Society of Motion Picture and Television Engineers	10	9	19
International Alliance of Theatrical and Stage Employees (various locals)	0	14	14
Bar associations	10	0	10
Women in Film	7	0	7
Women in New Technologies	7	0	7
International Television Association	7	2	9
Institute of Electrical and Electronics Engineers	5	14	19
International Animated Film Society	2	6	8
Los Angeles MacIntosh Users' Group	2	3	5
Writers' Guild of America	5	0	5
Director's Guild of America	3	0	3
Miscellaneous	130	155	285

Table 11 suggests that multimedia and digital visual effects workers are notably gregarious on the professional front. Respondents are joined together in webs of intersecting affiliations in a wide variety of formal organizations (including IICS and SIGGRAPH), as well as in many different informal support groups. Note that 18 IICS respondents claimed to be members of SIGGRAPH, while 8 SIGGRAPH respondents claimed to be members of IICS -- a finding which suggests that while there is some redundancy in the survey data reported here, it is also fairly limited. In general, the organizations noted in Table 11 play an important role in the local labor market. They provide corporate representation of their members' interests, they offer training programs of various types, and they ensure that critical information about new technologies, skills, job opportunities, and so on, circulates rapidly through the local labor market. Recall from the earlier discussion that a significant proportion of questionnaire respondents obtained their current jobs through organizational contacts.

The Local Labor Market and Regional Economic Development

The labor market for workers in the multimedia and digital visual effects industry in Southern California is highly distinctive in its overall structure, and it has emerged in its present form via a complex process of space-time filtering of individuals through a series of geographic and institutional staging points. It is made up, for the most part, of rising young professionals of both sexes, but has a very low representation of minority ethnic and racial groups. Workers in the industry are well educated and trained, and they earn notably high incomes, on average. While it is always possible that the survey method used here to gain information about the local labor market may have yielded a very one-sided view of its general make-up, more casual data collected in firm interviews fully corroborate the broad conclusions offered here.

The local labor market that has grown up around the multimedia and digital visual effects industry in Southern California is endowed with rich institutional infrastructures, and workers themselves appear to be extremely involved in job-enhancing, extra-work activities, including the pursuit of part-time training. Above all, they are joined together in many different criss-crossing networks of association through which they are able to collectivize their individual experiences, knowledge, information, contacts, and so on, thus generating organizational frameworks that supplement general processes of worker socialization and job mobility. In other industries and other regions, such networks have been found to be an important basis of worker expertise and innovative activity, no matter whether it be in the case of semiconductor engineers in Silicon Valley (Saxenian 1994), or international finance workers in the City of London (Thrift 1994), or even visual artists in New York (Montgomery and Robinson 1993).

In fact, local labor markets typically function not only as simple adjuncts to specialized regional economies, but also as critical sources of the agglomeration economies that keep those economies functioning as dynamic and tightly organized spatial units. When they work well, they ensure that trained and habituated workers with frequently up-dated, agglomeration-specific know-how are constantly supplied to employment places. In the present study, I have not examined in any detail those aspects of this question that have to do with the attitudes, habits, and practices of workers in the multimedia and digital visual effects industry, or more generally, with the culture-generating capacity of cities and its expression in the character of local labor markets and local economic development at large. As a simple matter of observation, this capacity, and its recent flowering in the cultural economies of major metropolitan areas, has now become a significant element of contemporary world capitalism (cf. Molotch 1996; Scott 1997). The multimedia and digital visual effects industry is virtually certain to become one of the driving forces behind the continued growth of urban cultural economies in future years, and Los Angeles -- with its highly developed entertainment complex -- is already a major center of the industry. In light of this remark, further research on the elusive issue of place-specific forms of worker socialization and acculturation is urgently needed, and nowhere more so than in the burgeoning cultural-products industries where subtle processes of habituation of the labor force are critical to overall economic success.

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