

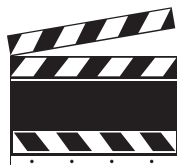
# **MAKING DIGITS DANCE**

## **Visual Effects and Animation Careers in the Entertainment Industry**

Prepared for  
City of Los Angeles Private Industry Council  
NOVA Private Industry Council serving Silicon Valley  
by  
The Public Affairs Coalition of the  
Alliance of Motion Picture and Television Producers

and  
The PMR Group, Inc.

March 1997



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## ABOUT THIS HISTORIC PARTNERSHIP

California is the global leader in multimedia and entertainment. In Southern California, the well established and hugely successful film and entertainment industry, centered around Los Angeles, has stimulated our senses and ignited our imagination by their recent ventures into digital creation. In Northern California, the multimedia industry has burst onto the scene to lead the world in cutting edge new digital media technology that interacts, amazes, and educates. Centered in the Bay Area, this exciting new industry emerged from the synergy between the Silicon Valley technical innovations and the creative talent that thrives in the Bay Area.

Created by the presence of a skilled and talented workforce, and linked by their leadership in digital technology, jointly these regions and industries have been the driving force in California's economic recovery. To ensure continued growth and vitality, an adequate supply of workers with the necessary skills to meet the growing demand is critical.

NOVA Private Industry Council (NOVA PIC) serving Silicon Valley, the Public Affairs Coalition of the Alliance of the Motion Picture and Television Producers (AMPTP), and the Bay Area Multimedia Partnership (BAMP), have created this historic partnership between the public and private sectors, and between the Bay Area and the Los Angeles regions, to respond to these industries and their critical workforce development needs.

This multimedia and entertainment industry workforce study, published in two volumes, will provide the basis for the larger, long-term partnership project with the State of California Employment Training Panel (ETP) to create "SkillsNet" - the workforce development consortium linking industry directly with educators and trainers.

SkillsNet, driven by industry leaders from the multimedia and entertainment industries, is focused on identifying common needs, developing strategies, setting priorities, and building support for action. An Industry Skills Council, composed of industry leaders from Northern and Southern California, is guiding the implementation of SkillsNet. This unique collaboration between industry, education, and government will ensure that SkillsNet accelerates the growth of the industry and the economy by working together to meet critical workforce needs.

We want gratefully to acknowledge the contribution and involvement of the following:

- The SkillsNet Industry Skills Council:**  
 Nick DiMartino, American Film Institute  
 Susan Jordan, American Graphic Solutions  
 Mickey Mantle, Broderbund  
 Mikel Pippi, The Walt Disney Company  
 Jeff Vargas, Hewlett Packard  
 Jim Topping, KGO-TV  
 Amy McCombs / Janette Gitler, KRON-TV  
 Ralph O'Rear, Lucas Digital  
 Brian Conrad / Robert Roden, MAXIS  
 Mark Steeves, 7th Level  
 Yvette del Prado, Silicon Graphics





Sande Scoredos, Sony Pictures Imageworks  
 Dave Master, Warner Bros.

**And for their vision and leadership:** Ed McCracken (Silicon Graphics); George Vradenburg, III (Latham & Watkins); Gini Barrett (AMPTP); Sunne Wright McPeak (Bay Area Council); and Larry Baack ( Bay Area Economic Forum); Gerald Geismar (ETP); and Rebecca Morgan (Joint Venture Silicon Valley Network).

**And to the industry and educational participants who gave generously of their time and information in order to develop the dialogue from which we all benefit.**

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**ABOUT THE PARTNERS:**

***Public Affairs Coalition of the Alliance of Motion  
 Picture and Television Producers***

The Public Affairs Coalition of the Alliance of Motion Picture and Television Producers (AMPTP) was

established in 1991 to promote and enhance the ability of member companies to effectively conduct their motion picture and television businesses in California. The Coalition serves as the collective voice for these companies on legislative and regulatory issues; establishes mutually supportive relationships with all levels of government; and advocates effective policies to meet the common needs of Coalition members.

***Bay Area Multimedia Partnership***

The Bay Area Multimedia Partnership (BAMP) is a public-private partnership between industry leaders, government, research and education and other collaborative organizations. This consortium was created in 1994 by the Bay Area Economic Forum as a strategic approach to build on the region's global advantage in digital new media and to further promote the growth and vitality of this burgeoning industry by collectively meeting their challenges.

***City of Los Angeles Private Industry Council***

The City of Los Angeles Private Industry Council is a non-profit governing body appointed by the Mayor to create a public/private partnership between business, labor, and education. PIC board members have worked closely with the Los Angeles City Council and Community Development Department. Through innovative job training and placement programs funded by the federal Job Training Partnership Act (JTPA), the PIC has contributed to the economic health of the Los Angeles business and residential community for over 14 years.

***NOVA Private Industry Council serving Silicon Valley***

NOVA Private Industry Council serving Silicon Valley (NOVA PIC) includes representatives of local business, industry, education and service agencies. It was formed in 1983 to implement the federal Job Training Partnership Act (JTPA) for North Santa Clara County. NOVA has been an innovative leader in addressing workforce needs in a variety of industries. The services provided by the NOVA PIC are administered by the City of Sunnyvale.





## THE DIGITAL CONNECTION

This historic partnership between industry, education, and government has come together to address the common workforce issues affecting the multimedia and entertainment industries. The NOVA Private Industry Council (NOVA) has led this exciting team effort to study these workforce issues, which are documented in two companion reports:

***“Making Digits Dance: Visual Effects and Animation Careers in the Entertainment Industry”*** Alliance of Motion Picture and Television Producers (AMPTP)

***“A Labor Market Analysis of the Interactive Digital Media Industry: Opportunities in Multimedia”*** Bay Area Multimedia Partnership (BAMP)

The digital visual effects and animation segment of the entertainment industry and the interactive digital media segment of the multimedia industry draw upon a common base of talent and technology. Both these areas require a highly skilled and trained workforce that merges technical and artistic capabilities.

In order to conduct a comprehensive study of the labor market, a methodology was developed to assess the needs and requirements of these strongly related and connected industries. Since both these industries are located throughout the state, rather than using geography to establish the scope of the studies, it was decided the most effective approach would be to investigate the distinct needs of the entertainment and multimedia industries.

These two teams found that while there are distinct requirements for each industry, there are also common needs. Both industries need professionals who have an underlying foundation in artistic and technical theory and tech-

niques. Also, both industries require many of the same core competencies in their workers, such as understanding of the production process, communications, creativity, teamwork, and problem solving.

These reports are a vital step in communicating these industries needs to the educational and training resources who are preparing workers to enter this growing labor market. In order to keep this information current and to coordinate the exchange of information between these two groups, the Bay Area Multimedia Partnership (BAMP) and the Alliance of Motion Picture and Television Producers (AMPTP) are developing SkillsNet.

Building on these labor markets analyses, SkillsNet will develop regional employer/training consortia around both short-term occupational needs and longer term capacity building. SkillsNet will enable effective interaction between industry and educators by aggregating industry information and communicating it to the educational community. Since this information changes rapidly, the partners are developing a website to ensure that the latest information is readily available. The SkillsNet partners are working with industry and educators in designing this website, which will have features that take advantage of the capabilities of the Internet for discussing and exchanging ideas and information.

The State of California Employment Training Panel (ETP) and industry leaders have funded SkillsNet. ETP is a joint business-labor supported State agency that provides training funds to empower workers, promote business and propel the economy. By focusing funds on training that leads directly to employment and higher wages, and strengthening the development of new and emerging industries, ETP plays a strategic role in California’s economy.





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## ACKNOWLEDGMENTS

**I**n the preparation of this report many people gave of their time, talent and knowledge. Unfortunately, there are too many to list here, but in Appendix A we identify the production and service firms, schools, colleges and agencies who participated in our research. We appreciate the generosity of the people and their organizations. The City of Los Angeles PIC and the State of California for financing this report. NOVA and Ron Gamble for program management and for helping to link the project to the U.S. Department of Labor/California Employment Development Department O-Net project.

We want to acknowledge with thanks Brady Bevis of the Bay Area Multimedia Partnership, and Maureen Regan and Peri Drucker of Regan & Associates, who are doing the parallel study in the Bay Area, for their friendly and helpful cooperation.

Finally, the staff members of The PMR Group, Inc. and the Public Affairs Coalition of the Alliance of Motion Picture and Television Producers (AMPTP) have been invaluable in doing research, interviewing and drafting material. Without their help, the report would have been impossible.

In the end, the report is the responsibility of the following:

David A. Wilson, President. The PMR Group, Inc.

Belle Cole, Vice President, The PMR Group, Inc.

Kathleen A. Milnes, Vice President, Public Affairs Coalition, AMPTP





# EXECUTIVE SUMMARY



SkillsNet seeks a report on the labor market of skilled workers in animation and visual digital effects in the production of film, television and web material. The labor market as defined in the report consists of three fundamental elements – employers, job seekers (employed or unemployed) and training institutions. The market also includes segments committed to facilitating employment such as recruiters, search firms, career development specialists, placement firms and agents. All elements share an interest in occupations and skills.

## INDUSTRY

Research for the study has identified more than 300 firms in California producing animation and digital visual effects. About 30 in person interviews have been conducted and another sample of approximately 30 have been interviewed more briefly by phone. These interviews covered such information about firms as products, employment, intra-industry affiliations, key occupations, recruiting and training activities.

The industry is characterized by a variety of “firms” that include divisions of major studios. They produce different products for different segments because of the range of techniques, production values and marketing systems. Independents of middle size are about the same size as studio divisions and service more segments. Small independents specialize in a particular market segment. Right now, there is much turbulence caused by mergers, acquisitions and alliances driven by the quest for talent and also a drive for horizontal and vertical integration.

At the same time, the industry as a whole is still characterized by vertical disintegration. There are many small performers, temporary project-related “firms” and freelance talent that prosper in the present conditions of rapid growth, particularly as the growth affects demand for animation and digital visual effects. Thus, there is much use of freelancers and temporary employment as well as contracting out to small companies. This sustains a range of opportunities for a variety of talents and skills.

The high growth in these production areas supports full employment and competition for experienced and new talent. The number of people employed in animation in the Los Angeles area is estimated at between 3,500 and 4,000, about twice as many as a decade or so ago. In digital visual effects, a variety of estimates suggest there are about 6,000 people employed compared to virtually none a decade ago. There is a common pool of fundamental artistic skills drawn upon at least at entry level. Because to a significant degree the fundamental common skills also serve other segments such as games or CD ROMs, demand will probably be sustained for at least five years.

## OCCUPATIONS

The report identifies 30 selected occupations in the two production areas. We grouped them into six families. Family relationships are a combination of shared skills and common type of work. Two categories of families are: 1) those where common skills lead to a progression of occupations that relates substantially to increased proficiency and 2) those where dif-





ferent skills are applied to the same work. These lack the progression characteristic. There is significant overlap of artistic occupations between animation and visual effects. Career paths are loose and difficult to categorize because of the fluidity of employment and the changes related to technology.

The six families are:

- ◆ visual development which explores literary or musical property for the visual content.
- ◆ story which visualizes a script in a storyboard consisting of a series of image panels.
- ◆ layout which breaks a storyboard into scenes, camera set-up, lighting, etc.
- ◆ painting, which paints in variety of media, background for animation or mattes for live action.
- ◆ traditional animation which does cel animation comprising character, effects and clean up.
- ◆ computer artist comprising 2D/3D/technical artists who create images using computers and special software.

The occupations are analyzed by tasks and skills from a list of skills developed from interviews with production firms and skilled artists. The report presents these analyses in a series of charts.

## EDUCATION AND TRAINING

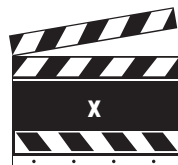
**T**hough some firms invest substantially in employee training, the principal burden for educated and trained people in this

industry rests with the education and training institutions. What does the industry want from education and training institutions? How are these institutions responding?

Programs in education and training institutions that offer animation and/or visual digital effects have been identified and included in an Inventory of Education and Training Institutions which includes both foreign and domestic institutions from which industry recruits.

The inquiry focused on the Los Angeles region because of the industry clustering and identified programs for professional, practical, technical and basic training, both traditional and short courses. Training that meets the needs of animation and digital visual effects takes place in different kinds of schools — art and design, film/T.V. and engineering. Within this framework, the hardware and software needs were identified by trainers. Special schools, both in extension divisions of four-year institutions and private institutions, offer short courses in art and digital graphics primarily for industry professionals.

A variety of new program initiatives are being developed, often in cooperation with production firms. These are special examples of expanded interactions with industry, relevant to recruitment, internships, financial support, equipment, curricular development, management and source of instructors. A number of problems facing education and training have been identified, including the need for improved communication with industry, keeping up with the technology, finding faculty and competition among trainers for industry attention.





Profiles of institutions interviewed are included as an appendix.

## **FACILITATORS AND RECRUITMENT**

The report identifies several categories of job placement facilitators whose function is to assist job seekers in finding employment. Private sector agencies work with both employers and job seekers. One of the principal industry associations, SigGraph, has an annual conference with events for industry, trainers and students. LAwNMoweR (Los Angeles New Media Roundtable) is a loose network of individuals and companies, created and facilitated by a recruitment firm, that

provides career development seminars and creates opportunities for networking and social interaction. Education and training institutions offer a variety of placement and career counseling services. There is little specialization in animation and digital visual effects facilitation services. Some production firms, especially the major studios and larger independents, invest substantially in recruitment.

## **SUGGESTIONS**

Finally, a number of suggestions for consideration by SkillsNet are proposed as a conclusion.





# I. INTRODUCTION



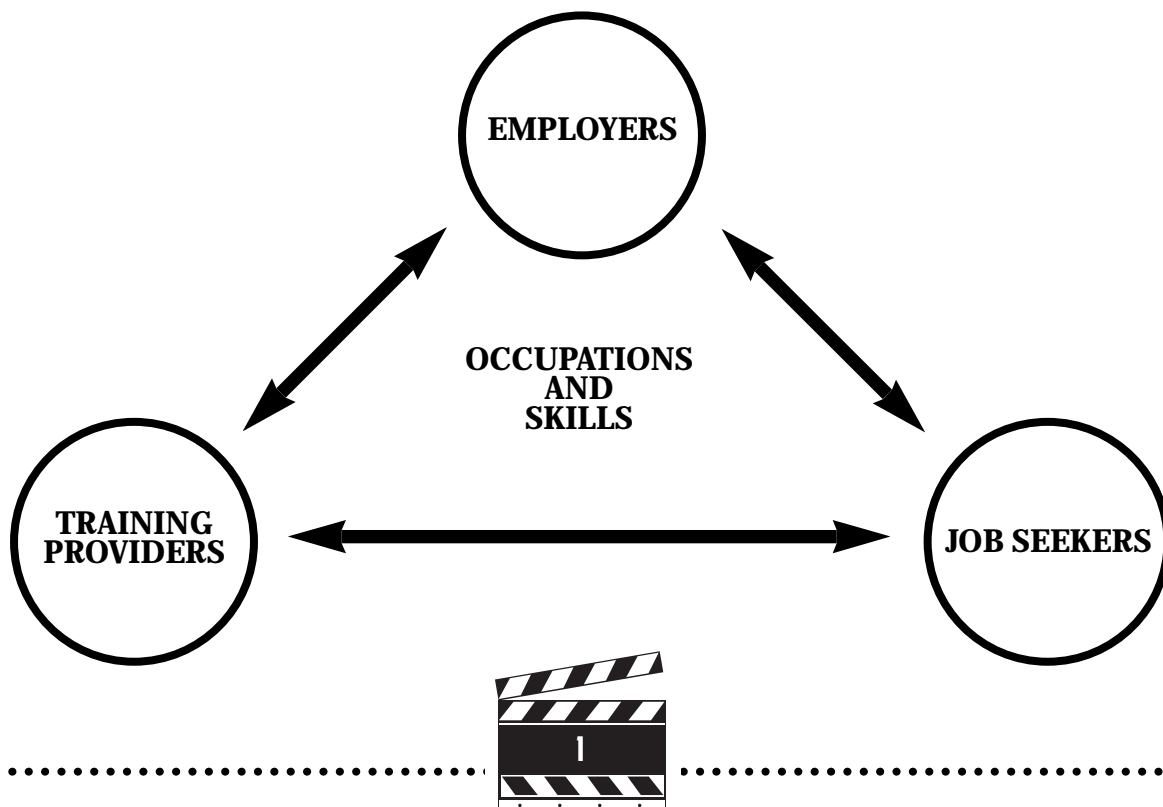
As it grows, the California entertainment industry is experiencing difficulty in matching demand for skilled workers with available supply. The Alliance of Motion Picture and Television Producers (AMPTP) Public Affairs Coalition, working with The PMR Group, Inc., has undertaken research into labor market issues in the production areas of animation, both traditional and digital techniques, and digital visual effects. The study's goal is to clarify the scope and dynamics of the effects of digital technology within the labor market.

Animation and digital visual effects were selected to focus attention on production activities that clearly are changing rapidly because of new media capability. The present report addresses findings about these segments derived from research sponsored by the NOVA PIC. A deliberate decision was made to post-

pone investigation of other production areas, notably directors and producers of digital sound, digital editing, and other digital post production. These areas may be undertaken subsequently.

The study is structured by a concept of the labor market, widely shared by the United States Department of Labor Market Information Division, California's Employment Development Department, and many Private Industry Councils, as well as scholars and students. It conceives of the labor market as including three interactive segments – employers, job seekers (whether employed or not), and education/training institutions – linked by a common interest in skills and in sharing, however imperfectly, pertinent information.

**Figure 1.1 Labor Market**





Each segment affects the market as its characteristics change. As more jobs become available or new or modified occupations are required, employers change market conditions by increasing or decreasing demand. As search firms, professional recruiters and the like are deployed, information is improved. As job seekers become increasingly numerous, skilled or mobile, supply is changed. As job seekers are assisted by facilitators (agents, placement counselors, employment services, etc.), information about supply is improved. As schools, colleges and other institutions change access to knowledge and skills, supply is affected. Thus, collectively, the actions of these players continually shape and modify the market.

These segments are singled out because their decisions can to a degree be influenced by deliberate effort in ways that other forces – economic conditions, demographic change – cannot. The present report and related

reports provide information that should be of substantial use in improving the labor market for skilled performers in these industry segments.

This is a part of a larger effort within the framework of SkillsNet, a joint activity of AMPTP and Bay Area Multimedia Partnership (BAMP) sponsored by the California Employment Training Panel (ETP) and the industry. SkillsNet is developing a readily accessible labor market information service and also consortia among production firms and training institutions. BAMP, working with Regan & Associates, is also doing a study of the use of digital media to produce games, business applications and educational materials. Both of the labor market studies are coordinated by NOVA PIC, an active participant in the project.





## II. INDUSTRY



California continues to play the preeminent role in producing entertainment. The synergy between the software and hardware “tool makers” of Silicon Valley and the content providers of Southern California bodes well for the new media industries in California. In Southern California, entertainment firms are strongly clustered along a geographical axis that runs roughly from Glendale to Santa Monica Bay, with many firms in the San Fernando Valley. Because entertainment is not only an information-based industry but also talent-based, it appears that the importance of informal networking between firms and individuals provides competitive advantage to those located in core areas.

Even as California's lead appears to grow, other regional production centers are emerging domestically and internationally. North America, Florida and Vancouver have developed their physical production capability and successfully captured some entertainment activity. Other burgeoning centers worldwide, such as Paris, London, and Tokyo, are likely to contribute more material to growing markets. Overseas centers for animation outsourcing, such as Seoul and Shanghai, may emerge as competitive sources of animation productions in their own right. California firms participate in foreign production often seeking talent in these locations. At the same time, the power of the Southern California distribution capacity draws revenue from emerging markets world wide.

### THE DEVELOPMENT OF ANIMATION AND DIGITAL EFFECTS

Film, television, and commercial production is a major, rapidly growing industry in California. According to the most comprehensive study to date, the industry accounted for direct employment of 164,000 in 1992.<sup>1</sup> Revenues have grown at a compound annual rate of 5.7% over the last five years, and the current \$31.4 billion market for filmed entertainment is projected to increase 5.5% annually for the rest of the decade.<sup>2</sup> The market channels are also growing with 95 million TV households in the United States (76 million with VCRs and 63 million with cable) and 925 million in the world.<sup>3</sup>

As subsectors of the entertainment industry, animation and digital visual effects are difficult to measure in size and growth because data collection is not systematic. Nonetheless, a preponderance of indicators suggests these subsectors are growing at an even faster rate than entertainment as a whole. The three top-grossing films in history, for example, are *Jurassic Park*, *The Lion King*, and *Independence Day*. Animation and/or digital visual effects were used extensively in the production of all three.

In the television medium, nearly 200 cartoon shows, not including specials, were aired in the Fall 1996 season.<sup>4</sup> The market is dominated by cable, although broadcast channels continue to compete. The adult market is grow-





ing on the heels of *The Simpsons* success. At the same time, international distribution is expanding rapidly.

**A**nimation has been used for entertainment, communication, and artistic expression for about three quarters of a century. In the past decade, there has been an explosion in the use of digital visual effects and animation in film and television.

In the late 1980s *Who Framed Roger Rabbit* was a landmark film, exposing a large audience to sophisticated compositing of live action and animation aimed at an adult audience. *Little Mermaid's* financial success set off a new enthusiasm for animated feature films that accelerated demand for new products and techniques. *Toy Story* was 1995's highest-grossing film, also making history as the first feature film entirely created by computer. Because it was conceived not by a movie studio but by Pixar, a computer software company, it is emblematic of the impact of digital technique.

The continuing enthusiasm for animated feature films has been matched by films whose popularity was substantially enhanced by elaborate visual effects. While not a novelty by any means, *Jurassic Park*, *Independence Day*, and *Terminator*, for example, demonstrated the power of digital techniques to produce effects of a quality never seen before. The revenues of many such films have been a stimulus to the increasing use of digital special effects. Effects often account for 15% of the total production budget in contemporary features, and this proportion is probably grow-

ing. On large features, as much as \$20 million to \$30 million may be spent on effects<sup>5</sup> which are employed in a growing number of shots. Animation and special effects merge spectacularly in *Space Jam*, which, like *Roger Rabbit* mixed media technique with a cast of actors and cartoon characters that required over 1,100 digitally composited shots. *Twister* drew audiences largely because of its high-quality computer simulations of tornadoes. *Babe*, which portrays a talking pig realistically using digital techniques, won an Oscar.

**A**s digital visual effects become more sophisticated, they generally become in the words of Pacific Title Digital's advertisement, "transparent!" They are increasingly being used to modify film in ways that are not seen as special. Natural objects are added, removed or modified for aesthetic or economic reasons and the work cannot be detected. Visionaries foresee films not only with realistic effects, but cyber thespians as well.

In television, the popularity of these techniques also is strong. Digital effects continuously get more sophisticated and find new uses, especially in commercials where eye-catching effects can add valuable impact to a very brief spot. The rapidly growing demand for animation, both traditional and digital, reflects the proliferation of cartoons on an ever-increasing number of channels. The demand also has opened opportunity for cartoons for adolescent and adult audiences (*The Simpsons*, *Beavis and Butt-head*, *Dr. Katz*, etc.), thus expanding the market into new time segments and outlets.





Advances in computer and telecommunications technology have much to do with the rapidly increasing demand for animation and digital visual effects. It is possible to foresee communications technology pushing demand for blending art and digits. High-resolution visual images contain a large amount of information, so manipulating them by computer requires fast processors and large amounts of memory.

Accessibility to production technology is opening. Conventionally, it is known that the price-performance ratio of computers has fallen exponentially. Current mid-level personal computers are sufficiently powerful to create and edit broadcast-quality video with appropriate software and hardware. While production for big-screen films is generally done on high-speed workstation computers rather than PCs, new high-end PCs using Macintosh and Windows NT operating systems are attaining the necessary speed and flexibility. Concurrent with advances in hardware, software packages have become more powerful. Comparable capabilities for tasks such as image editing and 3D modeling are now available in less expensive packages, and high-end packages, while not necessarily cheaper, have much greater depth and scope of features.

Advances in telecommunications technology also continue to open new markets and create new distribution channels. Many households around the world now have access to dozens of cable channels or direct-broadcast satellite channels. Access to foreign audiences is easier than ever before via video, satellite transponders, and the emergence of “global” channels such as CNN and MTV.

The recent explosion of interest in the World Wide Web portion of the Internet represents the emergence of an entirely new medium. Because it is so different from traditional media and its bandwidth still quite limited, the Internet has yet to achieve substantial utility for entertainment. Nonetheless, it has become a significant advertising medium – notably for the promotion of feature films – and some research suggests that it is competing with television for “viewers.”

The real possibilities in increasing cost effectiveness of digital production techniques as well as new channels and media, support an expectation of expansion in these industry areas. In turn, the demand for workers skilled in the artistic and computer techniques is expected to be high.

## SEGMENTATION AND EMPLOYMENT

The industry where animation and digital visual effects are utilized is multi-segmented. Each segment experiences different economics and thus will be in its own particular state. (See Figure 2.1.) The multiplicity of segments should give a degree of stability to the industry collectively because of its diversity. Since all segments provide occupational opportunity for artists of brush or computer, the market for these skills can be expected to share the overall strength of the segments. It is reasonable to see this as a new characteristic of the labor market that has historically been volatile and unpredictable. This instability has doubtless discouraged possible candidates from entering these occupational areas.



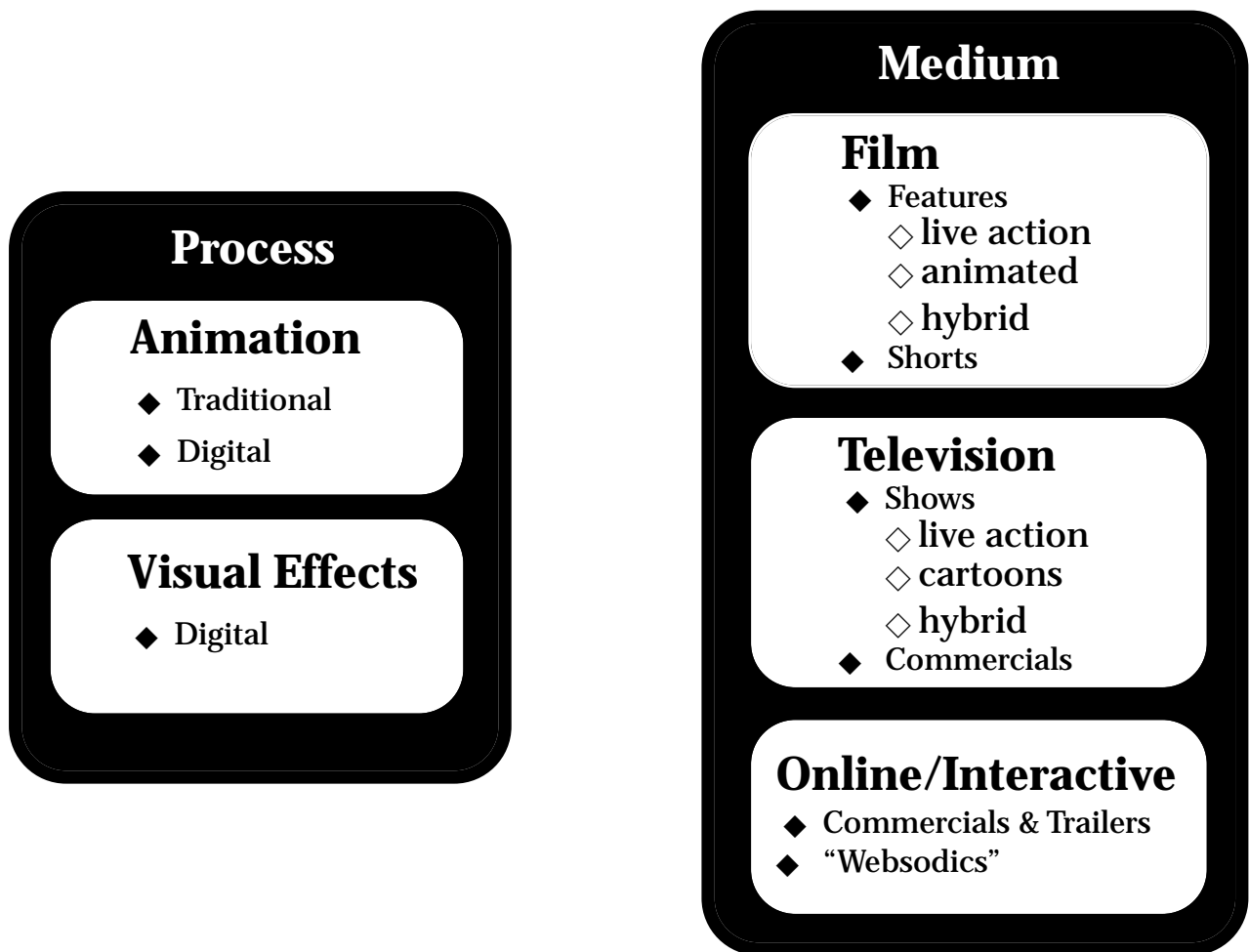


Available employment and wage data for these subsectors is limited, but clearly indicates disproportionate growth. Animation professionals number from 3,500 to 4,000 in the Los Angeles area, at least twice the number of 10 to 15 years ago.<sup>6</sup> The visual effects industry employs approximately 6,000 digital artists in California – 10 times as many as in 1991.<sup>7</sup> Typical salaries for computer animation-related positions have risen 33% in the past two to three years accord-

ing to industry estimates.<sup>8</sup> Some have risen as much as 500%.<sup>9</sup> Rapid hiring by the large studios to staff expanded in-house digital effects and animation facilities has escalated competition for talent.

The perspectives of the industry, unions, training providers, and press strongly corroborate these indications of growth. In the interviews conducted for this study, most animation firms

**Figure 2.1 Industry Segmentation**





confirmed the expansion of demand for animation since 1990 and explosion of calls for digital visual effects in the last three years. Many industry leaders also expressed uncertainty about how long this growth rate could be sustained. Clearly, however, demand for product translates into demand for skilled workers.

## INDUSTRY STRUCTURE AND ORGANIZATION OF PRODUCTION

The structure of the entertainment industry is extraordinarily complex. Some experts consider it a model for the way other industries will increasingly operate in the 21st-century global economy.<sup>10</sup> Some key characteristics of the industry are summarized below:

- ◆ comprised of diverse companies including many small and medium sized firms — independents, subsidiaries and corporate divisions
- ◆ information- talent- and skill-based
- ◆ many organizations determined by project production
- ◆ highly “networked,” i.e. production performed by combinations of contract or project-based employees and large, medium and small contractors.

### Firm Size

There are seven major studios, three major networks, and dozens of independent companies involved in production for theaters, television, and the World Wide Web. Despite

the high visibility and central role of the major corporations, the vast majority of production companies are extremely small. In 1992, there were more than 1,000 companies devoted to motion picture, television, and commercial production; 85% employed fewer than 10 people. There are also numerous companies that provide specialized services to the producers; more than 80% of these employ fewer than 10 people.<sup>11</sup> The quantity of small firms is exceeded only by the number of freelance workers. Of the 164,000 industry workers identified in the AMPTP Public Affairs Coalition, “The Impact of Motion Picture, Television & Commercial Production in California: Monitor Company Report,” 1994, 95,000 were freelance workers, 52,000 were on the staff of production companies, and the remaining 17,000 were on the staff of specialized suppliers.

There has been a wave of mergers and acquisitions over the past few years, driven by the desire for greater vertical and horizontal integration. Electronics companies in search of content are being followed by substantial investments from computer and telecommunications firms in entertainment and media, reflecting the convergence of technology among these industries. A striking example of this trend is Microsoft positioning itself aggressively to become a major content provider with the formation of MS/NBC, the establishment of Microsoft Multimedia Productions (with offices in Redmond, Santa Monica, and New York), and the company’s re-commitment to the Microsoft Network.

The major studios are part of media giants that combine a variety of production and marketing capacities. They all have complex structures in which entertainment production is





but a part. Economies of scale and strong capitalization enable the major studios to undertake highly expensive and complex productions and to invest heavily in state-of-the-art equipment, full-time workers and training.

**A**t the other end of the spectrum, entrepreneurs and freelancers face barriers to entry that vary according to industry segment. Many individuals and small firms compete primarily on the basis of talent and experience and have minimal capital requirements. New entrants must, of course, initially overcome obstacles based on lack of production experience and contacts. Traditional animation is labor-intensive rather than capital-intensive. Digital animation and digital visual effects, however, require continuous investment in state-of-the-art hardware and software. But the “desktop video” capabilities of average personal computers are rapidly advancing. Online and interactive productions can easily be created on typical PCs. Film work currently requires very high-end PCs or work station computers. The proliferation of graphics-capable PCs creates opportunities for people interested in the industry to acquire hands-on training and part-time employment that can provide a valuable entry point to the industry.

The labor market for talent in animation and digital visual effects has been modified by various trends of change in the industry. Walt Disney Pictures has long dominated feature animation production. In the past two to four years, however, other major studios have aggressively entered or reentered the animation business by rapidly developing in-house facilities. The major studios are also engaged in

efforts to capture digital effects production through acquisitions of smaller independents and development of new corporate divisions. These changes exacerbated competition for talented workers, already intense due to exploding demand for product. Some observers in the industry believe that mid-size companies are getting squeezed out. Small companies are very cost-competitive due to low overhead, while the large companies have capital and the capacity to handle complex projects involving large numbers of shots. Still other mid-size companies will emerge as a new type of “mini major” such as Digital Domain and Pixar.

In T.V. production and broadcasting, there has been a consolidation affecting independent stations with the appearance of three new networks (Fox, UPN, WB). The precise impact of all these changes on the labor market is unclear, but it can already be seen as significant. Will the total number of jobs increase or decrease? Will the impact on salaries be temporary or permanent?

**T**hese structural characteristics have important implications for the labor market. Large companies are more likely to seek a long-term staff and invest in extensive recruiting and training of employees. Smaller companies typically depend on freelancers and contractors. They invest only in a limited way in training and recruitment. Short-term production aggregations have no interest in training, but given the tight labor market, may give support to new roles in facilitating the employment of labor such as agents, placement specialists and possibly “temp” organizations. Surely the project-related structuring strengthens the place of small production houses and specialized suppliers.





As a result of the uneven workload associated with project-oriented production, subcontracting and hiring of freelance workers has long been common practice in the entertainment industry. Effects and animation jobs are increasingly being split among several subcontractors because of the growing number of digital effects or animation shots in a typical production. Clearly some large animation and digital effects companies rely more on permanent staff than in the past, apparently due to high demand for work and intense competition for talented workers. Disney, with its multiple production capacity, is a model for stability that others emulate.

The T.V. animation industry has a long-established practice of sending most of its highly labor-intensive production steps overseas, particularly to the less-developed countries in Asia, where wages are relatively low and there is an adequate supply of artistic talent. This practice continues strong: the highly creative and critical pre-production work such as storyboarding and character development is done domestically, as is post-production. It is unclear if digital technology in animation will increase productivity to the point where more production will be done in the U.S.

## Labor Unions

The labor organization of the entertainment industry is an important part of the structure. In animation, the Motion Picture Screen Cartoonists, Local 839 of the I.A.T.S.E., has agreements with major studios and other houses that seem to cover about two thirds of the motion picture workforce. Their coverage of

the television cartoon industry is much less. The area of digital visual effects is largely non-union. Individual digital occupations include work covered by a number of distinct unions (such as Editors, Illustrators, Matte Painters). These unions are seeking agreements with the studios while they continue to discuss among themselves the question of who should represent these workers.

Because of the fluidity of labor which is characteristic of the project-focused organization of production, the unions have developed flexible approaches to members that adjust to employed and unemployed status and also provide services such as pre-tax retirement funds, both employer and employee-funded, health insurance and the like. The unions also try to establish a standard of pay, benefits and conditions on an industry-wide basis that maintains some degree of stability in an often turbulent labor market.

### Note: The Industry Database

The PMR Group developed a relational database system for internal use to support the industry research and analysis. This database contains detailed information about firms in the industry including location, industry segment(s), and products/services. It currently contains approximately 312 California firms involved in some way in digital visual effects, animation, or other new media. Because no comprehensive directory of such firms exists, firms were identified, with the assistance of the AMPTP, from a wide variety of sources including entertainment industry directories, industry trade journals, the general press, seminars, conferences, per-





sonal contacts and word of mouth.

For a subset of firms, including those that were interviewed, more detailed information relevant to the industry and the labor market was collected. This information includes the founding date and recent growth of the firm; number of employees in relevant categories and key occupations; extent to which labor shortages are an observed problem; recruiting process, techniques and problems; approaches to training; management's per-

spectives on labor shortages and other industry challenges and what can be done about them; management's opinion about the need for more coordination and information sharing among firms, training providers and workers; and interest in and suggestions for a SkillsNet website focusing on labor market issues.

.....  
*Animation is no longer a two or three player game—  
demand has created room for anyone who's willing to play.*

BARBARA FISHER, PRESIDENT, MCA TELEVISION ENTERTAINMENT  
.....

.....  
*In the Land of the Giants, if you're not a giant, you better  
be fast and clever. Or else, be dinner.*

ROBBY LONDON, SENIOR VICE PRESIDENT, DIC ENTERTAINMENT  
.....





### III. OCCUPATIONAL OUTLOOK



The structure of production, occupations and demand in these areas of animation and digital effects is very dynamic and changing. The following snap shot will give a picture, perhaps somewhat blurred, of the key elements of the structure and some estimate of the directions of change.

#### PRODUCTION PROCESSES

The production and filming for motion pictures of images that are not photographs of people or objects in the natural world (live action) is what animation and digital visual effects are about. The fundamental requirements seem to be largely the same, even though there are a variety of techniques in use. Thus, ink and paint drawing, clay animation and other puppets, and computer-generated images all are the result of artistic ability used to generate pictures that can be transferred to film (or video) in a sequence of frames to simulate motion. Because of this, there are a number of steps that must be accomplished to make a product.

An overall visualization of the project is necessary. A storyboard must be created that shows how the images develop through the sequence of frames representing time and motion. The characters, whether living or inanimate objects, that will carry the action forward need to be designed. The layout of characters in scenes and from scene to scene must be visualized. Backgrounds or mattes must be designed and rendered. Finally, the various elements must be composited into a complete scene. Ultimately, the sound, titles and

other parts of “post production” are accomplished.

#### Animation

The production of an animated film has distinct steps. It is “... very much like making a flip book, where you flip the pages and the figures on them seem to move.”<sup>12</sup>

According to written sources, which was verified by current interviews, these are the steps: The story (script) is written and essential sketches for the visual interpretation of the story are put onto a storyboard. Key movements of a given action are drawn by an animator who numbers the drawings and annotates them on an exposure sheet. The assistant animator follows the instructions on the exposure sheet, adding more drawings. An inbetweener fills in drawings between frames. Drawings are photographed under an animation camera (pencil test) and the resulting film is reviewed for corrections. Drawings are transferred to acetate sheets (called cels) which are then colored. Simultaneously, backgrounds are made for every scene according to the sketches of the layout artist. Cels are placed on the backgrounds and photographed.

With computer animation, approved and cleaned drawings are scanned onto electronic ink and paint systems which then begin the final color applications. The color material is also integrated with the backgrounds electronically. For fully 3D animated films, virtually all the steps are done on comput-





er. Imagery and scenes are created with animation and rendering software with emphasis on modeling, lighting, shading and rendering. Thus, it is in many ways convergent with digital visual effects.

Summary of traditional animation process:

- ◆ script written
- ◆ storyboard created
- ◆ scene layouts developed
- ◆ key frames animated
- ◆ intermediate frames animated
- ◆ in-between frames animated
- ◆ backgrounds painted
- ◆ cels painted
- ◆ cels and background assembled for photography
- ◆ with computers painting and color integration is done electronically.

## Digital Visual Effects

The process in digital visual effects also entails various steps. The process outlined is based on interviews with companies. There are four basic steps to the overall process which includes: storyboard, conceptual design, modeling, animation, lighting, rendering, compositing of files, transferring to film or video. These can be summarized as visualization, research and design, production, and filming. The length and difficulty of the project is strongly related to whether the work is 3D

or 2D. 3D projects are more complicated, difficult, and time consuming since they require 3D graphics to be created and animated. 3D, by nature, is more intense and prone to problems than equivalent 2D work.

The storyboard phase is analogous to storyboarding for T.V. or feature animation. An artist will visually plan out shots in a series of panels. Following these, conceptual drawings are made to detail the effects and the desired look. For 3D work, this will require modeling the figures and objects.

The research and design (R&D) phase is when 2D, 3D, and technical artists develop the digital effects. Once the shot design is determined, models are built by the modeler, animated and finally inserted into the plate. The phase of inserting the modeling contains several components as well: lighting, refining texture, adjusting color/shading and compositing of all elements (coordination of multiple elements in preparation for render processing). Finally, the effects go to film or video.

Summary of the digital visual effects process:

- ◆ Visual Development
- ◆ Storyboard
- ◆ R & D (Research and Design)
- ◆ Modeling
- ◆ Animation
- ◆ Lighting
- ◆ Compositing
- ◆ Film/Video



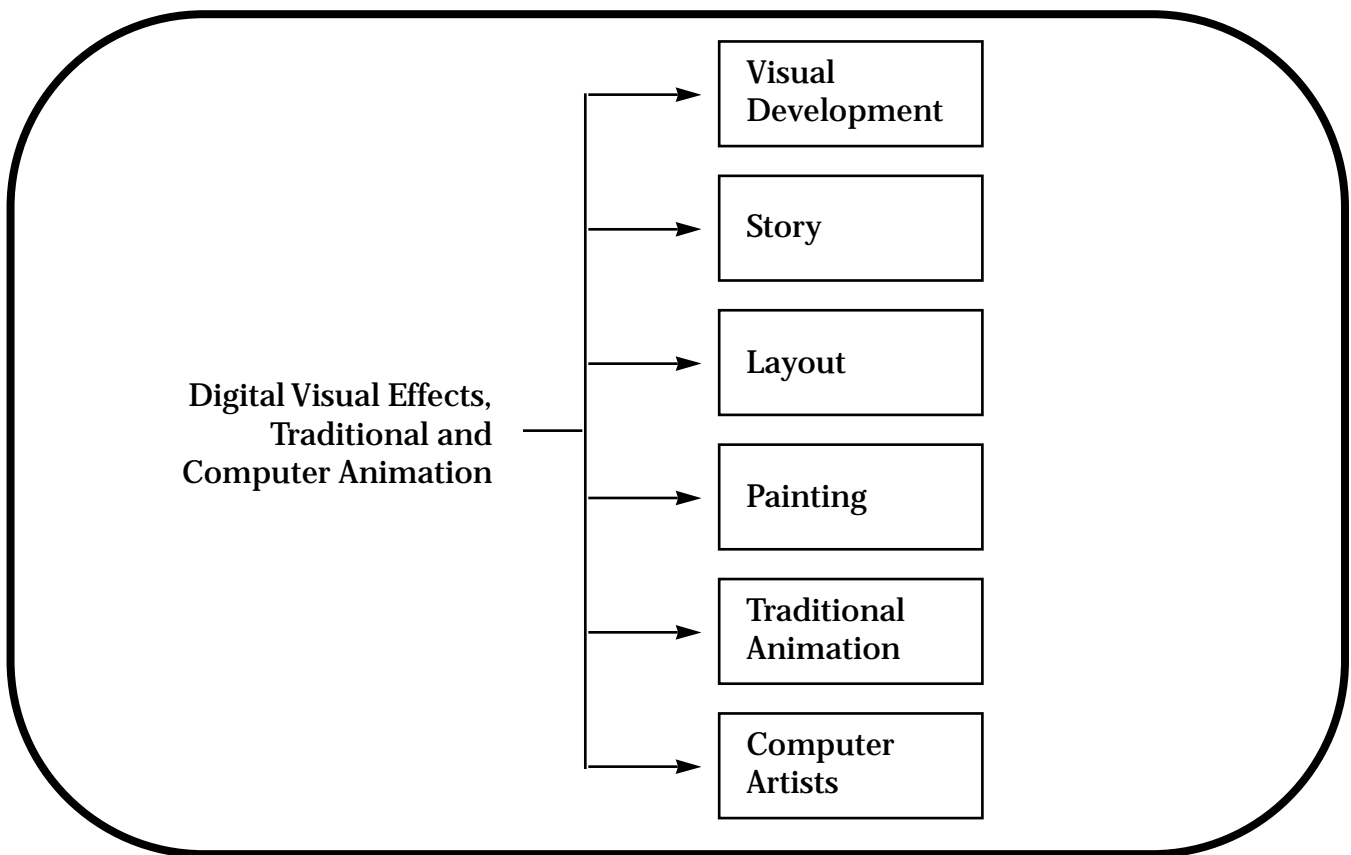


## OCCUPATIONAL STRUCTURE

Key occupations in the production of animated films and digital visual effects can be comprised in six families of occupations (See Figure 3.1 Family Framework of Occupations).

Families are defined by shared type of work and shared skills. Families may include from three to five occupations. Altogether the study has identified 30 occupations.

**Figure 3.1 Family Framework of Occupations**





In the production of animated films, definitions of families are strongly influenced by the traditional process of animation that, until the introduction of digital technique, has been substantially unchanged for 60 years. Such a strong continuity is strengthened by collective bargaining and the influence of the large studio animation houses that have agreements with the Motion Picture Screen Cartoonists union. In digital visual effects occupations, however, the strongest influence in defining occupations is the digital technology. The nature of the digital effects production bears little relationship to occupations in the optical and physical special effects processes.

Even so, the artistic occupations in the two areas share art skills and the primarily computer occupations also share at least basic skills. The requirements of the production values sought in different industry segments substantially attenuate the significance of shared skills. That is to say, the requirements of animated feature films are sufficiently different and distinct from T.V. cartoons that needed skills are qualitatively different. How the development of digital technology will affect occupations is not at all clear. There seems to be a consensus that artistic skills will continue to dominate the production requirements.

As one commentator said in response to the question, "Are traditional animation skills transferable to digital animation?" "The answer is 'yes.' Such things as an eye for movement over time, a feel for entertainment – character and story. Skills like art direction, character design, animatography, lighting, production design and even drawing transfer as well. In fact,

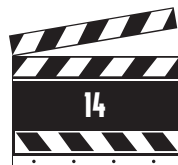
these areas continue to be the most important skills/talents being sought in 3-D animation."<sup>11</sup>

## CAREER PATHS

In the large companies that dominate feature animation there is a pattern of career development linked to the families of occupations. People are expected to develop their skills in storyboard, character animation or background, for example. How they do that depends on talent and temperament which is probably the underlying reason for the relatively weak patterns. Moreover, the fluidity of the employment practices generally provides plenty of opportunity for personal choice of careers depending on these personality characteristics. Therefore, it is difficult to make very useful statements about career paths other than that people will find opportunity for choice which will be enhanced by knowledge of the elements of film making and film image creation generally.

## DEMAND

Demand for people to fill these occupations at a required skill level clearly exceeds supply at present. Knowledgeable people in the industry testify to rapidly rising pay rates. There is evidence, largely but not entirely anecdotal, that over the past two years, pay has been increasing somewhere between 20% and 100% a year depending on the occupation. Assistant animators and CGI artists are conspicuous examples. Other evidence is the investment by studios in recruitment. Companies that





can afford it are recruiting in systematic ways and with specialized staff on a nationwide and international basis.

The demand is driven mainly by the expanding market for product in feature films, television films, cartoons and commercials. Both animation and digital visual effects are used in all segments and it appears that demand for these techniques is also increasing in all segments. At the same time, expansion in these markets is surrounded by growing demand for people in similar occupations in other industry segments such as world wide web material, games, educational and business applications and such special areas as kiosks and marketing materials. While it is not possible to forecast with anything approximating certainty, it seems probable that demand for workers in occupations requiring combined digital and artistic skills will continue to grow for the next three to five years at least.

What is not clear is to what extent the “shortage” is a matter of too few job seekers (unlikely), inadequately trained/experienced job seekers or rarity of exceptionally talented job seekers. It is clear, however, that it is some mix of these three dimensions. Exceptional talent is the most scarce, perhaps by definition. But the fundamental problem seems to be not enough adequately trained and experienced job seekers since well-trained and experienced people are fully employed. Companies are hiring minimally trained people who they hope can be trained. As in recruitment, companies that can afford it are investing in training staff and are encouraging expansion of training in schools and colleges. Many of these institutions are actively working to respond to the demand. Some innovation is also being undertaken by those who would facilitate the market. Recruitment, training and facilitation are discussed in Sections V and VI.

*I have always felt that if the animated feature were to outgrow its reference as a cartoon and be accepted as a legitimate form of filmmaking, it would be through the personal visions of artists.*

PETER SCHNEIDER, PRESIDENT, WALT DISNEY FEATURE ANIMATION





## IV. SKILLS



### ORGANIZATION OF SKILLS AND FOCUS

This study lays out a range of occupations‡ in the production of animated entertainment products and digital visual effects and identifies the requisite skills. To gain clarity of the skills underlying these occupations and how the occupations relate to one another, the study has organized the occupations into a framework of families. (See Figure 4.1. Framework of Artistic Occupations.)

Animated film occupations, as was mentioned above, have a tradition and stability that relates them in families of shared skills with progression substantially by increased proficiency. The families are distinguished by the type of work where the mix and emphasis of skills is different. For example, the work of storyboarding. While certainly sharing artistic skills with character/effects animation, it is sufficiently different in its emphasis and combinations to be distinguishable. The skills are for the most part performed with pen and brush even though computers may also be used to enhance the range of tools. The occupations that are linked closely to digital techniques and tools are grouped by common type of work, particularly 2-D and 3-D, but often have a number of shared skills. The purpose of this framework is to help conceptualize the occupations and, in particular, clarify the skill sets that underlie them. In practice, professionals may mix and match the tasks and

requisite skills of various occupations in a particular job.

This approach yields two groups of families depending on how the occupations in that family are related to each other. Painting is a family that mixes the two types with some progression in the traditional skills of backgrounder in film animation.

- ◆ Occupations are progressive and are defined by their level of proficiency at a task. As skill in the task improves, the performer can progress to the next occupation. For instance, as an in-betweener's skills improve, he can progress to an assistant animator. The families in this group include story, layout, clean-up and character/effects animation.
- ◆ Occupations are mixed in task but related in the type of work they do. Some of these occupations are entry-level and some require experience. As a professional's skills improve, her tasks will increase in difficulty rather than proceeding to a different occupation. For instance, a rotoscoper would start out by creating a simple matte of a white shirt on a dark background and proceed to creating a matte of a person in the sun on the sand. The families in this group include visual development, computer artist and computer art technician.

‡Jobs and their descriptions are groups of tasks that are needed to produce the desired output or product. The grouping of tasks varies by organization and circumstances. Occupations are groupings of tasks that are somewhat more abstractly developed to include the variety of jobs that exist in the market. These groups permit a comprehensive identification of skills and knowledge needed to meet the objectives of the production process.



The skills that are defined by these occupations fall into two broad categories: shared and specific. The PMR Group has developed a list of skills based on interviews. (See Figure 4.2.) They have drawn upon the list to identify the skills in a given occupation. Note that the skills for a given occupation may differ somewhat because of the specific nature of the occupation. Thus, the list serves as a baseline of information used to describe both current and available occupations as well as future occupations. It should have utility as a device for analyzing the changing content of occupations and serve as a foundation for the *lingua franca* in the industry and in all sectors of the labor market.

## SHARED SKILLS

There are numerous skills that are common to nearly all the artistic occupations. The shared skills we are identifying are specific to entry-level jobs. The shared skills fall into four categories: general understanding, technical skills, organizational skills and artistic skills.

General understanding of the film making process and the production process for the product area in which they work is an important area of knowledge for all the occupations in all the families. Job seekers should understand how their particular job fits into the larger context of animation or digital effects. It seems broadly agreed and numerous industry people interviewed suggested to trainers the possibility of a “true production 101” course. The course would serve to teach students the whole process as well as engage their ability to solve problems in a production time line setting.

Organizational skills include those abilities that support the process. These skills are critical because of the characteristics of the production process. Teamwork is an essential characteristic which demands several skills. First, one must be able to work well with others. This requires communications skills, both oral and written. Second, one must also be able to work independently. This, in turn, requires the ability to solve problems, follow directions and handle deadlines and pressure. Other critical skills include: patience to do routine work, scheduling/time line, and keeping information and files organized. All in all, team skills are very important because all projects are produced in a team fashion.

As the result of the increasing importance of technology, job seekers should have some technical skills. They should be familiar with all three standard operating systems: MAC, Windows and UNIX. They should have an understanding of networks, file sharing and file management. They should also have an understanding of basic software such as word processing, spreadsheets and web browsers. Additional technical skills related to particular software packages, proprietary firm-specific software, and production particularities are taught by the employer or learned on the job.

Lastly, there are some basic art skills which nearly all the occupations require. These are color theory, perspective, design and drawing.

In discussions with companies about skills, we found that they would ideally like to see people with both artistic and technical skills. Given the need to choose, job seekers who have proven artistic ability are pre-





ferred. Employers see it this way because experience indicates that technical skills can be learned more readily than art skills.

## SPECIFIC SKILLS

Aside from these shared skills, every job seeker should have or develop certain specific skills related to the occupation preferred. The specific skills are highlighted below in the context of the families and the occupations of which they are composed.

The figures that follow present information about important occupations in traditional animation, including computer assisted occupations, 3D animation and digital visual effects. The occupations are grouped in the families mentioned in Section III which are briefly described in Figure 4.1. There are

then figures for nine family groups. In some cases, there is more than one figure for one family, but this is suggested in the descriptions in the previous figure. Each family figure lists the occupations and gives information about associated tasks and skills – art, technical and organizational. The tables provide a comprehensive and focused analysis of the different occupations, the skill sets that underlie the occupations and how they can be conceptually related.

This analysis focuses on core artistic occupations both traditional and computer. Many important occupations are not included for various reasons, but mainly because they are not primarily artistic, being either managerial/supervisory or technical. In the future, it may be possible for SkillsNet to expand the coverage to more of these areas.

**Figure 4.1 Framework of Artistic Occupations**

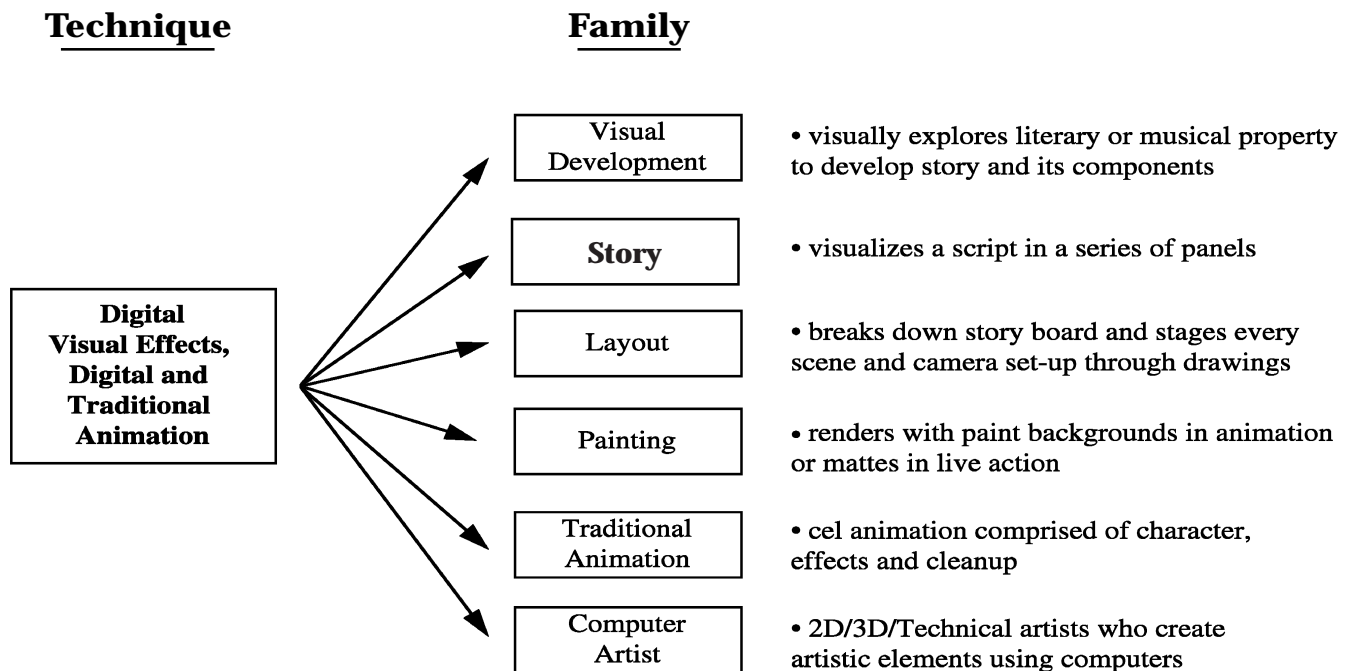




Figure 4.2 List of Skills

- This is a list of skills that we are drawing upon to identify the particular skills for a given occupation

Art Skills	Technical Skills	Organizational Skills
<ul style="list-style-type: none"> <li>•color theory</li> <li>•composition</li> <li>•design</li> <li>•visualization/conceptualization</li> <li>•perspective</li> <li>•story development</li> <li>•cinematography</li> <li>•film theory</li> <li>•timing</li> <li>•lighting and staging</li> <li>•classic figure drawing</li> <li>•quick sketch</li> <li>•observation (emotions, personality types, body language, attitudes)</li> <li>•painting (various media)</li> <li>•sculpture</li> <li>•human and animal anatomy</li> <li>•architectural rendering</li> <li>•acting, movement, dance</li> <li>•set design</li> <li>•art history</li> <li>•architectural history</li> </ul>	<ul style="list-style-type: none"> <li>•basic (word processor, database, spreadsheet, web browser)</li> <li>•off-the-shelf art (Photoshop, Premiere, Quark, Illustrator, Director)</li> <li>•hi-end (Softimage, Silicon graphics, Wavefront, Alias, Prizm, Lightwave)</li> <li>•programming languages (UNIX, C/C+, VTML/HTML)</li> <li>•operating systems (UNIX, Windows, Mac)</li> <li>•knowledge of communication protocols</li> <li>•writing interface drivers</li> </ul>	<ul style="list-style-type: none"> <li>•completing tasks independently without detailed direction</li> <li>•oral and written communication with colleagues, subordinates</li> <li>•client interaction</li> <li>•teamwork: work effectively with others</li> <li>•routine work</li> <li>•dealing with pressure</li> <li>•meeting deadlines</li> <li>•scheduling/timelines</li> <li>•following directions</li> <li>•management/delegation: breaking down work, assigning various components of work and responsibility, giving functional and technical guidance, work with above-the-line personnel</li> <li>•holistic understanding of business</li> </ul>

Figure 4.3 Visual Development

- Visual development visually explores literary or musical property to develop story and its components
- The occupation below does not consist of a progression of skills but of artists doing similar type of work

Occupation	Description	Skills
Visual Dev. Artist	Ability to conceptualize a scene and the artistic skill to express it. Works with director, producer and writer. There are also character and effects development artists or designers whose skills are similar but their talent lies in a particular area	<u>Art</u> : painting, drawing, story development, highly developed artistic style, rich imagination; for character and effects designers, traditional animation skills <u>Tech</u> : very proficient at numerous 2D/3D software packages <u>Org</u> : work with above-the-line personnel, deadlines, completing tasks independently, client-interaction, teamwork





## Figure 4.4 Storyboard Artist

- Storyboard artists visualize a script in a series of panels
- Occupations are based on increasing difficulty of tasks, greater responsibilities and a progression of skills

Occupations	Skills
<p><u>Apprentice/ Clean-up</u> Entry-level: revisions of storyboard (dialogues and characters).</p> <p><u>Assistant</u> More developed clean-up. Begin to do some sections of storyboard (story interpretation) under supervision. 6 months - 1 year experience as an apprentice.</p> <p><u>Storyboard artist</u> Interprets script into a storyboard. Plans out shot. Must visualize and conceptualize story before drawing. Using different angles and maintaining continuity among the shots. Average 2 years exp.</p>	<p><u>Art</u> Good drawing, quick sketch, basic background (buildings, landscapes), perspective and compositions, <b>drawing styles (cartoon, realistic). Story development</b> and interpretation. Conceptualization. Understand animation process: i.e. timing of script, next step (layout).</p> <p><u>Technical</u> Basic computer literacy, storyboarding software is limited but may become more prevalent in the future.</p> <p><u>Organizational</u> Follow directions, organized, follow a style cleanly, cut and paste, completing tasks independently, management skills as person advances.</p>

## Figure 4.5 Layout Artist

- Layout artists break down storyboard and stage every scene and camera set-up through drawings
- Occupations are based on increasing difficulty of tasks, greater responsibilities and a progression of skills

Occupations	Skills
<p><u>Apprentice/ Clean-up</u> Finalizes background (i.e. by cleaning up lines) before it is passed on to the background painter or to scanning.</p> <p><u>Key Assistant</u> Engages in scene planning and camera movement decisions.</p> <p><u>Layout</u> Stages every scene and camera set-up through drawings. Draws backgrounds, characters and understands animation process. 3-5 years experience.</p>	<p><u>Art</u> Excellent drawing skills (especially cartooning), able to follow basic designs of established characters, <b>understand how scene works.</b></p> <p><u>Technical</u> Conversant with camera mechanics including field size and camera movement. Computer layout artists must also be proficient at various paint programs.</p> <p><u>Organizational</u> Teamwork, follow directions, meet deadlines, completing tasks independently, management skills as a person advances.</p>





## Figure 4.6 Painting

- The occupations below are grouped together because they require a fine arts painting background
- **Background is an animation position that has a progression from an assistant to background**
- Matte painting is a digital visual effects position that lacks a standard progression of skills delineated by occupation

Occupation	Description	Skills
Assistant Background	Uses various media to paint background under supervision of background artist.	<u>Art:</u> Facility in painting with various media (watercolor, acrylic, oil, pastel), excellent drawing skills <u>Tech:</u> basic technical conversancy <u>Org:</u> follow directions, deadlines, completing tasks independently, teamwork
Background Artist	Designs background based on layout drawings. Works with layout artist. Amount of drawing/design dependent on detail in layout. Determines type of media to translate drawings into color.	

Occupation	Description	Skills
Matte Painter	Specialized position for feature live-action work in visual effects companies. Paints scenes that are imaginary or inaccessible.	<u>Art:</u> highly developed style, painting (photorealism) <u>Tech:</u> AfterEffects, basic technical conversancy <u>Org:</u> follow directions, deadlines, completing tasks independently, teamwork

## Figure 4.7 Traditional Animation - Character/Effects

- Traditional cel animation is comprised of character, effects and cleanup
- Occupations are based on increasing difficulty of tasks, greater responsibilities and a progression of skills

Occupations	Skills
<u>In-Betweener</u> Fleshes out movement of animated sequence by providing "in-between" drawings as specified by assistant animator and animator. Entry level with <b>proven artistic skills</b>	<u>Art</u> A strong theoretical background in color, perspective, design and lighting. Character animators: acting, timing, strong drawing skills (classic figure, <b>characters and characterizations</b> ), <b>solving problems of proportions</b> for characters. "Effects animators make the world in which the characters live real." Good atmospheric drawing skills (i.e. rain, dust, shadows). Entry level in both demands the ability to follow a style and draw clean lines.
<u>Assistant Animator</u> Focuses on details of an animated sequence. Interprets animator's rough, leaving a few frames for the in-betweener. Can be a career position.	
<u>Animator</u> character development. Requires an overall sense of character and spirit. "Actor with a pencil."	
<u>Supervisory Animator</u> Works with director to manage overall animation and manages the process.	
	<u>Technical</u> Basic technical conversancy. An understanding of camera operation.
	<u>Organizational</u> Self-discipline, organized, follow directions, complete tasks independently, teamwork. Higher positions require management skills.





Figure 4.8 Traditional Animation - Clean-up

- Traditional cel animation is comprised of character, effects and clean-up
- Occupations are based on increasing difficulty of tasks, greater responsibilities and a progression of skills
- Clean-up occupations are broken out only in major feature productions

Occupations	Skills
<p><u>In-Between</u></p> <p>Provides detailed drawings of roughs made by animators under the supervision of assistant clean-up artist. Entry level position requiring proven artistic skills.</p> <p><u>Assistant</u></p> <p>Manages whole scene, breaks scene down into sequences and supervises in-betweeners artists.</p> <p><u>Key Assistant</u></p> <p>Works with animator, manages clean-up process, breaks work up into scenes and delegates to assistant. Exists in feature only.</p>	<p><u>Art</u></p> <p>Basic drawing skills, high line quality and consistency, <b>figure drawing, anatomy, animation skills (flipping)</b>. Flipping is the ability to manually flip through a stack of animated sequences drawn on paper in order to preview the animation.</p> <p><u>Technical</u></p> <p>Following exposure sheets. Following and directing timing charts.</p> <p><u>Organizational</u></p> <p>Self-discipline, organized, follow directions, complete tasks independently, teamwork. Higher positions require management skills.</p>

Figure 4.9 Computer Artist - 3D

- 3D artists create artistic elements using computers
- The occupations below are not a progression of skills but are grouped together because they all work in 3D

Occupation	Description	Skills
Modeler	Uses software to create 3D models. Must understand 3D space and perspective. Traditional modeling skills helpful but not <b>critical. Entry level through hi-end.</b>	<u>Art:</u> read blue prints, traditional modeling skills (i.e. sculpture). <u>Tech:</u> very strong computer skills (3D software packages) <u>Org:</u> deadlines, working in production, teamwork, <b>completing tasks independently</b>
Animator	Uses software to create and animate characters, objects, or effects. Responsible for choreography, timing and acting of characters, objects, or effects. Entry level would animate simple character. Emphasis on traditional animation skills. Hi-end would animate more <b>complex shots and may manage people.</b>	<u>Art:</u> 3D motion, 3D structure, traditional character animation skills, life drawing <u>Tech:</u> software packages, programming skills not essential but helpful <u>Org:</u> file management, organization, deadlines, teamwork, <b>completing tasks independently</b>
Layout Artist	Blocking, staging, and camera setup for every scene	<u>Art:</u> <u>Tech:</u> 3D computer modeling, knowledge of computer graphics, familiar with UNIX for lighting, detailed multi-tasking, knowledge of computer science at BA level <u>Org:</u> deadlines, working in production, teamwork, completing tasks independently





Figure 4.10 Computer Artist - 2D

- 2D artists create artistic elements using computers
- The occupations below are not a progression of skills but are grouped together because they all work in 2D

Occupation	Description	Skills
Paint People	Artist applies colors to objects and removes wires/props at entry level. May do basic rotoscope. Hi end is color modeling; create color keys which are applied by entry level. Work closely with producer and art director.	<u>Art:</u> basic art skills, tracing skills on film and computer <u>Tech:</u> various paint programs <u>Org:</u> follow directions, teamwork, deadlines, supervisory skills, client interaction, completing tasks independently
Rotoscoping	Creates matte by isolating elements of a frame to modify or remove it. Entry level through hi-end positions. Artist begins with aspects like dirt and wire removal.	<u>Art:</u> traditional painting skills oriented, good drawing skills <u>Tech:</u> various paint programs <u>Org:</u> follow directions, deadlines, supervisory skills, completing tasks independently
Texture Painters	There are two parts to this job: create the map which is a 2D art skill and then apply it which is a 3D technical task. Tasks often done by same person.	<u>Art:</u> traditional painting skills <u>Tech:</u> various paint programs <u>Org:</u> deadlines, completing tasks independently
Compositor	Uses software to layer and match several images in frame. Entry level to hi-end depending on complexity of assignment.	<u>Art:</u> matte logic (basic underlying philosophy of compositing), lighting, photography, composition, perspective <u>Tech:</u> various programs <u>Org:</u> teamwork, deadlines, completing tasks independently, management skills
Hi Speed	Works directly with client to do real-time compositing. Handles long shots and final overall fixes. Hi-end position.	<u>Art:</u> lighting, photography, composition, perspective <u>Tech:</u> experience with compositing software <u>Org:</u> teamwork, pressure, client-relation skills

Figure 4.11 Computer Artist - Technical

- Technical artists create artistic elements using computers
- The occupations below are not a progression of skills but are grouped together because they do similar work

Occupation	Description	Skills
Match Mover	Uses animation software to match the positions of 3D computer graphics databases (i.e. a model) into something that was already shot in live action. Entry level through hi-end.	<u>Art:</u> no skills necessary at entry level <u>Tech:</u> very analytical and detail oriented <u>Org:</u> work well under deadlines, communication, completing tasks independently
Motion	Design technical specifications of a characters movements and creates proper computer controls to enable movement. Works closely with animator.	<u>Art:</u> 3D motion, 3D structure, human form <u>Tech:</u> strong understanding of 3D software <u>Org:</u> teamwork, deadlines, detail oriented, completing tasks independently
Lighting	Positions lighting and sets the mood for scenes.	<u>Art:</u> photography, film, set lighting <u>Tech:</u> computer experience with various 3D programs <u>Org:</u> teamwork, deadlines, detail oriented, completing tasks independently
Shader Writers	Most technical position. Writes RenderMan shaders to help create the look of the film. Must understand the physical properties of object being lit.	<u>Art:</u> understand animation and composition, strong sense of lighting, plus skills of lighting technical director <u>Tech:</u> strong programming skills in C, rendering software <u>Org:</u> teamwork, deadlines, detail oriented, completing tasks independently
Effects Animator	Very technical position. Use 3D paint system (i.e Wavefront, Prizm) to model natural phenomenon. Entry through hi-end depending on difficulty of task and supervisory demands.	<u>Art:</u> motion, perspective <u>Tech:</u> software packages, medium programming skills, understanding of motion <u>Org:</u> file management, organization, deadlines, teamwork, completing tasks independently





## V. EDUCATION AND TRAINING



**T**raining and education is a major way of modifying the labor market for highly skilled people. This study finds that the education and training community in the Los Angeles region is already closely identified with the entertainment industry and is struggling to respond to changing needs. Firms are investing substantially in their own recruitment and training programs. They are participating in a number of cooperative training programs with education and training institutions. The interaction between industry and education is central to many new training initiatives as well as to the industry's recruitment efforts. Increasingly, education and training institutions are seeking closer ties with industry to help with curriculum development, equipment and facilities, portfolio development, expanded internships and placement. They seek improved, systematic communications with industry on their changing needs.

What is this industry seeking from education and training institutions? How is the education and training community responding to the industry's training needs?

### INDUSTRY NEEDS

The most persistent theme of those interviewed for this report was the expressed need for people who can draw — people with well-developed artistic skills especially competency in life drawing, draftsmanship and composition. People with a blend of artistic and technical skills are very much in demand. Animation firms expressed the importance of strong traditional animation skills discussed in previous sections. One indication of the shortage

is the pressing desire for people with advanced skills and experience in speciality areas.

**B**ecause of their frustration with the shortages of qualified people locally and with what companies believe is the extremely high quality of artists trained abroad, firms are accelerating their recruitment worldwide. The larger studios also are investing heavily in their own training. A number have hired full-time training administrators and are running training programs to teach all steps of the production process as well as expanded on-the-job training. Companies stated that their training costs are high and increasing. A new group representing industry training administrators has begun to meet regularly and hopes to improve communication and efficiency.

The following examples of industry training activity reveal their needs. The Walt Disney Feature Animation CGI Training Program offers an in-depth experience in animation with emphasis on computer production techniques. It was developed to meet the increasing need for talented CGI animators within Disney. It is an intensive 12-week schedule of classes and exercises covering: traditional animation overview, basic CGI information and specific Disney CGI production techniques. Warner Bros. Feature Animation offers a variety of training and artist development programs covering many basic skills for animation. Sony Pictures Imageworks has a full-time employee devoted to planning and implementing training with classes in all aspects of the production process. Pixar has created Pixar University which offers a 10-week internal training program required for new hires and is available for all levels of employees.





## EDUCATION AND TRAINING INSTITUTIONS

### Inventory

The first effort was to identify those institutions providing relevant education and training. An inventory of education and training institutions that offer programs in animation and visual digital effects has been developed. This information, obtained through interviews, website browsing and published sources, includes some data on 150 education and training institutions. Since the search for trained, qualified people in these fields is world

wide, foreign and U.S. institutions identified by industry sources from whom they recruit are included. This data will be available through the SkillsNet consortia and on the SkillsNet website when complete.

Recognizing the concentration of animation production firms and visual digital effects companies in the Los Angeles region and the concern about the pipeline of artists, the report expanded coverage of education and training institutions in the Los Angeles region to include those who offer a variety of relevant training to these sectors. Figure 5.1 lists the 20 institutions interviewed. Appendix C includes Profiles on those institutions.

**Figure 5.1 Education and Training Institutions Interviewed**

- AFI Center for the Advanced Film and Television Studies, Los Angeles
- AFI Advanced Technology Program, Los Angeles
- American Animation Institute, North Hollywood
- Art Center College of Design, Pasadena
- Associates in Art, Sherman Oaks
- California Community Colleges Interactive Multimedia Design Program, Fullerton
- California Institute of the Arts, Valencia
- Digital Media Institute, Hollywood
- Los Angeles County High School for the Arts, Los Angeles
- Otis College of Art and Design, Los Angeles
- Ringling School of Art and Design, Sarasota, Florida
- Rowland High School, Rowland Heights
- Santa Monica College Academy of Entertainment and Technology, Santa Monica
- Silicon Studio/LA, Santa Monica
- UCLA Center for Digital Arts, Los Angeles
- UCLA Extension Dept. of Entertainment Studies and Performing Arts, Los Angeles
- UCLA Film and Television Animation Workshop, Los Angeles
- USC Integrated Media Systems Center, Los Angeles
- USC School of Cinema-Television Film, Video and Computer Animation Program, Los Angeles
- USC School of Cinema-Television Summer Production Workshop, Los Angeles





## Characteristics

Figure 5.2 shows four types of education and training programs in the Los Angeles region leading to jobs in animation and digital visual effects. How does the level of training fit into the workforce?

**I**ntroductory training taking place at a few high schools enables students to enter directly into some jobs in the industry. However, it also prepares them for post-secondary education where they can expect that their credentials will be an advantage in admission to specialized animation and multimedia programs.

The two-year programs teach basic skills and technical specialties preparing students for entry level positions in animation, visual effects and multimedia, as well as for successful transfer to four-year colleges.

Professional programs refer to specialized art and design schools, film schools including animation, and engineering schools which

have relevant majors and concentrations leading to undergraduate and graduate degrees. These programs provide a broad base of qualification in the liberal arts including literature, math, art history and sciences. They qualify their graduates for jobs requiring the mix of artistic and technical capabilities and those demanding well-developed traditional animation skills.

**T**he short programs and classes are used by working professionals in the industry, who need to fill-in or upgrade their skills; those seeking to change their careers and others with gaps in their training.

What seems apparent from this sample of institutions is that there are course offerings and programs that provide training for the artistic and technical skill requirements listed in the earlier charts. However, this study does not have the data to assess whether these programs respond to the specific needs of this industry.



Figure 5.2

### Characteristics of Education and Training Institution Types

Education / Training Program	Type of Institution	Degree/ Certificate	Curricular Emphases
Introductory Training	High School	Diploma	fine arts major, animation major, digital media career academics
Practical/Technical Training	2-Year Colleges	Associates in Arts (qualifications for transfer) Credentials	fine arts, computer knowledge, compositing, camera, 3D computer graphics, multimedia skills, animation, camera
Professional	4-Year Colleges	BA, BFA	film production, character animation, life drawing, color and design, layout, graphic rendering techniques, motion control, digital media, painting, video, storyboarding, 2D/3D animation
	2 to 3-Year Graduate Program	MFA, MS, MA	
Technical and Art Short Programs	University Extensions	Course Certificates	digital imaging, digital photography, 3D modeling, 3D tools, 2D/3D special effects, digital compositing, figure drawing, painting, composition, character animation, background painting
	Software Trainers	N.A.	
	Art Schools	N.A.	
	Other	N.A.	

Source: The PMR Group's Educational/Training Provider data

### Facilities

Keeping pace with rapid technological changes is a major challenge to training providers. In order to update and keep current, training institutions have to acquire the

latest technology used by industry professionals. Because equipment is costly, many institutions are falling behind.

Figure 5.3 lists some of the 2D and 3D software packages widely used by industry pro-





professionals and trainers to create digital art on Silicon Graphic, PC, and Macintosh platforms. Many software packages are designed to perform a series of functions for different phases of the production process and are com-

patible with other software tools. New products are continuously being developed and made available on the market to professionals and trainers.

**Figure 5.3**  
**Animation and Visual Effects Software Examples**

SG	Mac	PC	Software Package	Capability
			<b>2D</b>	
x	x	x	Adobe Photoshop	Automated editing, navigator palette, guides & grids, free transform tool, multicolor gradients, 48 new special effects filters, digital watermarking.
x	x		Elastic Reality	Morphing, manipulate shapes and images, develop effects, matting, layering, warping, and compositing.
x		x	Parallax Matador	2D painting, photo retouching, matte painting, wire removals, compositing, and rotoscoping, special interactive lighting and glow effects.
x			Tic Tac Toon	Vector-based program with layout, animation, effects animation, clean up, in-between, storyboard, auto-gap closing, color styling, inking, painting.
x			US Animation	Vector-based, high-speed, high-quality digital system. Process scanned line art through all phases of production.
			<b>3D</b>	
	x	x	3D Studio Max	Rendering, modeling, flexible keyframing, editing.
	x	x	Adobe Premiere	Real-time viewing on the Web.
x			A/W Composer	Compositing images, develop timeline, create and sequence events, alter color, work with animation parameters.
x			A/W Dynamation	Interactive system creates dynamic events and natural animation.
x			A/W Kinemation	Character animation system - skeletal control through forward and inverse kinematics or motion capture.
x	x		A/W Power Animator	Create organic free-form models, lighting and particle system effects, lip sync and facial animation, muscle and skin deformations, motion capture sequences, and digital hair.
x			A/W Studio	3D modeling - curve, surface, rendering.
x			Amazon Paint	Background matte painting, 3D texture map design, multilayered painting, and 3D painting on models.
x	x		Discreet Logic FLINT	Paint, editing, animation design, compositing, image processing.
x			Houdini	Modeling, character animation, particle system modules - object editor, surface operations, editor, model editor, materials editor, texture operations editor, composite operations editor.
x			Kodak Cineon	Digital imaging & effects - paint, animation, compositing, blue screen.
x			N World	Create polygon-based characters and environments, modeling, skeletal animation, 3D paint, color reduction.
x		x	Softimage 3D	Modular interface and logical approach to tool sets for animation.





**T**raining partnerships have been effective and used innovative means to deal with high capital investment costs. Private training vendors equipped with state-of-the-art facilities are cooperating with universities and colleges. For example, UCLA Extension has a partnership agreement with the Digital Media Institute which allows them to offer training on Silicon Graphics equipment at the DMI training facility. Silicon Studio/LA will be the training provider for the Hollywood Digital Careers — a proposed retraining program for displaced workers offered by Private Industry Councils.

## Animation Training

There are a limited number of institutions offering formal programs in animation principles and technique. These are the source for much of the highly sought after talent, and they are located principally in the U.S., Canada and Europe. They offer undergraduate and graduate degree programs ranging from three to four years that provide professional training in animation which include:

- ◆ life drawing
- ◆ character animation
- ◆ color and design
- ◆ character design
- ◆ story telling
- ◆ computer animation
- ◆ graphic rendering techniques (2D and 3D)
- ◆ background
- ◆ layout

The program at CalArts is an example that illustrates the time and rigor required to achieve and perfect the skills. In a typical undergraduate program the student masters these subject areas and techniques at an increasing level of difficulty. Film making projects are also introduced. For example:

- ◆ first year concentrates on these fundamental skills and basic 2D computer graphics.
- ◆ second year involves similar work at a more advanced level. It includes a project of up to two minutes duration to incorporate dialogue and sound effects. Basic 3 D animation is an option.
- ◆ third year students continue to refine basic skills but may specialize in industry-related courses in clean-up, inbetweening and effects animation. Projects are up to three minutes and collaboration with students in the School of Music is encouraged. Students may choose to work exclusively with computers on 3D animation.
- ◆ fourth year emphasis is on developing story content and character. Students develop a portfolio for presentation to the industry.

**D**uring the program, students must learn fundamental animation principles, such as timing, staging, anticipation, follow through, squash and stretch, and overlapping action. They must be trained to visualize how characters move realistically; how they convey a feeling of weight, of looseness, of balance-in-motion, and of emotion.

According to data provided by CalArts, students graduating from this program over the





past five years have had excellent placement with the leading animation and visual effects firms.

For those who seek short courses taught by instructors with strong studio experience there are:

- ◆ classes in animation that are geared to industry professionals offered by Motion Picture Screen Cartoonist Local 839 IATSE through the American Animation Institute in North Hollywood. Introductory and intermediate classes are offered for people without previous professional experience. Courses range from 18-72 hours. In addition to the animation skills listed above there are classes in:
  - ▶ inbetweening and assistant animation
  - ▶ advanced assistant animator
  - ▶ animation (focuses on principles of hand-drawn, full character animation)
  - ▶ quick sketch
  - ▶ dynamics of figure drawing
- ◆ classes in drawing, painting, sculpture and animation (similar in content and duration to those mentioned above) offered by Associates in Art in Sherman Oaks. They are taught by professional illustrators and animators.

## NEW PROGRAM INITIATIVES

The urgency of the situation has stimulated a number of new initiatives in the L.A. region. These are some of the most important examples:

- a. new and expanded animation and digital media concentrations (Art Center College of Design expanded concentration in animation).
- b. new degree and certification programs (Otis major in Digital Media, AFI MA in digital media, UCLA Extension proposed certificate in Digital Image Creations and New Media.)
- c. new schools (Santa Monica College — Santa Monica Academy of Entertainment and Technology is proposing programs in computer animation, theme park design, new media, and entertainment production management. Classes will begin in Fall 1997 with 150 students. They have worked closely with industry in designing the program.)
- d. public schools (career academies: The Alliance of Motion Picture and Television Producers in conjunction with Workforce LA is helping to create entertainment and new media centers in L.A. area high schools.)
- e. industry initiated distance learning. (Warner Bros. Feature Animation has created a unique program involving a nationwide consortium of telecommunications providers and school systems including Rowland High School and several CSU campuses. The Virtual Training Network pilot program allows professional animators from Warner Bros. to teach and demonstrate animation techniques on a closed-circuit interactive T.V. network to students and teachers in various pilot sites around the country.)





## Government Sponsored Programs

Initiatives have been taken by a number of state, federal and local government agencies to develop training programs that ultimately will help keep jobs in California. ETP supports the SkillsNet project as well other programs. The L.A. Private Industry Council (PIC) and the Employment Training Panel (ETP) are supporting the USC Integrated Media System Center's certificate program, designed to retrain displaced unemployed workers. The U.S. Department of Labor is backing The Interactive Multimedia Design Program of the California Community Colleges which provides retraining to displaced workers in computer graphics, 3D modeling and animation. Human Resource Marketing Services together with Silicon Studio have formed a strategic alliance to develop a visual effects industry assessment and training program for over 50 participants referred from local Private Industry Councils.

The 1997 Governor's budget includes an allocation to the California Cal Grants program of \$1.2 million designated for digital artists.

## ISSUES

Education and training institutions face some common problems in sustaining high quality programs and initiating new ones.

The first problem is the future flow of prepared applicants who have potential for careers in these industries. At all levels, institutions are concerned about the pipeline. Will there be adequately prepared students from the school system? What incentives attract

students to study and train for careers in animation and digital visual effects? How can local educational institutions compete effectively with those from other states and abroad? Retaining students is also an issue. Professional schools want to persuade firms not to recruit top students before they complete their programs.

The second is the relatively high cost associated with this type of education and training, an obstacle to initiation of new programs directly responsive to industry needs. Institutions face serious problems in covering costs of equipment and facilities. Also, like all higher education, programs in entertainment face difficulty in providing adequate financial aid to qualified students.

The third problem is the concern about shortages of qualified instructors. A commonly held view is that it is difficult to find qualified people to teach at all types of educational and training institutions. Firms too have difficulty in staffing their training programs. This issue needs further investigation before an approach can be chosen. For those institutions having difficulty, what qualifications are they seeking? How important are academic credentials? What are the problems raised by relying on a teaching staff made up primarily of industry professionals? Are faculty leaving for higher paying jobs in industry? How can costs be controlled? Who is training the trainers?

The fourth issue concerns sustaining communication with industry about immediate and longer term needs. As is pointed out in this study, relations between industry and educators are expanding because of mutual interdependence. Staying current with fast





paced changes in the industry is a problem. Most educational institutions do not have the resources to assess these changes on a regular basis. Industry also frequently lacks sufficient information about education and training offerings. What more, for example, can both training institutions and industry do to help students develop portfolios that meet industry expectations?

Finally, attention needs to be paid to improved communication among educators and training providers. It is important to avoid excessive duplication of offerings and to moderate demands on industry time. Educators can benefit from conferring with each other about their programs and plans. Improved communications will help identify complementary areas and mutual interests.

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*We don't teach art in elementary school. Children miss the window in their developmental process when it would be easy for the brain to learn the language of art. Later, when they try to learn in college they have a much more difficult time. Their brains' wiring is art-impaired.*

MARGOT PIPKIN, VICE PRESIDENT, KLASKY CSUPO

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## VI. PLACEMENT AND CAREER FACILITATION



Job seekers consist of different groups depending on the stage of their career. There are recent graduates with some practical training; industry professionals, employed but seeking a career change; and self-trained artists. Job seekers may find assistance of a career facilitator useful. Facilitators can place job seekers in qualified positions. Moreover, because they have insider knowledge about the industry and individual studios, they can

guide job seekers through resume writing and interviewing.

We have identified several categories of facilitators broadly distributed among the private sector, industry-affiliated organizations, studios, and education and training institutions. Figure 6.1 summarizes each facilitator's role and function.

**Figure 6.1**  
**Placement and Career Facilitators**

Facilitator	General Description
Private Sector: Job Placement Agency Employment Agency Agents Headhunters	Private sector agencies work with both employers and job seekers. They solicit firms for job orders and find qualified applicants. They also provide placement service to job seekers. Job placement and employment agencies generally do not have long-term clients while agents present artists on more permanent basis. Headhunters work for employers and fill positions. Fee is generally based on percentage of income.
Industry Affiliated* SigGraph LAwNMoweR ASIFA Labor Unions	Industry associations provide career development seminars and workshops; create opportunities for networking and social interaction; and disseminate industry information. They facilitate labor market flows through various events and programs. In addition to organizing career workshops, labor unions provide referral services. They keep employment and contact information for their members.
Studios	Studios' recruitment activities are driven by their specific needs for qualified employees. Some studios make regular visits to local and national schools and maintain a database. They hold career seminars and portfolio reviews at industry association conferences and events.
Education & Training Institutions	Most education and training institutions offer students career counseling, job placement and referral services. They make available job information on internal bulletins and websites. They also organize studio visits and lectures by industry professionals.

\*See Appendix C





## PRIVATE SECTOR FACILITATORS

Private sector facilitators work directly with employers and job seekers and have traditionally occupied a key role in the job market. Recent trends indicate there are more agencies specializing in animation and visual effects occupations because of the growth in demand for artists in those occupations. The December 1996 issue of Animation Magazine featured AniManagement and Catalyst Literary and Talent Agency, both relatively new agencies assisting and representing artists in the field of animation. Both older and new agencies are seizing opportunities to represent artists in contract and salary negotiations. They provide services such as resume writing and interview techniques.

## INDUSTRY AFFILIATED

Industry associations like SigGraph, ASIFA-Hollywood and LAwNMoweR - The New Media Roundtable contribute to career facilitation by creating opportunities for industry professionals and job seekers to interact and network. The Motion Picture Screen Cartoonists (MPSC) Local 839 does not actively help members or others find jobs, but makes available to employers a list of names, employment status, and contact information.

We learned through our industry interviews that many studios find artists within their social network. Therefore conferences, workshops, lectures, and social events become opportunities for job seekers to initiate and build relationships with industry professionals and learn about career opportunities. Many of the programs sponsored by industry

associations are directly relevant to job seekers.

ASIFA has organized a Job Opportunities Expo for the March 1997 World Animation Celebration in Pasadena. Industry professionals will be there to evaluate and comment on portfolios. The World Animation Celebration itself will have many animation workshops, demonstrations, and special events such as the New Animation Technology Exposition which will exhibit student works from almost 100 national and international schools. The SigGraph 24th International Conference on Computer Graphics and Interactive Techniques will be held at the Los Angeles Convention Center in August 1997. This annual event will feature a Computer Animation Festival.

## STUDIOS

Major motion picture and TV studios and the visual effects houses are recruiting widely both from within the industry and at education and training institutions. They target many formal animation programs throughout the nation and the world, including art schools, community colleges, private colleges, unions and high schools. During their school visits, they make presentations, advise on portfolio preparation and review, and offer internships. They conduct studio open-house tours, participate in job fairs and career days. Some are attempting to coordinate internal hiring and have invested in recruitment staff. They use informal networks and cultivate relationships with training administrators.

The animation divisions of Dreamworks,





Warner Bros., and Disney make periodic visits to top national and international schools conducting seminars and portfolio reviews. The Walt Disney Corp. has recently organized a touring job fair appropriately named “Disney Day” featuring top Disney animators who talk with college and art school students about careers in animation. Many studios keep a database of applicants and portfolio review results which is used to contact artists for future projects.

## EDUCATION AND TRAINING INSTITUTIONS

Most of the major education and training institutions devote substantial resources — staff, equipment and space — to career develop-

ment support for students. Company portfolio preparation, job listings, employer interviews and the like are major and continuous activities. Institutions like UCLA Extension, Silicon Studio, and the American Film Institute do not have a separate department devoted to career facilitation. However, every training provider recognizes the critical need for facilitation and informally provides job information to their students through websites, internal bulletin boards, and/or personal communication. The American Animation Institute operated by the Cartoonists Union (Local 839) sees their introductory seminars as a good placement tool. During this seminar, students learn how to evaluate their own portfolios and improve on them for actual job interviews.

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*Every day we push our software tools and our wetware creativity beyond our most ambitious expectations. Every day the sole test for decisions is: Will it make the film better?*

TIM JOHNSON, DIRECTOR, PACIFIC DATA IMAGES

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## VII. ISSUES AND NEXT STEPS



The production and distribution of motion pictures, television and related communications industries are among the fastest growing in California. They are also characterized by very rapid growth and technological change. The information presented in this study is designed to clarify the scope and dynamics of a small segment of this industry's labor market — digital visual effects and animation. SkillsNet, the partnership between the AMPTP and BAMP, is the mechanism for using this information to improve the connections between employers and training institutions. However, many individuals, schools and other training providers, funding sources, and policy makers will not be able to join in the SkillsNet consortia directly. The SkillsNet web site will serve as a clearinghouse to broaden the reach of this effort beyond the handful of direct participants.

The suggestions below represent some of the issues that should be considered — not just by SkillsNet — but by the whole system of workforce development in California.

### INDUSTRY ISSUES

SkillsNet needs to monitor developments in the industry to keep its assessment of industry needs current. We think that the following technological developments are likely to affect the demand for animation and digital effects dramatically. Key issues include:

- ◆ extended applications of digital techniques to animation production
- ◆ investigation of other production areas including directors and producers of original digital content for the web, dig-

ital sound, digital editing and other digital post production

- ◆ Internet bandwidth and future of the Web
- ◆ movies and interactive games: convergence or divergence?
- ◆ deployment and success of the digital versatile disk (DVD) standard
- ◆ re-adjustment to new formats for filmed entertainment
- ◆ other developments likely to shape production.

### OCCUPATIONS AND SKILLS

SkillsNet needs to be prepared to update and modify data on the families of occupations and skills in response to market changes. Of particular interest are:

- ◆ effects of technology on occupational structure
- ◆ effects of technology on the skill content of occupations
- ◆ identification of common (shared) labor market skills among all segments of the industries covered by SkillsNet
- ◆ clarifying career paths.

### EDUCATION AND TRAINING

As SkillsNet forms the consortium of education and training providers, they need to address and analyze for these institutions, the following:

- ◆ producing sufficient numbers of qualified





artists to match growth

- ◆ quality of graduates
- ◆ gaps in offerings, particularly regarding changed technologies
- ◆ improved communications with industry about market needs
- ◆ obstacles in responding effectively to industry requirements
- ◆ policies for developing pipeline of artists through the school system.

## CAREER FACILITATION

SkillsNet has a major role to play in sorting out what works and what doesn't work in career facilitation in order to:

- ◆ enable the industry to recruit more effectively
- ◆ improve access to information for job seekers on developments in the job market, job openings and training options
- ◆ improve collaboration among educators and between educators, with industry and with facilitators.

.....

*A new star has arrived at the party. And instead of being a single wildly successful individual with a private entourage, it is a large and growing group of artists that work together towards a common goal, collaborating to create new characters, new effects and essentially new visions.*

MARK VOELPEL, DIRECTOR OF CGI, R/GA DIGITAL STUDIOS





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<sup>7</sup> Apodaca, Patrice. "Effects Industry Decries Lack of Art Education" *Los Angeles Times*, October 13, 1996, p.A-1.

<sup>8</sup> Di Orio, Carl . "Cost and Effects" op.cit.

<sup>9</sup> Mallory, Mike. "Animation:The Going Rates" *Daily Variety*, October 1, 1996, p.A24.

<sup>10</sup> Micklewait, John and Adrian Woodridge. 1997. "Hollywood's Business Sense." *The World. The Economist*; AMPTP Public Affairs Coalition "Economist's Overview" op.cit.

<sup>11</sup> AMPTP, Ibid.

<sup>12</sup> Culhane, Shamus. *Animation from Script to Screen*. St. Martin's Press, 1988.

<sup>13</sup> Plantec, Peter. "Crossing Over to Digital Animation" *Animation Magazine*, March 1997, p. 4.

## Notes

<sup>1</sup> AMPTP Public Affairs Coalition. *The Economic Impact of Motion Picture, Television & Commercial Production in California: An Economist's Overview*. Los Angeles, California, 1994.

<sup>2</sup> Veronis, Suhler & Assoc. study, quoted in *The Hollywood Reporter*. November 25, 1996, p. 14.

<sup>3</sup> Motion Picture Association of America.

<sup>4</sup> Richmond, Ray. "Tooning In: Fall Animation Lineups" *Daily Variety*, October 1, 1996, pA44.

<sup>5</sup> DiOrio, Carl "Cost and Effects" *The Hollywood Reporter*, May 31- June 3, 1996, p.S-18.





# APPENDIX A

# INTERVIEWS





# APPENDIX B

## TRAINING PROVIDER PROFILES





# APPENDIX C

## INDUSTRY ASSOCIATION PROFILES

