



The State of Visual Effects in the Entertainment Industry

Written by
Renee Dunlop, Paul Malcolm, Eric Roth

For the Visual Effects Society
July 2008

TABLE OF CONTENTS

Introduction	2
Content Creation	4
Digital Changed All That	5
Visual Effects and Traditional Practice: Moving Toward “Hybrid” Crafts	6
Advances in Visual Effects Technology Drive Changes On and Off the Set	6
Visual Effects and The New Production Paradigm	8
Impact on the Bottom Line	10
The Mission Going Forward	11
Footnotes	11

The State of Visual Effects in the Entertainment Industry

Introduction

The entertainment/production industry is more than 100 years old, yet is still in its infancy. We've seen an evolution from the silent film era to the widening list of film formats, broadcasting options, video games and other genres we have today. Technology is at the center of those changes, a center that is spinning faster with each technological advancement.

The production paradigm that dominated the first hundred years of entertainment industry has undergone rapid change, with above and below-the-line artists facing those changes daily. The mechanisms by which people worked in this collaborative storytelling environment were defined early on. However, the borders drawn are no longer directly applicable to storytelling today, and the business environment in which we create entertainment content has not embraced the pace of technology or the ensuing workflow.

From the advent of computer graphics in the late 1960s, VFX technology has triggered profound shifts in worldwide film production with ever-escalating speed. Rapidly evolving technologies along with economic demands have rendered the three distinct phases of the filmmaking process (pre-production, production and post-production) almost obsolete. The world has gone digital and has forced everyone to re-think their business models, sometimes painfully so, as witnessed by the recent Writer's strike and the constant state of uncertainty in the entertainment labor union community.

When moving pictures became a popular form of entertainment in our culture during the last century, that phenomenon gave birth to a collaborative storytelling environment in which there were many distinctly defined roles in the production assembly line. Recently, though, the traditional production paradigm has undergone, and continues to undergo, rapid change. These same forces of change have led to the proliferation of new technical and creative professions while threatening or eliminating other traditional crafts. In the process, the long-established relationships between many production positions have been radically reoriented and numerous questions arise in the context of the evolving pipeline. First and foremost among those questions is how to define the ever-changing roles of those who are critically involved in the process. Other important questions include the following:

- How do you define the ever-changing roles of those involved in the process?
- How do you allocate the budget to include artists in various production departments that didn't exist before?
- What are the responsibilities of the creative team and the crafts that are involved?
- Where are department lines drawn and where do they overlap, and who is in charge of the various phases?
- What's the role of a DP if you don't have a camera?
- How do you work with an art director if none of the sets are real?
- Should a production rely on motion capture or keyframing animation?
- Should the release be in stereoscopic 3D?

The Visual Effects Society has published this white paper as a first step towards entering into a vigorous dialogue with other crafts and guilds about current conditions and the future direction of the industry. Our desire is to explore the role that digital visual technologies play in this transitional period and address anxieties that have arisen as a result. We believe that we, the unified entertainment community, will need to find constructive responses to these issues in order to move forward.

Advances in technology help generate an ever-sophisticated set of tools enabling the digital artists to craft stories in compelling new ways. However, it is important to remember that technology should never be elevated above the vision and creativity of the people who make entertainment possible.

Content Creation

Change through technology is inevitable and, in fact, is the reason this industry has flourished and survived. In October 1927, the year of the *The Jazz Singer*, it was recognized that sound was the future, but the change was not without its uncertainties. Some established and popular actors did not have a good stage voice. Should they dub them? Or should they continue to produce silent features and avoid such advancing technologies altogether? The new technology was welcomed once a clearly defined workflow could be defined and embraced by the industry as a whole.

But the use of effects early on was considered an enigma best separated from other departments. Legendary German Cinematographer Karl Freund, who shot Fritz Lang's landmark effects film *Metropolis*, was perhaps the most vociferous opponent to this new position of special effects. Wrote Freund:

"I feel that the policy of maintaining a separate special-effects department is ridiculous. It leads to undesirable confusion, duplication of effort and responsibility, and in all too many instances, to inferior work. In Germany – and all throughout Europe, for that matter – the production cinematographer is invariably in charge of any special effects work, no matter of what sort, for his productions. This to my mind is the only logical method, for only the production cinematographer can know exactly what is wanted, and only he can perfectly match the treatment of the special-effects scenes to the treatment he has given the rest of the picture."ⁱ

Farciot Edouart (1894-1980), who went on to win two Academy Awards for best Special Effects, five for technical achievement and an honorary Oscar, took up the case for the special effects departments:

"The entire trend of the industry is toward specialization. Pictures must be made faster and more efficiently than ever before – and on greatly reduced shooting schedules. If therefore a production can be scheduled so that the process work is held until the last, a much-reduced crew can be used for this [and] the process sequences can be done far more efficiently than if the production cinematographer had to figure everything out for himself.

No special-effects cinematographer or department can hope to succeed single-handed, for every process scene must fit perfectly into the picture it is made for. Therefore, the special-effects technician must inevitably work in the completest harmony and cooperation with the production cinematographer. If each will do his [or her] part, each making plain to other just what his [or her] aims and problems are, both will succeed."ⁱⁱ

Edouart's comments nearly coincide with the advent of early 1930s rear screen and optical printer technology, which was the final piece of the puzzle solidifying the "assembly line" production model of the classic studio system in the post-sound era. The optical-based production pipeline at the heart of this system remained intact for more than half a century, often undisturbed by even late advances in VFX technologies such as motion-control camera systems.



Digital has changed all that.

Visual effects technologies blur the line between pre-production, production and post, almost the exact opposite as it was in the 1930s. This new reality leads to a far more active and collaborative role for VFX Supervisors and artists across every phase of production, long before other collaborators have joined and long after they've moved on.

In short, visual effects are no longer limited to post-production. The options that now allow for anything to be created anywhere at anytime, across all time zones and all phases of production, also present their own unique set of demands, requiring multifarious pipelines. The advances that technology has produced raise many questions that industry creatives and studio executives must address as they ponder artistic and cultural changes brought about by digital visual effects technology on an industry-wide scale.

Visual Effects and Traditional Practice: Moving Toward “Hybrid” Crafts

In the past, technology only allowed visual effects artists to add something of limited scope, such as an individual character or prop, and the majority of the scene was captured in realtime on set. Anything that wasn't a complete image on the screen at the time that you were shooting came to be known as a hybrid. To date, the term “hybrid” has been a catch-all for images not captured in front of the camera in their final state: The hybrid workflow is when what is shot in front of the camera is only a part of the elements that make up the final image.

Hybrids have come to represent a wide range of enhancements, from photorealistic backgrounds with cartoon characters, most notably utilized in 1988's *Who Framed Roger Rabbit*, to the 2006 film *300* where the style was realism pushed through color treatment. As each studio seeks to top the latest new and unique visuals, and as tools became more powerful, the distinction between how much can be added after the fact and what is shot in realtime has shifted. Now, in the digital mode, effects are a part of production- it's just not realtime production.

Building on the hybrid success and pursuing new styles has resulted in untested pipelines under ever-shorter production schedules and tightly restricted budgets. Cultivating a better understanding of hybrid production -- both in the current ranks and the next generation of film artists -- is crucial to maintaining quality and efficiency in the digital era.

Advances in Visual Effects Technology Drive Changes On and Off the Set

The advancing technological juggernaut has had a ripple effect on every level of the production community. Throughout its history, Hollywood has experienced regular periods of economic uncertainty. But the situation we see today, when the technology of one department so directly impacts the potential future of another, is relatively rare.

There are a number of key industry differences between the 1930s and today. The stability of the classic Hollywood studio system, when artists and craftspeople were studio employees who worked together on projects year in and year out, is long gone. While the professional collegiality of the industry remains intact, relationships between various departments and their personnel are more often than not established anew at the outset of each production. Every production, in turn, presents its own set of demands that can require unique pipelines and varied points of intervention by different departments at different times.

In addition to that, visual effects are having a major impact on, or replacing everything from stunt work to costume design to make-up even to the point of eliminating or replacing various departments. Such interventions into what has been the traditional realm of other crafts will inevitably increase as Producers and Directors look for ways to tell stories in compelling new ways and, concurrently, save time and money on set. The anxieties triggered by such interventions are certain in any industry undergoing rapid technological change. While digital visual effects have opened the door wide to tremendous opportunity, those working in the pipeline are still jostling to claim their place in the process.



Though it is understandable that different crafts want to protect their own territory, safeguarding the old ways of doing things often gets in the way of creating partnerships. To wit:

- An oft-heard concern raised by Art Directors and Production Designers has been a lack of consistency throughout the pipeline and the impact new technologies used by VFX artists will have on their work. However, the fact is that part of a VFX Supervisor's responsibility is to maintain communication with DPs and Art Directors to ensure that the final product reflects what those parties wanted.
- Often it is difficult to determine who is in charge of certain creative decisions that overlap craft boundaries.
- There are cultural and generational factors to consider. A lot of Directors don't want to commit to what the shot's going to be until they're in post. However, many younger Directors are very open to manipulating images early on.
- On many, if not most, projects, Art Directors and DPs are often on another project and no longer accessible to VFX artists after the shoot. Unfortunately, this is when VFX Supervisors are finalizing their work in post, which impacts the work done earlier by other craftspeople.

Yet another factor is time. As studios continue to push for shorter production periods, putting together the perfect pipeline becomes increasingly difficult. As Alex Funke, Visual Effects Supervisor and DP says:

"In a perfect world, the live action would be shot first, the miniatures would shoot second and then the digital effects would assemble and enhance the whole mix. But it doesn't usually happen that way. It's more likely that the miniatures will be shooting along with the live action, and the digital artists will be trying to get rough assemblies of shots done so they can find out just how much work they will have to do." *iii*

Traditionally, the storytelling process has been executed during production and post. Now, it is the process of pre-visualization (pre-viz), which was initially used to design the overall look that tends to define where the camera moves are. This is where many creative decisions within the production process are made

Members of many guilds and trades have been forced to adapt and incorporate at least a moderate understanding of technology that was not initially a part of their career. Their anxieties are something that many visual effects artists, who first learned their craft in the optical era, can empathize with. Many of today's Visual Effects Supervisors have had to adjust and adapt in mid-career to stay on top of the changing technologies of their own craft. During any transitional period, anxieties are likely to increase. Therefore, it behooves visual effects artists to be aware of these anxieties and be sensitive to the implications they have on the lives of the people they work with.

Digital visual effects have created an abundance of new production positions such as digital matte painters, digital compositors, virtual designers and digital colorists. Increasingly, practitioners across the production pipeline are realizing that hybrid films require hybrid artists, especially those professionals who can bring aesthetic sensibilities, honed by traditional production experience, into a digital production environment.

The advantages of hybrid knowledge can already be seen in the flourishing traditional model and miniature work in the digital age. Once thought to be headed the way of the stop-motion dinosaur, models and miniatures remain an asset of many productions, not in spite of digital effects techniques, but integrated with them. Miniatures have featured prominently in some of the biggest Hollywood films in recent years, including *The Lord of the Rings Trilogy*, *King Kong*, and *The Chronicles of Narnia*. In many ways, the integration of practical models and miniatures with the digital toolbox offers a textbook example of how new production pipelines can be created to wed the aesthetic quality of traditional techniques with the benefits of digital technology, all while saving time and money.

Not only is this melding of traditional and digital more efficient and cost-effective, it has allowed miniature artists to push past the traditional limitations of their craft, utilizing the advantage of digital effects to remove rigging, seams and other infrastructure. The effectiveness of this new method of working, however, is still dependent on a number of factors that aren't easy to overcome.

In an article written for the Art Directors Guild Technology Wiki, Tino Schaedler, Art Director for digital sets, describes how his background in both architectural design and traditional craft production, as well as 3D animation and digital visual effects, gave him the edge in solving pipelines issues on *Harry Potter and the Order of the Phoenix* (2007):

“The most common means of communication to describe a design to the persons who will realize it are construction drawings. Unlike carpenters, postproduction artists are not trained to understand the abstract language of plan, elevation and section, and this leads to misinterpretation of the design intentions. It is therefore necessary to develop new ways of handling the flow of design data between Art Department and post-production. The most promising approach, which was used on *Harry Potter and the Order of the Phoenix*, is to prepare the information for post-production using an integration of 3D modeling and animation. This demands an understanding of the technical implications of CGI, which fortunately my dual background in architectural design and 3D animation and VFX provided.”^{iv}

The challenge of maintaining consistency and quality requires new methods of communication and organization. Software-based design solutions must be, as some have argued, pan-departmental. While each specialized artist works on his or her individual shot or sequence, they must also have access to the “big picture” of a film’s look and feel. Though such an approach has been employed on a number of recent projects, whether it can be implemented industry-wide remains to be seen.

Visual Effects and The New Production Paradigm

Despite changes in technology, the ultimate goal of every production department remains the same as always, to bring about the coherent artistic unity of visuals and story. The Visual Effects Society recognizes that nothing can, or should, put technology above the creativity and artistry of the people who make such entertainment possible. Achieving that unity in the digital age requires new ways of working and new ways of communicating. Most of those solutions will have to be, by necessity, technologically based. But they will also require rethinking and responding to changes in the culture of film production in order to maintain productive and collegial professional relationships.



Some of these cultural changes need to begin within the visual effects community itself. As VFX Supervisor and former Visual Effects Society Board Chair Jeffrey A. Okun noted:

“In our earnest desire to get a seat at the ‘adults table’ of the business, we have been engaged in a 30-year publicity campaign to make everyone aware of what we do and how we do it. In this process we have focused on the success stories and hidden away the terrible truth of how we got to those successes. As far as the public, most directors and producers are concerned, they are not at all aware of how time and hands-on intensive the process really is. What we need to do is begin telling the painful truth.”^v

Long-standing analogies that equate visual effects work with “magic” and the visual effects artist to “magicians” have given the industry its own unique identity, both within the industry and with the general movie-going public. The desire to be a part of the magic is what has drawn people to the industry for generations. Okun’s comment points to ways in which this image can become a trap, as it encourages Producers to avoid understanding what goes into the work because of its arcane and mysterious reputation.

Adapting the image of visual effects artists to new economic and production realities, while also retaining the mystique that makes the industry so special, is one of the cultural challenges we are facing today. One way to accomplish this is to open the “black box” and allow others to peer in. The need to clarify the digital visual effects process has never been greater.

Producers are often under the impression that the bar to create the latest visual effects work has been lowered and made easier. That now it is simply a matter of lining up rows of computers to process the work. This has encouraged the unfortunate misperception and acceptance of what is approaching a digital sweatshop environment. From the studio perspective, the visual effects “black box” is where money goes in and visual effects come out, and few in the industry know what happens in between. When a Director talks to a Key Grip, he or she is able to estimate how much time it’s going to take for a set up. When a Director brings work to a digital effects studio, the only real indication of what it has taken to accomplish the shot is when the VFX team begins to show signs of severe exhaustion.

Visual effects artists need to bring other practitioners into the VFX production process as part of the education process. Unfortunately, this often proves difficult because of long-standing territorial issues. As productions are shared throughout the international production community, consistency and quality can be difficult for Department Heads to monitor.

Writing of his experience working on *The Golden Compass* (2007), Tino Schaedler recounts that ensuring consistency and quality of the final work can be difficult on a production in which different VFX shots have been dispersed to companies located around the world.

“This disjunction of time and place removes the designer’s ability to check on the set’s progress, to discuss finishes or make design changes if necessary.”^{vi}

In this instance, technology can offer a much-needed fix. One proposal has come from the Art Directors Guild, which calls for a centralized database of reference materials. It would be initiated and maintained by a single department (of course, the ADG recommends that the art department take the lead in these matters), from which all other departments can draw the information they need to ensure that their work remains connected to the film’s overall design aesthetic.



New and better software systems, however, cannot be the answer alone. They can help, but they can just as easily lead to the same problems of greater isolation, unrealistic expectations and greater headaches. Simply touting better technological fixes can often fall short of realistic solutions. There is a commonly held misconception in the industry that newer technology enables us to keep creating more and more work at a faster and faster pace. Its a "race to the bottom" attitude that leads to outsourcing work to other countries for cheaper production. This is because we don't fully acknowledge the human factor. We don't value the unique talent of the vfx artist as being the critical driver behind great effects creation and great story telling.

To put it another way, we have never sufficiently explained that the "magic" of visual effects has never resided in technology; it resides in the people using the technology.

Impact on the Bottom Line

As anyone with even a modicum of experience in the entertainment industry knows, nothing ever changes unless producers can be convinced that it's in their best economic interest. That said, visual effects professionals have a very convincing argument to make with producers about the need to re-evaluate the impact of VFX on the bottom line.

Roughly 20 out of the top 25 highest grossing films of all time are visual effects films. Visual effects typically take 25-50% or more of an entire show's budget, an estimate that is often admitted as low. In animated films, that number is far higher. Clearly, the work, the creative product, and the practitioners of the visual effects industry all have an enormous impact on the producers' bottom line and the show's eventual success in the marketplace.

Essentially, if visual effects artists are included in decision making up front, productions costs will drop because the VFX artists can help streamline the production path in telling the Director's story. They can be instrumental in offering more choices that help guide and generate better creative and production decisions and, therefore, a more efficient production schedule.

Within the next five to ten years, the entire entertainment industry will look completely different than it does now. With ever more advances in technology expected, it's likely that a great many line positions on major productions will be eliminated. Newer uses of technology will allow ever greater economies of scale, whereby one person using the latest software will be able to do the work of many, thus ensuring that facilities and studios will no longer need to have hundreds of compositors, matchmovers or rotoscopers working for them. Also, it's just a matter of time before we see a full-fledged attempt by a studio to use a scan of a famous actor and have the actor perform digitally. When that occurs – and it will sooner or later – who will make the decisions regarding the performances, the actor or the studio...or the VFX artist sitting in front of a computer screen?

VFX is still an intimidating mystery in Hollywood. However, the key to better entertainment product and better results for the bottom line lies in understanding how to manage better communication and workflow, along with a manageable schedule for the staff and a realistic budget.

The Mission Going Forward

The dissemination of knowledge about the techniques and trends mentioned in this document is an essential responsibility for the Visual Effects Society going forward.

Over the coming months and beyond, we will be engaged in initiatives to share information with our colleagues---Art Directors, Cinematographers, Editors, Directors and Producers, et al. --- so they may better understand the full range of ramifications that visual effects have on their work – including ways to accomplish their work more efficiently, with more creative choices and with a more favorable outcome to the bottom line.

The Visual Effects Society is uniquely well-prepared to face these current and approaching challenges and to help reconcile them to the benefit of the entire industry. Our 1800 members in 20 countries are at the forefront of this new workflow revolution and have the *talent*, *experience* and *knowledge* to anticipate how this unstoppable wave of change will be played out.

Footnotes:

i *American Cinematographer*. "Riddle Me This." March 1933, p. 12-13

ii *Ibid.*, p. 12

iii Williams, Mark London. "Miniatures: Still The Real Thing." *Below-the-Line*. April 2005. p 8.

iv Schaedler, Tino. "A Question of Communication: Thoughts on Digital Set Design." ADG Art Direction Wiki.

http://www.wiki.artdirectors.org/~wiki2/index.php?title=A_Question_of_Communication:Thoughts_on_Digital_Set_Design

v Okun, Jeff

<https://members.visualeffectssociety.com/portal/discussionForum/index.cfm?page=topic&topicID=39>

vi Schaedler, Tino. "A Question of Communication: Thoughts on Digital Set Design." ADG Art Direction Wiki.

http://www.wiki.artdirectors.org/~wiki2/index.php?title=A_Question_of_Communication:Thoughts_on_Digital_Set_Design