Living Dragons: Illustrating VFX Character Creation Techniques

Karen Vandivert
kav7311@rit.edu

Follow this and additional works at: http://scholarworks.rit.edu/theses

Recommended Citation

This Thesis is brought to you for free and open access by the Thesis/Dissertation Collections at RIT Scholar Works. It has been accepted for inclusion in Theses by an authorized administrator of RIT Scholar Works. For more information, please contact ritscholarworks@rit.edu.
Karen Vandivert

Living Dragons: Illustrating VFX Character Creation Techniques

A Thesis submitted in partial fulfillment of the requirements for the degree of:

Master of Fine Arts in Visual Communication Design

School of Design I College of Imaging Arts and Sciences

Rochester Institute of Technology

May 20th, 2015
Abstract

Living Dragons is a 3D character design Master’s thesis project in which four visual special effects technologies (puppetry, stop motion, CGI, and motion capture) are represented with four different characters intended to represent the archetypes of those technologies. The goal is to foster curiosity in these topics and encourage its audience to explore their new interests further. The project itself is meant to be casual and fun, an inviting place to begin learning about a new topic. This project is also meant to explore how character design can be used to convey how technology works, and to utilize that design to educate an audience in a casual setting.
Introduction

“Living Dragons: Illustration VFX Character Creation Techniques” is a 3D character design project in which four visual special effects technologies (puppetry, stop motion, CGI, and motion capture) are represented with four different characters intended to represent the archetypes of those technologies. The plan was to design, model, and rig four characters created to represent four different visual special effects (VFX) technologies.

This project is an introduction for beginners to spark initial interest, and to then encourage its audience to pursue the topic further. It is meant to present the information in a fun, accessible way. The design inquiry was to use character design to represent a kind of technology/technique in a unique way. The project was not meant to be in-depth or a complete look into VFX, but rather a beginner’s guide made to spark interest in the topic. The project will direct its viewers to other sources if they want more information.

Choosing dragons as the base character served several purposes. It was a way to add a personal touch to the project, a way to make it unique. Also, using dragons added appeal, as the target audience would likely be in the demographic to be drawn to media featuring fantasy creatures. Draconic characters also adds an interesting design challenge: creating dragon characters that stand out from the crowd. Dragons have, naturally, be done in a number of media and thus it is difficult to create a design which will stand out from the crowd.

A major source of inspiration for this project was a series of iOS games based around breeding and raising dragon characters. These games - such as Backflip Studio’s Dragonvale - base each of their dragons on different elements or concepts. For
example: the game includes dragons based on fire, steam, solar eclipse, along with many more. It allowed the artists to experiment with the concept of a dragon, and to push that design, what would be recognizable as a dragon while keeping the chosen theme. Personifying an abstract idea as a person or character is not a new concept, it it is an ancient one, but this is a new application. What this project did was take that concept and apply it to VFX in an informal educational setting.

Lastly, the chosen format was four characters to represent four technologies: puppetry, stop motion, CGI, and motion capture. The four technologies used were chosen because they represented a range of different kinds of VFX, including two physical and two digital. Each one was meant to represent the archetype of each to simplify the message.

The core goals and concepts behind the project served as a guide through the entire thesis process from concept to conclusion. The end product was meant to be a fun introduction into VFX technologies using unique characters. The designs changed and the process was lengthy and there were many challenges along the way, but the core concept never changed.
Survey of Literature

“Avatar Featurette: Performance Capture”
Official Avatar
January 19, 2010
https://www.youtube.com/watch?v=OJ1JzYPjcj0&feature=youtu.be

This video describes the process used during the filming of James Cameron’s *Avatar* and the motion capture techniques and technologies used. It provides a demonstration of such technology in-use. Used as both inspiration for the character designs and for writing the text to go with the character.

Chinese Shadow Puppetry: A comprehensive informational website
http://www.chineseshadowpuppetry.com/

A website about the techniques and history of Chinese Shadow Puppetry. Used as a source for the Puppetry section of the final website.

“History”
Jim Henson’s Creature Shop
http://creatureshop.com/history/

This is a page from the website for Jim Henson’s Creature shop, explaining the history both of Jim Henson and his company. It discusses the technological and artistic achievements of the two.

House of Moves
http://moves.com/

This is the homepage of a professional motion capture studio called House of Moves. It lists and displays their accomplishments and facilities. Used as a reference for a professional studio both in and out of use.
“Laika Studio Tour”
Laika Animation Studios
Jan 5, 2014
https://www.youtube.com/watch?v=H-9oErotlNo

A video about the creation of Laika Studio’s *ParaNorman*. It serves as a brief look into how a modern studio creates a stop motion movie. It has explanations of the process as well as demonstrations of the kinds of rigs used and lets the audience seem them in use.

“Our Story”
Pixar
http://www.pixar.com/about/Our-Story

This is a brief slideshow about the history of Pixar, ranging from its very earliest beginnings in 1979, following the technical and artistic developments of the company through to today.

“Rigging a Quadruped in Maya”
Jason Baskin
Lynda.com
http://www.lynda.com/Maya-tutorials/Rigging-Quadruped-Maya/166506-2.html

This tutorial by Lynda.com explains the basics of creating a rig for a quadrupedal character. Used as a refresher on the topic.

“Sculpting a Dragon with ZBrush”
Maarten Verhoeven
The Gnomon Workshop

A tutorial by Gnomon Workshop in which a 3d sculptor creates a dragon and a rock for it to perch on. The tutorial explains how to create a detailed character in ZBrush starting from scratch. It covers every step needed to create a dragon in this way, focusing on the technical aspects of using ZBrush, or any similar sculpting program.
“Where No One Goes: The Making of How to Train Your Dragon 2”
dwaawards.com
http://www.dwaawards.com/video/

A video by Dreamworks detailing the process of creating the movie How To Train Your Dragon 2 from concept to completion. It covers topics ranging from initial concepts to storyboarding to animation.
Process

The implementation was long and had many parts, which was expected given the complexity of the chosen project. The end product would be four images each containing a posed character and a background. Each character and environment had to be designed, modeled, and textured, each character rigged and posed, and each finished scene lit and rendered. Each stage posed design and technical challenges, from the initial concepts for each character to the fine tuning of the final renders.

The four technologies represented in this project (puppetry, stop motion, CGI, and motion capture) represented a range of techniques from across time, including technologies both digital and physical. This project was meant to cover more than just recent history. This project would show a range of different technologies to touch on the depth and complexity of VFX. It would introduce older, physical technologies and not focus solely on newer, digital technologies. It is just as important to know what came before digital technologies, as it is to know what is now the most advanced.

Initially, the character series included a make-up/theater prosthetics character rather than puppetry. It was another physical technique that has seen great change and development over the course of its existence. However, along with the major design overhaul, this was changed to puppetry. The make-up field was ill-defined as it existed in this project, and the character itself fitted poorly with the others. Puppetry was a more focused topic, but still filled the role of an older, physical technology.

The research regarding the content and designs of the characters focused on the pioneers of the various techniques. The project was to portray the archetype of each technology, and thus trying to convey every possible variation or nuance of each
technology would be cumbersome. To focus the project and the designs, pioneers from each field were chosen to inspire and provide most the research behind each character. They were: Jim Henson and the Muppets for Puppetry; Ray Harryhausen for Stop Motion, Pixar (with a focus on its early work) for CGI; and James Cameron and his film Avatar for Motion Capture. Each person was a demonstration of the potential of each technology, use their methods and incorporated into scenes, both character and environment. For some scenes though, I did mix in some other, more modern influences, but still designed to stick to the spirit, the archetype, of each technology.

The Puppetry scene was the one that deviated most from its inspiring pioneer, in this case Jim Henson’s Muppets. Though the final character was a string puppet, much of the character design (face, texture) was influenced by the Muppets. The environment design more general, like a theater, with foot lights and curtains. It was made to look like an actor on a stage. As the character was a string puppet, the shadow of a draconic puppeteer was added behind the character itself.

The Stop Motion scene used the type of setup and tools Harryhausen used to create his creatures. The camera in the scene was based on what Harryhausen would have used. There is no armature displayed inside character, but camera, flight armature, stage setup standard (albeit simplified) for any stop motion work, including what Harryhausen did. The multiple poses used by the character were made to communicate how stop motion works, snapshots of many poses put together to create motion.

The CGI scene different modeling style than what Pixar used in its early years (separate floating polygons created the character rather than the character being whole)
but the inspiration came from the simplicity of those early models, which were based off of simple shapes. The environment was based off of the UI of Autodesk Maya, using a baseline grid to base the character and scene off of. This was done to communicate that the character exists in a digital space, and by putting the character on a grid in an otherwise empty space could be used to communicate that digital space even to someone who is unfamiliar with Autodesk Maya or the technical workings of CGI.

The Motion Capture scene took inspiration from the sets used in the motion capture segments in *Avatar*, but the references were taken from a small motion capture studio, House of Moves. This was done because the sets of *Avatar* were large and complex, and the studio’s sets were smaller and provided more details on how the process worked, from placement of the cameras to output information designers would see. Though this was a deviation, it was done to stick to the spirit of the technology used in *Avatar*, the concept is the same, the use of cameras around a special studio to capture movement from actors in specialized suits, then turn that data into characters.

The first iteration each character would have a drastically different body type, to make them visually distinct from each other, and to show how elastic the descriptor “dragon” can be. In this case, I used a standard Western dragon, a serpentine Eastern dragon, a wyvern (a dragon with no arms, only a pair of wings and hind legs) and a hydra. In this phase there was experimentation with a number of days to approach the project and the different ways to create the characters. Eventually it was determined that the characters had little cohesion, and that sticking to one body type would unify the design. At this stage the characters were redesigned with consistency in mind.
The second iteration focused on one body type, that of the typical western dragon: four legs and two wings. This is the most easily recognizable type of dragon, and thus was the strongest kind for the entire set to be based off of. The challenge was to go from there and to create variations for each character, that they would be able to portray their own technology and be visually distinct from the others, but without losing that consistency. They also had to avoid homogenization, they could not look totally identical. Each character was then given individual textures and elements to differentiate them from their siblings, for example: the motion capture character was given white markers instead of spines, the puppetry character had strings attached to joints on its body, and so on.

After the designs were approved it was time to transition to implementation. Until this point presenting the designs were in the form on sketches, done for quick ideation and easy presentation. A 3D image is naturally far more complex then a simple sketch, with more elements to consider and refine throughout the process. However, as a project of this scale can only be done in steps, it eased the transition to the implementation phase. Frequently the CGI character was the one which went through the greatest number of changes, as it was the easiest to build (being based on simple primitive shapes) and allowed for quick prototyping to begin to examine if the chosen plan was the best way forward. The CGI rig was completed long before the others, and was thus used to iteration on posing, lighting, and camera angle in the environments long before the more complex characters were finished. The other three characters were far more complex, and during each phase of implementation they were all kept
around the same stage of production. This one done to keep the pace, to make sure the thesis keeps progressing and that no one character fell behind.

Partway through development a tutorial by Gnomon Workshop on modeling a realistic dragons in ZBrush. It provided an easy to follow guide on constructing a creature of this type. Though it was made for ZBrush, the techniques worked into Autodesk Mudbox, one of the software packages used to create this project. The tutorial gave insight on how to sculpt a dragon. The iOS games were more inventive in their designs then the ZBrush tutorial, which is why they served as inspiration. The major difference between this dragon and the ones used in the iOS games used for the inspiration for the project was a greater attention to realistic anatomy. The game sprites were cartoonish and style, but more importantly were 2D. This was where the ZBrush tutorial was useful, it gave specifics on how to translate a fantasy creature into a 3D medium with attention to proper anatomy and detail.

The Puppetry, Stop Motion, and Motion Capture characters used high poly models, because the final images were only stills the polycount was not as a concern, so the focus was on making smooth, polished models. The exception was the CGI model, which was made from primitive shapes. The others started with the same low-poly base mesh crater in Autodesk Maya, which was imported and refined in Autodesk Mudbox. Here the base mesh was refined, adding details to the face, claws, and spine. After this was complete, each character was edited to best fit their respective topic, such as the markers on the Motion Capture character, or the clay texture on the Stop Motion character. All environments and props were modeled in Maya, and were
considerably less complex than the characters. They were simple models and often used only procedural textures, so to not distract from the characters.

For lighting, this project used mostly spot and directional lights for all scenes. All scenes were indoor, so every light was from an artificial source. This included stage lights for Puppetry, Stop Motion, and Motion Capture so focus on bright, indoor lights. The Puppetry scene included light fog to emphasize the main spot light on the character, to further emphasize the stage setting. Additional lighting for motion capture character, lights added to cameras and slight glow to monitors. Both of these would emit light in the real world, though the cameras had their lights exaggerated to emphasize their importance in the scene.

The backgrounds for each scene were greyscale to emphasize the characters, and to keep the overall style simple. The characters would be the ones with a color palette, (red for Puppetry, orange for Stop Motion, green for CGI, and blue for Motion Capture) to reinforce the order they were presented in. The characters had their textures painted in Mudbox, with the exception of the CGI character, which had its shaders colored. The majority of the materials on the background elements were simple, either modified lambert, blinn, or mia material, to achieve an appropriate look, though some were more difficult than others. The strings on the puppet character for example, needed to achieve a specific look. The strings needed to be visible to the audience as strings (to further communicate that the character is a puppet) but not to be so obvious as to be distracting. To achieve this the material properties were tweaked so that it had low transparency but bright highlights. Metal textures used variants of the Mia
material to get the appropriate look. The majority of the textures on the background elements were procedural, using built-in textures to create bump maps.

Rigging each character to pose was the most technically difficult aspect of the project. The CGI character, created out of simple shapes, was rigged using simple parenting, and took very little time or effort. The other three used the same, but far more complicated rig. The complexity of the models and the high poly count made for a number of issues when rigging and posing began. The rig had to not only move the limbs, neck, and trunk but also the wings and wing membrane. While the wing membrane was the most difficult part to rig it was not the only troublemaker. Frequently, all across the rig, when posed clusters of vertices would move in unexpected ways. A cluster of points would pull away or not follow the rest of the limb. This was the most common problem while rigging, and learning how to smooth out these patches a challenge. This was resolved by learning more complex techniques for painting weights, and by painting the weights differently for each character according to pose. The characters only had to look good at one angle and one pose, so there was flexibility in correcting weight paint issues.

Composing each scene natural began with sketches, though heavy iteration occurred as the design phase began. The CGI character model was finished and rigged before others, so it used as a place holder to refine staging, for all the scenes. This allowed for easy iteration on staging throughout development, and refined composition, especially as new assets or research added on to the scenes. Each shot was meant to display the entire character, no head or bust shots, so it had to contain and display all parts of the characters, as well as all props. The challenge of doing this with a draconic
character is coordinating the wings of the character. The limbs and tail were natural to
pose, but the wings were more difficult. The wings were posed differently in each scene
as appropriate for the setting, giving each character a different silhouette and
composition in each image. The Puppetry character is bowing, as if at the end of a
stage performance. The Stop Motion character begins in flight and then lands (in
stages, as one would animate a stop motion puppet). The CGI character is examining a
geometric shape, one of many in the scene with it. The Motion Capture character is in
motion, showing off to the cameras around it.

For rendering, Mental Ray was used as the rendering engine for quality and the
occasional mia material (such as the metal beams in the Motion Capture scene). The
greatest challenge during rendering was adjusting lighting and shadows. Naturally some
details in the lighting showed only after a full render, meaning this was the time to
troubleshoot any issues with the lighting or materials. Some trouble areas included the
monitors on the Motion Capture scene (balancing how much light those should emit was
a challenge) and the lighting in the CGI scene (differentiating the prop objects from the
background, not losing detail in the character to shadow).

All these challenges were overcome, from difficult technical challenges of rigging
to unclear initial designs. These were all solved and the project was successfully
completed. Lessons were learned both on how to address issues on this project and
how to handle similar problems in the future.
Testing

Feedback about the project was received from a number of sources and media. Primarily feedback was received from users via a survey, but the opinions of fellow thesis candidates (all designers themselves) and friends (mostly non-designers) were also considered. This meant information could be gathered from both the target audience and more professional feedback.

Throughout the process I would speak with friends (both designers and not) as well as peers for feedback on my project as it progressed. This allowed me to catch one issue early on: one of comprehension by the audience. The images of the characters alone were not enough to explain the concept to someone who had no background in the topic. As such, the most important piece of feedback received was the suggestion to add text to each image, as there was an issue with comprehension when it was simply the images. In both surveys and in observation, users experienced an epiphany when they read the text, which then sparked the interest which the project aimed to inspire. This led to the addition of a small paragraph of text accompanying each image explaining what each technology was, and what the elements in each image represented.

This led to the development of the final deliverable of the project: a website to host the images and text for the project. The website itself was designed to be extremely simple. It was built from a template, as it required no special functionality beyond the ability to navigate through a few pages. It consists of a home page with links to all the other four. The other four pages had the image of one character and the corresponding text explanation. The website itself was kept simple and plain, following a
similar color palette to the characters themselves: greyscale with added color corresponding to each character.

The primary means of formally collecting information closer to completion was through an online survey. An online survey meant that a user could give guide feedback (to make sure the information given would be useful) and that to create an easy record to later analyze and document. The survey was limited to 10 questions to focus down to what information was needed. A question about navigating the site was removed for example, as the site itself is minimal enough that there is little reason to ask if most people could navigate it without issue. Rather the focus was on demographics data (age, previous design experience, previous knowledge on topic), their evaluation of the material (did they understand the purpose of the site, did they understand what each image represented, what their favorite character was), and what the impact of the project was on them (did the user learn something, is the user still interested in the topic) as well as a box to leave additional comments.

The survey itself was used in two places. The first was posted to a personal Facebook account, where friends and associates were encouraged to take the survey, and to then encourage others (especially those outside the immediate circle of friends) to take the survey. This worked as a test of the survey, a chance to eliminate typos or unclear wording before the survey was released to a larger audience.

The second place the survey was used was during ImagineRIT 2015. During the event each thesis student was assigned one or two computers to display their work, while visitors walked around. Visitors could look and/or interact with the project itself and talk with the student who designed it. As my project did have some interaction (the
exploration of the website) people who visited the Living Dragons station were encouraged to explore the website. I kept the survey open in another tab so that anyone who wished to take the survey could do so. I made sure to observe visitors as they explored the website as well as noted what they said or what questions they asked.

The major disadvantage of the ImagineRIT testing was being near the games. It was placed right near the door so it would be the first thing anyone (especially young children) would spot as they walked in. This was intended as a distraction for those children, but it also meant that there was an immediate association by visitors between the games and this project (as it was in the middle of the room, right behind the games, the second thing someone would likely spot upon entering the room. This meant that frequently young children would flock to the Living Dragons table expecting a game or animation, only to be disappointed when it turned out to be no such thing. Regarding observation, this skewed some preconceptions of the project, as the most frequently asked question was “How do I make it move?”. Though an animated version of this project would have been interesting (perhaps using cinemagraphs rather than full animations) it would have taken significantly longer, and it would be preferable if people judged this project on its own merits, rather than on incorrect assumptions.

However, despite these difficulties ImagineRIT overall proved useful for gathering information, both from the survey and from observation and discussions with users. It did include the target audience, and those old enough to understand the text expressed that they were interested in the subject and wanted to learn more. The information from the survey itself (see Appendix B) was helpful as well. Though most of the responses were from people above the target age range (21-30, the target being 16 - 20), there
was an appropriate mix of users who had no design experience or VFX knowledge and those who did. Most people know a little about VFX (50%). The survey suggests that the project was a success in communicating its message with 92% of people saying they understood the website and learned something new, 100% understood the images, and 61% were still interested in the topic, while 23% were indifferent, and 15% were already knowledgeable on the topic. This certainly leave room for improvement, nothing is perfect after all, but overall this suggests that the project was a success in communicating its message.
Conclusion

This project was about using character design to convey how VFX technologies work in a casual setting. This project fulfilled its stated goals as the given feedback testifies. This project or similar ones could in theory be modified to serve a difference audience, or other possible applications.

The significance of the project is in its approach to communicating complex information in a casual educational setting. It used character design to engage its audience and generate interest in a specific topic. The concentration was in movie VFX, giving a glimpse into how such effects are made. It was intended to be a starting point into the topic, so the scope of the project itself was not grand, but it meant that the message could be focused and appropriately polished.

In the future such a project could instead focus on the topic more in-depth. This project was a beginner’s look into the topic of film VFX. There are possibilities that the same approach could be taken but for a more advanced topic. Perhaps using a series of characters to address one type of technology, or the history or one technology.

During the ImagineRIT testing, a number of younger kids (about ages 5 - 10) frequently approached the Living Dragons table. They, like the older target audience, were drawn by the dragon characters. However, they were far below the intended audience and often grew bored of the project quickly when faced with text and still images. Focusing on an older audience meant explanatory text could be included: a small paragraph at the bottom of each page. However for younger children this was clearly insufficient to keep their attention or to educate them on this topic. This could open the door to another variant on this project targeting younger children. This would
require more research on education, especially the education of young children. This could open the door to different interpretations of this or similar projects, but perhaps more visually focused, or with another way to convey the complex information the images had difficulty explaining entirely on their own.

Living Dragons, according to all metrics, was a successful thesis. According to feedback received from the surveys and from review by the thesis committee, it achieved its stated goal. There are many possibilities for how a project of this type could be taken in the future, either built upon or taken in a different direction entirely. It would be fascinating to see where others take this kind of project in the future.
Bibliography


Appendix

Appendix A: Final Images

Puppetry

Stop Motion
Appendix B: Survey Questions and Results

1. How old are you?
   - Under 16
   - 16 - 20
   - 21 - 30
   - 31 - 40
   - 41 - 50
   - 51 - 60
   - 61 <

2. Do you have any formal past visual design experience? (graphic design, character design, etc.)
   - No, I have no past experience in design
   - No, but I am self-taught
   - No, but I have experience (formal or self-taught) in similar fields (fine art, photography, etc.)
   - Yes, I had a formal education in visual design

3. Do you have any previous knowledge of visual special effects (VFX)?
   - None at all
   - I know a little
   - I have some knowledge
   - I am an expert

4. Do you feel that you understand the website and its purpose is?
   - Yes
   - No
   - Maybe

5. Do you feel that you understood what each image represented?
   - Yes, they all made sense
   - Some of them made sense
   - None of them made sense

6. Please rank the characters, from favorite to least favorite, by click-dragging the options below
   - Puppetry
   - Stop Motion
   - CGI
   - Motion Capture

7. After viewing this website, do you feel that you've learned something about VFX?
   - Yes, I learned something new
   - No, I did not learn anything
8. After viewing this website, are you interested in learning more about VFX?

- Yes, I would like to learn more
- No, I am not interested
- I am indifferent
- I was already knowledgeable on this topic

9. Other comments?

![Chart showing age distribution of respondents]
Do you have any formal past visual design experience? (graphic design, character design, etc.)

Answered: 26  Skipped: 1

- No, I have no past experience...
- No, but I am self-taught
- No, but I have experience...
- Yes, I had a formal...

<table>
<thead>
<tr>
<th>Answer Choices</th>
<th>Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>≈ No, I have no past experience in design</td>
<td>42.31% 11</td>
</tr>
<tr>
<td>≈ No, but I am self-taught</td>
<td>3.88% 1</td>
</tr>
<tr>
<td>≈ No, but I have experience (formal or self-taught) in similar fields (fine art, photography, etc.)</td>
<td>19.23% 5</td>
</tr>
<tr>
<td>≈ Yes, I had a formal education in visual design</td>
<td>34.63% 0</td>
</tr>
</tbody>
</table>

Total: 26
Do you have any previous knowledge of visual special effects (VFX)?

Answered: 26  Skipped: 1

<table>
<thead>
<tr>
<th>Answer Choices</th>
<th>Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>None at all</td>
<td>30.77%</td>
</tr>
<tr>
<td>I know a little</td>
<td>50.00%</td>
</tr>
<tr>
<td>I have some knowledge</td>
<td>11.54%</td>
</tr>
<tr>
<td>I am an expert</td>
<td>7.69%</td>
</tr>
<tr>
<td>Total</td>
<td>28</td>
</tr>
</tbody>
</table>
Q4

Do you feel that you understand the website and its purpose is?

Answered: 26  Skipped: 1

<table>
<thead>
<tr>
<th>Answer Choices</th>
<th>Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>92.31%</td>
</tr>
<tr>
<td>No</td>
<td>0.00%</td>
</tr>
<tr>
<td>Maybe</td>
<td>7.69%</td>
</tr>
<tr>
<td>Total</td>
<td></td>
</tr>
</tbody>
</table>
**Q5**

Do you feel that you understood what each image represented?

Answered: 26  Skipped: 1

<table>
<thead>
<tr>
<th>Answer Choices</th>
<th>Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes, they all made sense</td>
<td>100.00%</td>
</tr>
<tr>
<td>Some of them made sense</td>
<td>0.00%</td>
</tr>
<tr>
<td>None of them made sense</td>
<td>0.00%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
</tr>
</tbody>
</table>
Please rank the characters, from favorite to least favorite, by click-dragging the options below.

Answered: 26  Skipped: 1

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>Total</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Puppetry</strong></td>
<td>8</td>
<td>10</td>
<td>3</td>
<td>3</td>
<td>6</td>
<td>2.81</td>
</tr>
<tr>
<td><strong>Stop Motion</strong></td>
<td>7</td>
<td>5</td>
<td>10</td>
<td>4</td>
<td>26</td>
<td>2.58</td>
</tr>
<tr>
<td><strong>CGI</strong></td>
<td>9</td>
<td>9</td>
<td>7</td>
<td>7</td>
<td>20</td>
<td>2.42</td>
</tr>
<tr>
<td><strong>Motion Capture</strong></td>
<td>6</td>
<td>7</td>
<td>10</td>
<td>26</td>
<td>2.19</td>
<td></td>
</tr>
</tbody>
</table>
After viewing this website, do you feel that you've learned something about VFX?

Answered: 26  Skipped: 1

<table>
<thead>
<tr>
<th>Answer Choices</th>
<th>Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes, I learned something new</td>
<td>92.31%</td>
</tr>
<tr>
<td>No, I did not learn anything</td>
<td>7.69%</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
</tr>
</tbody>
</table>

28 responses
After viewing this website, are you interested in learning more about VFX?

Answered: 26  Skipped: 1

<table>
<thead>
<tr>
<th>Answer Choices</th>
<th>Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes, I would like to learn more</td>
<td>61.54% 16</td>
</tr>
<tr>
<td>No, I am not interested</td>
<td>0.00% 0</td>
</tr>
<tr>
<td>I am indifferent</td>
<td>23.08% 6</td>
</tr>
<tr>
<td>I was already knowledgeable on this topic</td>
<td>15.38% 4</td>
</tr>
<tr>
<td>Total</td>
<td>26</td>
</tr>
<tr>
<td>Date</td>
<td>Time</td>
</tr>
<tr>
<td>------------</td>
<td>---------</td>
</tr>
<tr>
<td>5/2/2015</td>
<td>4:06 PM</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2:04 PM</td>
</tr>
<tr>
<td>5/2/2015</td>
<td>10:34 AM</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>5/2/2015</td>
<td>10:33 AM</td>
</tr>
<tr>
<td>4/23/2015</td>
<td>3:35 PM</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>4/14/2018</td>
<td>12:18 PM</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>5/2/2015</td>
<td>10:33 AM</td>
</tr>
<tr>
<td>4/23/2015</td>
<td>3:35 PM</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>4/14/2015</td>
<td>12:18 PM</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>4/13/2015</td>
<td>3:35 PM</td>
</tr>
<tr>
<td>4/13/2015</td>
<td>3:35 PM</td>
</tr>
</tbody>
</table>
Living Dragons: Illustrating VFX Character Creation Techniques

Karen Vandivert

Thesis Proposal for Master of Fine Arts Degree
Rochester Institute of Technology
College of Imaging Arts and Sciences
School of Design
MFA Visual Communication Design
Title: Living Dragons: Illustrating VFX Character Creation Techniques

Submitted by: Karen Vandiver

Date: October 16, 2013

Thesis Committee Approval:

Chief Thesis Adviser: Marla Schweppe, MFA Visual Communication Design

__________________________________________  __________________________
Signature of Chief Thesis Adviser               Date

Associate Thesis Adviser: Shaun Foster, Visual Communication Design

__________________________________________  __________________________
Signature of Associate Thesis Adviser           Date

Associate Thesis Adviser: Chris Jackson, Visual Communication Design

__________________________________________  __________________________
Signature of Associate Thesis Adviser           Date

MFA Thesis Candidate: Karen Vandiver

__________________________________________  __________________________
Signature of MFA Thesis Candidate              Date
This thesis is related to 3D character design and using it to illustrate four character creation techniques in the development of movie visual effects (VFX).

3D character design allows for a new way to visually document different technical styles, in this case various VFX techniques.

The scope of this project will be limited to a small number of characters to show four of the major VFX techniques: stop motion, practical/make-up effects, motion capture, and CGI. The research here will include time period, technology used, and visual aesthetic.
PROBLEM STATEMENT

The history of film special effects is very well documented and analyzed. While taking abstract concepts and turning them into characters is not a new concept, no one has previously tried to base character designs on major techniques in film special effects.

For my thesis project I will create a series of character designs which represent four major VFX character creation techniques in movie special effects history. Each character will represent the technology and visual aesthetic of that particular technique. For this project the techniques covered will be: stop motion, practical/make-up effects, motion capture, and CGI.

The goal of this project is to demonstrate that character design can be used to illustrate the different technologies, including some basic knowledge of how they work and some methods of using these techniques. Each character should be able to quickly communicate the basic concepts of the VFX technique associated with it.
1) Artist Insight: Effective Character Design  
by Francis Tsai  
ImagineFX, 2007  
http://www.imaginefx.com/02287754331827093439/effective-character-design.html

This article focuses on ideation and techniques for creating effective character designs. It gives tips on what makes a good character design (distinct silhouette, patterns) as well as means to express personality, tweak the design to make it more unique, and means to bring all these elements together into a single character. It presents an interesting guide on various possible steps and concepts which should be considered when creating any kind of character.

2) The Encyclopedia of Fantasy and Science Fiction Art Techniques  
by John Grand and Ron Tiner  
Running Press, 1996

This book focuses on traditional art techniques and concepts specific to older fantasy and science fiction art. Though it focuses only on traditional media, it goes on to define the different variants of both genres, as well as tips for creating creatures, characters, and environments that would fit within those settings.

3) 20 Character Design Tips  
Computer Arts  
May 23, 2006  
http://www.computerarts.co.uk/features/20-character-design-tips

A short article featuring short tips on character design. These are general tips on how to start the process and tips for ideation in character design. These are a simple steps to start and can be used for the duration of the character design process.
SURVEY OF LITERATURE

4) Top 50 3D Characters
3D Total

This article is a compilation of 50 different 3D character design tutorials. They range in character type to photorealistic human to cartoonish creatures. The huge range of tutorials means that it touches on a range of ideation strategies and technologies, as well as various different means of rendering and stylizing different kinds of character designs.

5) Top 40 character design tips - Part 1: Animal based characters
Computer Arts
http://www.computerarts.co.uk/blog/top-40-character-design-tips-part-1-animal-based-characters-133594
Accessed September 12, 2013

Another tips resource for character design and ideation. What makes this list unique is that it focuses specifically on creature design, and the do’s and don’t’s of creating unique and interesting creature designs, how to start and what to do during the process.
SURVEY OF LITERATURE

1) Secrets of ZBrush Experts: Tips, Techniques, and Insights for Users of All Abilities by Daryl Wise and Marina Anderson
Course Technology PTR, 2012

This book is a compilation of the work and advise of several notable ZBrush artists, intended for a range of skill sets from ZBrush experts, to those who have only a passing interest in the topic. All of the artists are character designers, and the book shows some of their work, in addition to small tutorials by each one, demonstrating some technique or element of ZBrush. This book includes some small exercises which it encourages its audience to try, to cement their new knowledge.

2) ZBrush Character Sculpting: Projects, Tips & Techniques from the Masters
Edited by Simon Morse
3D Total Publishing, 2012

This book provides information and guidance from industry experts on how to use ZBrush for creating characters. It includes a large number of color photographs and written instructions on the various modeling techniques in ZBrush. This goes more in-depth into the workings and possibilities of ZBrush, the more complicated means to create models and achieve believable characters.

3) Creating Characters from Design to Composite in ZBRush and Maya
Digital Tutors

A series of short videos (ranging from 3 minutes to 15 minutes) covering the entire workflow of creating a 3D character using Maya, ZBRush, Mudbox, and Photoshop. This is an extremely thorough guide to the process, showcasing the abilities of several different kinds of software and techniques, from creating the base mesh in ZBRush, to textures in Photoshop, creating displacements in Mudbox, and setting up the final render in Maya.
4) A Beginner’s Guide to ZBrush
Digital Tutors

Series of 2 to 10 minute videos covering the basics of ZBrush, from the interface to
sculpting workflows to exporting files so other programs can use it. This resource is
different from the previous books as it is broader and more basic in its instruction
than the others. These videos assume that the viewer is an absolute beginner to the
software, so it covers the use of the software at a low, methodical pace. Digital Tutors
also contains tutorials for a number of other technical topics which may be used in the
future of the project, including rigging models in Maya.

5) Digital Creature Creation in ZBrush, Photoshop, and Maya
Lynda.com
http://www.lynda.com/3D-Animation-Character-Design-tutorials/Digital-Creature-
Creation-in-ZBrush-Photoshop-and-Maya/83781-2.html

This series of videos (ranging from 3 to 5 minutes in length) cover the entire work-
flow of creating a creature in ZBrush and Maya. This tutorial focuses on some spe-
cific aspects which might come up in creature design, such as tips for modeling claws,
spikes, and fangs. It also has a focus on customization (how to import custom brush-
es) and efficiency. It also goes into great depth on how to light, shade, and render the
final scene.
SURVEY OF LITERATURE

SUBJECT MATTER

1) A Brief History of Movie Special Effects
   by Allie Townsend
   TIME Magazine
   http://content.time.com/time/photogallery/0,29307,2055255,00.html
   Accessed September 10, 2013

   A visual list of milestones in film special effect history, ranging from the very earliest animation in the 1900’s made by illustrators to James Cameron’s Avatar. It provides a brief overview of each method as well as the movie which featured or perfected that element. It is not an in-depth look at any of these elements or films, but rather provides a broad overview of the evolution of technology and indirectly how it allowed movies to portray different kinds of content.

2) Digital Visual Effects in Cinema: The Seduction of Reality
   by Stephen Prince
   Rutgers University Press, 2012

   This book discusses the rise and use of digital special effects in movies, largely within the past twenty years. It also goes into technical detail of each effect discussed, from 3D rendering to new lighting techniques and stereoscopic 3D. It also discusses the integration of live actors and these effects, as well as how to create immersive worlds without either turning to pure special or leaving the audience feeling disconnected from the film. This more technical look at more recent effects provides a detailed look at the recent history of film special effects.
SURVEY OF LITERATURE

3) The Art of Ray Harryhausen
    by Ray Harryhausen & Tony Dalton
    Billboard Books, 2006

Ray Harryhausen was one of the pioneers of movie special effects with his stop-motion work. This art book focuses less on the movies themselves and more on the behind the scenes and concept work. It includes storyboards, sketches, and photographs of the armatures he used, as well as descriptions of the processes used to animate and integrate them. His work is an example of practical special effects and stop-motion animation, and much of his work focused on creating antagonistic monsters in movies, most famously the skeletons in Jason and the Argonauts.

4) The Evolution of Cinematic Special Effects
    National Public Radio
    December 28, 2009
    Accessed September 7, 2013

This is a transcript of an interview by host Neal Conan with Richard Rickitt, the author of a book on the history and technique of special effects in movies. It mainly discusses the 2009 James Cameron movie Avatar, and the special effects used in that film, but it does touch upon historic trends in special effects (including the history of 3D in film) as well as related issues and topics. It also discusses in some detail the special effects used in Avatar, including but not limited to its use of 3D.

5) Monster Mash! 10 Famous Creatures of the Silver Screen
    Encyclopedia Britannica Blog
    Accessed September 12, 2013

This is a blog post listing and briefly discussing several famous movie monsters, ranging from Godzilla to to Wolfman to aliens and so on. Most of the movies on the list are from movies made in the 1950’s to the 1960’s, but are generally considered classics. Though the article does not go into huge depth on each monster, movie, and only briefly touches on effects, it provides a good starting list into studying specific movies, monsters, or effects used to create those same.
Inspiration

The major inspiration for this project are a series of iOS games based around breeding and raising dragon characters. Though each game is essentially a clone of the other, they each have different, interesting designs for their characters. The ways these apps used dragons to represent different themes and concepts. The premise behind the thesis was in part to take this idea, using dragons to personify something, and applying that to VFX technology.

More information on these apps can be found at:

backflipstudios.com/games/dragonvale/

storm8.com/game/dragon-story/

socialpoint.es/games/dragon-city/
DESIGN IDEATION:
SKETCHES
DESIGN IDEATION: SKETCHES
METHODOLOGY

The target audience for this project will be film students (apprx. ages 16 - 22), or anyone with a casual interest in film special effects in that same age bracket.

The final output will be a series of short (apprx. 45 seconds) turntables, one per character. The video will be HD, and fully rendered. There will also be a final still render for print, one for each character.
IMPLEMENTATION

The end result will be a simple series of turntable animations, one per character. There will additionally be a printed still of each character.

ASSET LIST

All four characters regardless of final design will include:
  3D model/geometry, UV map, normal/displacement map

<table>
<thead>
<tr>
<th>Character</th>
<th>Props</th>
<th>Background</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stop Motion</td>
<td>Additional masks</td>
<td>Inanimate armatures, boneyard.</td>
</tr>
<tr>
<td>Practical Make-Up</td>
<td>Make-up tools</td>
<td>Vanity (furniture)</td>
</tr>
<tr>
<td>Motion Capture</td>
<td>Additional small spheres</td>
<td>Green screen on a stand</td>
</tr>
<tr>
<td>CGI</td>
<td>Primitive geometric shapes</td>
<td>Checkerboard, or imitation of a checkerboard pattern</td>
</tr>
</tbody>
</table>

Final render for each character will include:
  Bitmap texture, shader, and lighting setup (slightly different per character, depending on the needs of the specific scene)

The end result will be a simple series of turntable animations, one per character. There will additionally be a printed still of each character.
The primary means to dissemination will be during ImagineRIT in May 2014. Here the thesis, near completion, will be available to the general public. The second primary means of dissemination will be during the May RIT Thesis show, where it will be available to all attendees of the thesis shows.

Other means of dissemination will include 3D modeling/character design contests, where these models will be entered. Here, the work will be judged by industry professionals against works by other 3D artists and students.

Additionally, the final renders may be uploaded to places such as Vimeo (videos), Creative Crash or Area (stills), so that they may be viewed and critiqued by professionals or the target audience.
EVALUATION

There will be two primary means of evaluation.

The first will be during ImagineRIT, where the work will be posted for the general public. Their feedback will be recorded either via survey or by observation.

The second will be testing among my peers, either in this department or in film and animation. The students will not only be observed as they examine the project, but there will also be a survey they will be asked to fill.
PRAGMATIC CONSIDERATIONS

BUDGET

3D Contest Entrance Fee.... TBD
Printing Fees..................... $150
Autodesk Maya 2014........... $3,675
ZBrush 4R6....................... $ 795

Total...................................$ 4,420
BIBLIOGRAPHY


http://content.time.com/time/photogallery/0,29307,2055255,00.html

http://www.imaginefx.com/02287754331827093439/effective-character-design.html


http://www.computerarts.co.uk/features/20-character-design-tips


BIBLIOGRAPHY


“The Evolution of Cinematic Special Effects” *National Public Radio*

“Monster Mash! 10 Famous Creatures of the Silver Screen”

“Top 50 3D Characters”. *3D Total*

“Top 40 character design tips - Part 1: Animal based characters” *Computer Arts*.
Accessed September 12, 2013
http://www.computerarts.co.uk/blog/top-40-character-design-tips-part-1-animal-based-characters-133594