Previsualization: Assisting Filmmakers in realizing their vision

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Organizer and Presenter
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Abstract

Previsualization is widely used in many productions in Europe and North America, however it is not as popular in productions in Asia. This will be an introductory lesson targeting Directors, VFX Supervisors, Producers, Studio Executives, Artists of all levels and specialties the advantages of using previs for their productions. The main purpose of Previsualization is to visualise complex sequences before they're being shot. It helps the producers and directors communicate not only to their crew, but also to studios what they are putting their money into. Previsualization has also evolved to serve other purpose, such as pitching projects to studios; planning complex scenes through technical previs, etc.

The role of the Previz Artists is to work with the Directors in realising their creative visions, at the same time, it offers an excellent opportunities to work with some of the best creative minds in the industry. Most Previs Artists needs to have strong understanding of cinematic languages and craftsmanship as well as solid visual story-telling skills, however the barrier for entry is relatively low as it is not as technical. Many Previs Artists are generalist.

Presentation formats:
This will be a halfday course. Presentation formats will be Power Point Presentation, followed by a hands-on demonstration of constructing a previs scene in maya, using simple tools and cheats, ultimately not to produce a finished CG movie, but enough to communicate to most people staging of the scenes and the story.

Topics covered:

- Introduction to Previsualization: History, present, and why Previs.
- Types of Previsualization.
- Previs in Asia.
- Previsualization workflow.
- Demonstration of previsualizing a scene in Maya.
- Conclusion: Future of Previsualization.

Target audience:
Directors, VFX Supervisors, Producers, Studio Executives, Artists of all levels.
Prerequisite: Some 3D experience helpful, but not required.

About the Presenter

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Hock Hian is currently a previz/layout artist on Dreamworks Animation's "The Croods", coming out in Spring 2013. He also worked on Puss in Boots, How To Train Your Dragon, Shrek Forever After and Kung Fu Panda 2. Over the last 15 years, Hock Hian has worked on varies aspects of CG productions, from films, such as: Transformers: Revenge of the Fallen, 2012, Astro Boy, Eagle Eye, to TV shows such as Fight Science and Sports Science, Pushing Daises, etc. Hock Hian was also at Sony Playstation for 6 years, where he was the Lead Animator on numerous Triple A games.

Hock Hian has a Masters of Arts Degree in Game Development from Savannah College of Art and Design, where he received a fellowship for outstanding portfolio. He also studied at the Academy of Art University, where he graduated with Appreciation with a BFA in Computer Arts. Besides his day job, Hock Hian teaches part-time at the Art Institute of California, Hollywood, in Media and Animation, and Game Arts courses.

Hock Hian is a native of the Garden City, Singapore.

Course Overview

3 minute: Introduction and Welcome.

Hock Hian Wong

- Self introduction and overview of course.

60 minutes: An over view of Previsualization and its sub-categories, it's application and workflow.

Hock Hian Wong

Power Point Presentation and sample images and movies will be used to illustrate the following.

- Introduction to Previsualization: History, present, and why Previs.
- Types of Previsualization.
- Previs in Asia
- Previsualization workflow.

45 minutes: Demonstration of previsualizing a scene in Maya.

Hock Hian Wong

Presenter will demo a previs scene from start to finish, typical previs work flow in Maya.

1 minute: Conclusion

Hock Hian Wong

10 minutes: Q and A

Hock Hian Wong

Contents

Chapter 1

Introduction

Previsualization: History, present, and why Previs.

Previsualization is almost a must to many directors and producers of big budget movies nowadays, especially if they are visual effects heavy, studios often start the previs process way before production begins, in order to help the film maker work out complex shots, expensive scenes, or even pitch to studio execs ideas and story for their movies. Previs was made popular by George Lucas and his team on the Star Wars prequel, but it has really been around much longer, though in different incarnations. From using miniature models and shooting with video cameras, to using primitives to stage shots etc.

The advent of Previsualization also brought about a discipline of CG artist, though not entirely a new craft, but rather, a combination of varies skill sets, including animation, modeling, surfacing, effects, editing, cinematography, etc. Many of them are aspiring directors, that have seen the learning opportunities of being a previs artists, including working with top directors, supervisors, to home in on their on screen craft.

"These days, the best previz artist has been to film school or has a directorial sensibility, which helps with interpreting artistic notions from a filmmaker." According to The Third Floor Studio founder and creative director Christopher Edwards, who went to film school.

One of the most important function of previsualization, is as a communication device. A means for the director to communicate to the crew what he/she has in mind for the shots/scene/sequences, it is especially valuable for high dynamic shots with intense visual effects, which may not be easily verbalized, or even story boarded.

In Stranger than Paradise, which Third Floor also prevised, Cinematographer Guillermo Navarro mentioned that the scenes using previs mainly involved those with visual effects. "There were digital characters involved," the DP relates. "So the previz in that sense is an opportunity to understand how all the pieces fit together. It [visual effects] is a very abstract process when you're doing it, so I find previsualization a very helpful tool, and use it every chance I can. You can't always get the exact kind or speed of movement in reality that you have in the previz, but

that isn't as important as the idea behind what is presented in the previz, and that is what I find most valuable." (1)

Ultimately, previs is a tool for filmmakers to communicate their creative vision to their crew, and allow the crew to plan and execute that vision. In addition, Previs is also being used in other aspects of productions, which we will touch on below.

Chapter 2

Types of Previsualization

Following are different types of previs, extracted from previs society's website

Specific Types of Previs

"**Previs** is a collaborative process that generates preliminary versions of shots or sequences, predominantly using 3D animation tools and a virtual environment. It enables filmmakers to visually explore creative ideas, plan technical solutions, and communicate a shared vision for efficient production." *

A number of sub-types of previs* exist in current practice, including:

Pitchvis illustrates the potential of a project before it has been fully funded or greenlit. As part of development, these sequences are conceptual, to be refined or replaced during pre-production.

D-Vis (Design Visualization) utilizes a virtual framework in pre-production that allows for early in-depth design collaboration between the filmmakers. Before shots are developed, d-vis provides a preliminary, accurate virtual design space within which production requirements can be tested, and locations can be scouted. Approved design assets are created and made available to other previs processes.

Technical Previs incorporates and generates accurate camera, lighting, design and scene layout information to help define production requirements. This often takes the form of dimensional diagrams that illustrate how particular shots can be accomplished, using real-world terms and measurements.

On-Set Previs creates real-time (or near real-time) visualizations on location to help the director, cinematographer, visual effects supervisor, and crew quickly evaluate captured imagery. This includes the use of techniques that can synchronize and composite live photography with 2D or 3D virtual elements for immediate visual feedback.

Postvis combines digital elements and production photography to validate footage selection, provide placeholder shots for editorial, and refine effects design. Edits incorporating postvis sequences are often shown to test audiences for feedback, and to producers and visual effects vendors for planning and budgeting.

*All definitions formulated by the ASC-ADG-VES Joint Technology Subcommittee on Previsualization. (2)

Of all the above sub categories of "previsualization", other than the actual previs itself, Pitchvis and Postvis seems to be most widely used. With the lower cost of workstations and more readily available trained CG artists, more indie producers are able to relatively quickly create a low cost but adequate representation of a trailer or short of the film they wanted to make. These movies will be used to pitch to studios, executives, investors for more funding or other opportunities.

Postvis, as mentioned above, is a great aid especially to editors, whom without the place-holder vfx elements would often have to edit shots with none or minimum acting/directorial reference. Many shows that choose to use previs tends to use postvis as well.

On-Set Previs is a relatively new entry, but gaining popularity with better real-time graphics technology. It is especially popular with TV shows, with some that shoot most of the scene in green screen and comp over CG or location footage. It is use widely on big budget live action features, to provide more immediate feedback to directors, cinematographers, vfx supervisors etc.

D-vis is helpful especially if there are many original creations in a movie. On Transformer, Revenge of the Fallen, the previs team is brought on fairly early, about 18 months before principal photography, to work with the art department in designing some of the articulation of the robots. Some of the previs models and rigs were pass on to the visual effects vendors for reference.

Technical previs, much like architectural visualization is useful in planning and designing set, panning locations shoots, etc. Another useful application for a project I worked on was designing and planning motion control camera move with actor on an animatronic seat. My involvement was mainly in the camera move, which was then translated by the clever TD into data for the camera and animatronic. It was used for a ride for Universal's Harry Potter ride.

A tool is only as good as the user's knowledge of its application and purpose. Previs is a great tool provided productions understand its value and the crew in other departments do not feel intimidated. Previs was meant to be a collaborative and communicative process that serve to facilitate workflow between each department. As a previs artist and supervisor, it is essential to convey that message to the crew. It is a team effort, to ultimately serve the creative vision of the filmmaker.

Chapter 3

Previs in Asia.

The theatrical market statistics report, which the MPAA conducts annually, found that though ticket sales in the U.S. and Canada remained unchanged at $10.6 billion, overseas revenue jumped 13% in 2010 compared with 2009. (3)

The largest growth occurred in Latin America and the Asia Pacific region, which grew 25% and 21%, respectively, and accounted for $10.8 billion in box-office revenue. It marked the first time that Europe, the Middle East and Africa, which generated a combined $10.4 billion in box-office revenue, accounted for less than half of all international ticket sales. (4, 5)

For all it's popularity and advantages that it brings to film productions, why hasn't Previs caught up in Asia? Is it a budget issue or the system? Or is it the skill level or genre of the films? I would think it's probably some or all of the above reason.

India alone makes about 800-1000 films a year. Japan and Korea, though make much fewer, but has much higher production value and budgets (no comparable to Hollywood, of course). The film industry in these countries is relatively matured and the audience has a specific taste that the local films are able to cater to. There are more vfx heavy films being produced, but the general audience are contend watching imported North American and Europe films with heavy vfx. Thus, there isn't much potential or business sense for specialized previs companies. If previs is needed, most of the production houses could probably have a few well-trained, experienced artists double as previs artists and work with the creative leadership in previsualizing the scenes.

China is somewhat of a different scenario, being the fastest-growing film market, China produced 791 films in 2011. The box office has been rising by 30 percent a year since 2003, reaching a record 13 billion yuan ($2 billion) in 2011. It's widely believed it will become the second largest film market, after North America, by the end of 2012. China has a quota on the number of films it can import, presently at 20 films per year, but set to rise this year for Imax films. This, together with the increasing number of local films being produced, more interests in films financing and production with higher budgets, many more films and TV shows are beginning to include vfx elements.

"Chinese audiences, having shown great enthusiasm for visual effects-driven films like Avatar and Transformers, are more demanding now," Pixomondo's executive producer Jan Heinze says. "Their demand will urge domestic filmmakers to make more visually stunning pictures."

Pixomondo, a Germany based VFX studio has multiple production offices all over the world. It is building a growing number of Chinese clients.

“The Chinese offices used to work mainly on Hollywood films but are dealing with three Chinese films' pre-productions - about half of the projects they will work on in China this year.

I see our domestic efforts as an investment in the future," Bremble says. "We like to be part of China's rapid growth in the film business and technology. People will be surprised at how fast this industry grows."

The company has worked on one or two Chinese films a year from 2007-11. But by the first half of 2012, more than 70 percent of its projects are Chinese. Four to five big Chinese releases are being lined up for 2013.

Christopher Bremble, founder of China’s BaseFX, points out that, “traditionally, Chinese movies usually have just one or a few investors. So, they want quick returns and don't allow much time for post-production work. However, a growing number of Chinese filmmakers have realized pre-production's importance, such as Zhang Yimou, who worked with Base FX on The Flowers of War and Lu Chuan on King's Feast.”

Visual effects budgets are also another obstacle for Chinese films.

Kai, of Base FX, points out most Chinese films spend only about 10 percent of their budget on visual effects, while Hollywood films use 15-30 percent, and even more for such visually striking pictures as Avatar.

But Chinese filmmakers are starting to spend more on effects, Heinze says. "Some movies are already in the scale of what Hollywood would spend on an independent movie." (6)

China, like many other Asian film industries, has a somewhat different system compare to North American and European productions. Though there are studios that fund and produce films, but unlike Hollywood productions, the studio executives generally have lesser creative inputs. The director is often the ultimate creative authority in his or her own productions. In North America, studio executives from multiple divisions, such as Consumer Product, Marketing, Development, etc, often have inputs that may influence or change the director’s original vision.

As the ultimate creative visionary, one may see less of the benefits that previsualization bring to a production. The director may see previs as a redundant tool, like a kitchen with too many chefs.

Education is needed to make proper introduction to filmmakers about the benefits of previsualization. This is one of the reasons the Previs Society in Los Angeles was founded. Besides building comradeship, exchange of information the society also helps inform filmmakers the benefits, process, and application of previs.

As Brian Pohl, a Previs Supervisor and one of the founding member puts it:

"…to some directors previs is in direct conflict with their creative process and we need to respect that. Directors are leaders and sometimes a leader's ability to control the situation gets lost when presented with too many options."

At the same time:

"…Work is underway to help define standards and practices that inform the unconvinced, but in addition to that, directors need to realize that there are several types and usages of previs that can serve very distinct purposes. Once these specific processes are understood for the value they can provide, unrealistic expectations about previs can be put aside and specific personalities can be matched with the type of previs services they need. " (7)

Chapter 4

Previsualization workflow

Many animation studios called the Layout process Previs, for the obvious reason. They are quite similar in workflow. Many of the Previs studios in L.A. work on animate features as well. Such as Halon did part of the Tai Long escape sequence for Kung Fu Panda; The Third Floor Studios worked on Mom From Mars, Arthur Christmas, Smurf, etc.

Different studios have different previs/layout process; the tools may be different, but many of them have similar process.

4.1 Scouting

Like in live-action movies, we usually start previs /layout with the scouting process. Where we look at the set models at locations where the actions are happening. The art department and director would have provided information on what actions are required, what are the major story moments, what is the dynamics of the scenes, but by looking at the models, we explore placement of cameras based on the storyboards. Often, blue prints will be provided if sets will be build, if it's an existing location, survey may be requested in order to provide the previs team with the information they needed.

After the "location scouting" we may suggest alternate staging if there are any concerns. Very often, modeling department may not anticipate certain areas to be detailed for the camera, so such sessions are great communicating and coordinating with other departments. If the director feels strongly about a shot, they may decide to add more details to certain areas of the model. Most importantly, it gives the previs/layout artist a good geographical understanding of where the scene is happening, and it gets us thinking where and how to stage the scenes to best tell the story, taking into considering the designs, the limitations, the challenges, and to provide creative solutions.

4.2 Launch

In animated project, layout is the start of the 3d production process, other than modeling and surfacing. In major project such as animated feature films, there is usually a Layout/Previs launch session, attended by the director, producers, and department heads. The director will run through and explain the storyboards or

animatics, elaborating on the important story beats of the sequence, what is to expect in terms of animation, lighting, effects etc. This may be a Layout launch, but it also allows other department to start prepping the scene, such as pre-lighting, or to do R and D on the effects, etc. The department supervisor may raise questions or budgetary concerns at this time. For example, the Effects Supervisor may ask about the effects needed; the Lighting supervisor may ask for some lighting direction, such as time of the day, etc. Many times, if the department supervisors have valid concerns about certain scenes, this is often a good time for discussion, before we go too deep into production. For example, if budget is a concern, we may frame shots differently to minimize or avoid expensive effects, usually at no lost of production quality. It is to everyone's benefit to keep things practical, realistic and doable, and not to be carried away with personal egos. The sooner we discover production issues, the sooner we resolve it, the less time and resources are wasted.

Where else in Previs for live-action films, the "launch" is usually early in the production or pre-production and the actual shoot may be months, even years away, so usually the Previs Supervisor would launch his/her team on the project. More information regarding will trickle in as the production finalize more details, such as designs, locations, scripts, etc.

4.3 Previs/layout in an animation package.

Again, the process differs studios to studios and person to person. It is really determine by their preference and the tools available to them. In big studios, the process may be more rigid due to their customs tools, usually to make the process more efficient and artist friendly. The general approaches, however, are fairly similar.

It is always helpful to have storyboards to work with. Usually in animated features, storyboards will be provided, but not always for live action previs projects. I have made it a practice to at least thumbnails the sequence, not only to help with the framing, key poses, but to check continuity, composition, etc.

Previs/Layout artists usually work in sequence or a few artists may collaborate on a sequence, if it's a long one. The supervisor would usually assign the sequence or section where there is a change of location, characters, or/and action for better structuring of the 3d scene file and continuity. Usually, at the initial phase of the project, we would have all the cameras in one scene file, where possible. E.g. in the Maya scene, you have shot_1_camera which is from frame 101 to 239, shot_2_camera from 240 to 312, shot_3_camera from 313 to 379, and so on.

Personally, I like to begin with blocking the whole animation before I set up the camera. The animation requirement for the Previs/Layout phase really depends on

the supervisor, but the rule of thumb is: “Enough to convey the action and story.” I would block out the key poses and their translation, it gives an overall view of where the action and geography are taking place, and if I am able to hit the story beat within the time and geography constrains.

After I am happy with the initial blocking, I would start adding the cameras, making sure first that they are named accordingly and set to the correct frame range. Camera set up may be tricky if you are not sure about your final output. There are numerous settings that can drastically change the quality of your output. Usually, in a big studio, this is usually done by the Technical Directors and builds into the system. In smaller productions, make sure you find out what are the deliverables, for what platform, square pixel or compressed, SD or HD, etc.

The first camera pass is usually stationary, where I spend time composing the shots, set focal length, set up custom rigs if necessary (such as a constraining cameras on a curve, or object, etc) and check the before and after shot for continuity. This is when I would start to draw from my creative bank, my understanding of how to tell the story effective by applying visual languages that I have acquired, (most of which I have covered in the previous tutorials.) Most important of all, I want to make sure if I am telling the story the director wanted.

At this time, if I am not able to get the shot I want, I may also tweak the animation or character positions to the camera. This has to be done with caution with regard to the continuity of the scenes.

4.4 Moving the camera

The rule of thumb to moving a camera is, “ A camera move has to be motivated”, meaning you move the camera only if there is a reason to do so. What we called a “Motivated Camera Move”. With the convenience of 3D animation software, lesser trained artist tend to move the camera too much and too often, thus making it too “CG”, making the scene looks jarring and causes distraction. Some shots are better off if they are “Lock off”, or stationary. Whenever a camera moves, it begins to introduce a different emotion to it. The speed of the camera further adds to the emotion. The faster the move, the more dynamic, but it may also risk becoming a distraction to the viewer. Most of the time, the purpose of the camera is to help lead the audience to where you want their emotion to go, to get them involved personally in the story-telling. A good camera move would be invisible to the audience. The audiences are so absorb in the story that they don’t notice the cut or the move at all. Abrupt camera move may detach the audience from the story and becomes a distraction.

4.5 Making CG camera more natural

Over the years, I have picked up many tricks from fellow co-workers and friends on the ultimate goal of making CG cameras more like the real world one, or more natural or what we like to call, "organic" others would put. It is a challenge to add the "human" touch to a CG camera; this is created mostly by emulating subtle "mistakes" of real world camera and follows the limitation of the real world mechanics.

Very often we would add subtle secondary animation to a camera move, much like the "follow through" principle in animation. For example, a pan would finish with small back and forth animation. Or adding ease in and ease out in the animation.

A very useful tool that has become essential in most Previs/Layout artists' bag of tricks is the "Shaky cam". The camera rig differs studio to studio, but they are generally based on the same principle. Basically, the camera is connected to animation data, changing the values on the channel; the artist can introduce "noise" to the camera, adding subtle animation. One can make replicate the look of a cameraperson holding a camera and walking, running. This tool helps to emulate the organic "hand-held" characteristics of a real world camera. This is especially useful for action scenes. The Previs Artist can easily create very convincing camera animation with the introduction of the "shaky cam". Many online cg websites have links to camera rigs create by different studios. Some are better than others. I usually prefer the simpler ones, which makes it easier for me if I have to add addition rigs or constrains to the camera.

Another relatively new tool in Digital Cinematography is Camera Capture. There are many manufacturers using different Technologies, such as optical (much like motion capture), gyroscopic, etc. The technology is brought to the limelight with James Cameron's Avatar, where the famed director used special camera rigs that allow him to manipulate the camera in the CG world, much like he would in the real world. It allowed him to frame and move camera as he pleases, thus allowing the traditional filmmaker much creative access in CG world. By capturing the data of the filmmaker operating camera, and the subtle movement, Camera Capture is able produce a very organic camera move. Many productions have adapted the technology, from films to TV and games production.

Previs/Layout is usually created on the fly; the goal is to create the best representation of the filmmaker's vision in the fastest possible time. Often, we choose not to include details such as secondary animation on the characters, lighting, effects; the models are usually relatively low resolution with simple textures to allow the artists to work faster. Every so often, we may have the luxury to include

some lighting, but mostly to illustrate a story point. E.g. a person emerging from the shadows, or someone turns on light to a house. Like wise with effects, we may create rudimentary effects such as explosion, gunfire, to serve the story. The quality of the deliverable movies is mostly generated with Maya Playblast. However, with the advancement of technology, and to satisfy the creative thirst of the artists, as well as the need to create more accurate representation of the final scene without spending too much time, many productions are exploring ways to produce fully lit and rendered Previs and Layout movies. It's also not uncommon to include more real-world lens effect such as Depth of Field, lens flares, etc, to give it a more cinematic look. They are not as finished as the final product, but there are a lot more bells and whistles, with the goal of impressing the directors, producers, studio executives etc. Some studios are adapting real-time technology, taking advantage of faster GPU, to create previs that are highly detailed, and with quick production time. Thus, Previs/Layout artists are not only expected to be proficient in cinematic craft, but good lighting and color understand are essential as well, much like the live-action cinematographers.

4.6 Final Layout

In animated feature projects, there is usually a Final Layout department that does a few very important but often over-looked, under appreciated process. One of which is Set Dressing. Some animation studios have a set-dressing department; this is an important step in the animation process. A strategically placed prop or set of props can add a great deal to the composition. Good set dresser will greatly raise the visual quality of the film, by resolving compositional, spacial relationship, scale and other issues. Another important work of the Final Layout department is the finalling of the camera after animation is finished and approved. Final Layout artists will open the animated scenes, tweak and finesse the camera to the animation. More subtle camera moves are added(if necessary) in order to have the shots flow smoothly.

4.7 Editing

Editing is huge. Editing is essential when doing previs and layout. Most productions have an editor or an editorial department, who will constantly update the reel and see the full sequence in continuity. They may spot story or camera issues that you may have missed, or suggest alternate cameras to make the story flow better. I tend to do my own edit before I send my shots to the Editorial department. It allows me to check for any continuity issues or ways to improve the shots. Editorial is an integral and critical part of production, and works hand in hand with the Layout

Chapter 5

Demonstration of previsualizing a scene in Maya.

Generic assets, lower resolution assets, especially characters, to allow faster workflow. Easy to edit assets, reuse and import animation.

Chapter 6

Conclusion: Future of Previsualization.

Global box-office receipts for all films released in 2010 reached a high of $31.8 billion, an increase of 8% over 2009, according to a report from the Motion Picture Assn. of America.

The theatrical market statistics report, which the MPAA conducts annually, found that though ticket sales in the U.S. and Canada remained unchanged at $10.6 billion, overseas revenue jumped 13% in 2010 compared with 2009.

The largest growth occurred in Latin America and the Asia Pacific region, which grew 25% and 21%, respectively, and accounted for $10.8 billion in box-office revenue. It marked the first time that Europe, the Middle East and Africa, which generated a combined $10.4 billion in box-office revenue, accounted for less than half of all international ticket sales. (8)

Previs has become a part of many productions in North America, Europe, Australian, and New Zealand, mostly those with bigger budgets with heavy visual effects scenes. Filmmakers are taking the advantage of using previsualization to help them. In Asia, there is yet a strong presence, despite being the fastest growing region in terms of size of productions, budgets, number of productions and box office receipts. As more

directors, producers and studios become more aware of the advantages of previsualization, they will hopefully realize that it is an immensely useful and creative tool that will not only increase the production value of their movie, but they will be able to communicate more effectively to their crew.

Chapter 5

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