CG 101

CG/VFX Production Theory

General Principles of Process

1. Quality CG/VFX Take Time

2. CG/VFX is a Team Sport

3. Workflow Process is a Pipeline

4. CG/VFX: Efficiency meets Creativity

5. Planning is Essential

6. You're Surrounded by Expertise

"Victorious warriors win first and then go to war, while defeated warriors go to war first and then seek to win."

--Sun Tzu

Quality CG/VFX Take Time

Quality CG/VFX Take Time

A CG PRODUCTION IN LAYMANS TERMS

R&D
Coming up with how it's going to look and how to do an effect. from scratch!

MODELING
Sculpting EVERYTHING seen from scratch in a COMPUTER!

UV & TEXTURE
Unwrap each sculpture like origami, and hand-paint the texture. From SCRATCH!

SHADING
Assign surface properties that look real, using attributes the computer will understand.

RIGGING
Build a user-friendly system that deforms the sculpture using complex hierarchical kinematic expressions. (math)

ANIMATION
Apply the Principles of Animation to bring life to the lifeless. From Scratch!

SIMULATION & FX
Simulate natural phenomenon like smoke, water and fire.
From SCRATCH! USING MATH!

TRACKING
Track features of moving footage, input survey information to backward engineer a camera move or to trace an object.

LIGHTING
Simulate real-world camera lenses, moves, and cinematographic principals in the COMPUTER!

RENDERING
Using complex ray tracing render algorithms to simulate real-world lighting a have a Computer draw an image. From Nothing!

When a CG Artist sits down, they start with an empty world, infinite in all directions.
They manifest something from nothing, it is not a trivial thing, nor should it be treated as such.

It takes time because it's hard. Simple.

CG/VFX is a Team Sport

We are working for the same company.

Our various departments work towards the same goal, and want to achieve the best quality as possible, and impress our clients.

It is essential that the mentality of, "We are in this together" be shared between artists, support staff, and production. With all the external pressures it can get lost in the day-to-day stresses. Each department takes ownership while inspiring and working with the other departments. Ideally, we elevate each other. Talk to each other.

Spend time actually physically talking to each member of your project team. Not small-talk, but just a "how's it going?" It's amazing what knowing what everyone else is up to does for communication.

I'll let you decide which Department is who.

CG/VFX is a Team Sport
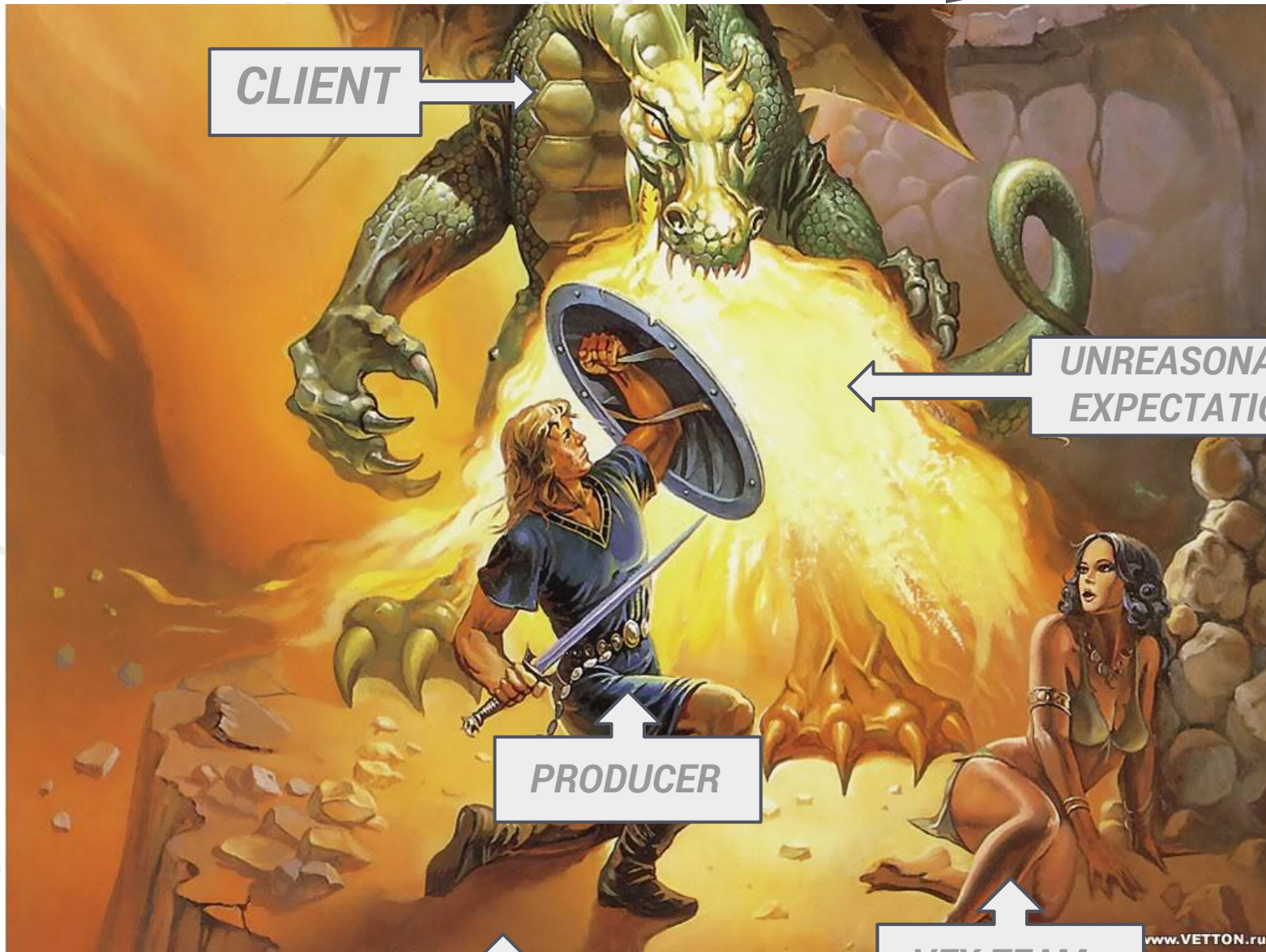
CLIENT

UNREASONABLE EXPECTATIONS

PRODUCER

VFX TEAM

HOW IT SHOULD FEEL

CG/VFX is a Team Sport
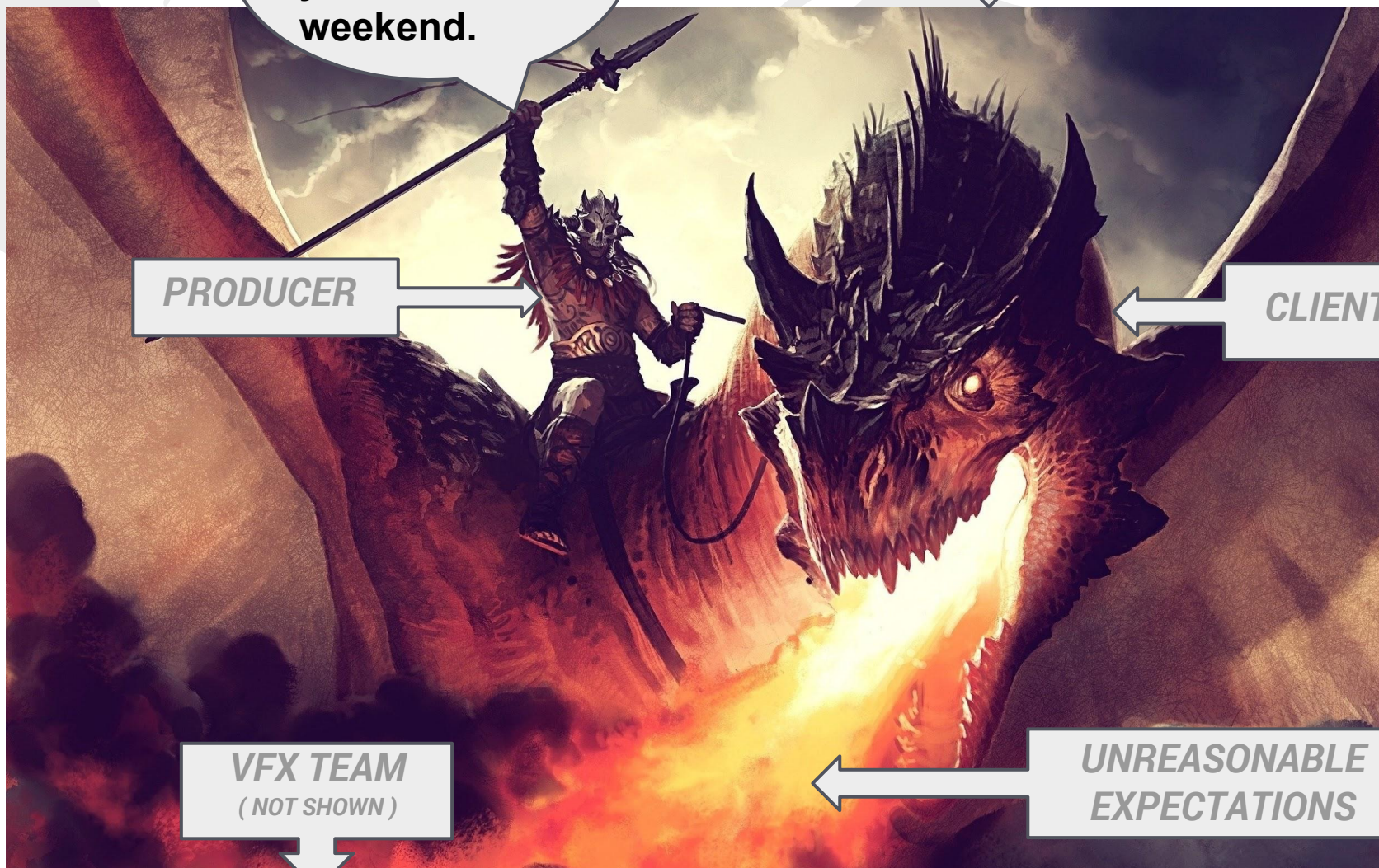
Workflow is a Pipeline

The process of how we work together, communicate, operate software, name files, is all considered a workflow.

When the workflow becomes standardized and tools installed which facilitate efficiencies of the workflow process, you start to create a pipeline. Often a pipeline can span across many departments. Where a workflow may be flexible, a pipeline typically is not.

Think of it as a conveyor belt system, or the way a house is built.   There are steps along the way, that each to themselves have a reason, and process.

To skip a step, or try to return to an earlier step once the next step has been started, is working against the pipeline, and will cause stress and inefficiencies.

Workflow is a Pipeline

A CG/VFX project is like construction of a house, due to the linear stages. Where one stage depends on the previous stages to be complete.

Everyone agrees and **Signs Off** on the Blueprints before construction begins.

Contractors are scheduled, supplies are bought, delivered and installed.
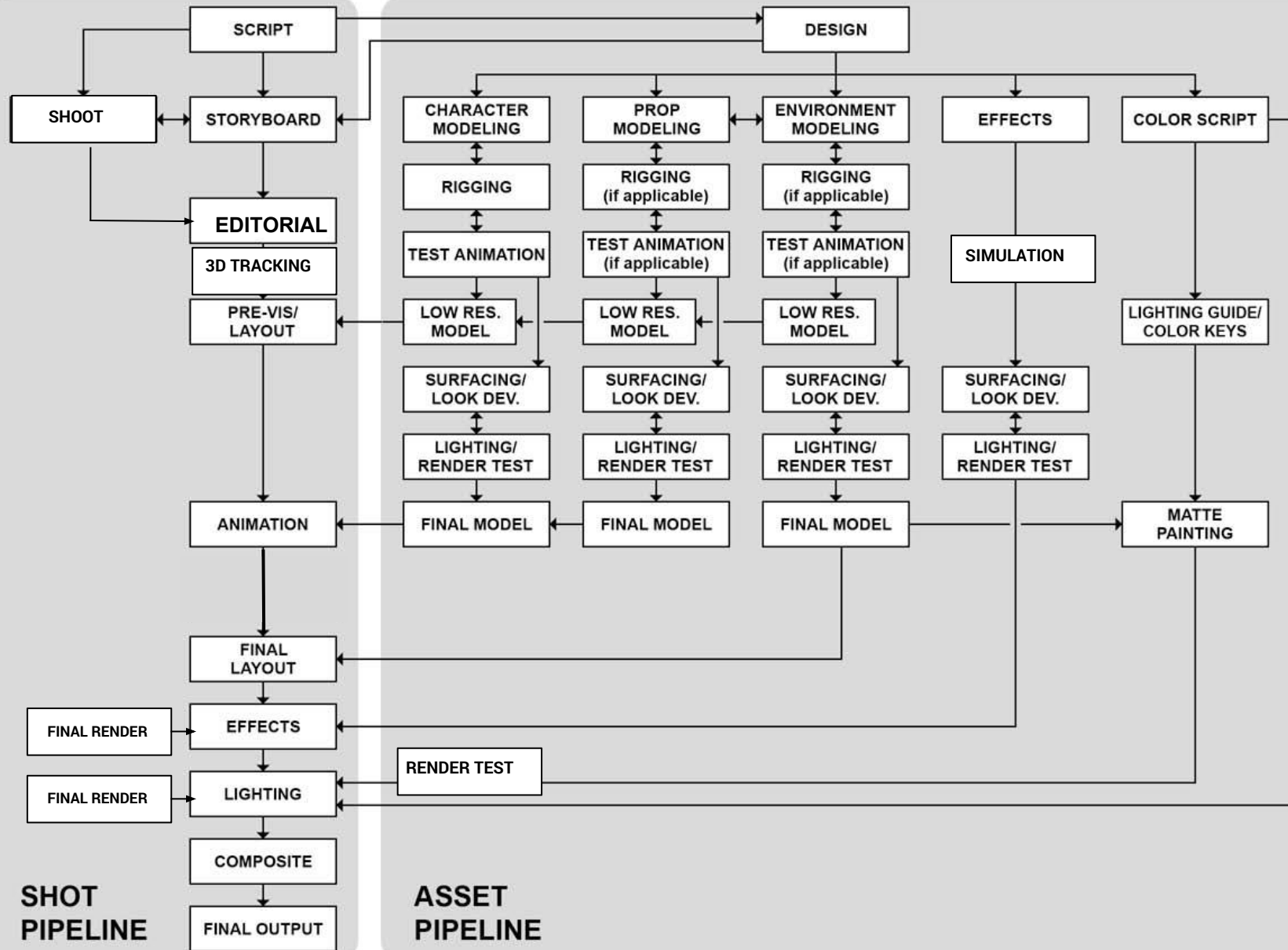
Individual stages must complete and make Deadlines before the next stages begin.

Design changes, or changes to the agreed plan are costly and avoided at all cost

Imagine if a client asked to change which direction a house faces after the foundation was laid and walls framed!?

Seems ridiculous right?

Workflow is a Pipeline

SHOT PIPELINE

ASSET PIPELINE

CG/VFX : Efficiency meets Creativity

    The very nature of VFX is creative. Typically making something from nothing, and augmenting reality is a creative endeavor.

    When it's done as a process, and mass produced as is the case with Commercial effects, there has to be efficiencies achieved to make it sustainable and profitable.

    Efficiencies should balance along with creativity, allowing for a higher quality than could have been achieved otherwise.

Considerations:

- Planning and Casting the correct Team
- Managing expectations of both Client and Team
- Anticipating problems and avoiding them BEFORE they arrive.
- Planning and Understanding the schedule as early as possible, including internal and client reviews.
- Understands why you're being asked for something.
- Solve problems that arise with creative solutions.
- Getting all the information to and from those who need it before a task begins.
- Avoid idling artists, or 'general overtime' work due to poor planning.
- Pre Visualizing, so as to only build what is necessary.
- Research and Development Technical Techniques to find the approach that will.
  - Serve the Effect
  - Be Directable and allows for Iterations
  - Capable of being achieved with the resources and time.
- Blocking in visuals with broad strokes and refine, refine, refine.
- Do not incite panic.
- Talk to each other!

Is your team functioning optimally?
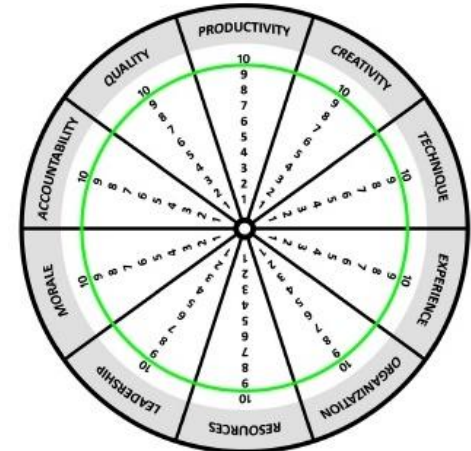
Or is there room for improvement?
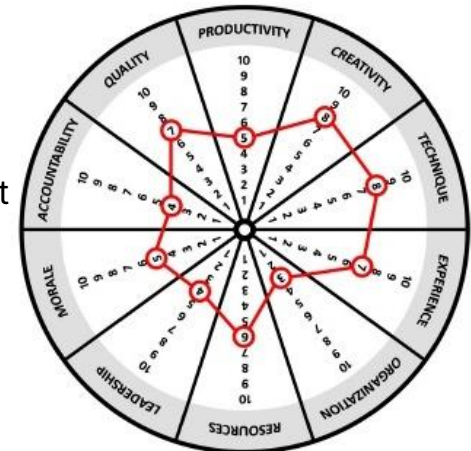
Planning is Essential

This cannot be stressed enough. Planning is the single most important thing we can do to make sure expectations are met, quality is achieved, and the process isn't painful. When things get hectic, fast-paced, or overwhelming, it's easy to fall into a, **"just do something now, and we'll figure it out later"** frame of mind. This will get you into trouble down the line. Usually, this is the time to slow thinking down and look at the big picture again.

With a proper understanding of what the task is, how long there is to do it, and the resources available, you can then arrive at a solution that is achievable with the best possible quality in mind.

To plan, dissect your workload, break into logical steps, make sure the Department leads on the project are all aware and in agreement of the plan. Then it's up to everyone on the team to facilitate and execute the plan.

Considerations:

- What exactly is the task and scope that is being asked to achieve?
- What are the team and time requirements?
- When I'm being asked for something, what is it being used for?
  - What are the needs down the pipe for this element/task?
- When are the important dates!?
  - Shoot date?
  - Conform and plates on the server?
  - Reviews?
  - When does the compositing team start?
  - Deadline?
- Are Custom Design(s) needed?
- What are the Technical specs?
  - Frame rate? Resolution?, Anamorphic?
  - :30? :60? :90?
  - Time warps?
  - 3D Scale?
  - What Renderer is ideal? Render time scheduled!?
  - What Software is being used!? Do we have enough licenses?
- Has the Team gone shot-by-shot through the edit and agree on expectations?
- Is the plan clear to everyone involved!?
- What will help things go smoother?

Facing uncertainty...
- Anticipation
- Preparation
- Action

You're Surrounded by Expertise

Knowledge

How much more I realise there is to know

How much I think I know (%)

How much I actually know

Expertise

The "I know nothing" phase — **Beginner**

The "I'm an expert" phase — **Hazard**

The "I know nothing" phase — **Expert**

Things everyone in Post Production SHOULD know:

- Who the members of your project team are and what they do.
- The general stages and their order of CG asset creation.
- The general stages and their order of CG shot creation.
- Why a shoot supervisor is needed and when.
- What a tracking marker is, how and why we use them.
- Why we acquire HDRI's on set and what they are.
- Why we require lens information, or camera information in Post.
- The different image formats we use and why. (.psd, .exr, .sgi, .eps .ai)
- What software we use everyday, for what task, and why.
- What CAD data is, and why it's not "production ready"
- Recreating Natural Phenomenon (Smoke, Water, Fire) is just plain hard.
- Simulation is extremely computationally time consuming. It's just slow.
- How to facilitate each other during the pipeline
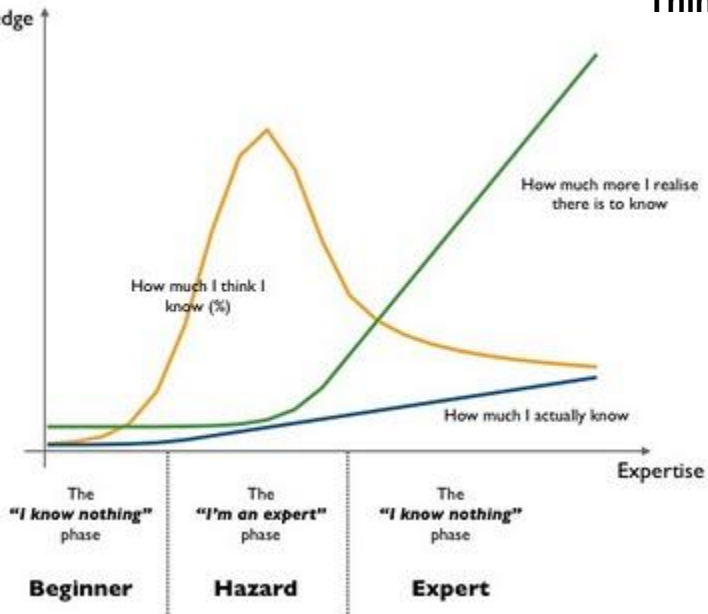
If you're not a CG/VFX Artist, you're <u>NOT</u> expected to know:

- What a polygon is, or vector, or incidence pass, or pretty much anything technical.
- How to track
- How to use an HDRI
- What a floating point is. (though it certainly would be nice)
- What color or bit depth, or linear workflows are. (though, it certainly would be nice)
- The difference between green screen or blue screen. (though it certainly would be nice)
- You're not expected to know EVERYTHING

Don't be a Hazard

You're Surrounded by Expertise

No matter where you fall in the pipeline, you should not be scared to ask questions or admit you don't know something! Be forward - get information from others when you need it, instead of trying to hide what you don't know. Take notes, and your enthusiasm will be noticed, and your work will progress faster.

It's often useful to **get to know different departments at work**, and to talk to those either side of the job you are doing, to get an idea of what they need if you're not 100% clear. Get to understand who around you has knowledge and expertise that you can tap into in order to get the task in hand done as quickly and efficiently as possible. It may be your Lead, or maybe the person who's been working there for a bit longer than you. Ask respectfully and be sensitive to their workload - disturb them too often and the goodwill may disappear. Always read the manual or research problems first. Identify those with greater experience, and use them as role models without bugging them.

It's always preferable to ask someone who knows the information, rather than to just assume or make it up. Not knowing is actually prefered to 'assuming' the answer.

Nothing will stress the relationship between departments more, than errors made on assumptions or wrong information. It's one of the most offensive reasons for overtime, and totally avoidable.

As a professional commercial artist or producer, you should be checking your information twice, and only doing the work once.

ASSUME NOTHING

In Conclusion

1. CG is hard, seriously.

2. Support your local CG/VFX artist anyway you can.

3. Make an effort to understand the process, Please.

4. Help us be efficient, don't propagate mistakes

5. Plan the big picture, and communicate it

6. There is a process, if you're unsure, please ask.

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This Document can be found at:
www.kungfukoi.com/NTDC/CG101.pdf

THANK YOU!