THE APPLICATION OF CGI
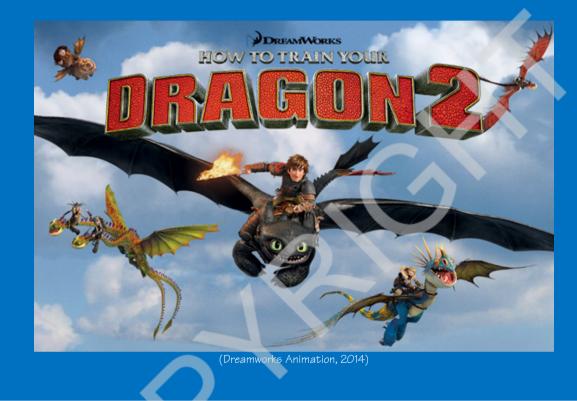
in

(Dreamworks Animation, 2014)

A BRIEF ANALYSIS

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5 Oct 2014

(Dreamworks Animation, 2014)

FILM SUMMARY

Director: Dean DeBlois

Production Company: Dreamworks Animation

Release: May 2014 - Cannes Film Festival, June 2014 - USA

Budget: US$145,000,000 (Dreamworks, 2014)

Worldwide Box Office: Gross US$609,000,000 by Sept 2014 (Box Office Mojo, 2014)

INTRODUCTION

A meaningful discussion of *How To Train Your Dragon 2* will not be complete without a précis of CGI.

Computers in film-making have existed for decades. However it was only in 1995 with *Toy Story* - the first animated film of feature-length to achieve blockbuster success - that CGI came into prominence as a ground-breaking tool in film-making. The hugely successful *The Matrix* followed in 1999 where CGI and "wire work-driven motion" (Thomas, 2014) achieved enhanced and effective perception of slow motion and rotating bullet effects which became 'signature' special effects of the film series.
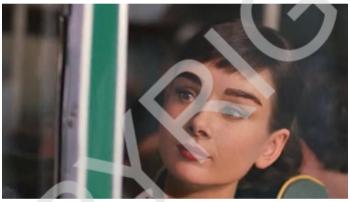

(Disney Pixar, 2014)

THE MATRIX (Palmer, 2013)

According to Oscar-winning director George Miller, CGI is the biggest change to film-making since the introduction of sound. Miller states that CGI is now used on all movies including those on limited budgets (Maddox, 2010).

The advancement of CGI, in recent years, has been staggering. CG imagery is at a point where quality is such that it is extremely difficult for an ordinary viewer to distinguish between reality and otherwise.

This quality is exemplified by the recently-released Audrey Hepburn Chocolate Commercial. In this advertisement, CGI was used to reconstruct Hepburn's face and blend realistic facial expressions and movement which were crucial to authenticity. The resultant visual imagery is so convincing that many have called the advertisement 'creepy' (Thomas, 2014).

AUDREY HEPBURN CHOCOLATE COMMERCIAL (Los Angeles Times, 2014)

http://www.youtube.com/watch?v=gx9eDoS76LM

Without doubt, CGI is here to stay and for good reason. It provides high quality visual-imagery and is far easier to control being accurate and flexible, and more cost-effective than traditional methods of film production involving expensive set-pieces and props, large numbers of extras and hazards to safety like real explosions. This contributes enormously to maintaining, or reducing, budget.

Where CGI veritably shines is in the creation of images that can only be generated artificially by computers as they simply do not exist in reality; for instance, living dinosaurs, extraterrestrials or animated movies like *How To Train Your Dragon 2*. Embellishing such narratives would be difficult, in some cases impossible, without CGI.

And while the foundation created by the forerunners of visual effects and animation like Walt Disney and Looney Tunes must be rightfully respected, CGI brings about a quantum leap that is undeniable.

APPLICATION & SIGNIFICANCE OF 3D MODELLING, RENDERING & ANIMATION INVOLVED

At the pinnacle of this movement lies Dreamworks Animation. In recent years, they found their extant software - EMO – outmoded. With the aim of creating their own in-house animation system, they formed a partnership with Intel to develop technology to support their system into the future. Lincoln Wallen, CTO of Dreamworks, refers to their technology as AT – Animation Technology (Takahashi, 2014).

One of the tangible results, of this synergism between Dreamworks and Intel, is this year's blockbuster movie: *How To Train Your Dragon 2*.

How To Train Your Dragon 2 is Dreamworks' first movie produced using their new platform – *Apollo* – (McCracken, 2014), incorporating two new components: animation software *Premo,* and lighting and rendering software, *Torch* (Failes, 2014). These software systems provide animators with the means to create and edit seamlessly.

"In movies, CGI is best when you don't even notice it" (Cooper, 2014).

This quote was obviously made in the context of non-animation movies and suggests, quite rightly, that sub-standard or tokenistic CGI will be noticed by viewers. That is, poor CGI will emphasise that which is unrealistic. However the quote arguably is just as applicable to animated movies. Movies like *How To Train Your Dragon 2*, being 100% animation are perhaps more susceptible to criticism. The fact that the film has been widely acclaimed and received in a positive light by audiences speaks for its **'natural'** and **'realistic' animation** and narrative.

HICCUP (Dreamworks Animation, 2014)

Transcending into Dragon 2

Dragon 2 is completely CGI but viewers soon transcend – and bridge effortlessly - from the real world into the fictional world of *Dragon 2*. Audiences marvel at the **flawless**, **lifelike** animation – in characters and environment – and are amazed at the realistic **emotions** and **nuances**, the flicker of clothing, **shimmering** of leather armour, along with realistic surfaces like skin and water. The CGI is of such high quality that you do not even notice the small bugs existing (Takahashi, 2014).

Working with *Premo* & *Torch*

Fredrik Nilsson, Dreamwork's Workflow Director for Animation and Crowds, stated that one of the hallmarks of this success is the software's **intuitive interface** with models, making the process more 'natural' (Collins, 2014). Animators are able to create with virtually no constraints and can interact with their creations in **real-time**; plus they can generate views from virtually anywhere as camera positions, angles and movements are available on the fly (Asghar, 2014).

In *How To Train Your Dragon 2*, the Dreamworks team created, then worked with **fully realised** and **skinned** characters (Bishop, 2014), and were able to directly manipulate multiple characters on screen without the hitherto annoying delays traditionally associated with previewing and rendering.

Premo is so flexible and intuitive that it is said to be akin to '**claymation**' (Collins, 2014); i.e. animators have the ability to sculpt characters – pose, push, pull, adjust skin, muscles - by working in real-time directly on large pressure-sensitive screens by Wacom (Bishop, 2014). Gone are days of tedious data entry.

PREMO (Dreamworks Animation, 2014)

Therefore *Dragon 2* animators were given - what they, perhaps as sculptors, might have had traditionally - the **hands-on analogue** creative experience. This gave the artists the ability to interact closely with their designs. Nilsson observed that "It's been liberating to allow our animators to just hop around and pose what they see" (Collins, 2014).

The animators were able to experiment with movements, poses, pulling faces and the like, and then simply **manipulate** and **adjust** their characters **directly**. Dreamworks realised that creating **realistic** and **endearing characters** required direct and interactive links between the animators and characters; and that this is a **crucial element** of the animation process (Collins, 2014). This relationship between animator and character resulted in the natural and realistic **expressions** of the adorable characters in *How To Train Your Dragon 2*.

BARF & BELCH, BABY NIGHTMARE & MEATLUG (Dreamworks Animation, 2014)

To top it off, *Premo's* functionality also includes the ability to access all available shots from entire sequences. This feature was unavailable to animators previously.

CGI & Business Value

Wallen stated that it took less than a week – 90 million compute hours - to render *Dragon 2*, which is a remarkable achievement of performance (Takahashi, 2014). Wallen also reminisced that it used to take 20 to 40 hours to render a single frame of theatre-ready animation (McCracken, 2014). With their present technology, Dreamworks can render at 24 frames per second. Wallen refers to all this as "delivery of business value" (Takahashi, 2014).

A Sensational & Flawless Spectacle

How To Train Your Dragon 2 has to be one of the most sensational animated spectacles thus far. For this author, at least, it was a remarkable and tremendously enjoyable experience; and without doubt, the movie is a **sophisticated** and **elegant** product of CGI.

Both human and creature characters move, not only naturally and dexterously, but **gracefully**. The characters walk, run, jump, leap, perform athletic and acrobatic movements, and fly, doing so with such beauty and **elegance**. Key moments of drama – particularly expressions by characters – are

"powered solely by the visual nuance of a computer-generated character's performance" (Bishop, 2014).

Numerous dragons fly around **simultaneously** and **flawlessly** in epic battle scenes, encompassed within a comprehensive visual environment. All this was made possible by Dreamworks' latest multi-core processors where adequate power was available to generate the animation (Bishop, 2014).

(Dreamworks Animation, 2014)

Powerful processors aside, the biggest difference is the **user interface** (Failes, 2014). Dreamworks' software *Premo* and *Torch* are clearly **intuitive**, encompassing efficient **real-time functionality**.

Creative Use of Light

In *How To Train Your Dragon 2*, Dreamworks adopted the cutting-edge 3D texture painting software MARI which is extraordinary (Failes, 2014). More than colour, however, Director Dean DeBlois was clear in his aim to embrace light creatively. Roger Deakins, DOP at Dreamworks, stated "In the film, we didn't push colour – **we pushed light**. So people feel like they're seeing something live action-like but at the same time isn't trying to be live action." (Failes, 2014). In other words, the language is a stylised and romanticised version of live action.

An example of this effective visual language is: where sky is over-exposed and dragons under-exposed giving the scene a **live action language**. In other words, not having both perfectly exposed and readable which would be the norm. This creative use of light resulted in beautiful silhouettes of dark dragons against a super bright sky (Failes, 2014).

(Moran, 2014)

Another example is the ice cave scene where Stoick and Valka reunite and kiss for the first time. The soft light of the cave was achieved creatively – by **lighting through the ice**, rather than bouncing light off the ice (Failes, 2014).

INFLUENCE OF TECHNOLOGY ON NARRATIVE & SUCCESS OF PRODUCTION AS A WHOLE

Without today's technology, or more precisely without Dreamworks' proprietary animation system, *How To Train Your Dragon 2* may not be the blockbuster success it is. What is a certainty, however, is that the movie would not be of such **refined** quality in **visual animation** and **delivery of narrative**.

Recent advancement in 3D animation "has determined the actual content of films and programs, with producers using these [computer] tricks to embellish the storyline" (Epand, n.d.).

CG animation's positive influence on narrative is evident in many scenes in *How To Train Your Dragon 2.* For example, many of the story's characters **conveying thoughts** and **emotions** – therefore **narrative** - through **facial expressions**. One such scene is Stoick confronting a woman from his past where his expressions are a "powerful piece of performance" and "conflicting emotions battle on his face is simply remarkable" (Bishop, 2014). Such scenes add enormous **depth** to the narrative.

STOICK (Turner, 2014)

HICCUP & TOOTHLESS (SciFiNow, 2014)

With *Premo*, animators were able to add scenes – akin to actors **improvising spontaneously** – when they recognised opportunities to **embellish** the narrative. In the past, animators were restricted by limitations of technology. In *Dragon 2*, there is an **endearing** moment where Toothless the dragon looks longingly back at his master Hiccup. This off-the-cuff interaction, by the animator, improved the film and narrative (Bishop, 2014).

Re-visiting the ice cave scene, this sequence includes fabulously soft lighting in which Valka is brilliantly portrayed as extremely beautiful - as intended by the narrative. To create this soft light effectively, the animators located light sources within the ice so that it glows (Failes, 2014).

Yet another superb example of CGI shaping narrative can be found in the same sequence, where Valka's "tear running down her cheek has little droplets and breaks up and catches the light" (Failes, 2014).

STOICK & VALKA (Pitchiner, n.d.)

Krell (2014) suggests that the reason CGI is so immensely desired is because "of the way it makes you feel in your heart" and where "your inner-child bursts out of its cage... ." While Krell was referring to CGI in *Transformers*, the same sentiments apply to *Dragon 2*. He states further that his "imagination is certainly grateful for the fuel CGI gives it" (Krell, 2014) and, in this respect, *Dragon 2* positively fuels this author's imagination.

CGI immerses the audience into the narrative and, as a result, contributes firmly and immeasurably to the film's success.

CONCLUSION

CGI continues to have a profound effect on film-making and nowhere today is this illustrated clearer than in a movie like *How To Train Your Dragon 2*. In this film, CGI does not only allow an audience into the movie - it actually immerses the audience in it. The quality of CGI and its effectiveness in depicting narrative is unsurpassed. CGI brings movies like *Dragon 2* to life and I suggest that such movies – in reverse - give CG animation life.

CGI is far superior to traditional visual effects and has the potential to inject more realism into movies whilst being cost-effective. With savings derived from CGI, film executives will have the added benefit of being able to afford the best actors, sets and props.

For the student of animation, *How To Train Your Dragon 2* has to be one of the best case-studies currently available. Technology aside, the film also presents a treasure trove of examples showcasing the application of the 12 Principles of Animation. In this respect, the movie is a wealth of knowledge.

For now, this author keenly awaits the release of the film on Blu-Ray disc!

(JB Hifi, 2014)

REFERENCES & BIBLIOGRAPHY

Asghar, W. (2014). The Animation Mechanics Working Behind The Scenes Of 'How To Train Your Dragon 2'. Retrieved 8 Sept 2014 http://techfrag.com/2014/06/14/animation-mechanics-working-behind-scenes-how-to-train-your-dragon-2/

Bishop, B. (2014). The Amazing Animation Software Behind 'How To Train Your Dragon 2'. Retrieved 8 Sept 2014 from http://www.theverge.com/2014/6/12/5804070/the-amazing-animation-software-behind-how-to-train-your-dragon-2

Box Office Mojo. (2014). How to Train Your Dragon 2. Retrieved 14 Sept 2014 from http://www.boxofficemojo.com/movies/?id=howtotrainyourdragon2.htm

Carneiro, G. (n.d.). The Fundamental Principles of Animation. Retrieved 8 Sept 2014 from http://www.dgp.toronto.edu/~patrick/csc418/notes/tutorial11.pdf

Centre for Animation & Interactive Media. (n.d.). Animation Notes #5 - 12 Principles of Animation. Retrieved 8 Sept 2014 from http://minyos.its.rmit.edu.au/aim/a_notes/anim_principles.html

Collins, B. (2014). SIGGRAPH 2014 News: DreamWorks' Premo May Be The Future of Animation. Retrieved 8 Sept 2014 from http://blog.digitaltutors.com/SIGGRAPH-NEWS-DREAMWORKS-PREMO-MAY-FUTURE-ANIMATION/

Cooper, D. (2014). In movies, CGI is best when you don't even notice it. Retrieved 8 Sept 2014 from http://www.engadget.com/2014/08/28/neuroscience-brains-ignore-cgi/

Disney Pixar. (2014). Toy Story [Image]. Retrieved 25 Sept from http://toystory.disney.com/

Dreamworks Animation LLC. (2014). Baby Nightmare [Image]. Retrieved 8 Sept 2014 from https://www.howtotrainyourdragon.com/explore/dragons/baby-nightmare

Dreamworks Animation LLC. (2014). Barf & Belch [Image]. Retrieved 8 Sept 2014 from https://www.howtotrainyourdragon.com/explore/dragons/barf-belch

Dreamworks Animation LLC. (2014). Hiccup [Image]. Retrieved 8 Sept 2014 from https://www.howtotrainyourdragon.com/explore/vikings/hiccup

Dreamworks Animation LLC. (2014). How To Train Your Dragon – Dragonpedia [Image]. Retrieved 8 Sept 2014 from http://www.howtotrainyourdragon.com.au/

Dreamworks Animation LLC. (2014). How To Train Your Dragon 2. Retrieved 8 Sept 2014 from http://www.howtotrainyourdragon.com.au/movies/how-to-train-your-dragon-2

Dreamworks Animation LLC. (2014). How To Train Your Dragon 2 Movie Poster [Image]. Retrieved 8 Sept 2014 from http://www.schoolofdragons.com/how-to-train-your-dragon/httyd-2

Dreamworks Animation LLC. (2014). Meatlug [Image]. Retrieved 8 Sept 2014 from https://www.howtotrainyourdragon.com/explore/dragons/meatlug

Epand, V. (n.d.). CGI And Its Benefits To Film, Television And Video Games. Retrieved 8 Sept 2014 from http://www.streetdirectory.com/travel_guide/141274/gaming/cgi_and_its_benefits_to_film_television_and_video_games.html

Failes, I. (2014). DreamWorks' new tools for *Dragon 2*. Retrieved 8 Sept 2014 from http://www.fxguide.com/quicktakes/dreamworks-new-tools-for-dragon-2/

Hiltzik, M. (2014). Introducing the creepiest TV commercial ever made. *L.A. Times* [Image]. Retrieved 25 Sept from http://www.latimes.com/business/hiltzik/la-fi-mh-creepiest-tv-commercial-20140304-story.html

Hookham, G. (2012). Lecture 1 / Module 1: Introduction to 3D Modelling, Rendering & Animation . INFT6302 - Computer Games Production, The University of Newcastle. Australia.

Hookham, G. (2012). Lecture 2 / Module 1: Basic Modelling Techniques in 3D. INFT6302 - Computer Games Production, The University of Newcastle. Australia.

Hookham, G. (2012). Lecture 3 / Module 2: Materials & textures in 3D. INFT6302 - Computer Games Production, The University of Newcastle. Australia.

REFERENCES & BIBLIOGRAPHY

JB Hifi. (2014). How To Train Your Dragon 2 [Image]. Retrieved 25 Sept from https://www.jbhifi.com.au/movies-tv-shows/movies-tv-shows-on-sale/family/how-to-train-your-dragon-2/616852/

Krell, J. (2014). Why The Movie Industry Owes A Hell Of A Lot To CGI Animation. Retrieved 8 Sept 2014 from http://animation.io9.com/why-the-movie-industry-owes-a-hell-of-a-lot-to-cgi-anim-1563910626

Lightfoot, N. (n.d.). The 12 Principles of Animation. Retrieved 8 Sept 2014 from http://www.animationtoolworks.com/library/article9.html

Maddox, G. (2010). Is CGI compromising good film-making? Retrieved 8 Sept 2014 from http://www.smh.com.au/entertainment/movies/is-cgi-compromising-good-film-making-20100422-tez8.html

McCracken, H. (2014). How to Animate Your Dragon. Retrieved 8 Sept 2014 from http://www.technologizer.com/2014/07/18/how-to-animate-your-dragon/

Moran, S. (n.d.). Hiccup and Toothless Soar [Image]. Retrieved 25 Sept from http://screenrant.com/how-to-train-your-dragon-2-clip-images/

Palmer, L. (2013). What 'The Matrix: Revolutions' Teaches Us About Hollywood's Past Ten Years [image]. Retrieved 25 Sept from http://filmschoolrejects.com/features/what-the-matrix-revolutions-teaches-us-about-hollywood.php

Pitchiner, K. (n.d.). Stoick & Valka [Image]. Retrieved 25 Sept from https://www.pinterest.com/pin/440508407276014373/

robertoortiz. (2014). The amazing animation software behind 'How To Train Your Dragon 2' (Premo). Retrieved 8 Sept 2014 from http://forums.newtek.com/showthread.php?142120-The-amazing-animation-software-behind-How-To-Train-Your-Dragon-2-(Premo)

Science Daily. (n.d.). Computer-generated imagery. Retrieved 8 Sept 2014 from http://www.sciencedaily.com/articles/c/computer-generated_imagery.htm

SciFiNow. (2014). Hiccup and Toothless [Image]. Retrieved 25 Sept from http://www.scifinow.co.uk/news/how-to-train-your-dragon-3-release-date-delayed/

Takahashi, D. (2014). How DreamWorks created a visualization system to prototype scenes in 'Dragon 2'. Retrieved 8 Sept 2014 from http://venturebeat.com/2014/07/25/dragon-making-visualization/

Takahashi, D. (2014). How DreamWorks made 'Dragon 2' movie with the 'absolute pinnacle' of tech (interview). Retrieved 8 Sept 2014 from http://venturebeat.com/2014/07/25/dragon-making-cto/view-all/

Takahashi, D. (2014). How DreamWorks reinvented animation software to make *How to Train Your Dragon 2*. Retrieved 8 Sept 2014 from http://venturebeat.com/2014/07/25/dragon-making-premo/

Thomas, L. (2014). An Introduction to CGI in Film. Retrieved 8 Sept 2014 from http://www.bearhatstudios.com/blog/an-introduction-to-cgi-in-film/

Turner, K. (2014). Stoick Finds Beauty [Image]. Retrieved 25 Sept from https://www.pinterest.com/pin/564920346981581046/

Wikipedia. (2014). Computer animation. Retrieved 8 Sept 2014 from http://en.wikipedia.org/wiki/Computer_animation

YouTube. (2014). Audrey Hepburn Galaxy Chocolate Commercial [Video]. Retrieved 15 Sept from http://www.youtube.com/watch?v=gx9eDoS76LM