EXPLORING GAME ENGINE TECHNOLOGY IN LINEAR PRODUCTIONS

WHEN ANIMATION MEETS GAMING

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CHAPTER 3 - Annexes

Foreword

NEW ENGINES OF GROWTH FOR THE BOOMING ANIMATION SECTOR

The market for animation is continuing to enjoy global growth. With this first edition of "Exploring game engine technology in linear productions" we are offering fresh perspectives on the use of game engines in the animation production pipeline.

These approaches go beyond just new tools in the toolbox: they have game-changing potential to give filmmakers more creative freedom, new way of working, and the promise of speeding up traditional pipelines. In this context it is essential to understand better its viability, opportunities, and challenges. Together with the animation sector and policymakers – CineRegio is excited to explore ways to increase the use of real-time technologies in the creation of animated films and TV series.

What will it take to turn some of Europe's animation regions into global centres of excellence in the field? Conferences and forums for brainstorming and collaborative thinking would be the first step in furthering a deeper understanding of the potential of these new creative options. And we need to ensure that Europe's animation regions have all the expertise and skills needed to take advantage of the new technology. New skills, standards and courses need to be initiated to meet the demand.

Our sincere gratitude to the passionate and insightful experts from the industry who have taken the time to share their knowledge as we embrace this new learning curve and to K6 Animation Institute, Belgium for producing the report.

The initiator of this publication is the CineRegio Animation group, which was created to exchange knowledge and share good practices and also to anticipate and bring an answer to what future policies are needed for the animation industry to flourish, provide cultural diversity, and stay competitive.

Perhaps the advice one of the industry expert offers to creators in this report, is just as pertinent for investors and public film funds: "Start small…..do a pilot project, get key stakeholders internally involved and excited about the possibilities. It is not always easy, but it is possible". Testing, collaboration and shared learning will be essential as we take our first steps into this new frontier, full of possibilities for business, for storytelling, for diversity, for the environment.

Start small…. but start now.

Charlotte Appelgren
General-Secretary,
CineRegio AISBL
Brussels, May 2022

Introduction

The animation industry is thriving more than ever. Netflix greenlit over 40 animated series in 2021, which is twice as many productions as they invested in 2020. Their competitors, Disney+, Hulu and Amazon, are hot on their heels as these entertainment giants race each other to fuel their audiences[1] insatiable demand for animated content.

Likewise, the gaming industry has seen the brightest glimmers of the global COVID-19 pandemic's silver lining, reporting an unprecedented boom which companies are attributing to lockdown boredom. Games sales rose by 30%, consoles and hardware sales exploded, and new consumers entered the market, presumably driven there looking for an escape from the monotony of staying at home for weeks and months on end. Market analysis from Newzoo shows that gaming revenues could reach US$217.9 billion by 2023[2].

This report aims to shed light on the rapidly evolving overlap between game makers and animation producers, specifically in the technologies used to create films and television series. The mainstream entertainment industry has gradually become aware of the potential for game engines to transform the way linear animated content is produced. This emerging interest in a new style of working—applying video game software to the production pipeline—is being driven by the game engine companies, who are aggressively moving into the space and disrupting the status quo.

Currently being pioneered by major Hollywood studios, we aim to offer insights into how the European industry is embracing this merger of gaming and animation, where there is more work to be done, and where the opportunities exist for funders to participate in its growth. There is also a disruption taking place in the industry, particularly felt in Hollywood right now, where content-hungry streamers like Disney+ and Netflix and giving a steady flow of work to smaller studios, who are seizing the opportunity to work with emergent technology[3]. The promise of this technology is cost-saving productions that will level the playing field for creative content being made in this way. The reality, as the case studies in this report illuminate, is a little bit more complex.

The trend represents some advantages for producers, but also limitations and a myriad of unknowns. However, for creators, patrons, producers, and investors seeking to understand if game engines are the future of linear production, we turn to the innovators pushing forward into this field.

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1   geeko.lesoir.be/2021/03/29/netflix-va-produire-plus-de-40-series-danimation-en-2021

2   investingnews.com/daily/tech-investing/gaming-investing/gaming-outlook

3   https://www.protocol.com/newsletters/entertainment/game-engines-hollywood

AN OVERVIEW

1

1.1 Drivers, Start Your Engines…
How Is Game Engine Technology Integrated into Linear Productions?

Game engines rose to prominence in the 1990s with the invention of 3D computer graphics. A game engine is a suite of programming and design tools, provided in a software environment, that allows video game makers to build interactive content (i.e., games).

With the increasing demand from gamers for more cinematic graphics and deeper storytelling, a growing symbiosis is emerging between game engines, animation and live-action productions. The technology is more powerful than ever, and television and film creators are starting to pay attention to the possibilities of using game engines to produce linear (non-interactive) content. Innovative, disruptive, and incredibly wealthy, the game engine companies are fostering this new market. The most powerful two companies amongst them, Unity Technologies (owner of Unity) and Epic Games (owners of Unreal Engine), have both made their software open source, that is, free, to anyone who wants to use them. The model removes a barrier of cost for creators, enticing curious artists and producers to consider this method of production.

While virtual productions made their debut as early as in the 1980s (with feature films such as *What Dreams May Come*) major studios in America like ILM and producers like Jon Favreau (*The Jungle Book, The Lion King, The Mandalorian*) are pioneering new techniques and set-ups to push the boundaries of audiovisual production, utilizing game engines. Disney+'s *The Mandalorian* has become the benchmark for production of this kind. Executive Producer, Jon Favreau's approach is considered a groundbreaking evolution in filmmaking.

However, we are not at the point where this merging of worlds is complete. Animation studios and linear content creators have not fully embraced game engine technology. The application of it is still a theoretical possibility rather than a reality for many producers. Adoption of this approach remains the domain of well-funded Hollywood projects, and even then, it is not being used widely. So, what will it take for game engines to cross the chasm into standard linear production?

As the case studies of this report detail, much depends on the existing pipelines, the skills and expertise of the team, budgets, and the content that needs to be created. Many questions remain, but the collaborative and interactive aspects of the gaming world offer interesting, new solutions for audiovisual creators and investors to adapt from the traditional production of linear storytelling.

WHEN THE CAST AND CREW BECOME THE PLAYERS

Possibly the most exciting aspect of game engine technology being used in linear content creation is virtual production sets. In a virtual production set, actors, directors and the crew can ''play live'', using all the interactive tools and features offered in game engines in real-time.

In 2020, ScreenSkills[4], a UK television and film industry-led skills body, organized a roundtable with production and VFX experts, to identify existing skills gaps. Their first step was to reach a consensus on definitions of such an emergent area. Through these discussions, these four key areas in the virtual production pipeline were identified—

- **pre-visualisation and virtual scouting;**
- **building virtual production studios to include the likes of LED screens, camera encoding and motion capture;**
- **running virtual production stages;**
- **and creating the digital content to put onto the on-set LED walls.**

Replacing green and blue screens, these next-gen film sets feature walls made up of LED panels. Projected backgrounds, lighting and visual effects are triggered during filming, creating an immersive experience very different from what we are used to seeing in traditional audiovisual productions.

The director is seeing the scene come to life in real-time, and the acting experience is elevated as actors are much more immersed with non-natural elements (created content being fed into the environment in real-time) that would have previously required more imagination on their part and a lot of post-production work.

"Typically [in traditional filmmaking], you are measuring changes within days or weeks before you see the changes happen...That affects your choices and you're always measuring against time wondering if it's worth another pass. When you can see it happening live on set, it triggers a different part of your brain,"[5] said Canadian cinematographer Andrew Scholotiuk about the process of working with a virtual set.

HOW ARE GAME ENGINES USED IN LINEAR PRODUCTIONS?

Game Engine Feature ▶		Content	Display
Background		Animated or filmed	LED walls
Motion capture		Actors Animated characters	LED walls Studio
Camera controllers		Animated objects and movement in scene	LED walls Studio
Live special effects		Animated objects	LED walls Studio
Real-time lighting		In projection or on set	LED walls Studio

5   cmf-fmc.ca/now-next/articles/now-next-podcast-s3e3-virtual-production-techniques-for-film-tv-sky-is-the-limit
Now and Next Podcast by the Canada Media Fund

Modern LED stages typically have a curved screen, like the set-up that was used to shoot The Mandalorian. These wraparound layouts are called a "cave". Then, real-time content (CG or real footage that has been scanned with photogrammetry) is fed from the game engine into the LED screens to create the backgrounds, effects and lighting. Then, the cameras used are set up with linked tracking sensors that allow interactive, composited movement through the actual space and created backgrounds, in real-time.

A collision of worlds becomes apparent here; game engines allow photorealistic renders to be fed into the screens of live-action productions, meaning modern audiences are watching seamlessly hybrid animation/live-action content. While this has always been true with special effects, this new pipeline and the high-quality photorealism that can now be achieved with game engine rendering means the level of overlap is greater than ever before.

FIXING IT IN POST

The major cultural shift from classical production pipelines to this new way of working is the front-loaded nature of the effects. In a traditional pipeline, many of the special effects or background elements would be added into the content in post-production, now they can be included in the creation on-set, in real-time.

"Instead of expensive post-production processes, virtual production brings a huge amount of the visual work forward, allowing the filmmakers to plan their shoot in a different

way," said Ben Smith, Head of Film, TV and Publishing for UK-based multimedia company Rebellion — which produces comic books, video games, film, and visual effects[6].

Ironically, this is somewhat a return to the past. The early days of film saw the "smoke and mirrors" stagecraft of theatre productions brought onto sets to create movie magic. Likewise, in early animation, tricks of perception such as the effect created by Walt Disney Studios' multiplane camera rig from the 1930s, saw hand-painted glass panels manually moved across each other to create the sense of visual depth in forest scenes (famously used in *Snow White and the Seven Dwarves* and *Bambi*[7]).

Returning to this mode of creation will require new pipeline developments and a change in how productions are planned. Post-production expertise may become less desirable, but what kind of new skills will be demanded instead? This shift throws ripples that are explored in some of this report's case studies. But the change will come if directors and producers continue to pioneer this method and explore the potential game engines have in bringing about innovative linear productions.

COVID-19 AND REMOTE COLLABORATION

The COVID-19 pandemic has accelerated interest in the advantages virtual productions offer. The film and television industry bore a major economic impact from the legally enforced lockdowns and shelter-in-place orders that swept the world. Filming delays and rising, unbudgeted costs (buying masks, plexiglass, extra hires for sanitary security measures, and so on) saw producers seeking methods to salvage their productions via remote work options. Game engines are playing a key role in shaping the future of animation by introducing real-time rendering.

In 2020, Japanese studio, Toei Animation, and entertainment technology group, Guild Studio, teamed up to make Healin' Good PreCure, an animated series that revolves around a group of magical girls who battle evil forces. They created a sequence for the series in Unreal, intending to perfectly match the visual signature of the series traditionally made in 3D, yet rendered in 2D. Thanks to the collaborative aspect of working with Unreal, they managed to have teams working remotely to successfully achieve that[8].

Virtual environments allow for social distancing, with the technology allowing actors to be motion-captured into the scenes, directors to view the production remotely and lighting, rendering and special effects to all be keyed-in, live. With obvious advantages in a pandemic, there are other positives to working this way, including a reduced carbon footprint (not least because of the reduction in travel to shoot on-location) and the opening up of the talent pool and labour market that is unlimited by

6   cnbc.com/2020/05/23/how-hollywood-movie-making-becomes-virtual-after-coronavirus.html

7   awn.com/vfxworld/all-worlds-virtual-stage-disneys-new-camera-capture-system

8   unrealengine.com/en-US/spotlights/real-time-rendered-animation-matches-traditional-methods-for-quality-on-precure

1.2 Playing To Win
The Economics of Game Engines in Linear Production

geography.

With so few genuine and complete examples of European animation productions that are using game engines to produce their projects, it is impossible to analyze the economics of this pipeline shift. We have heard the promise that this is a cost-saving move for studios because working in real-time eliminates various parts of the traditional process, speeds up production time, and solves all of the animation world's

problems. Of course, the reality is another matter.

TIME IS MONEY

In 2020, Kidscreen reported on research commission by Epic Games that found 69% of the game engine's current users did so because of the time it saved during the production process[9].

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9   kidscreen.com/2020/08/10/why-animation-is-leaning-into-real-time-tech/

On the Unreal Engine website, the company claims that in 2020, the number of TV and film productions using their technology doubled[10], and 25% of the money handed out by the MegaGrants program, went to TV and film projects.

Even Unity cannot confidently offer statistics on the purported cost-saving factor of integrating game engines into linear pipelines. "The [savings factor] is always a tricky question, and the results will vary from studio to studio," says Mike Wuetherick, Head of Media and Entertainment at Unity technologies, "but we've seen case studies of 40% savings compared to traditional workflows. The biggest savings tend to be on the 'back-end' of the production, i.e. cameras, layout, lighting, compositing." But he admits that Maya or Blender remain necessary for asset creation, which assures hybridity in the pipeline. So, it is necessary to understand that projects using game engine technology will still, most likely, demand a suite of animation tools that should be budgeted for.

We consulted many audiovisual experts in the field while researching this report. They are in the process of assessing the benefits of game engines and seeking the finances to explore using real-time technology in their linear projects. What we learnt from them is that despite the game engines themselves being free and open-source (until the project created hits a high revenue threshold) the adaptation of this mode of working is far from being cost-neutral for

studios. Integrating Unity or Unreal Engine fully into a studios pipeline appears to be a major financial undertaking for those studios with established, proven pipelines.

But, therein is the caveat. It is the shift itself that seems to be the pain point. Both from a learning curve point of view and a financial standpoint. When there is an existing workflow in place that has successfully produced projects, and personnel who have become experts at managing the efficiency of it, it may be hard to pivot. For animators (such as young creators, or new studios without the baggage of already built workflows) the adoption of this technology is much simpler because they are not heavily invested in something else. Wuetherick agrees, "Transitioning an entire studio is absolutely a challenge, particularly if you have multiple live productions running with overlapping schedules and timelines."

Incentivizing the adoption means providing the money for research and development (R&D). This kind of finance is often scarce in small-to-medium budget projects. But, without the money and time to learn and experiment, the resistance will remain.

Epic Games offers initiatives (known as MegaGrants) designed to help creators around the globe finance their endeavours using the game engine's technology. The MegaGrant Program launched in 2019 is a US$100 million fund to accelerate projects being made with Unreal Engine, graphic tools and open-source software.

10   unrealengine.com/en-US/blog/real-time-roundup-the-growth-of-interactive-3d-and-emerging-2021-trends

As of 2020, they had already distributed US$42 million[11].

Unity is also funnelling investment into software that is compatible with low-cost performance capture tools, such as allowing facial performance capture via their tools and an iPhone, or building compatibility with affordable motion capture systems on the market now (Xsens, Rokoko, Noitum, among others). All of these tools converge to make storytelling accessible to low-budget creators in a way that was never before possible.

MEETING AT THE MARKETPLACE

Both Unity and Unreal Engine have online platforms where creators have the opportunity to upload digital art assets they have made, for sale in the user community. UE Marketplace not only supplies a huge amount of content created by Epic (much of it for free) but it facilitates the sale of assets created for Unreal Engine by users, such as characters, props and environments.

These exchange hubs offer individual creators, studios and larger companies a place to resell digital assets that they have created for their own projects. There is potential here to factor in the resell of assets to their creation budget, meaning that higher-quality backgrounds or more detailed characters can be modelled if some of the investment put into building them can be recouped.

It also offers a source of revenue, where creators could move into the retail of assets as a sideline, or studios could add it to their business structure as a corporate revenue stream.

11   unrealengine.com/en-US/blog/epic-games-provides-over-42-million-in-epic-megagrants

1.3 Game Engines Then and Now
A Brief History

Whilst there were a few 2D games designed before the 1990s, game engines started to see the light of day with the arrival of 3D computer graphics, approximately three decades ago. Construction kits (Pinball Construction Set, Thunder Force Construction, Adventure construction set, Arcade Game Construction Kit and many more[12]) allowed for the creation of the first popular games. Then, later, they became plugins for leading game engines.

Unity Technologies was founded in 2004 in Denmark. It is the producer of the game engine, Unity. The licensed game engine was used for popular games such as Hearthstone, Cuphead, Escape from Tarkov, Pokémon Go and many more. With 3,379 employees worldwide, the engine counts up to 2 billion monthly active users, including 1.5 million monthly creators.

The first official Unity film example was Adam, a short created by the team in Stockholm in 2016. "Adam became a bit of a lightning-rod for many as an example that not only could real-time be used as a part of the creative process, but also that the rendering capabilities of real-time tools…could deliver final pixel quality that matches offline capabilities," explains Wuetherick.

Epic Games released their first game in 1998 and the company is now one of the ten most valued startup companies in the world, with a net worth of approximately US$28 billion and counts almost 8 million developers worldwide[13]. Its game engine, Unreal Engine, was first designed solely as a first-person player to directly compete with Quake Engine. The game engine included never before seen features gathered together, such as a map editor, a modification program, its own scripting language, upgraded lighting, rendering and camera positioning parameters. To this day, along with Unity software, Unreal Engine is an industry game-changer and state-of-the-art engine that is behind many games, including the company's flagship smash-hit, Fortnite.

HOW GAME ENGINES HAVE CHANGED THE RULES

Touted by industry commentators as disruptive and innovative, the reasons Unity and Unreal Engine have shaken up the industry are not purely related to their technical capabilities. Their business models are based on a "freemium" style model, where the software is open source and free to download until the project makes a certain amount of money.
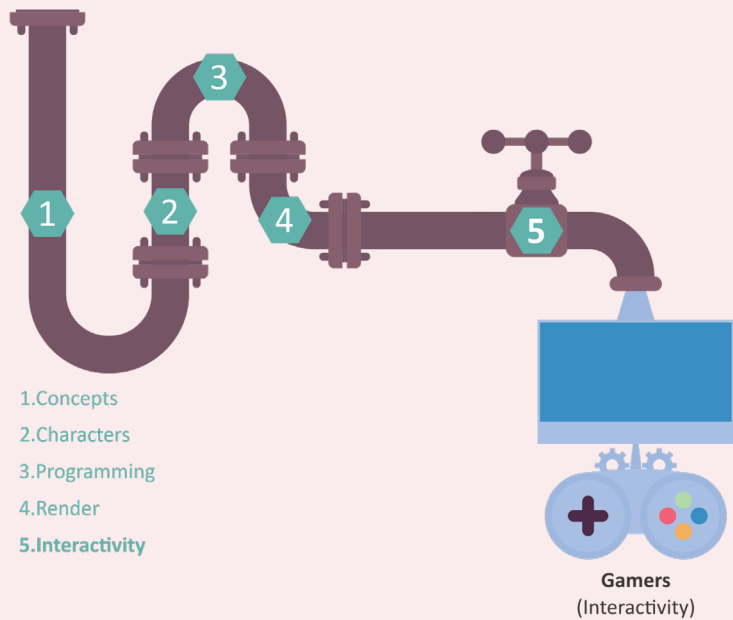
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12   prezi.com/w56f8xawwcyg/the-history-of-game-engines
13   gamesindustry.biz/articles/2020-01-16-what-is-the-best-game-engine-is-unreal-engine-4-the-right-game-engine-for-you
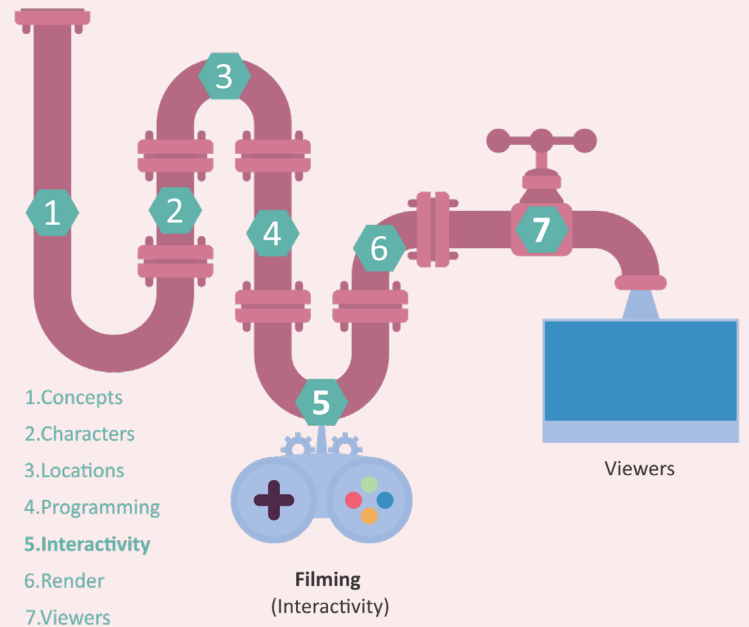
This is a relatively new business model in the linear animation software space.

The claim from the companies and users is that this is to democratize access. It's hard to argue with them.

- **Unity - free to use until the project generates US$100,000 in revenue**
- **Unreal Engine - free to use until the project generates US$1M in revenue**

1.Concepts
2.Characters
3.Programming
4.Render
5.**Interactivity**

Gamers
(Interactivity)

TRADITIONAL VIDEO GAME PIPELINE

1.Concepts
2.Characters
3.Locations
4.Programming
5.**Interactivity**
6.Render
7.Viewers

Viewers

Filming
(Interactivity)

NEW-GEN LINEAR PIPELINE

IN THE PIPE, FIVE BY FIVE

This illustration shows how game engines are traditionally used in game creation. We see that the interactivity takes place at the end, where the gamers trigger all kinds of actions to influence the course of their quests.

The new-gen point of interactivity lies in the moment of creation, with the crew while filming on-set. The use of triggers, sliders, remotes and controllers make for a completely reinvented film set.

1.4 What Are The Advantages?
Of Using a Game Engine
in Linear Production

Mike Wuetherick, the Head of Media and Entertainment Solutions at Unity Technologies, explains that the number one advantage is that "real-time engines provide immediate feedback that creators are looking for, and that has been typically lacking from offline workflows." Through ongoing experimentation in the field, many experts seem to agree with him.

"A common challenge with offline tools is the lag time that occurs between making a change and being able to see the results of that change," he explains. "When everything is real-time, the feedback cycle is dramatically improved. This applies to everything from cameras and animation to lighting - the entire creation pipeline becomes immediately responsive. If you want to change a light, you just rotate the light and see the changes instantly. No more waiting for the 'render farm' to see the results of your change."

KEY ADVANTAGES

- **Improved flow and quality** of the final image in a photorealistic style
- **Able to see changes immediately** without needing to wait for rendering
- **Higher rendering speed** than traditional software
- **Interacting with created characters, creatures and props** in real-time on set
- **Tweaking lighting in real-time** by moving the sun in the virtual LED environment

- **Improved experience for directors and actors on set**, as they no longer have to visualize the final image with only a green screen for reference thanks to live projection of virtual backgrounds.
- **More accurate eyelines** for actors when they look at Computer Generated (CG) elements.
- **Visual effects triggered live,** while filming, including dynamic augmented reality elements that move in front of actors (e.g. a low-flying plane zooms overhead)
- **Smaller teams are required to be physically present**, to shoot the environment that will later be projected on LED screens. This allows for a larger part of the filming to be done in virtual studios with actors and props. It saves money, time, and reduces the environmental impact, and physical stress on the team, of travelling.
- **Derivative experiences can be more easily created by** reusing scenes and characters
- **Post-production teams no longer have to key** from green screens avoiding green spill on the scene
- **Multiple people and artists can collaborate** in real-time from remote locations
- **More natural lighting and reflection on objects and skin tones,** with LED versus green screen results.
- **Open-source software means anyone to access the technology without the barrier of price.**

1.5 What Are The Challenges?
Of Using a Game Engine
in Linear Production

"Real-time is not a silver bullet," says Wuetherick. "There are still areas where traditional offline rendering surpasses the quality possible in real-time, for example, complex simulations like fur, hair, water and fire. While research is progressing rapidly... It is important to understand that real-time is a tool in your creative tool chest. Figuring out where it makes sense to use it for your specific production is important."

KEY CHALLENGES

- **A lack of expertise in the field** because there are so few examples of it being done

- **Retraining and recreating modes of work** - team members may struggle to adapt to the new ways of working

- **Training and experience** - game engines require more technical development skills that classical animators may not have

- **Equipment costs** - while engines are very powerful, the computers needed to process and render the content may be an additional expense

- **Inertia is an issue that Unity's client-facing teams have encountered: busy studios are set in their ways because their pipeline is proven, and changing it feels too risky**

- **Human faces are incredibly difficult to create in a photorealistic way:** The mouth, skin and lips are usually the first elements to give away the digital origins of a character. It is known as the "**Uncanny Valley Phenomenon**"

- **Animation creators**, especially the ones behind cartoony and stylized characters, need to develop **hybrid custom pipelines** that can become unwieldy to manage

- **Collaborating between suppliers,** other teams or co-producing partners, can be difficult when it comes to exchanging files

- **Access to the infrastructure** - virtual production studios are expensive and not many of them exist for creators to use

- **Access to financing** - investors may be reluctant to fund an untested approach

- **Identifying the right project for the pipeline** - creators and producers may not have the experience to know which story would be best created in this mode

1.6 Crossing The Chasm
How Do We Push Through?

At this time, no one has been able to create a linear production solely in a game engine. That is still a milestone we have yet to see. In Geoffrey Moore's famous 1991 tech marketing book, Crossing the Chasm, the author explains how new products and innovations often languish in "the chasm". Without the correct marketing strategy, technology can remain in an abyss between the market of early adopters, without the ability to break through to the mainstream market. Through that lens, the use of game engines in linear animation, and even live-action productions, remains somewhere in the realm of the early market and the chasm.

Through our interviews, we have gleaned the thoughts of experts in the field about how game engines in linear productions can be moved into the mainstream arena. The recurring themes are

- **training, education and R&D opportunities**
- **funding of projects and infrastructure (virtual sets) in this space**
- **updates made to the technology to adapt to the specific needs of animators**
- **more visibility and collaboration amongst creators exploring this technology.**

"The key to crossing the chasm is positioning and securing a "beachhead" in a mainstream market — creating a pragmatist customer base which relates to each other and talks. The consequences of being sales-driven during the chasm period are, to put it simply, fatal... Word of mouth is the only way to successfully cross." writes Moore.
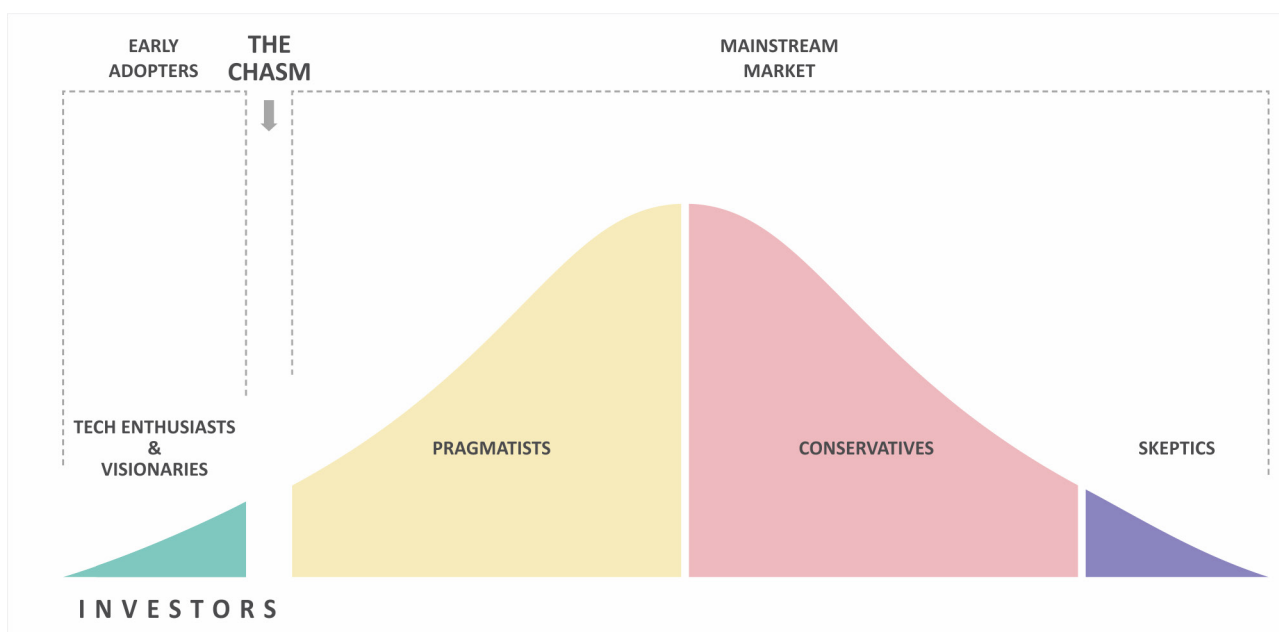
Fostering a community of creators and producers who are drawn to the use of game engine technology in animation, to share resources, understanding/experience, and expertise, would serve in pushing this approach into the mainstream. Leading the charge, of course, are the game engine companies themselves, followed by innovative creators who are passionate about the potential of the technology and excited to share their learnings.

The benefits to the industry may be many, but as Mike Wuetherick explains, there is an opportunity to provide a platform for new kinds of stories. "What personally makes me excited about the space is the fact that smaller teams or individuals can produce world-class animation with our tools... with the rise of short-form content (Tik Tok, Youtube), there is a huge opportunity for creators to produce the next generation of content. The world needs more diverse stories, from more diverse creators."

SYNK, the technology currently being developed by THEPACK in Belgium, may also assist in bridging the chasm. As middleware created by experts from the linear animation world, it provides a link to more seamlessly transfer elements between different tools, platforms, formats, and teams internationally.

The diagram shows "Investors" on the verge of the early adopter's market and the chasm. This implies that investors should be involved right now, in the emergence of this approach to producing linear content, to allow as many creators as possible to experiment and make it accessible to the mainstream market of animation and live-action productions.

EARLY ADOPTERS THE CHASM MAINSTREAM MARKET

TECH ENTHUSIASTS & VISIONARIES PRAGMATISTS CONSERVATIVES SKEPTICS

INVESTORS

"with the rise of short-form content (Tik Tok, Youtube), there is a huge opportunity for creators to produce the next generation of content. The world needs more diverse stories, from more diverse creators."

1.7 Training, Ressources and Education
A Starting Point for
The Seekers of Information

The transition to game engine technology in linear production hovers somewhere in the chasm between enthusiastic, technically-confident, early adopters and visionaries, and the pragmatic mainstream. Successful bridging depends so much on access to learning opportunities and training. "I'm a firm believer that education is the key to adoption and change in any ecosystem," says Mike Wuetherick from Unity Technologies.

There is an obvious need for investors and funds to support transition through a broad range of methods. Providing matchmaking and mentorship opportunities could elevate knowledge-sharing within the film and television industry. Training, workshops, conferences, research and other educational forums could also be part of the solution that sees game engines finding their way into more pipelines of linear television and film productions in Europe.

But the deepest pockets, at this time, are those of the game engines themselves, who are continually pushing resources into the animation community, to help encourage the shift.

UNITY RESOURCES

For beginners, Unity provides starter resources for free including a whole course dedicated to the fundamentals of animating in real-time (called Real-Time Animated Storytelling) on their Learn website learn.unity.com

They have also just launched the Cinematic Studio Sample which includes a new set of tools to simplify creating animated content in Unity.

For a studio looking to convert an entire pipeline over from a traditional workflow to a real-time pipeline, there is more work involved. But Unity is committed to providing support for that and has dedicated R&D and Solutions teams to help linear productions integrate Unity into their set-up. There are also online forums that bring together the user community to tackle questions and challenges, sharing their knowledge in adopting the change.

EPIC GAMES RESOURCES

Similar to Unity, the Unreal website provides an array of courses, video modules, and learning resources, much of which is free for a beginner. They have also established certified training centres around the world for deeper, in-person learning.

The Unreal Fellowship[14] is a 30-day blended learning experience for experienced film, animation, and VFX professionals. It is an incentive that aims to teach Unreal Engine and train participants the virtual production tools, and real-time production.

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14   unrealengine.com/en-US/fellowship

CASE STUDIES

2

2.1 Cyborn Studio

For creators who have been working with innovative technologies like VR and mo-cap for several years, adapting game engine pipelines to linear productions is not such a huge pivot. But, there are still a few pieces missing from this puzzle.

key points

- ☑ It is a career opportunity for new animators

- ☑ Stepping back to step forward - learning to work with real time

- ☑ The technology cannot yet standalone, a hybrid pipeline is still needed

Cyborn
IVES AGEMANS

ON A TECHNI-CALITY

Cyborn is a 3D animation, app and game studio based in Antwerp Belgium, creating AAA quality film/series-, VR- and game productions. Founded in 1998 by owner and CEO Ives Agemans, Cyborn started as a 3D animation company.

www.cyborn.be

"We've been using Unity since 2016, I guess. We've existed for twenty-two years, but we only started to use game engines when we started to make apps for clients. That was the first time, and around the same time, we began VR productions. So, from that moment on we were using both engines. We're using game engines to create our own film, it's the mini-series we are making while we are creating the game at the same time, with the same team.

We use Unreal for VR games that we're making...and we use Unity more for mobile apps and animation. We have a [virtual] studio that we started building some years ago, where we connect our mo-cap to Unreal Engine, and then the director can log in from another country to be part of the recording, and we can give the actors VR glasses if they want to use them. [In that virtual studio] they can look at the environment, or we can project it on the screen. So, that's what we used first for animation.

"We have a [virtual] studio that we started building some years ago, where we connect our mo-cap to Unreal Engine, and then the director can log in from another country to be part of the recording, and we can give the actors VR glasses if they want to use them"

JUST ANOTHER TOOL IN THE KIT

[For linear productions, game engines are] one of the tools, just like any other animation project where we use different programs to do different things.

For our mini-series, we will probably use a game engine for rendering and lighting. We have always rendered in Arnold, now we're looking at probably using Unreal to render. But we still use Maya for example, or we use mo-cap and clean it in Shogun or Vicon, and then it goes into Maya. Of course, ideally, we would use Unreal directly.

Right now, it's still quite complex for animators, who are not really good, to use Unreal. You can quickly make a character to a certain level but, for us, it's not [at the level we need] yet to utilize fully. You still have to use other tools. It's much easier to animate in Maya. So you have to constantly switch from one to the other to get the real-time to actually work for you. You have to be looking. What you put in a scene and be aware of your polygons when you make models, and you have to bake your lighting and so on. For rendering, to be honest, we're not there yet. Not for a film. We're doing tests but, right now, you still have to render in Arnold. It's still a combination of

> "For rendering, to be honest, we're not there yet. Not for a film. We're doing tests but, right now, you still have to render in Arnold. It's still a combination of things needed to get the results. The real-time thing is nice, but of course, there are still limitations."

things needed to get the results. The real-time thing is nice, but of course, there are still limitations. But, we'll see how it goes.

If you're working on a film, then it has to be 100% realistic, but it's different in games or even in a series, you can make your own level of reality. Lots of people... youngsters, people in their thirties and forties, play games. So they are used to many different levels of realism. So, the uncanny valley effect is mainly a case of putting a real person alongside a created character. Then it gets really complex. And that's why the LCD set-up they had for *The Mandalorian* helps a lot because you can have the same lighting with your live-action shoot duplicated for your characters to achieve the same realism. But indeed, getting to that level is still quite complex.

Of course, it's interesting for us, even if it's a little bit more expensive. We have our own system, but Metahumans is a nice system. You can capture the facial and do it directly in Unreal. We're going to try to do that (we'll see how that goes) but for now, the animation itself is still made in Maya. If you quickly need an extra character, for example. It's a nice system and it's interesting for us to compare and learn from it, in comparison to our system, and understanding areas where our tech is not that sufficient or the other way around.

In the past, we were doing more cartoony rendering, but now our style is quite realistic. So we have looked at the tracing

and so on in Unreal, the difficulty will be matching the level we have for things like the hair and the skin. We have a really good lighting supervisor who has supervised several films, and it took a year or so to push him to test things out in real-time. Now he's really into it, and getting very close. I think Unreal evolves a little bit, it's going to get interesting.

LEANING INTO THE LEARNING CURVE

Unreal Engine is not a real engine for us because we have developers and engineers who can just code apps for it. We just write whatever is still missing, especially for VR, to make it work for us. If you are an animation studio, you probably don't have that many developers, so it would be more difficult. Secondly, in Belgium -especially in Flanders-, we don't have that many good animation schools but we do have a really strong game school here, where several hundred people start every year and they finish up graduating almost as a professional. A lot of people working on our films have training in games [meaning that] they can script a little bit [because] they train them differently from the classical animation schools. That is another reason why it was easier for us to switch than most.

It's about training people. If you give them the time (some months) to play around with it, then they find their way, and they're going to like it. But nobody likes to learn things fast, especially if you have to take a

"A lot of people working on our films have training in games [meaning that] they can script a little bit [because] they train them differently from the classical animation schools. That is another reason why it was easier for us to switch than most. "

step back to do it. And, you do have to take some steps back with the game engines, and be creative, to get the same quality that we are used to. It was really easy for us to let everybody play around with Arnold when we came from other engines because that was a step up. There are more unknowns with game engines, at this time.

With Arnold you have more power, so it's easier to get higher quality renders, while with game engines you have to be more creative to get there. On the other hand it works faster in real-time, because you directly see the effect of adding lights, while with a renderer as Arnold, every time you add or change a light, you have to wait a long time to see the result.

Unreal is a free solution, that you only have to pay for when your product makes money...I think that's a really good thing for young animators and smaller studios. Of course, it's still an investment to set up the pipeline this way. But, even big studios calculate budgets on software and hardware because it's a cost -- especially the ones you don't use. That's a common problem if you need a lot of different software licenses, but then you're not using them for a while, so you have ten of them lying there doing nothing. Even for a big studio...that's money being wasted. So that isn't a problem with Unreal. But it's not cost-saving. Not yet.

OPEN AND DEMOCRATIZING

There's this thing about Unreal where it's open-source, the company is very open and democratizing. You really can go and talk to them and they listen and they solve things. They're trying to get information from the community and they're supportive of users.

As a studio, you can't do everything. You have to be specialized in certain things or it becomes too much [to manage], otherwise. Once you succeed in games, then it kind of takes over a lot because there's a lot of money in games. Games want to be much more cinematic now. The storytelling and the characters are becoming important to the big game franchises. That's also why Unreal is now really focusing on the film world, and on series, there is more and more overlap.

There's not much information about the results of those MegaGrants from Epic. Here and there people are being funded but they don't release an extensive report every year. It would be very interesting to have this insight.

I think game engines will take over the way we work, step by step. I believe it's going to go all to real-time in the end because if it all works, and the hardware and software are there, it's so much nicer to work in real-time. If you're talking about animation series, I think three or four years and we'll start to see rendering, lighting and scene settings, and shading all done in real-time.

WORK HARD, GET MONEY

Having the money taken care of is every producer's dream. If you're young and starting out, I would recommend finding a team that is all in it and trying to make your project as cheaply as possible. [With a lean, dedicated team, you have the chance to] try to make something really good, because it just takes several people who have the time to go for it, and work day and night together. You can make nice things that way. But, once you're an established studio, you have to pay everybody, then you need to take commercial work to get the money, and it goes on.

Then you have something to show, to prove yourself. You have a product that can attract investors. I would do that first and then try to convince someone to put money into your studio. Personally, I believe in having a product that people want to see. And don't be afraid that you're going to lose your brilliant idea (...you'll think of another.)

2.2 Dreamwall

For animation studios interested in integrating game engines into their pipe, the journey is one of exploration, experimentation, and excitement.

key points

☑ **Seizing the opportunity (why Dreamwall took the leap into experimenting with game engines in animation)**

☑ **The stakes for animation service providers and co-producers**

☑ **Game engines need to adapt their products to fully serve animation creators**

Dreamwall

ALL FUN &
GAME ENGINES

Dreamwall is an award-winning studio located in Charleroi (Belgium), that was created by Dupuis Publishing and television broadcaster RTBF. Intrigued about the convergence of the tools emerging rapidly in this industry, the team has agreed to share their thoughts on their experiments with hybrid gaming and animation pipelines. We met with Jean-Michel Ballaux, head of production; Olivier Auquier, artistic director and Alice Gorissen, head of the animation studio.

www.dreamwall.be

THE INSPIRATION

In around 2017, Jean-Michel Ballaux and Olivier Auquier started noticing that game engine developers and executives were being featured in the media and at audiovisual industry events, more and more. There was this growing talk about the use of game engine technology at these events and in industry publications, that promoted the real-time rendering aspect of it. So, they visited Montreal a few times to explore the approaches and techniques of creators and producers that were experimenting with game engines in animation.

Their inspiration skyrocketed when *ZAFARI* (2018) an animated series created by Montreal studio, Digital Dimension, distributed by NBCUniversal DreamWorks, that airs on RAI Yoyo, France TV and others, came out. ''It was completely made with Unreal Engine, we wanted to understand how they did it," says Jean-Michel Ballaux.

THE OPPORTUNITY

Finally, their moment came where they could work on two different linear projects, using Unreal Engine. Although they couldn't disclose too many details about the production, they produced a 4-minute pilot with a hybrid pipeline including Unreal, Maya and ToonBoom. It opened their eyes to the challenges they faced with this technology.

After that, they produced an animated short, a stereoscopic 270 degrees projection

in an amusement park. Given the size of the projection, they wanted to avoid extremely lengthy rendering time, so a real-time engine was an obvious solution for them.

This project was the culminating experience they've had using a game engine for linear production. The team at Dreamwall believes that the time is now, that the use of these engines just might be the future of the film and series production industry.

''We feel like there is great potential with those engines. For example, in a regular pipeline, we need approximately 30 days for lighting set-up. And once it's done, it's always a bit tricky for the director to ask for changes or tests. In Unreal, we were stunned by the speed of that process. It was about eight times quicker and we had more fun testing and switching things around.''

...BUT, BEFORE A FULL SHIFT

Although they believe we are entering a new era, the team identified a few challenges in terms of team-building, and the technology in terms of compatibility and visual signature.

> "in a regular pipeline, we need approximately 30 days for lighting set-up. And once it's done, it's always a bit tricky for the director to ask for changes or tests. In Unreal, we were stunned by the speed of that process. It was about eight times quicker and we had more fun testing and switching things around."

Jean-Michel Ballaux explains, "The different experiences we've had with this kind of technology are not convincing enough quality-wise. We prioritize traditional animation practices because our market is the animation of cartoon and stylized characters, where mo-cap is not adapted for."

"We worked on *The Smurfs* series and we know for a fact that we couldn't have done it in Unreal," he says.

Why is that? Because Unreal excels at photo-realistic renderings, that are sought out in the gaming world in the first place. Ballaux and his team believe that the game engines would need to adapt their tools.

''For now, the tools necessary are not fully integrated for a traditional animation pipeline, there is a series of animation finesse that you simply can't reproduce using game engines. You lose a lot of nuance in terms of animation," he says.

"We cherish the craft. The talent of our animators is what is most important for us right now, so we wait for more updates on the technology side, before we consider making a full shift''.

ADAPTATION & COLLABORATION

Dreamwall is a service provider and animation remains the core business of this division. As long as the tools are not fully adapted, they have chosen to continue with a more traditional pipeline, particularly because it is critical that their outputs are compatible with other studios, broadcasters and partners. ''We need to be extremely agile...and be able to adapt to the different software and technologies our clients are using," Alice Gorissen explains.

While creating the content for the ride, they were working with another studio. Neither of the parties was used to using a game engine in production. The deconstruction of the linear production procedures made it confusing at times for both teams, to organize interdependent tasks during production. Gorissen says, "How do you manage many people working at the same time on a scene? Next time we will have to rethink the way we quote for clients, according to this new reality."

"The software we used was not built to be compatible," she says. "So we shifted to Maya for the animation and combined it to Unreal for real-time rendering and visual effects. Because you can't review or update animated elements directly in Unreal, the team had to leave the Unreal Engine, open up the Maya scene again, make the modifications and go back to Unreal afterwards.

"Also, our technical director had to do a lot of custom programming in Unreal's blueprint to adapt to each production. But when the next version of Unreal was released, so many things had changed that he would have had to redo it all."
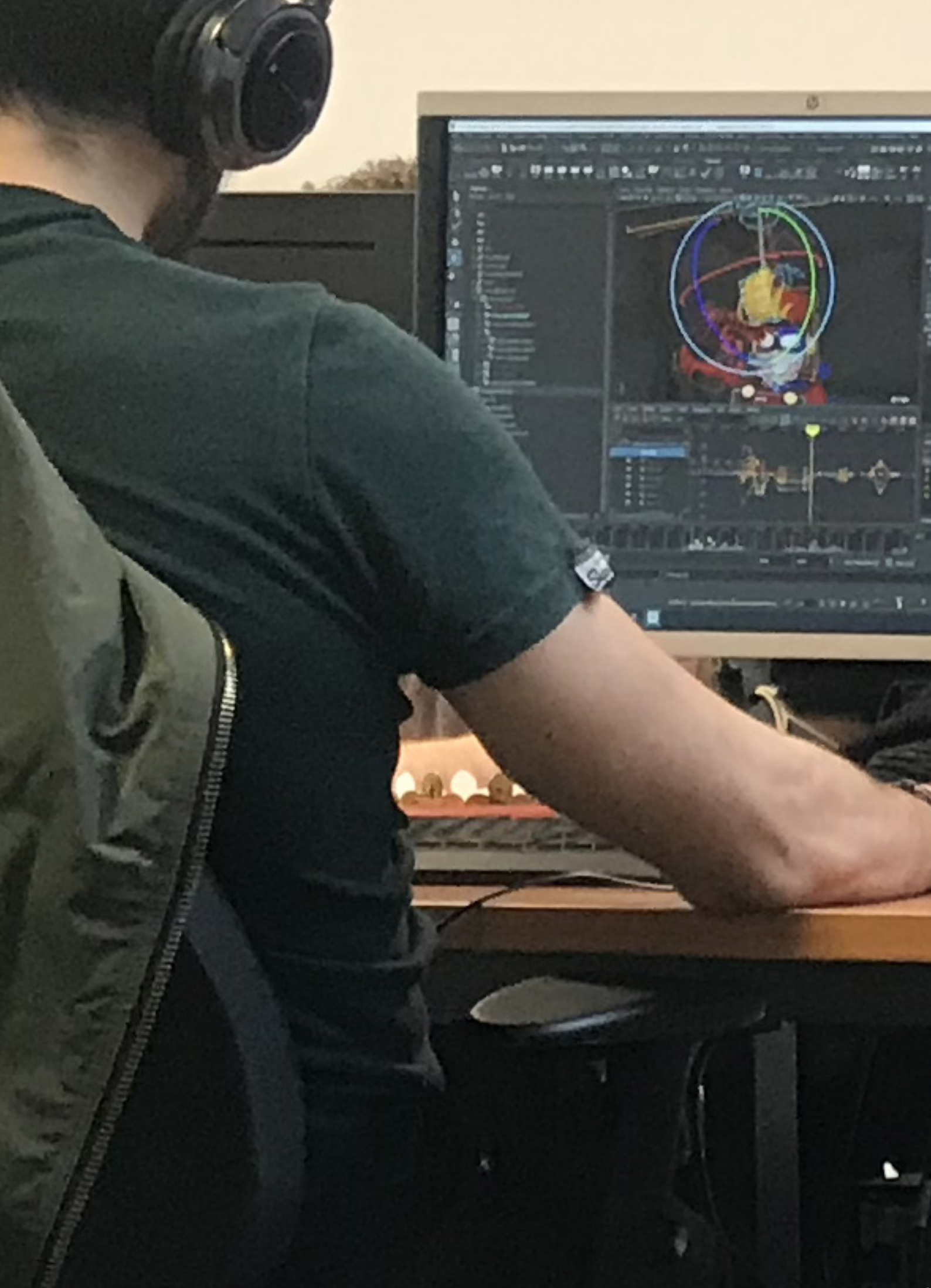
TEAM BUILDING & PROFESSIONAL TRAINING

Beyond the tool, the methods might be frightening for professionals who have been in this industry for a long time, Gorissen explains that for this reason, recruiting people coming straight out of school might be easier, because early-career professionals might be more open-minded to this new mode of animating.

The traditional approach to directing in linear production needs to adapt to the collaborative aspect of the work in a game engine. Having to validate some steps while other ones were not complete was confusing at times, in terms of focus. Taking a step back to get a birds-eye view

of the project, in that case, is even more important, yet sometimes challenging for a director. "The 'open bar' aspect of working in a scene in a game engine, is a learning curve for Directors," she observes.

Training centers are becoming more and more important in the industry so that gaming and animation experts can meet halfway. Developing a collaborative intelligence will allow these teams to anticipate which training and pipeline should be prioritized, depending on every production.

"We are trying to get in touch with educational institutions and training centers to explore how we can build the strongest teams and create the right bridges between the gaming and the animation world," says

Gorissen. "Several studios are in the process of positioning themselves in real-time manufacturing, such as Cybergroup, this means that the studios will start to train artists and that little by little, alongside training organizations, artists will gain experience in the use of this type of tools."

In a virtual conference hosted by Newb Labs in Montreal, Thibault Baras, Head of Dreamwall Media Solutions said, "My dream is to install an Unreal Academy in Charleroi. It's a real problem with the lack of training. I'm trying to raise awareness among politicians in Belgium. Because I don't have enough trained staff, I have to refuse projects."

Olivier recommends to any producer or creator wishing to take this route, that ''Everything must be written in advance. It's even more important than before. Both in terms of creative writing and technology pipelines''. This will ensure that the technologies will serve the narrative in the best way possible. ''And we are eager to see regional funds and tax shelters release new criteria grids adapted to these productions.''

2.3 THEPACK

Animation producers are discovering that the process of utilizing game engines demands a steep learning curve for their team, as worlds collide with animators and gamers having to find ways to mix their tools and talents.

key points

☑ **The tech is not ready yet... but the change is coming**

☑ **The benefits are great, but as with all new tech, there is a learning curve**

☑ **The future is collaborative**

THEPACK Studio

JAN
HAMEEUW

SEEKING
SYNCHRO-NICITY

Jan Hameeuw is the founder of THEPACK, an innovative post-production shop in Brussels specializing in visual effects, motion graphics, 2D and 3D animation, virtual reality and, now, moving into the realm of virtual production. The group has developed proprietary software called SYNK, which transforms files from software commonly used in animation into game engines, and from game engines, such as Unity, into files that are manageable for animation tools. It has been developed to help bridge the knowledge gap for newcomers to game engines, and vice-versa, and may well be a game-changer for the industry. They have been refining and testing it on the Belgian-Slovakian co-production animated film, "Journey to Yourland" for which they are minority producing partners

www.thepack.studio

"In recent years we bought a couple of competitors, so we're a group of three post-production companies. Our core business was basically finishing off film and TV series, but with THEPACK, it's always been the innovation. We have branched out into a lot of different things and that's how we ended up working with real-time technology for animation. Basically, we were working for the last five years on our technology, which is designed to port things from a regular pipeline into Unity or another game engine.

[How we got to this point with the technology] is a very long and complicated story. But, basically, we were working on a feature film where kids were transferred into a computer game. So we had to build these worlds for that film, and that meant we built, like, fourteen virtual sets for the production.

Since it was a film about a game, we asked the producer, "why don't you make a game to promote the film?" And he was like, "Yeah, but it costs so much money." But since we had actually already made all these environments we figured it should be easy to reuse. It turns out, that back in 2014, it wasn't that easy.

As an animation/VFX company, like all of us [in this industry], we spend a lot of time developing pipelines to make processes go smoother and so forth. So, we tried a lot of things for that film...but we couldn't get the environments we did, into the game engine.

And that's when, slowly, we started thinking, "OK, if we combine these both worlds, then, in the future, we might be able to make it way easier to bring environments from 3D software into a game engine."

Because you already could do it back in those days, we knew it was possible, but there just wasn't an easy, optimized way. So that's why we started figuring out a way to go back and forth between the tools in a controlled, pipeline-driven way.

Unfortunately, at that time we didn't achieve the goal of making a game out of those environments. We only produced the shots for the film in a classical postproduction way, even though it made total sense to make the game, the way to achieve this made it far too expensive for the producer. So, that became another thing that we got thinking about - how can we make this less expensive to produce? How can we bring these environments easily into the Unity engine ? And, ever since, we kept working on this idea.

And that's when, slowly, we started thinking, "OK, if we combine these both worlds, then, in the future, we might be able to make it way easier to bring environments from 3D software into a game engine."

A SANDBOX TO EXPERIMENT

A couple of years ago we came across an animation film and it was originally Eastern European production. They were looking around for co-producers, like many people that want to make their own IP. It's super difficult to get your own IP financed, especially if it's an IP with a first-time director attached and it's not a Hollywood-type budget.

When I first looked at the project I was not convinced it could work out. We are from Belgium, one of the most expensive countries in Europe, salary-wise. So, it might not be interesting to do this because of the difference in budget level between Slovakia, Czech Republic and then a studio like ours

in Belgium. But then, I thought... there might be a way...

The project could become more interesting for our company because I realized it was a way to push forward this idea of using a game engine to do the film because it brings us two things. One, it will probably drive down the production costs and thus realize the full potential of the script. And secondly, it will enable us to do something nobody else has managed to do and position us for the future. There has been a lot of talking about using game engines for animation, but there is almost nobody who has done it on a feature film..

This was a major motivation to take on this project. Along with the opportunity to make some things possible that you would probably otherwise never do for this budget. For example, there are fifteen minutes of the ocean in the film. They are in a boat, and then there is a storm, and then the boat explodes… normally, these kinds of things sound very high budget. To have fifteen minutes of water simulation in an animation film is super expensive. But that's one of the benefits, I think, that the game engine will bring to the project. It's the fact that you can create these things all together, whereas, in normal production,

you have to go out to eg. Houdini, make your simulations, then you need to bring it all back together in compositing…

Another motivation was to be able to phase out one of the departments, being compositing. Just to take it out of the pipe is quite a huge budget cut. But I didn't know if it was going to work because there was nobody we could ask, so we just went for it.

Another department was FX. My production manager said, 'you're going to go bankrupt. You have 700 shots with effects in this film. And what is the budget?' Fifty thousand euros. He says, 'it's impossible.' And there

again we used the game engine to its full potential. Today we are finalizing the film and we are completing most of the effects in the VFXGraph tool of Unity. It is a huge cost-saver and it allows us to give the director almost all the effects he wants.

But it still was a big risk. We have grown and become a big company so you become more conservative and you tend to take fewer risks... You also have huge budgets and you need to deliver in time, and your clients are used to a certain standard and quality. So, in that regard, there's not always the space to experiment. But with this film, there was space to experiment. So that's why I told them, OK, I want to become a co-producer on the condition that we can do it with Unity.

SYNK - THE MISSING LINK

But how to integrate Unity in the production pipeline? For a while, our R&D activities focus on producing content for different content platforms through technological innovation and simplifying the process, cost-efficiently. We made a system where you could upload a Maya scene to the cloud and download it as a Unity package. And then, you could also version it up and download and it would read in the changes. That was the prototype of SYNK, which is still online. Then, we used that experience to start building a production pipeline where Unity became just another software, like Blender or Nuke, in the whole pipeline.

At first, SYNK was targeted more towards independent game people. Like, you have one guy who is good in 3D, another one who is good in programming, but they don't know exactly what the other does. But the scope has grown. Now, SYNK improves the pipeline and connects tools within a studio.

One of the reasons why we've been stubbornly developing SYNK, this 'middleware' if I can call it that, is to take away the initial investment cost. To ask an animation studio to rewrite a big part of its pipeline is part of the resistance to studios using new tech; first, it's a tedious process, it takes a lot of time. Secondly, it costs a lot of money.

Studios are having to invest like six months or a year to write the pipeline for productions. I find it crazy but it still happens all the time. We all do it, I see it in Belgium, all of my competitors, colleagues, every studio is having one, two, three, four developers writing code to make it all work, and it's actually a waste of money. I know the Motion Picture Association of America is trying to put some standards in place for software in our industry, VFX and animation to get it more standardized so that people can more easily exchange code, assets etcetera. But that only started up two years ago, you know, but I think it's going to help.

The set-up, for us, was a parallel investment, in the sense that we were developing the product (SYNK) while we developed the projects, working on the film, and on the

game. We're trying to make this game engine, in our case, Unity, as flexible as possible for animation. So that any production company or studio can use it for all different aspects. So we have overinvested because our ultimate goal is indeed to have a product that we can share, that will be a plug-and-play product. We hope to monetize it later when it's ready.

It took us four years to build our relationship with Unity because in the beginning, they were like, 'that's nice'. Until we could show them what we are doing with the film, it was very difficult to even explain to them what we were building with SYNK. But then, when I showed Unity the demo, they started listening. And, then they also set up a media and entertainment division one and a half years ago. Since this division really started working, it's more interesting for us to talk, because they are really listening and these people understand the needs of animation studios. They originally started out as gaming people, right, it's a newer, younger

field and it's different from animation. Now with the new team, they are more aware of the animation industry's needs.

The problem why we are not ready yet to release SYNK, is that we are a service company, so the client always comes first. This means, SYNK is not finished yet, but it runs in our studio, and by the end of the year we will begin collaborating with other studios. We would love to speak to a couple of potential clients and get feedback from them.

ARE WE THERE YET?

We all feel that the world of film and gaming is converging. But, even today, you cannot model properly in a game engine and you cannot animate on a quality level for a feature film . You can do tricks and stuff, and

"every studio is having one, two, three, four developers writing code to make it all work, and it's actually a waste of money."

maybe for a game the quality is OK, but it's not up to the level of animation that we are used to. So, all of that work still has to happen outside of the engine. And, it becomes very complicated to make this work as a studio with an already proven production pipeline.

It is also difficult because it's a new mindset. [This approach brings together] two different worlds. I see it in my own company, where I have senior supervisors, senior artists, and they sometimes get extremely frustrated with how the game engine behaves, because for them there are a lot of things they have to take care of in the game engine that they are not used to worrying about. But it's not only about technology, it's also about cultural differences.

People who use game engines, which are still nerdier with a lot more scripts and hooks, have different skills from, you know, a senior CG supervisor who works with his team and his proven pipeline. It depends what kind of production you do but I see the new generation, for them, this shift is really way easier. Already at school, some of them have started working with game engines. So they're more used to how this thing looks and feels. It seems to be a good mix to have a couple of these younger, tech-savvy people on board.

THE CHALLENGE IS (UN)REAL

Everybody is in experimental mode while we adapt to this technology. But, finding the talent is going to be the hardest thing in this whole transition. I mean, I made the mistake. I took an experienced production manager who had done ten films and put him on this project. The trouble is, the principles of traditional animation don't always work. The principles change with this technology.

Working with game engines, there are a couple of things that you need to be aware of. As a producer, you try to lock down your stages, and, unfortunately, it doesn't always work like that. Sometimes something is delayed, and you have to go back in. That's a difficult one, to be honest, with working in a game engine because you import everything. So, it would be good to be able to have a couple of stages finalized before you go to the next step.

It's also due to the fact that a very popular format in animation, alembic, isn't that well supported [in Unity] at the moment. It's extremely sluggish because it's not used extensively in games. The engine is not really made for processing these super heavy files, however, they're working on improving that. Another challenge is workstations. My people say that a gaming computer, which is less expensive than a workstation, would actually run better with the game engine. So, that's the next thing we will do, to see if we can buy less expensive computers which might actually work better.

There are other things that we [as animators] are not used to, we are a bit limited in terms of the rigging, et cetera. But, on the other hand, you have more freedom because if you want to change the camera a bit, or you need to adjust your light; it's all real-time. It becomes less static than what we are used to in linear production. So it's a balance, but the advantage is that technology advances extremely fast. There are continuous updates and improvements going on.

THE FUTURE

I think in five years a lot will be achieved. We will see the shift with the mid-range productions, animation series or films with four...to nine million euro budgets. That's where we're targeting. Because, if you're talking about one hundred million dollar animation, Pixar or whatever, or a big contract for Netflix or Amazon, I would still wait, personally. You might not be able to deliver the quality, standard and turnaround times that these projects demand. However in the mid-range budgets even if it's going to take us quite a while to analyze the whole film, to even be able to tell you if at this point in time it's possible to do it with a game engine, it might be beneficial.

These are very exciting times, and they are evolving so fast. But on the other hand, it's also a very tough moment, our traditional core business is going down a lot with Covid, things are hard on the industry. But luckily, technology is helping things change and so is collaboration.
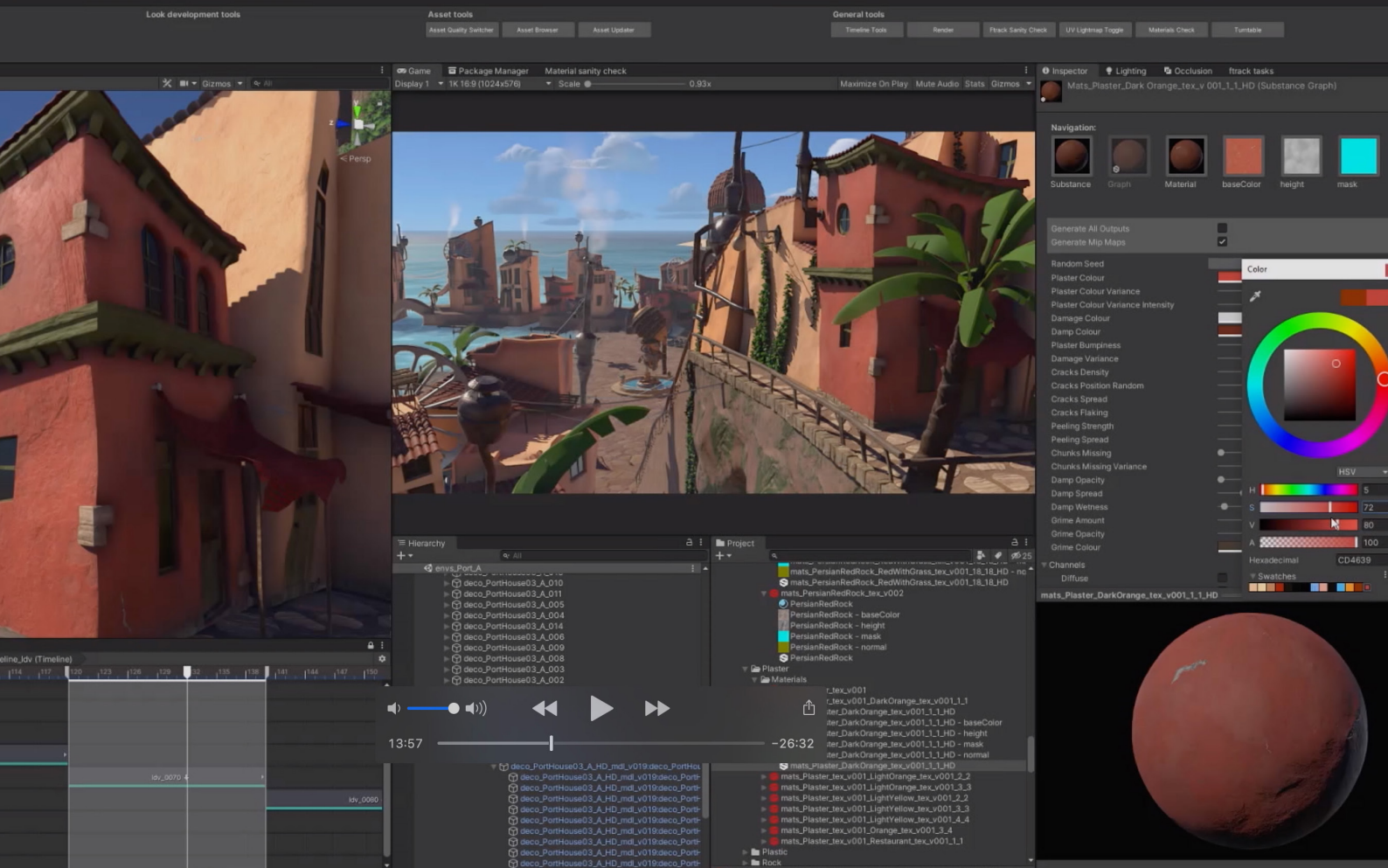
The whole studio world was always very much about everyone doing their own thing, and being very protective in a way. But times are evolving and we start to share our experiences and technologies a lot more. What I find nice—even with our film which is actually a pretty small budget—is that there are three studios involved. Content has to be made, and it's not only one studio making it. It can't be.

As a studio, it helps to have a vision for the future, imagine how something like this could be, and understand that collaboration and technology are key to getting there

2.4 Cyber Group Studios

The new technology allows us to produce differently, by capturing movement and using real time. It also offers an incredibly beautiful quality of animation with a fluidity of movement. That was not possible with traditional animation, while saving time in the production process.

key points

- ☑ **Collaboration is necessary to apply the technology to traditional animation**

- ☑ **Short content, video games and interactive content can be produced simultaneously**

- ☑ **Time -a priceless resource- can be saved**

Cyber Group Studios
**PIERRE
SISSMANN**

VERSATILITY
OF ANIMA-
TION STYLES

Pierre Sissmann, Chairman and CEO of Cyber Group Studios wore many hats through a career mostly dedicated to animation and music. Whether it was President of The Walt Disney Company Europe in charge of the development of all divisions, or a top executive at Sony Music Europe, Pierre remains a storyteller, where beautiful images, great script and music come together to offer unique experiences.

www.cybergroupstudios.com

"One of **Cyber Group Studios'** founding pillars is to constantly seek for innovative solutions to be able to tell the most beautiful and significant stories. For the past two years, our studio management led an integration of Unreal in our animation pipeline. I can't accept not being able to experiment something new because of insufficient versatility/ technology. Cyber Group Studios' first fully digital-native and 100% real-time animation series, **Giganto Club**, 26x11 is available globally on YouTube Kids since February 2022. It took two us years to get there and this is just a start.

We have currently 10 series in development and 10 series in production including four of them that I've had the pleasure to create or co-create. It's great to acquire different technologies to serve our stories in the best ways possible, with a team trained with the latest cutting-edge solutions. The fusion of the gaming and animation world is very exciting. Rather than fearing the loss of staff who would have difficulty adapting to new methods and processes, Cyber Group Studios believes in the diversification of these expertise and the training of talent.

The company has gained international attention of viewers from all over the world, thanks to a vast catalog of series aimed at all age groups from preschool to young adults, which is an area where we dived in very recently and which enable us to tell different stories using the power of animation.

Gigantosaurus, (156 x 11') Cyber Group Studios' hit series began airing worldwide on Disney Junior in 2019. In 2021, the 3rd season of the program premieres in the US. Following the success of the series we have created Giganto Club. Completely developed and produced by Cyber Group Studios, it expands on the success of

Gigantosaurus. The real time animated experience is interactive, soliciting viewers to participate in simple and fun exercises of spelling, counting, etc.''

Cyber Group Studios' flagship series, Gigantosaurus, translated into 29 languages is now available in 194 territories. The multi-award-winning program has aired on international networks globally, including Disney+ and Disney Junior worldwide, Netflix, France Télévisions (France); RAI (Italy); CCTV (China), where it has been rebroadcasted six times and many others.

The company is really proud of the IP. Fans from all over the world can access "dino-mite" content, on the official Gigantosaurus YouTube channels available in various languages. Kids can also interact with Gigantosaurus through the franchise's first ever video game featuring 1-4 player adventures and racing action for the whole family to enjoy together. Gigantosaurus it's also more than 400 products developed and are available at retail and on the main digital platforms around the world, including on Gigantosaurus Amazon stores. Gigantic surprises will be announced shortly. On the way an animated movie, a musical and many other surprises.

> **We are always looking for a beautiful image to accompany a beautiful story. But it's the extraordinary images that really allow people to immerse themselves.**

THE WRITER'S DREAM

I remember the first time I saw Toy Story. 3D arrived on our screens as a shock in the artistic continuity for cartoon creation. This souvenir still motivates me to pursue a relentless quest for innovation. We are always looking for a beautiful image to accompany a beautiful story. But it's the extraordinary images that really allow people to immerse themselves.

With real-time technology, everything needs to be written in advance, to prepare every asset and shooting accordingly. We are really making the most of 3D and real-time technology.

We have developed a proprietary pipeline with custom made plugins and extensions to better suit specific needs for this license. We have also implemented AI driven lip synching technology that automates the process of lip and mouth animation for any language. This kind of automation is a huge marketing advantage, whereas traditional ways of dubbing are time consuming and expensive. Our studio also has motion capture equipment, where we shoot with live actors. On giant screens, animated characters come to life through their movement. This is such a breakthrough for animation. It's so much fun to watch it happen live in front of our eyes. Now comedians can redo an animated scene over ten times in an hour if they want, and get it done. While traditional techniques would require days and weeks of many

people's work to have different versions of one short scene.

It's undeniable that Unreal's operative system makes it much more convenient for artists to develop ideas much more rapidly. This is an outstanding differentiating factor when it comes to distribution, sales and partnerships. It also offers an incredibly beautiful quality of animation with fluidity of movement that was not possible with traditional animation, all the while saving time in the production process.

EPIC SUPPORTING THE GROWTH

We received a MegaGrant from Epic Games, to push into immersive entertainment and interactive games.This has also contributed to the creation of one of the biggest real-time animation studios in Europe – in Roubaix, France.

Our collaboration with Epic Games has allowed us to develop the application of this technology to traditional animation. We are particularly proud that these developments, and those of Giganto Club in particular, were recognized by Epic Games. This has enriched our collaborations further and allowed us to continue recruiting the best talent, particularly Andreas J. Carlen. With 25

years of experience in real-time production and the mixing of animated series and video game production, Andreas is one of the best specialists in our industry.

We have always tried to make the most of crisis situations to change and move forward. The lockdown was complicated for all of us, particularly for distributors who lost direct contact with their clients. This new approach speeds up the animation process and allows for short form, video games and interactive content to be produced simultaneously.

SEAMLESS INTEGRATION ... IN OUR LIVINGS ROOM

But all that makes no difference to the listener, as long as the image is extraordinary, because nothing more is asked of them than to watch. Unlike the devices made available for viewers, such as 3D glasses or virtual and augmented reality headsets, the

adoption of this type of process is likely to happen at lightning speed. On its own, it represents a myriad of technical and artistic advantages, but it can also coexist perfectly alongside other traditional processes and technologies. The learning and adaptation are done on the professional side, rather than the viewers, for a seamless integration in living rooms.

Because technology must exist for the story, and not the other way around. "
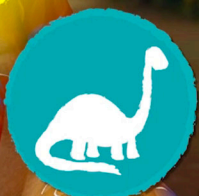
2.5 Telescope Animation

Transmedia has opened up vast creative and technical possibilities for Telescope Animation, but with freedom comes complexity, and all the excitement of the new.

key points

☑ The challenges of staying true to one's vision in the entertainment industry, where content and technology go hand-in-hand

☑ Transmedia projects allow writers to look outside the box and expand their world creation

☑ The collision of linear and interactive storytelling is especially exciting when starting a new venture

Telescope Animation

REZA
MEMARI

MAITE
WOKÖCK

TELLING A WHALE OF A TALE WITH NEW TECH

Reza Memari (writer and director) and Maite Woköck (producer) are the CEOs of Telescope Animation. Telescope was founded in 2018 and the team has been hard at work to bring their first story universe, The Last Whale Singer, come to life. While Reza's background is in games and marketing, Maite's is in animation feature films and series production. They are now combining their talents to realize this new vision and create meaningful transmedia content.

" When we started Telescope, we had the idea for one animated feature film, but then we began expanding the IP and developing a game prequel, and a TV series sequel, within the same story universe. Basically, this expansion on the creative side, along with the stunning advances in real-time rendering, have made all the puzzle pieces fall into place. So now, we are building two interconnected studios to produce films, series, games and XR content with Unreal Engine 5 from the ground up.

TRANSMEDIA PORTFOLIO

The Last Whale Singer is the first of many transmedia projects to come. We are developing our own proprietary pipeline at our animation studios in Hamburg to use Unreal for the production of animated feature films, series, games and XR content at the same time. We get excellent technical support from Epic Games, and are also proud recipients of two Epic MegaGrants. Their teams are really responsive and invested in what we are doing. They told us recently that we might be one of the first studios in the world to create an expansive Unreal Engine 5 pipeline like this, and actually put it to use.

We have a financed feature film that is going into production this fall, a console game that is coming out of prototype this spring, and we have a series in development. So, we're

not just creating a sandbox for something to come. We are pushing forward with all our projects, and the positive responses that we are getting from the market, from funders, and the government, are telling us that our whale might make quite a splash indeed.

TEAM BUILDING

One of our big advantages is that we didn't have to transform an existing studio. There wasn't a pipeline already in place, where we would have had to let go of routines and tools which we have developed over many years. We could basically ask ourselves, "OK, what's the latest, coolest tech?" and pick all the best parts to suit our vision of a dream pipeline.

Recruitment has definitely been a challenge that we are facing. Epic Games are selling Unreal Engine as a technology that allows a small indie studio of, let's say, five people, to seem like a much bigger studio. But finding those five people can be harder than you think, because this is such a new approach to film and game-making. The pool of experienced, talented people is still

rather limited, even though we are definitely noticing a lot of curiosity and willingness to adapt to a real-time production.

KNOWLEDGE IS POWER

We are friendly with a lot of studios worldwide, but we have found that there are not a lot of experts we can talk to about the kinds of projects we are making. We have conversations with game developers, and we have separate conversations with animation studios, but there is a real lack of examples where the two worlds overlap. Epic is really trying to give back to their community and be transparent about what they are doing, and we share this mindset. Once we are a little further down the line, we want to present our pipeline, tools and findings to the public and help advance real-time production.

We also plan to release our pipeline tech as a licensed model, so other studios can jump right in and skip all the growing pains. Of course, this could also help other producers in Europe who, perhaps, don't have large budgets or access to funding. So, it's

another way to give back to the community. But this won't be our main source of income obviously; our primary business model is to create amazing content.

There is definitely a pioneering spirit in the air right now. It's a kind of gold rush in a way where everyone is just trying to find their best path. We are a little bit ahead of the game, because we are not only ready to go on the technological side, but also in terms of our story universes, which are all being developed with real-time in mind. We think that Epic recognizes the level of quality and ambition that we are bringing to the table. We believe that this has earned us their trust and support from the very start.

WRITING FOR TRANSMEDIA

From a storytelling perspective, writing a transmedia project gives you a lot of freedom, but also added complexity. All the elements of the story universe have to fit together. Timelines, events and characters need to make sense on a much broader and deeper scale. Coming up with this kind of world expansion is amazing and very fun from a creative point of view. The way that transmedia allows you to think, because you're basically creating the most fertile ground that you can come up with.

For The Last Whale Singer, we chose the ocean as our main location, and whales as the main protagonists, because both are still very unexplored and mysterious – not only in reality, but also within the animation and gaming worlds. This might have to do with the problem of simulation and rendering water, which are still some of the most difficult things to do technically.

But we feel confident that it can be done now with Unreal Engine 5...and a sprinkling of extra magic.

"Give something back to the world, shine a light on diversity, on identity, on gender equality, on our planet. Life is too short, and animation and game making take too long for us to be making irrelevant content."
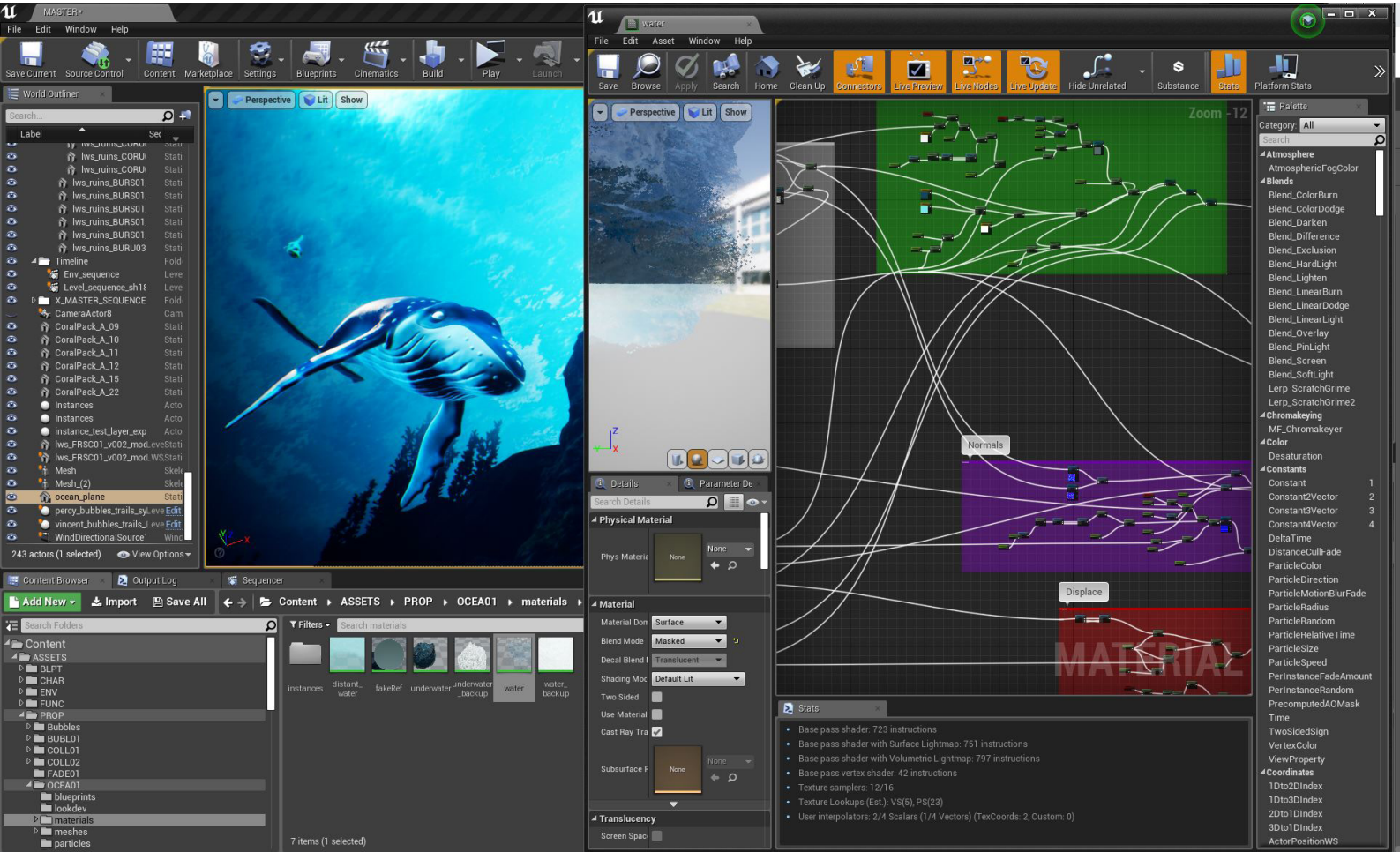
The concept of The Last Whale Singer began as a feature film. Then the question arose, what would the game be like? We didn't want to make yet another "cheap" movie-to-game or game-to-movie adaptation. Therefore, we decided to tell a totally new story, with all-new characters in the game, which serves as kind of a prequel to the feature film. When we started Telescope, we were adamant that storytelling would be our main focus. It's such a cliché; everyone's website says, "we tell engaging stories," but for us, it is really essential to tell stories that have meaning and sensibility, that are not just commercial money-grabs. Our mission is to give something back to the world, shine a light on diversity, on identity, on gender equality, on our planet. Life is too short, and animation and game making take too long for us to be making irrelevant content.

FINANCING CHALLENGES

The European Commission supported us to develop and staff our pipeline. Their call was for innovative business models and tools, so we applied and got confirmation that we would receive it last year. We raised money for the feature film really fast but then it took us a long time to get funding for the work that we have to do before we go into production, which is setting up the pipeline. In Germany, there is no funding for this kind of work. Film funds support projects, but not tech or studios. So, we were really glad when the European Commission gave us their blessing.

It is worth pointing out that early on, we decided not to go with venture capital. We didn't want to give away our own decision-

making power and rights to people or entities that seek different goals. At first, you think, "Oh, there is so much money out there now for tech startups,", but then you realize, "No, actually, they are looking for fast exits and for a return within five years." Our mentalities and realities just didn't align.

GREEN ROADMAP

The Last Whale Singer has a green message. Real-time rendering actually uses less electricity than the usual rendering process, so our technology is, in itself, greener. And we get our electricity from sustainable and renewable energy sources.

The entire story universe is about saving the oceans. So, for the merchandising, we will make sure that we use the least amount of plastic possible, or none at all. Also our merchandising will be manufactured by green and local companies. We are working with ocean protection organizations so that we can actually make a difference in the real oceans. We will create educational materials for schools and organize beach, ocean, river and forest cleanups. Hopefully, our story universes and real-time approach will not only entertain, but can help to make our planet a little bit healthier and happier, too.

2.6 Next Lab

Award-winning industry figure, Manuel Cristóbal, discusses his recent experience with Next Lab, the barriers for producers to embrace the usage of game engines in linear animation projects, and why the change will be led by directors who understand that "this technology can buy them freedom."

key points

- ☑ **Producers need to understand the financial advantage to feel confident with the approach**

- ☑ **There aren't enough examples of independent producers working with game engine technology, so the conversation is still speculative**

- ☑ **Incubators like Next Lab can shift the needle by creating opportunities for directors to learn about the approach and experiment with it.**

Next Lab & Comunidad de Madrid

MANUEL CRISTÓBAL

SHOW
DON'T TELL

Next Lab is an initiative that integrates a workshop, an event and a digital platform organized by Paramotion Films (organizers of Weird Market and Quirino Awards), sponsored by the Communidad de Madrid and created in collaboration with the Annecy International Animation Film Festival and Market (France). 2021 was the first edition, which focused on the use of VR, XR and AR tools together with the use of video game rendering engines for the prototyping and production of animation and VFX.

Award-winning audiovisual producer, Manuel Cristóbal, is an audiovisual industries consultant at the Madrid Regional Government. Audiovisual Producer, AMPAS member, Ph.D. in Film Studies. He has produced eleven films for the international market (animation, live-action and documentary), has won five Goya awards as best animated film and is involved in the creation and execution of Next Lab.

www.nxlb.org

" Next Lab is a program developed here in Spain, that takes place in northwest of Madrid, to explore new ways of producing animation. We did the first event, live, in June, it was very interesting. We are trying to make new technology approachable to artists, and updating the pipeline.

So, the participants explored proof of concept of short films, feature films or TV series projects. There is a wonderful image we use, of cavemen with a carriage that uses a square wheel, and somebody will say, "Maybe you should try a round wheel?" and the caveman says, "No, we don't have time for that." You know, when you're in full production, you don't have the luxury of time to look for all the solutions, or explore all the possibilities.

We worked with Quill and Unreal, and we plan to work with Grease Pencil. Although it's not finished products we were quite happy with the results. Out of seven projects, we had two of them that were selected to be presented at Annecy. They were short films, feature film series.

Next Lab showed us that people were more open and adaptable than we expected. We were surprised, and I think they surprised themselves! They were willing to test and things changed more than they thought. For example, there is a very beautiful project and his plan was to use CGI for that film, and now he's thinking about doing the whole show with Quill.

I hear that [game engines] are one of the things that will be important [for animation production], but we have to get it going on the ground. This is what we try to do at Next Lab.

I mean, the industry is adjusting. We've already moved from VHS to DVD, and from DVD to online etcetera, so it's not like something new is the problem. [When it comes to bringing game engines into linear production] the challenge is that we still have to see the figures, but it looks like it might save money. We need to look at who has done it, what is the cost and what is the final result for that price. That's a producer's thinking. The main challenge right now is finding the right information and then seeing what kind of pipeline can be made with the technology. Making this understandable to producers, that's the hardest thing.

> "Next Lab showed us that people were more open and adaptable than we expected. We were surprised, and I think they surprised themselves! They were willing to test and things changed more than they thought. For example, there is a very beautiful project and his plan was to use CGI for that film, and now he's thinking about doing the whole show with Quill."

I think, of course, it will be embraced. There is no resistance if you really have a pipeline that is faster, cheaper... What would be the problem? But, it's just that I haven't seen it. In Europe, there is noise [about game engines in animation] but no construction yet. But, there are bigger producers and studios with a lot of the necessary machinery already in place. They are more reluctant at first because they don't have time to change. But when you don't have to build things from scratch, that's an advantage that will save time.

Rendering is still a bottleneck, in animation, and we hear things about [game engines] reducing that. Getting rid of bottlenecks is a good thing. We are seeing that technology can help smaller groups accomplish things that used to be only possible with a much bigger setup. The level of the people that you use will be more and more important. Brute force is not the main thing, but having the right professionals to work with. It's a chance to do things with teams that are not so big.

A producer produces. They're financiers. The producer deals with creativity...but also with everything else. That's a producer. That's why I say, "OK, show me." You have to get down to the work. "Show me the shots done this way and then tell me how much that cost you to do it." Also, I think each project kind of shouts out for a technique. So, it's about finding the right project to use it for. Then having the right technical background behind the project.

No matter how lean you go in animation, you're still going to be sixty... eighty...a hundred people. I think it was Orson Wells who said, 'A writer needs a pen, an artist needs a brush, but a filmmaker needs an army'... but, you have to pay the army.

You have to find ways to do films with the funds you can raise in Europe. Which is not much. It's very romantic to say, "Oh my God, I'm going to do a 20 million euro animation film, that will look fantastic." But that's not a reality for most studios and producers in Europe.

I think it only takes one to prove a concept, and I'm willing to believe. I mean, I'm an early adopter, and I don't think it is such a huge thing to accomplish. his is how we make video games. So it's not that big of a deal. But I do believe that you have to see it to believe the results. I am already thinking of using this kind of pipeline, but I mean,

"Whenever I talk to a director, it's "OK, this is what I want to do. This is the graphic novel. I want you to direct it. How do we do it?" So, you need a director to kind of propose it. To say, "I want to do it in a game engine."

I would say you need a director to bring it to you. It's very important to have a director who has the technical and artistic skills.

Whenever I talk to a director, it's "OK, this is what I want to do. This is the graphic novel. I want you to direct it. How do we do it?" So, you need a director to kind of propose it. To say, "I want to do it in a game engine."

Established directors are not newcomers to the industry. They know their pipeline. They know the technique, they know the tools and they have more knowledge than I do. But I think game engines in animation will be embraced because it makes a director's job easier and they will love it. They also know that this technology can buy them freedom. When you are doing a film for 20 million, you have many opinions. But when you are doing one with three, nobody gets in the kitchen

Next Lab's next edition (2022) will be exploring game engine production into linear animation projects.

2.7 Flanders Audiovisual Fund

Understanding the role that funds have to play in the adoption of game engines in linear animation productions.

key points

☑ **Positive environmental implications in a notoriously wasteful industry**

☑ **The role of open-source technology in democratizing creativity and expertise - empowering less-privileged creators to learn the tools**

☑ **Funders and broadcasters setting up the studios to be the "infrastructure"**

☑ **Funders providing training via matchmaking initiatives**

VAF

**YOURI
LOEDTS**

**KAREN
VAN HELLEMONT**

EMPOWERING THE
DISRUPTION

The Flanders Audiovisual Fund (VAF) is a cultural fund in Belgium that provides support for productions that contribute to the creative tapestry of the Flemish film community. The organization administers three funds that cater to film, television media, and games. Youri Loedts and Karen Van Hellemont work in the gaming and linear departments, respectively, and offer their insights into the emergence of game engines in linear production.

VAF

Flanders
State of the Art

THE CURRENT

Youri Loedts: "I'm the head of the gaming department at VAF, so I work on the video game project submissions. But, my colleagues in animation, deal with projects in animation, movies and series. From what they tell me, I don't see a lot of changes there, yet. Yes, there are some projects already using Unity to produce content, for example, but these are studios that also already make games. So, it's not like we're seeing a big seachange right now, where everybody's just switching to the engines. That's not a case, at least not from my perspective."

Karen Van Hellemont: I'm responsible for the animation projects, the films, the series, but also the long and the short and the mid-length films. We also have an innovation lab where we support non-linear, VR and interactive projects. And we are a cultural fund, as opposed to Screen.Brussels and Screen Flanders, which is more of an economical fund, so they have different objectives.

[For linear productions using game engines to produce] we only have experience with one project, and that's "The Journey to Yourland". We have received only one application, so it's difficult to have a view of it. I can imagine that there is a trend worldwide or in Europe, but from our point of view, we can't say that yet.

LEADING THE TREND

Youri Loedts: We do have some companies that are preparing. I think there are companies in Belgium that are setting up virtual productions. But maybe we should start with also explaining virtual production since it's a really broad term because you have

- **virtual sets where people are working together in a virtual environment,**
- **you have the use of game engines to do special effects,**
- **and, you also have the LED walls.**

We do have a lot of companies that work or have worked in VR [in Belgium]. They are now looking at also doing virtual production because they already do things that are close to it. They are creating a lot of backdrops. They are creating oceans that could be a backdrop. They're creating mountains that are almost photorealistic. So all of these assets that they are creating are also applicable to virtual production.

They could delve into this vertical production of assets, by creating environments that could become backgrounds. So for them, they are exploring if there is a big demand for it. And, we do believe that the demand is coming.

But for the moment in Belgium, I have the impression that we are lagging when it comes to movies and series and stuff like that. I don't think Belgium is going to be the trendsetter. North America is where most of these things are happening, right now. To me, **Jon Favreau** is one of the people, of course, with **The Lion King** and **The Mandalorian** pushing boundaries in the field. I don't know of anyone who is playing the same role in Belgium, who is a pioneer.

Karen Van Hellemont: At the moment, we do not approach the game engines differently from other projects. We look at the whole project. Is it a good film? What's the target group? What is the storytelling? A game engine, that's just a way of making it. But we have certain criteria that relate to innovation and originality. So, a game engine as a production method might gain points on that as something new or different.

Youri Loedts: I think a lot of studios are already dealing with this technology, like in Belgium, it's **THEPACK**. So if they want to make an animation movie, they create high-quality assets and then they can scale them down towards the platform that they want to also publish it on.

In Brussels we have a studio who is mainly known for VR. Now they are setting up a production company, a virtual production set. Also our national broadcaster--they are called **VRT**-- they have something that's called **Sandbox** and sandbox is the part of the broadcaster that mainly deals with innovation. So they're venturing into the possibilities. Of course, their money is not unlimited.

THE CHALLENGES

Karen Van Hellemont: We try to get the game sector closer to the animation sector, with our projects and initiatives. We do this because they can be inspiring for each other and maybe the gaming projects lack good storytellers. And, with animation, now they might want to work with game engines but there seems to be a lack of experience.

Youri Loedts: There's quite a steep learning curve, of course. Some people are used to doing things in real life—that's what they built their careers on and it will not go away. The challenge is for producers to embrace it. They just have to see the possibilities. Of course, there's a cost. I see there's an initial cost, but it will also save money in the long term, even in the short term. You have to set up the production pipeline, the virtual studios, but on the other hand, once you have built them, other companies can use the virtual studio. It's not like you have to build a million of these. Once it is there, you have it. And with the LED walls, of course, you have unlimited backgrounds that you create digitally.

Karen Van Hellemont: With *Journey to Yourland*, the hesitancy of the commission [when we were assessing it to finance] with the approach was that it's so new. There needs to be experience on it. We see it as a minority project because it was initiated in Slovakia, and we supported the co-production here.. And at first, we thought the team in Slovakia may not be experienced enough, technically, but then THEPACK showed us some tests, and that helped to reassure us.

GAME ENGINES DISRUPTING THE LANDSCAPE

Youri Loedts: We should look to the companies behind these engines, like Unity. Unity is a public company and Epic, it's not a public company, but they have Fortnite, so they are sitting on an immense amount of money. They are now venturing into the movie and TV sectors, and there's a huge amount of money that they bring to the table. That's going to accelerate what's going on. And, by opening their software to the community for free, they're kind of pushing away the competition. And it's aggressive. But in a good way, in that it's changing things rapidly.

Epic is being really smart about things right now, and they're creating a database of every object in the world. They already create models for it and they offer it for free. It's just a smart way for them to attract people to the engine, "Here is every object imaginable so that if you need one of these objects, just use it and it's at no cost to you. And we can do it because we have so much money." They create value for people, which brings users to the engine.

The boss of EPIC, his name is Tim Sweeney, he's quite a genius, he's a programmer, but he's pushing the envelope in a good way. It comes from a background of gaming where there's a lot of knowledge sharing.

"We try to get the game sector closer to the animation sector, with our projects and initiatives. We do this because they can be inspiring for each other and maybe the gaming projects lack good storytellers. And, with animation, now they might want to work with game engines but there is a lack of experience there, especially with the producers. "

It's just part of the culture.

People will be intimidated. After all, they would rather protect their knowledge because they are afraid of competition. But I'm a firm believer that there's more than enough success in the world to be had. The rising tide lifts all boats. And I believe that [this open-source technology] will bring more innovation, which leads to better stories.

EXPLORING THE POSSIBILITIES

Karen Van Hellemont: What we see with feature animation, is that the financing is a difficult and long process and mostly involves co-productions with different countries in order to obtain the full financing. And, even then, many projects don't make it to a final film. So, maybe it will make productions easier to finance because hopefully it will be less expensive and it will be a faster process to produce this way.

Youri Loedts: I see a lot of people being convinced, also in part due to coronavirus. Thanks to coronavirus, it's hard for people to get together, so they see the benefits of this technology. I think it will go rather quickly because a lot of people just want to continue with making movies and series. And

"Calculate the money you can save. Just talk to people that have done it. Maybe look at what you're doing and they help you in calculating where you can save costs. But also where you can be safer, and where you can be more ecological about things. "

who knows what might come afterwards? I don't want to be a pessimist, but you never know what will be the next thing that will maybe make it more difficult for us to make movies and series or games.

Calculate the money you can save. Just talk to people that have done it. Maybe look at what you're doing and they help you in calculating where you can save costs. But also where you can be safer, and where you can be more ecological about things.

Youri Loedts: If you look at a lot of interviews with actors that have worked in virtual studios, they will say—maybe it's marketing—but they say it's a lot easier because, "I'm in the scene, I'm seeing these virtual characters. I don't have to look at the green screen or blue screen." So, the claim is that it's easier to evoke emotions, and do their job well.

I'm kind of subjective because I do a lot of things for the game makers and I see a lot of opportunities for them. So I'm like, OK, let's do this because it will create a lot of new jobs for gaming people.

Karen Van Hellemont: I understand that the start-up cost is very high, but if producers and directors can collaborate with studios that are experienced in it and can work together, that would be better. People might get the idea that it's much easier and much cheaper, but because it is so new there will be other difficulties. Everything depends on the evolution of the technical development,

and how much Unity or Unreal are going to invest in it. I hope, and I think it's going to grow because you can have a higher production value.

EDUCATION IS KEY

Youri Loedts: [Animation Studios] already have a lot of people from gaming inside of the company whereas, movie production houses lack this knowledge. So it brings us back to there has to be a lot of training. They've often been educated in film school, and this technology is quite recent. So, they really don't know anything about it. I also think a lot of people might be afraid of (and it's always the case with new technology). They might be afraid of what the consequences are. Will we lose our jobs? It will totally not be the case. [The shift will simply be a case of] adding differently skilled members to the crew. I think a lot of game makers will join people in the movie industry and TV industry.

The possibilities are huge but If you don't keep up, you will get behind. Again, education and training will be key. Besides, people get excited when they start learning, it's something new and they are challenged and they start to see the possibilities. I think this will enable students, for example. I know some young directors that are looking at it and interested in it, and they're trying to educate themselves, but it's all quite new. They're also looking at where do I go, where can I get this knowledge? Of course, a lot of it is online. So, that's a benefit from the

times that we live in. But, to get practical experience with these things, it's quite early still.

The funds could stimulate that. It's an opportunity for us to say, for example, we're going to have a fund, but it's especially for people who are pushing the boundaries and we will reward them with some money for being innovators, being pioneers. We should be facilitating matchmaking so that we can train people and let them discover what the benefits are of this virtual production.

Karen Van Hellemont: At the VAF, we have a talent development department for young graduates and people that are already working in animation or games, and we can partner them with a coach. In 2020 we organized an innovation atelier to pair graduates or more experienced, industry people…and we run workshops. So I think this is an important role for funds to create those opportunities. They can contribute to this new development, especially by coaching and matchmaking.

Youri Loedts: There's also the idea of infinite learning. There are so many things changing that you cannot allow yourself to just not learn new things. You just have to learn all the time. And some people might not be ready for this, they might feel like, OK, I know what I know, I did my learning. I make the comparison with music. [In the past] you had to have a teacher, you had to

borrow videos from friends, or they would teach you some chords. Now, you can just look it up on YouTube. It's only time that's restricting you from learning. And the earlier you start to learn, the more time you still have to learn.

THE FUTURE IS NOW

Youri Loedts: I had the honour to interview [Habib Zargarpour] who started with "Twister" and "The Perfect Storm'', those old movies, and he went to gaming. Now he's in movies again (Netflix's "Stowaway" and "Greyhound" with Tom Hanks). All of these new films are being made with Unity. He gave me his prediction about the future. He told me that even ten years ago when he started, he was already dreaming about photorealism, and he now has the feeling that we are getting close.

He also told me that a lot of things will change, particularly the pipeline. A lot of the work that used to be in post-production will become nonexistent, it will change the way filmmakers work.

"We should be facilitating matchmaking so that we can train people and let them discover what the benefits are of this virtual production."

Karen Van Hellemont: It's a really interesting area to explore, and maybe there are small examples but that doesn't mean that these cases predict the truth. There are certainly opportunities but we have to find the global point of view. Because it's not mainstream, so we don't have all the answers, yet.

Youri Loedts: I think we will see a lot of creators and approaches where we [as funders] will need to be open about things. It reminds us that talent can come from everywhere and that it doesn't really have to have come from the classical roots that we are used to. On the other hand, it still

has to be a good product. It's not because it's now cheaper and easier that you can approve anything that comes through the door. It will still be an art form, so it's not like everyone can do it. You will still need to have the talent. But I think in the past we had a lot of people with talent that just didn't have the means or abilities. It's great to be a part of helping people to attain what they are trying to achieve.

2.8 Screen.Brussels

Understanding the role that funds have to play in the adoption of game engines in linear animation productions.

key points

- ☑ **Regional funds should support projects that stimulate the creative industries in their territory**

- ☑ **Despite the new paradigms, traditional techniques will likely coexist with game engines in a linear production**

- ☑ **The story will reveal which technologies to use**

Screen.brussels
NOËL MAGIS

THE
BUSINESS
OF ART

Noël Magis is the Managing Director of screen.brussels, the audiovisual fund for the Brussels-Capital Region. With an annual budget of 3 million euros, they co-produce full-length feature films, television films, documentaries, animated films, web series and XR projects that work with the talents of Brussels.

www.screen.brussels

HOPES FOR A SUSTAINABLE EUROPEAN MODEL

"We are a small region of 162 square kilometres and 1.2 million people. So, we try to be as close as possible to the companies in the sector. We had been aware for three years of THEPACK's desire to develop innovative solutions to increase the productivity of content production. We knew that they were already actively developing transmedia projects...they tend to explore technological innovation.

Around the same time, I was asked to make a presentation at MIP in Cannes, and I met a person from Unity. I connected them with THEPACK, and it was the beginning of their investigations into the production of animation. So, that's how we got into financing a project that used a game machine to produce animation. There is another regional agency called Innoviris[1], which is a public agency that finances innovation and research and development. They helped fund THEPACK to develop technologies that allow for dialogue in the content between classic post-production software and animation software.

I think it helped that it is a European co-production with the Czech Republic and Slovakia. In countries where the cost of labour is quite high, like in Belgium, it can make it very complicated to manage a common ground between partners in countries where it is less so, like the Czech Republic or Slovakia. But,

THEPACK has built innovative systems which, I would say, optimize production to ensure that they can align themselves with their co-producers. [This changes the relationship] from a classical pipeline, where the labour cost-difference would probably mean it would have to be a supplier/contractor relationship, like when we work with India or Asia. The technology allows a more equal footing in the collaboration.

Today, THEPACK has become a case study for Unity. I think even Unity was quite surprised to see how THEPACK could use their solutions to produce animation. Before this came along, no animation project was presented to us using game engines. In the Brussels Capital Region, they are the only ones, as far as I know, using this solution. We have about ten other animation studios, they each have their own traditional pipelines. That said, we are now seeing more applications to explore this approach.

As a regional fund in Belgium, our objectives are, above all, economic. Unlike cultural funds such as SODEC in Quebec, or the Centre du cinéma in Belgium or France, or Ffilm Cymru Wales Film, the funds' objective is to support projects that generate audiovisual expenses in the region. So, we intervene in gap financing when we are certain that the project will be carried out (since the projects also come to us are already financed up to 50, 60, 70%) and that the project will generate hundreds, thousands of hours of work for the people of Brussels or Brussels enterprises.

1   innoviris.brussels

95
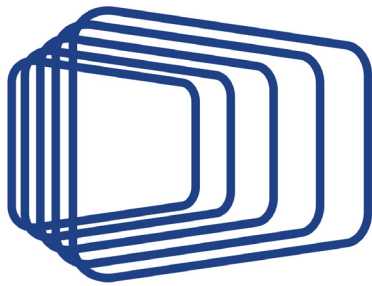
screen.brussels
the regional audiovisual solution

The regional funds that are part of Ciné Régio's network are often essentially interested in the economic aspects of the audiovisual sector. Add to that, of course, the impact of territorial marketing, cultural and creative industries, etc. And so, to return to THEPACK's project, *Journey to Yourland*, it is a project that created a volume of work that will be generated in the Brussels-Capital Region. Their employees, their workforce, and all the service providers are based in Brussels. And it's true that supporting projects that are made with innovative technologies also helps the economy. Because if a country drops out in terms of technological evolution, we are no longer competitive.

Belgium, in particular, is a very small country in the middle of Europe. We are extremely dependent on our European neighbours, our French, German, Netherlands, Luxembourg, Italian, Spanish, European and worldwide customers. And so we are obliged to remain competitive. In this respect, if we have local regional champions, we maintain our place.

THE STORY SETS THE TONE

I think that for producers and studios, they have to determine, are game engines a solution for us? The technology is probably not adapted to the other software that is out there, but it might offer some creative freedom, or does it? Maybe the systems will continue to coexist, just as 2D continues to coexist alongside 3D. There is stop motion

on one side and plasticine on the other. One does not prevent the other. New tools simply offer new possibilities for authors, producers and studios. I imagine that game engines will be another factor that enters the spectrum of possible modes for telling a story.

That's always what I find most important; what is the technology that is most likely to allow the telling of this particular story in this specific time frame, with the budget we have? At some point, it may make sense to say, "Well, for this type of content, we should develop it with a game engine." But, I can just as easily imagine strategic reflections, made in terms of content, that would rule it out.

The creators need to ask themselves, what kind of story do I have to tell? For what kind of audience? And what are the spin-off exploitations that I can see? The answers to this will become the guiding principles that lead them to artistic and technical tracks that make the shortest way between the idea and the consumer. Using game engines in the production of content, as long as it makes sense, could bring a certain added value. It will be interesting to see if these technologies also bring new creative capacities to allow more freedom.

However, it becomes an interesting consideration in light of possible derivative products. If you have an IP, and you're making a video game, and you're planning from the start, an animated series, etc.

I think it would be very useful to have a list of all the products that you're going to use. If you can plan the project like that, the cost of it may very well be worthwhile.

LEVELS OF LEARNING

The challenge that exists today is that the companies who might want to develop this type of solution do not necessarily have a pool of talent, ready to work, with mastery of these technologies. The field of expertise is still relatively new. Often, schools, rather practical or technical schools, train but not enough. Here in Brussels, we have a relatively small business culture, so implementing training and skills development costs time, money, and human resources. It's not easy.

I think that Belgium has a role to play in the solution, but what is needed is training the talent in the use of game engines in animation. This is a way for regional agencies to raise awareness among politicians and decision-makers. In Brussels, there are regional agencies whose mission is to bridge the gap between the skills of unemployed people and the needs of companies. There is a whole series of jobs, I imagine, where more talent can be harvested if they have these skills. But, we have to look at it urgently because we haven't found oil in Belgium yet. Here, our talent is what will ensure that we continue to develop projects, companies, and provide jobs. That's our job, as funds, too.

2.9 Auvergne Rhône-Alpes Cinéma

Understanding the role that funds have to play in the adoption of game engines in linear animation productions.

key points

☑ **The cultural differences of the video game and audiovisual sectors**

☑ **Do audiovisual funds need to reinvent themselves to adapt?**

☑ **How can investors (funds) enter the conversation earlier, to stimulate growth?**

Auvergne-Rhône-Alpes Cinéma

**GREGORY
FAES**

CULTURE
SHOCK

Gregory Faes is the general director at Auvergne-Rhône-Alpes Cinéma, a fund that focuses on developing regional co-productions for feature films. The fund also coordinates [Pôle Pixel](#) a program for companies from cinema, video games, web, communication, new media and digital arts. Their goals include the establishment and development of the industry of the region, stimulating new projects and market opportunities through networking and collaborative work. In addition, they offer facilities for meetings and filming studios.

www.auvergnerhonealpes-cinema.fr

ORIGIN STORIES

" If I had to summarize, we [Auvergne-Rhône-Alpes Cinéma] are not that different from Wallimage regarding the type of fund we are, i.e. both cultural and economic. We only fund feature films but some projects intersect between real-time technology, cinema and animation. My main profession and my competence have always been financing projects. Everything around project managing and financing productions (small and large).

The audiovisual sector in France is very concentrated in Paris, but Lyon can say that we are the second region of France for audiovisual activity. In our region [Auvergne-Rhône-Alpes], there has been a strong, historic presence of video game activity. We have a lot of animation companies here and a lot of video game-makers.

Yet, hybridization between these different professions is not at all natural. The world of games is a compartmentalized world, quite paranoid even, and it doesn't like to hang out with others. Whereas animation is a world much more focused on hybridization and openness. The world of gaming is very, very different. We are from the world of cinema and animation, whereas the gaming world is much more business-driven, much more

focused on the market than we are. But, we were interested to see if bridges could exist between the gaming world and that of animated cinema.

For example, we also have a large comic book community here in Lyon, and we realized that this community was not connected to the world of animation or the world of games either. So, for the past two years, we have been inviting the comic book community to Annecy to try to get these people to meet. Why am I talking about this? Because there is another topic even more important than the question of other technological developments around hybridization, and that is the question of developing intellectual properties which take two (or more) forms to interest different audiences. And then, we ask ourselves what technologies can allow for this cross-over. I think that is really at the heart of the matter and interests us.

Traditionally, game companies were not very interested in the animation sector. It is not the same economy, projects are not the same territories, it's not the same economic landscape. But, with the arrival on the market of real-time game engines, Unity and Epic dominate the market with extremely powerful products. Epic Games are investing a lot in this right now, so I have a feeling that linear and interactive productions will be in the same ecosystem in the future.

When we talk about hybridization, there are the technological and financial, technical, artistic aspects, but also corporate culture, the deep culture of each of the sectors. This is where there is the most resistance and complexity. It's not that easy to change your habits, your production methods or your approach.

EXPLORING THE HYBRID

There has been a lot of contribution of technology to try to combine the know-how of animation and the know-how of video games. We worked with Artefacts on the issue because, if you have a game and want to make an animation, the point is to try not to redo everything. The cost of adaptation should not mean a remake. Companies should be able to develop a license in different technological formats, without redoing everything each time.

To be brutally honest, it's not convincing. The reality is that there is still a lot of work

"When we talk about hybridization, there are the technological and financial, technical, artistic aspects, but also corporate culture, the deep culture of each of the sectors. This is where there is the most resistance and complexity. It's not that easy to change your habits, your production methods or your approach."

to do before we can get an acceptable rendering for animation when you are using existing video game elements. We worked with gaming studio Artefacts on the matter of costs of adaptation from gaming to animated content. We realized it's not easy and unclear how to do it efficiently.

On the other hand, what is much more convincing, is to use the technologies of the game—the engines—to directly produce animation. Artefacts piloted this with a series for France Televisions, currently in production, which is called Edmond and is made with gaming technologies.

Based on what they were creating, they wanted to know what they could do to open up new markets, how they could use their technologies and gaming skills in animation projects. Frankly, it's day and night.

Obviously, there is still a cost. It's a little more expensive to produce from a game engine than to use traditional animation techniques. However, there are at least two advantages. First, it gives artistic freedom, that is to say, a capacity for a much wider creative field. In a virtual set, for example, you create a setting and move around in it, in real-time you can modify the size of the plans, modify the points of view extremely easily. We can change the season - should we put snow, water, sun? All of this can be done in three clicks. Which, of course, is not possible in traditional animation. All of that, for a director, from a creative point of view, is quite interesting.

Secondly, it can be significantly time-saving.

ROCKING WORKING CULTURES

When we analyzed setting up virtual studios in our region, we saw very quickly, after studying it in detail, that it was not on our scale. This means that, at this point, the means that are needed to adapt studios (LED panel, equipment, etc.) is far too colossal an investment, too risky, too rapid obsolescence for a market that hardly exists, at least outside of Paris.

Without commercial work, advertising, and no other markets that are buoyant enough to amortize the investments, we cannot, except with public subsidies, meet the costs without high risks. Currently, LED panels are not completely suitable, not necessarily fully efficient, in every case, with risks of performance, upkeep and maintenance problems. When we put all this together, we very quickly gave up on getting started there. We prefer to stay with a much more classic model.

One of the drawbacks of the use of real-time, is the game engines require skills that animation companies do not have. This means that training is necessary and as you probably know, recruiting skilled talent in technology is extremely hard, it's a very tight market. People who are very competent in these areas are expensive, and there is a lot of competition for companies who are hiring. So, when we do the calculations, when we do the accounts, we realize that producing animation with game technologies increases costs, beginning with labour costs.

And there, we also saw it with the health crisis, skills that can be located at a distance. High-end technicians can set up anywhere, but it poses new questions. What workflow to use? How do we manage to control and organize production at a distance, between people who are completely broken up? But, in one year, the organization of remote work has been put in place quite well.

Big investors or major platforms are in constant search of innovation and talent and that can be everywhere in the world. They have developed a sort of very effective branch of talent search, talent detection, a bit like we do in sport. Even in a globalized system, small structures or independents can find their place.

CUTTING OUT A PATH

A big independent player called Teamto, is producing a lot internationally. They have developed their own real-time system and animation tools. The boss is someone who has always been into cutting-edge research and development, especially from video games. He is quite suspicious of the hybridization of video games and animation. He would rather that animation continues to develop its own tools, independently of video game companies. He is very sensitive to remaining technologically independent.

Xilam is one of the biggest animation entrepreneurs in France. They developed Oggy and the Cockroaches and Zig and Sharko, which are major licenses, sold

internationally. They are one of the biggest players in the market today. Two or three years ago, they were only doing 2D animation. So a big market, especially the bulk market in Asia, etc. But the owner realized that it was 3D animation that was winning in the streaming platform market and therefore he quickly bought a French studio called Cube Interactive, and like that, he integrated the 3D market very quickly. Today, he develops most of his series in 3D. In the field of animation, you have to adapt to the type of products they want to see on the platforms, and we also have to adapt very quickly to the market demand.

UNLOCKING THE EDUCATION PROBLEM

One of the challenges is training. It can be prohibitively expensive for businesses but very often schools do not have the financial resources to be properly equipped, even if they are often eligible to discount by software publishers. Because of this, they don't have the ability to reform themselves. Except for maybe one or two schools in the region, the others are teaching software that is already completely obsolete.

We do have a school of animation in Lyon, which was a traditional drawing school but in recent years, it has begun training on these new technologies. The school is Emile Cohl, and about five years ago started integrated all the new technologies of animation, especially 3D, but also real-time. So that's interesting, as it is a key element

to unlocking this whole thing. One of their alumni is Michaël Bolufer, who started Plip ! Animation. He has been straddling the two -video games and animation- as more as artists at the start, but also a very good technician and from the start of his career, he has worked on this hybridization. Today, that makes him one of the best specialists recognized on the subject.

FUNDING FUNDAMENTALS

Regional funds... are asking ourselves at the moment - Should we be sectoring, ie specialized in feature films? Should we remain small funds or join national funds? We are asking ourselves the question of what we will be in ten years, in fifteen years, but also as soon as in five years. With the push of streaming platforms such as Netflix, Amazon, Disney, Facebook, who have enormous financial means and are demanding content

I do not yet see a leader, amongst the big investors, or big commercial potential [for game engine technology in cinema] and I think there are reasons for that. Technological reasons, mainly, but also time reasons, cost reasons, rendering reasons too. So, for the moment, we are still in R&D and an evolution stage.

CNC created a temporary fund called the Shock Fund of Modernization (Programme de Choc de modernization), which was supposed to support innovative projects, precisely around new technologies and real-

time, virtual production, and things like that for film studios. There were 230 projects submitted, but they were extremely classic projects. Not at all innovative. Finally, there are five, six projects which are innovative technologically or content-wise, but my observation is that for the moment, very little innovation is being carried out. We remain very traditional [in the audiovisual industry] when it comes to production and financing.

There is still a lot of reluctance on these hybridization issues. I think that it will accelerate in the months or the years to come. One of the reasons may be specific to France. We have a strong national market for cinema and TV. It is quite a strong local market, but not necessarily very international. We have little intellectual property that is exportable. So, it's logical that we remain traditional.

Maybe we don't have much choice and we will also have to adapt to this new demand being driven by the platforms. But when we rethink our system, our modes of production, to go into new markets, the stakes for every region will be quite different. In a highly subsidized economy, maybe we better not change too much for the moment.

"Take advantage of a festival to invite three people to lunch with three others who might begin to discuss the topic. It may seem very small, but that's where it really starts. There is not necessarily a need to do a lot, but with awareness, we can help make the connections."

But perhaps it is still the role of regional funds to go and see the little studios, the independent makers, and match them to opportunities. Because video games and animation are not integrated. They are separate areas of expertise, so facilitating networking among students and studios could be a helpful contribution. We should be doing more than giving money to projects that seem promising.

I think when you've come of age in a changing industry, I do not see how we can not ask ourselves the question of supporting these new hybridization technologies. Whether regional or national, it doesn't matter, it's about understanding how to remain relevant in the medium term.

Personally, I don't think that the funds should invest a lot of money in these [game engine and real-time technology in linear] projects but I am convinced that we have

to step in and stimulate collaboration and growth. If we leave and if we wait, it's a risk. It's not easy, but fundamentally, our role is to be a spur, to be at the forefront and to try to push or, at least, somehow support those who want to move.

I told you about the example of the comic book world who were completely siloed. But, now there are more and more collaborations and exchanges. We need talent. If we have it in the comic book or elsewhere, we have to go find them and connect them to the industry.

Take advantage of a festival to invite three people to lunch with three others who might begin to discuss the topic. It may seem very small, but that's where it really starts. There is not necessarily a need to do a lot, but with awareness, we can help make the connections. "

ANNEXES

3

3.1 About The Author
K6 Animation Institute

Launched in 2020, K6 Animation Institute in Wallonia, Belgium, is a research institute specialized in next-generation animation technology.

The Institute offers students, partners, and clients, access to best-in-class applied research in the digital arts. The R&D lab explores high-quality, technologically innovative projects, as expressed in classical filmmaking, 2D and 3D animation, as well as interactive formats, such as video games and holographics.

Dedicated to the acceleration of advancement in audiovisual media, technology, and expertise through groundbreaking experimentation and innovative research, K6 Animation Institute remains at the forefront of the most important emerging trends of the digital arts.

This report was prepared by Maleïka Tidjani Beauchamp and Estelle Pigot, with the assistance of Cecile Bruyneel, Karim Talbi and Scot Thomson, under the supervision of K6 Media Group President, Laurent M. Abecassis.

3.2 Cine Regio Members

1. ALCA - RÉGION NOUVELLE-AQUITAINE
   www.alca-nouvelle-aquitaine.fr

2. ANDALUSIAN FILM FUND
   www.andaluciafilm.com

3. APULIA FILM FOUNDATION
   www.apuliafilmcommission.it

4. AUVERGNE-RHÔNE-ALPES CINÉMA
   www.auvergnerhonealpes-cinema.fr

5. BASQUE GOVERNMENT'S CULTURE
   DEPARTEMENT
   www.zineuskadi.eu

6. CANARY ISLANDS FILM
   www.canaryislandsfilm.com

7. CICLIC - CENTRE VAL DE LOIRE
   www.ciclic.fr

8. CINÉFOROM
   www.cineforom.ch

9. FFILM CYMRU WALES
   www.ffilmcymruwales.com

10. FILM I SKÅNE
    www.filmiskane.se

11. FILM I VÄST
    www.filmivast.se

12. FILM LONDON
    www.filmlondon.org.uk

13. FILM-& CINEMA CULTURE LOWER
    AUSTRIA
    www.lafc.at

14. FILMCAMP
    www.filmcamp.no

15. FILMFOND NORD
    www.filmfondnord.no

16. FILMFONDS WIEN
    www.filmfonds-wien.at

17. FILMFYN
    www.filmfyn.dk

18. FILMFÖRDERUNG BADEN-
    WÜRTTEMBERG
    www.film.mfg.de

19. MOIN FILMFÖRDERUNG HAMBURG
    SCHLESWIG-HOLSTEIN
    www.moin-filmfoerderung.de

20. FILMINVEST
    www.filminvest.no

21. FILMPOOL NORD
    www.filmpoolnord.se

22. FLANDERS AUDIOVISUAL FUND
www.vaf.be

23. FONDAZIONE FILM COMMISSION ROMA LAZIO
www.romalaziofilmcommission.it

24. FONDO AUDIOVISIVO FRUILI VENEZIA GIULIA
www.audiovisivofvg.it

25. HESSENFILM
www.hessenfilm.de

26. IDM SÜDTIROL- ALTO ADIGE
www.idm-suedtirol.com

27. INSTITUT CATALÀ DE LES EMPRESES CULTURALS/ICEC
www.icec.gencat.cat

28. KRAKOW REGIONAL FILM FUND
www.kbf.krakow.pl

29. ŁÓDZ FILM FUND
www.lodzfilmcommission.pl

30. MALLORCA FILM COMMISSION & FUND
www.mallorcafilmcommission.net

31. MEDIEFONDER ZEFYR
www.zefyr.no

32. MITTELDEUTSCHE MEDIENFÖRDERUNG
www.mdm-online.de

33. NORDNORSK FILMSENTER
www.nnfs.no

34. PARIS RÉGION FILM & AUDIOVISUAL FUND, FILM PARIS REGION
www.iledefrance.fr

35. PICTANOVO
www.pictanovo.com

36. REGION OF MADRID, MINISTRY OF CULTURE AND TOURISM
www.comunidad.madrid

37. RÉGION GRAND EST
www.grandest.fr

38. RÉGION SUD-PROVENCE-ALPES-CÔTE D'AZUR
www.maregionsud.fr

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