Tampere University of Applied Sciences

3D in Animated Storyboards

3D's Impact on the Creation of Animatics in the Animation Industry

Miilo Kyllönen

BACHELOR'S THESIS
June 2020

Degree of Media and Arts
Interactive Media

ABSTRACT

Tampereen ammattikorkeakoulu
Tampere University of Applied Sciences
Degree Programme in Media and Arts
Interactive Media

KYLLÖNEN, MIILO
3D in Animated Storyboards
3D's Impact on Animatics in Animation Industry

Bachelor's thesis 50 pages, appendices 9 pages
June 2020

Since the formative years of computer graphics, they have greatly impacted the creation of animated storyboards and techniques used in the animation industry. How have CG and 3D modelling changed the flow of the pre-production state of animation? As the resources and equipment keep developing, 3D has established its place in multiple fields and media. The focus point of this thesis is on how artists utilize 3D in animated storyboards, and how it might have changed the workflow used before 3D was available.

This thesis includes a practical study to determine how 3D works as a storytelling tool. To research this animatics for a short film were created, with diverse emotionally charged scenes. The goal was to see how 3D might affect the clarity, emotional impact, and workflow of an animated storyboard. This project also took notice of the challenges there might be, and how efficient it is compared to the traditional 2D methods. The theoretical part before the project explains the basic steps of creating an animated storyboard, what purpose animatics hold in the animation industry, and how 3D is used to enhance the animatics. Present technology offers fast solutions to produce and iterate animatics. Tools used by the animation industry keep constantly developing, which is why 3D animated storyboards are an important subject to study.

Key words: 3D animation, storyboards, animatics

CONTENTS

ABBREVIATIONS AND TERMS

TAMK	Tampere University of Applied Sciences
animatic	animated storyboard
storyboard	series of pictures or drawings based on a script, with directional information needed for a film
3D	three-dimensional graphics
2D	two-dimensional graphics, for example a drawing
model	object built in 3D-program
polygon	in 3D-programs it refers to the planes a model is built of
CG	computer graphics
render	creating 2D pictures out of 3D models
topology	structure of a 3D model
Blender	3D modelling program
keyframe	Animation’s transition’s location in a timeline

1 INTRODUCTION

The purpose of this thesis is to study the history and development of 3D in the animation industry, specifically how it has impacted the storytelling methods and techniques used for animated storyboards. Especially its impact to the pre-production stage of animated movies. This thesis includes a theoretical part which examines the essential steps of how the animated storyboards are created and 3D technology's place in that process, and how its importance has evolved during the passage of time.

After the theoretical part, we focus on a practical project: "The Lion and The Bird", which is an animatic made with 3D, made to study how efficient a tool it would be when creating visuals for an animatic. How a 3D animated storyboard's workflow differs from using 2D was also one of the points of focus. 3D can be used in various media and there are many books which focus on the technical terms and techniques of 3D modelling, but as the programs get updated those resources become quickly outdated. The goal here is to study the constant elements of a successful animatics which utilize 3D technology. Art styles and techniques keep changing, but the emotions we experience don't age, and the story alone can impact our feelings greatly which leads to successful animation.

When one starts to 3D model, it feels like a singular task. We start building up our character but often forget to think about the big picture. As in every art medium, it is important to stay true to your vision and to remember what it is that you are looking for. As an artist, one should never play it safe too long, but instead bravely experiment with your tools and ideas. 3D has many elements we can use to voice out our stories in a new refreshing way in the future if we just keep exploring.

Storyboarding is a creative point for brainstorming, where ideas are illustrated for the first time and everything feels possible. On storyboard every animation looks possible, but with the animatic the true amount of work is easier to comprehend, and it becomes easier to design the essential parts of the story with visual elements. How 3D has impacted animated storyboards and the pre-production process is the main question of this thesis. Pixar and other large animation studios

usually show parts of their animatics to the public, but most animatics done in the whole animation industry do not see daylight outside the studio's walls regardless of how crucial they are. This makes animatics still important subjects to study. How 3D is used in animated storyboards is a relevant topic since it is still constantly developing.

2 CREATION OF ANIMATICS

2.1 What are Animatics

Animatics can be defined as the first version of the animated film, created by adding soundtrack and straightforward animations the storyboard. They are not only for animation; almost every advert and feature film project has had an animatic made for it. Jim Cascarina is an animator living in London, and he has been working with animatics since 1999. On his professional website he explains how back in the past (Picture 1) they would shoot animatics from art drawn on paper with a rostrum camera. Since then the technology used in the animation industry has greatly evolved. (Cascarina 2020)

PICTURE 1. Equipment needed for animatics in 1990s. (Cascarina 2020)

Typically, animatics had strict time and financial budgets so initially they were made as simple as possible. The real skill was to get the story and concept through with just camera movement, excellent editing and compact animation. Back then simply re-rendering the scene wasn't an option so careful planning was essential. (Cascarina 2020)

At present the hardware and software available to us have progressed so much that the whole creation process of animatics can be made on computer, this has resulted in more complex animations and some animatics can already be very similar with the final version regardless of being only the first draft of the project. (Cascarina 2020)

Animatics are part of the pre-production phase of each project. Their purpose is to serve the needed vital visual information, timing and shot's length for the production. This gives valuable information and options to test out the visual flow of the story. The main goal of animatics is to represent narrative with visual elements. (Adib 2019)

The time spent on animatics depends a lot on what purpose it is made for. In the live action film industry, it is common that only the action scenes have detailed animatics, and the rest of the film only has a storyboard, mood board or not either one of those. In the animation industry the importance seems to be much higher. All sources have suggested that animatics are essential to the whole production pipeline and that they are not only a great tool for selling the idea for future investors, but also to prevent wasting time on scenes that are not needed. Some advertisement companies use animatics to test the story on focus groups and then ask the test subjects which videos they remember the best, if the animatic manages to convey a good story, it is likely that it would also make a good commercial (Simon 2007, 85).

2.1.1 Animatics' Place in the 3D Animation Pipeline

Each individual animation studio has their own way of creating 3D animation. Typically, there are multiple steps needed in order to successfully create an animated film. It demands a wide range of people working on the project, each having their own specialty and skills needed in the field. To utilize everyone's skills there needs to be a clear structure to follow, which in professional animation studios is called 3D animation pipeline. (Adib 2019)

A 3D animation pipeline is a system that includes people, hardware and software working in a distinct order. It does primary tasks and time frames, which lead to 3D products for the final assembly of the project. The most important quality of a 3D animation pipeline is that it is a clear and a tool used for communication. It places all the tasks so regardless of the number of artists, everyone knows what they are doing and what the next steps will be. The first step of the pipeline is pre-production. Animatics fall under this category, as their purpose is

to show with simple visuals the timing of each sequence, which usually is made from 2D storyboard (Picture 2). (Adib 2019)

PICTURE 2. Storyboard made for an advertisement by Paul Phillips (Phillips 2012)

When John Musker was interviewed by Tony Bancroft, he emphasized how beneficial animatics are for the project. “The reels are the working draft of the movie, and they’re the most malleable clay. They are the blueprint of the movie, but they are also an organic, fluid, dynamic, ever-changing writing instrument for the movie, and so they’re a crucial step.” (Bancroft 2014)

Animatics define the whole pace of the story, and how it flows on the screen with less effort than using the final footage. It also prevents needless shots and unnecessary work. They give valuable information to the whole production team and help the voice actors to do their jobs. Animatics are also a great way of testing out ideas to see what works with the final product and what does not. Essential imagery for the narrative can also be designed while working on this step of preproduction, just like designing the camera angles and movement. Overall, compared to storyboards the animatics offer more apparent example of the final product. (Adib 2019)

3D can be more time consuming than 2D if one is still learning the programs. In some cases, the idea might simply be easier to create with drawings. It is also good to keep in mind that staying on 2D animatics only for the sake of comfort is not always the best option if there is chance of something being achieved better with 3D.

2.1.2 Difference Between Animatics and Storyboards

Animatics differ from storyboard with their ability to portray movement and timing of each scene. With voice-over, dialogue and soundtrack the animatic can make a vivid first impression of the final product. Usually animatics are created from the images made for storyboards, which commonly have a minimalistic style and contain only the essential information. Most modern advertisement and feature films have animatics as well in order to cut the unnecessary work. (Adib 2019)

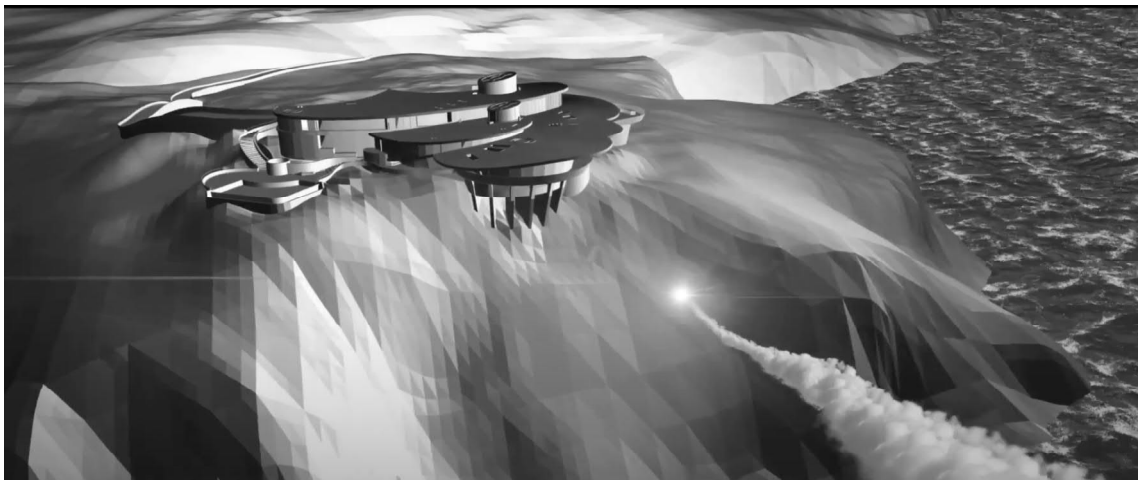
There is no one right way to create animatics, they can be made with many different techniques than just 2D drawings (Adib 2019). For example, 3D modelling the whole storyboard is one way to do it, or it is possible to have mixed technique and use traditional art and digital tools together. Below we see comparison between the animatic and finished animation from Frozen 2 (Picture 3).

PICTURE 3. From storyboard to the final frame (Frozen 2, 2019)

2.2 Visual Narrative of Animatics

Animated storyboards have helped animators for decades now, to sketch out scenes and to minimize waste of time that might go into unwanted scenes and frames that once needed to be drawn by hand. Ideally with a well done animatic, there should not be much more than fine tuning left for the editor.

Some projects work better with 3D animated storyboards than others, so it should depend on each individual project whether you use 2D or 3D for the animatic. Whether using 3D for animatics is a good idea also depends on the field where you are working. The needs of an advertising department and people who work with feature films are different. In Iron man 3 (Picture 4), 3D was used to demonstrate the more challenging action scenes.



PICTURE 4. Frame from Mansion attack animatic for Iron man 3 (D'Alessandro 2013)

Regardless the practical qualities 3D has, the traditional storyboard still has a solid place as part of the visual narrative and a tool used in pre-production. Most animatics that are made public from Pixar or Disney studios, are heavily made from 2D drawings, only occasionally depending on 3D while adding scenes which focus more on the perspective and environment. Pixar Disney movie Coco (Picture 5) has several animatics for public view, and while using mostly drawings, some wide shots and scenes with many characters have 3D elements implemented in them.

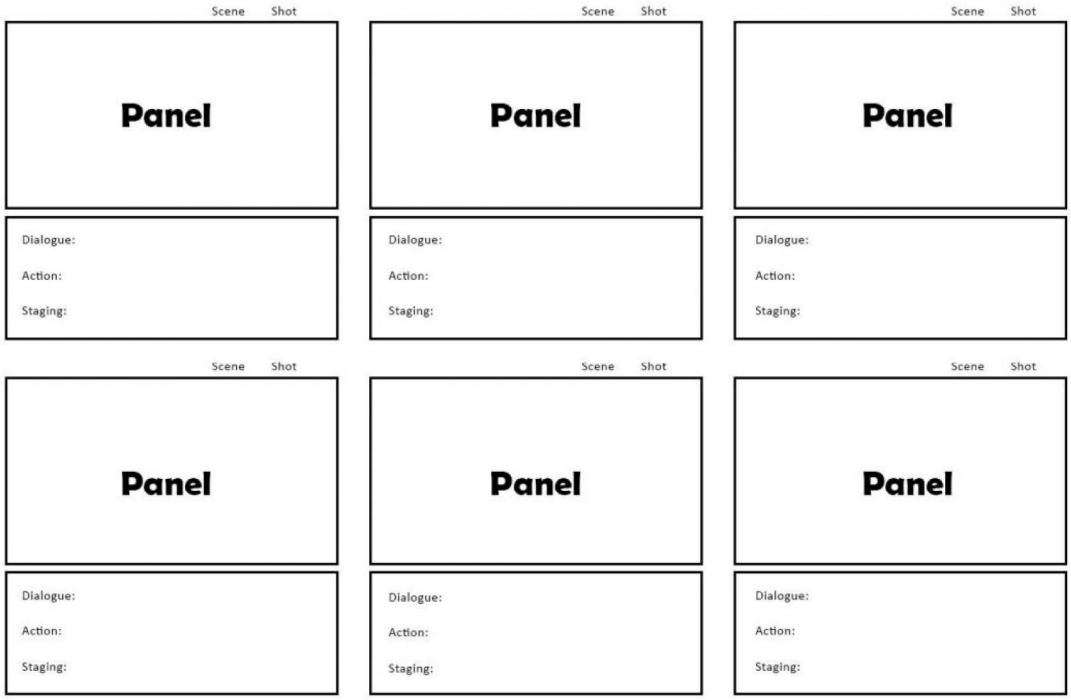
PICTURE 5. Pixar and Disney movie Coco's animatic and final version. (Disney-Pixar 2019)

2.2.1 Storyboarding Process

To understand what 3D can offer for animated storyboards, and why it is not always the first choice of technique used for the animatic even if the project is going to be a 3D animation, we need to think about what storyboards are. A Simple definition is that they are a sequence of drawings or pictures based on the script and their purpose is to test out how the story can be told visually as effectively as possible. Storyboard is a term that originates from the animation industry regardless of how it has been started to being used across different fields like advertisement industry.

A storyboard visually tells the story and informs what we will hear or see in the scene, as well as other technical information needed to create it. Staging, visual effects, transitions and audio notes are examples of information storyboards usually contain (Adib 2019). Since storyboards lean so heavily on the artist's way to express the story with simplistic visuals, they do usually come more naturally with 2D since most start to draw before we even learn how to use computers.

It is assumed that storyboarding was developed in the early 1930s by Walt Disney studio. The first storyboard was made from only “story sketches” during the 1920s when visualising short cartoon concepts. It was reported that the first complete storyboard was created in 1933 for a short film called “Three little pigs”. It didn’t take long for the rest of the animation studios to follow, and by 1938 in America most studios used storyboarding for their productions. Around the same time the feature films started also using the storyboards as a tool to help the pre-production of the films. Storyboard pages with six panes became a popular base model for the process (Picture 6). (Adib 2019)



PICTURE 6. Example of storyboard panel. (Adib 2019)

When working with storyboards you are working as a director, a designer and a writer at once. Making of the storyboard usually starts with the initial thumbnails, which process to rough storyboard, which gets a cleanup version and if needed, extra notes for the stage director. A finalized storyboard can be either fully colored, and looking impressive in order to please the client, or a “production storyboard” which is only made for the production crew and will not be seen outside the studio. (Wyatt 2010, 24-25)

One of the best pieces of advice about working with storyboards was from Scott Morse, who is a senior storyboard artist working for Pixar. He recommends acting like a camera, instead of acting like an illustrator. Skills of observation are important, and how we see real life. Finding out how to tell the story in the right way is one of the biggest challenges of storyboarding, but truly rewarding when it gets done right. (Morse 2017)

Storyboards are also used to give the first impressions of the color theme, general atmosphere, actions, camera movement and angles. Transforming the script given to you into a mesmerizing storyboard can be difficult if the director or the writer of the script have not done their job well. But if the storyboard is well done, the transition into animatics is usually a fairly easy process. Most of the visual footage is available by then, thanks to the storyboarding. In order to transform the storyboard into 3D animatic, the next step would be to model the scenes and objects. The storyboard gives a good reference for the modeling process.

There are a lot of elements to think about when one is making a storyboard, but the most important detail you need to focus on is clarity. The quality of the art is not as important as readability, but it often helps to sell your idea to potential investors if you are able to create great visuals. (Blazer 2016, 41-42)

2.2.2 Telling Stories with Animated Storyboards

Storyboards are used to bring out the first visual and expressive elements, while animatics make the flow of the story become alive and make it easier to fine-tune the little details and space the actions. When working on storyboards and animatics it is a must to communicate cohesively with the director.

“Serve your crew and they will serve the film.” This quote by Tony Bancroft summarizes well how the director is nothing like a dictatorship, but a creative job where one must bring out the best from everyone and gently but firmly direct the story in the right direction and while making sure that it is all cohesive. (Bancroft 2014, 55)

The rules of good storytelling apply to the animation industry the same way they apply to movies and books. Truby (2007) talks about to how to write a good character in his book “The Anatomy of Story”, he wrote: “The hero and the opponent drive each other to greatness.” Stories often lack a good and believable opponent, and that can lead to a boring story. If you focus on the villain and make them bring the best and worst attributes of the hero out, it makes the story more enchanting and interesting for the audience.

Truby established how each character is there to make other characters better, and to help them to have a larger range of emotions and motives. This applies to everything he wrote about, the world, the plot, the design principle, characters and symbols. All these elements should support each other to make the story whole (Truby 2007) I think that is something important to remember when creating animatics as well, the camera angles, scenes and character should be designed in a way that they bring the best out of each other.

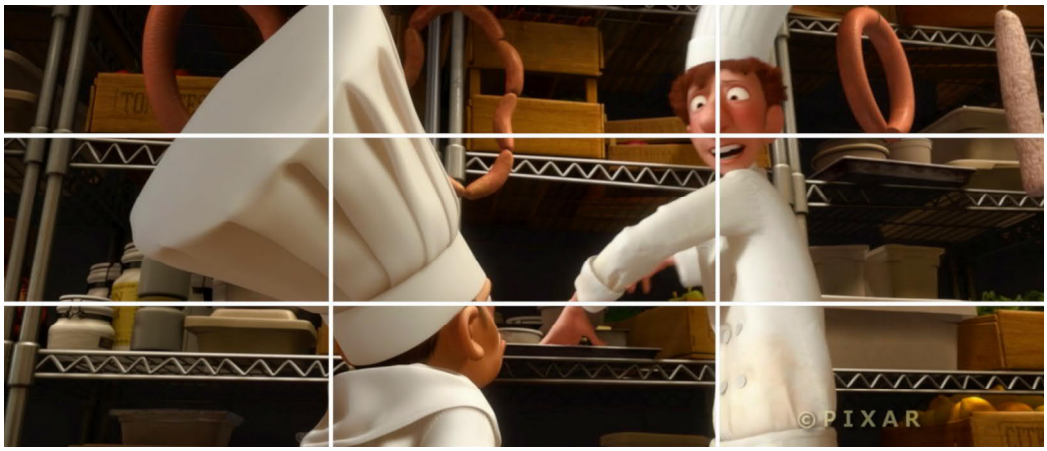
The fact that the book focused a lot on the organic way of building the story was a delightful change. With the three-act structure which is often mentioned when talking about creating stories, it might feel a little too literal and could easily suppresses the creative brain work when you get too focused on the rules. A storyboard artist’s job is to present the first visual footage of the story, so understanding the important elements of the story is essential in order to show the viewer crucial information from every scene.

2.2.3 Composition of the Scene

Liz Blazer (2016, 43-49) talks about all the important details you should remember when building your storyboard; shot composition, framing, staging and transitions all have a significant part in making your storyboard the best it can be. Shot composition should be built in a way that reveals only the things you want to reveal to the audience. For capturing a person’s joy, one can use a close-up to make the audience feel their happiness, and to make the mountain range feel majestic you could use panning extreme wide shots. (Blazer 2016, 43-44)

What 3D brings to the composition is the wild range of angles and changes in perspective which in traditional 2D take a long time to make and design. With 3D, after the modeling process you are free to try out the camera angles and framing of the scene, and that way you get easier access to finding new interesting ways to share the visual information.

As Blazer (2016, 44) mentions: “Framing is all about keeping the eye interested.” It is essential to keep the audience captivated by the imaginary and not to let them get bored by the provided visuals. Great framing is the key to enchant the audience, and to do so it is good to give them something to explore. Unless one specifically wants to keep the focus on the middle of the screen, it’s good to remember “the rule of thirds” as seen below (Picture 7).



PICTURE 7. The rule of thirds (Ratatouille 2007)

Staging is an important part of making the scenes easy to read. Where the subject is put in space should not be random but serve some purpose for the story. Avoiding unnecessary visual information that would distract the audience helps to define the important aspects of the shot. The given visual information should help in keeping the audience hooked and interested in the elements that are relevant to the story (Picture 8). (Blazer 2016, 46-47)

PICTURE 8. Staging and importance of visual information (Blazer 2019)

Another important aspect to think about while designing your scene is the light and shadow. With brilliant lightning you can highlight the important details, affect the mood and atmosphere of your scene. In the movie “Klaus” the lighting had a great impact to the visuals of the story and the film makers made sure every scene had a proper point of interest and direction of light (Picture 9). They used the lighting to imitate the look 3D animations often have, and this way discovering a fresh new way to execute the visual style of the movie. (Failes 2019)

PICTURE 9. Scene without and with proper lighting (Klaus 2019)

Blazer (2016, 48) states that the transitions are animation’s most powerful advantage. It is true that animation enables wide range of ways to transitions between scenes, but it is good to remember that continuity is still important.

When transitioning from one scene to the next without any effects or changes it is called the hard cut, usually it is used to alternate between characters’ points of views, make impact or change camera angle on the scene. Dissolve means

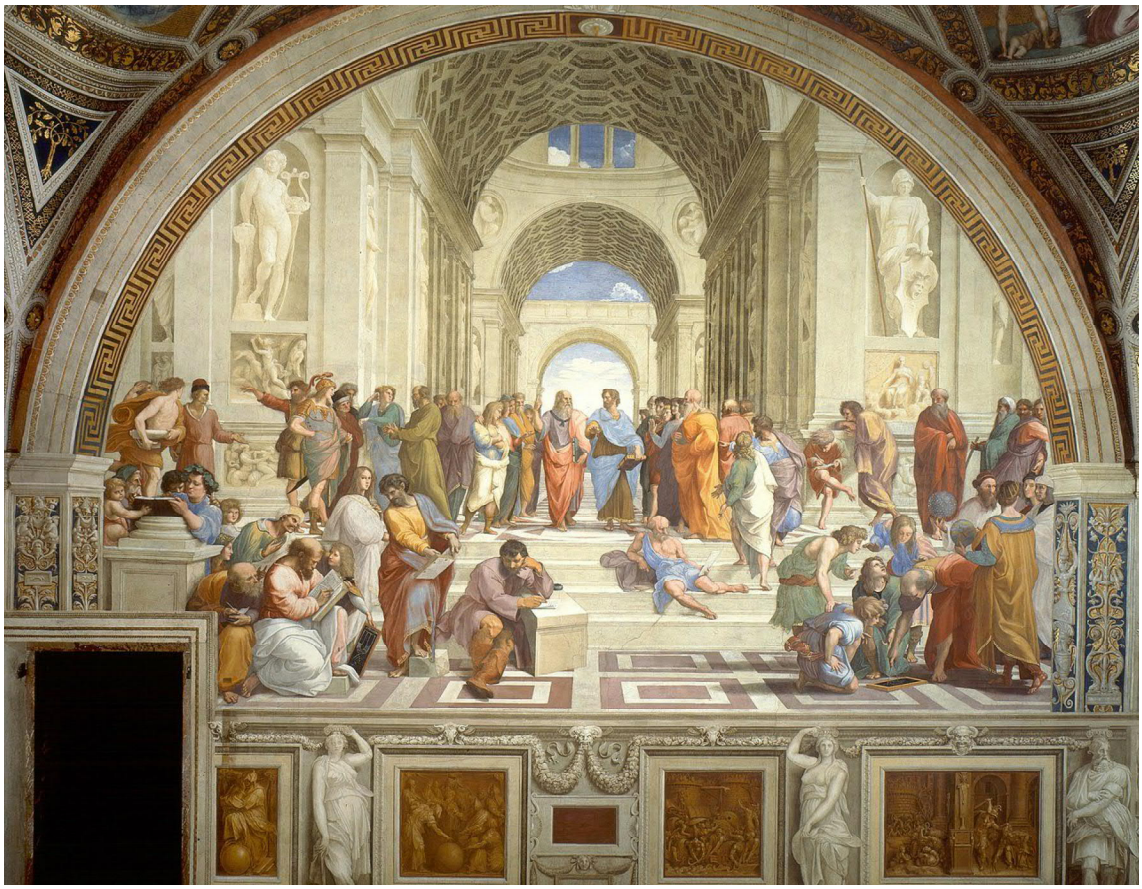
that we gently move to the next scene. Fade to black is a popular way to achieve this. It is a good way to transition when there is lapse in time or location changes. When one cuts on action it means they are matching the action from the first shot, the action itself ties together the different points of views. This is a good technique when making a fight scene for an example. (Richardson 2020)

Transitions are subtle details, which when done well the audience will not even notice but if done badly it cripples the whole flow of the story. One should try to think over every transition when working on a storyboard, so when you start making the animatics it is easier to think about the camera movement and how scenes are built in the 3D program.

3 3D AS A TOOL USED FOR ANIMATICS

3.1 3D's Roots in Art

3D refers to three-dimensional graphics created by the computer, also known as CG, computer graphics. Before 3D became a popular tool used in animation, games and other art mediums, artists had to figure out the linear perspective and how to comprehend reality. The first known publication about linear perspective was published in 1436 by Italian scholar Leon Battista Alberti. (Picture 1) displays how renaissance paintings use the rules of linear perspective, and by Alberti's treatise those rules became known to most of the artists and are still used today. (Paquette 2008, 11.)



PICTURE 10. The School of Athens (Raphael 1511)

Working with 3D, the software takes care of the perspective, and in that way helps the artist in creating the vision faster and in some sense more accurately, since it is a computer calculating the perspective and not a human hand which is more

open to make errors. Of course, the artist still must design the objects and look for the right perspective to make the scene look visually pleasing, but in general 3D has made itself very useful, especially when creating environments and when perspective needs to be illustrated accurately.

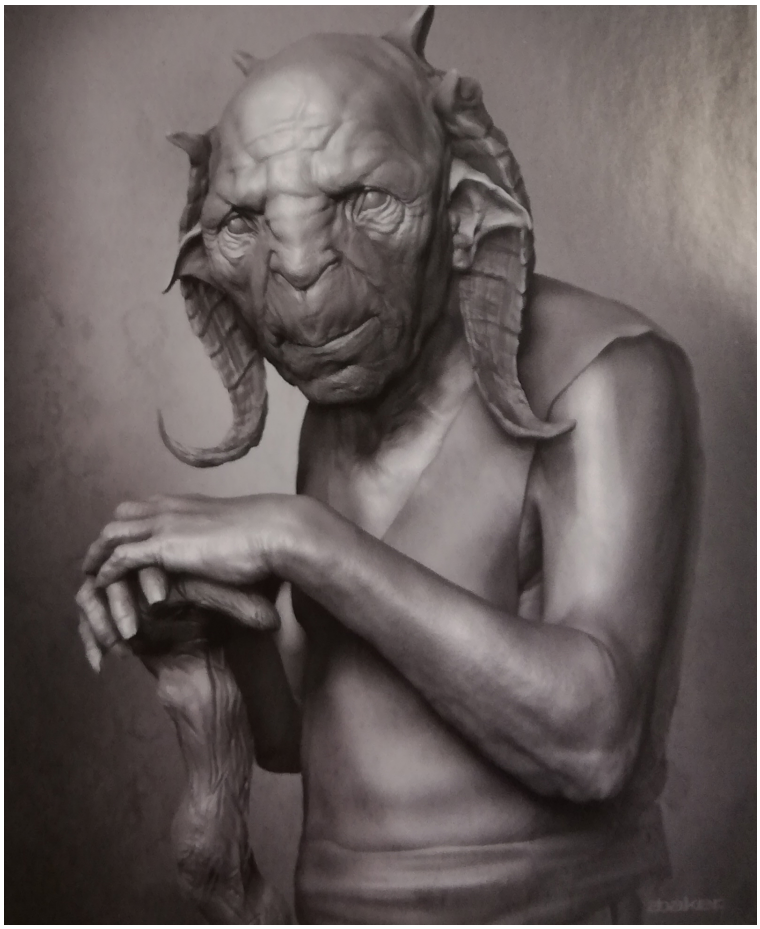
3.1.1 Advances in 3D Graphics

The CG in feature films and animation movies has proved the vast range of visual outcomes it can achieve. Realism can be illustrated in many ways and 3D programs offer several approaches to make objects look realistic with correct lighting and materials. 3D offers artists to try out anything they can imagine. For example, an artist under screenname Vagioo ae published an interesting way to characterise a can of Pepsi (Picture 11). Below on the process pictures the different steps of 3D can be seen, often the artists render out the shadows, light and materials separately and combine them in photo editing programs like Photoshop CC for an example.

PICTURE 11. Different steps of making Pepsi Character (Vagioo ae 2020)

As 3D became more popular and accessible some artists started sketching their ideas in 3D. Sketching out ideas is something so fundamentally attached to paper and pen that it truly is quite groundbreaking that nowadays one does not need those basic tools if they choose so. Zbrush is a handy tool if you want to sculpt out your ideas and see how the design works in a three-dimensional environment. Sometimes this might help you get your idea approved faster, as the art director is able to see it in 3D form right away (Kennedy 2013, 27).

While reviewing different CG artists, one quote from Andrew Baker made a relevant point: “Seeing a creature or character you’ve designed in a nice illustration and viewing it from different angles afterwards is so valuable.” This concept applies just as well when creating animatics, the freedom to inspect the different angles and the character’s contrast with the environment would give and valuable opportunity to truly see and explore how to make the each scene utilize the strengths of 3D. Baker made the illustration below (Picture 12) with Zbrush and Photoshop, and it’s a great example how much creativeness one can have with CG.



PICTURE 12. Tao – The ancient one (Baker 2008)

In order to create good 3D models efficiently, one must have a basic understanding of traditional art. With traditional art, usually the issue of light and shadow come across as the most important topic because that is what gives the depth to what we see defines the objects. Shadows vary from the simplest forms to more complicated hues. It would be a good idea to take some art classes with sketching

and painting if you want to study the shadows more thoughtfully (Ahearn 2012, 8).

Understanding how shadows and light works helps to comprehend the 3D space and to detect any possible issues with the model. Correctly made 3D models help in creating accurate elements for the storyboard and this results in more consistent workflow in the future steps of the production pipeline.

Often 3D models will be animated, so knowing how the character is going to be moving in the virtual environment is essential information. It is good for every artist to study anatomy, movement and how people move in real life, with this knowledge the 3D modeling will be easier in order to place the extra polygons where they are needed so the model can move smoothly without distortion. (Kennedy 2013, 81)

Basic knowledge of how the character moves helps when adding the character inside the 3D scene. How character interacts with its surroundings has a huge impact to the story's composition.

When comparing the needed knowledge for traditional art and successful 3D art, it seems that both require majorly the same basic knowledge and understanding of perspective, light and shadow, and critical eye for details and errors. With all this in mind we can start thinking how traditionally drawn storyboards have started to implement 3D in the workflow of animatics. It is artists responsibility to determinate when 2D should be used instead of 3D and vise-versa.

3.2 3D's Strengths in Animatics

2D drawings still have a solid place in the storyboarding process, so it is hard to find a public animation project that has used only 3D for storyboarding and animatics from the very beginning. Even though 3D is affordable and handy tool, it demands certain level of confidence and knowledge before the artist can get full potential out of it. In bigger studios animatics made from the 2D footage from the

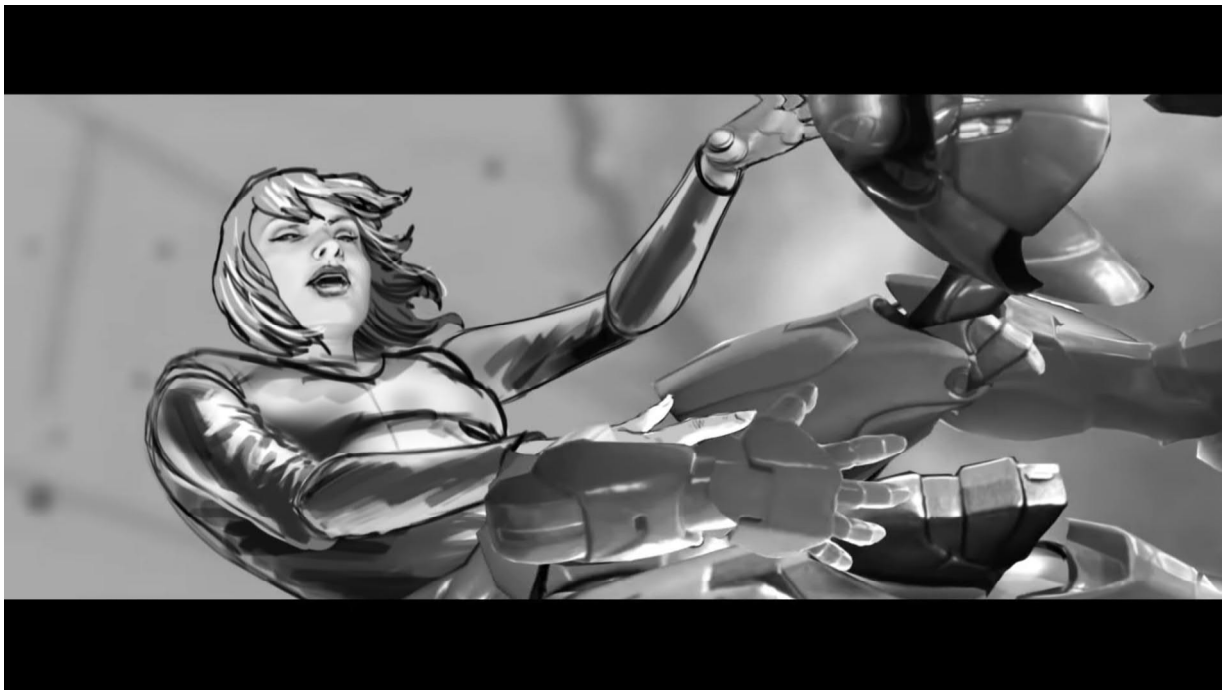
storyboards simply seem to be faster and easier to manage when having a large group working on a huge project.

The complexity of the object is the major factor that determinates if it will be more efficient to create with 2D or 3D. A common way to use 3D is for complex object that are important for the scene, for example cars. Creating systematic environment is easier with 3D models, so even if the environment is not especially complex, it is still useful to utilize 3D when making backgrounds for storyboards (Picture 13).

PICTURE 13. Storyboards with 3D backgrounds (Schuller 2019)

Feature films often use 3D when designing action scenes. Professional storyboard artist Federico D'Alessandro brilliantly used 3D to animate some more complex concepts of the story for movie Iron man 3. He used it to illustrate how Tony Stark's Iron man costume wears itself around Pepper Potts (Picture 14) in order to protect her from an explosion. Keeping a complex object like a moving robot suit would have taken a lot of effort to be drawn by hand, so in this case 3D served to make the scene more accurate and enabled smoother workflow.

The strong qualities of 3D were also used to storyboard these scenes were Tony Stark's mansion was being destroyed (Picture 15). The huge mansion falling off the cliff was brilliantly demonstrated with 3D models.

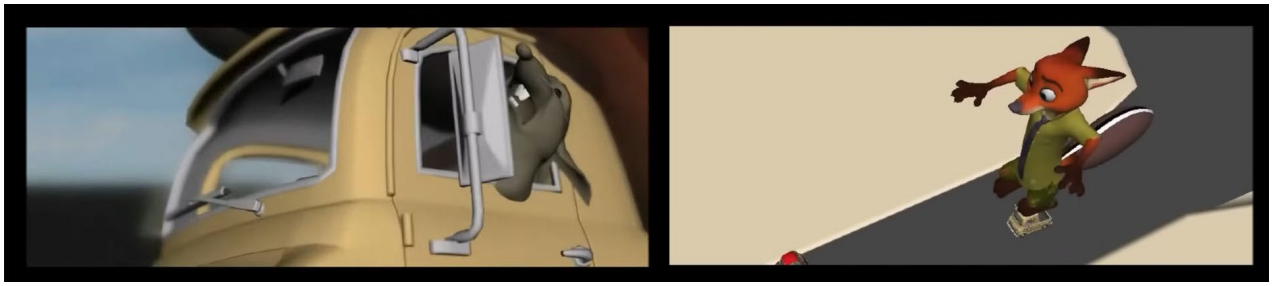


PICTURE 14. Mansion attack animatic for Iron man 3 (D’Alessandro 2013)

PICTURE 15. Mansion attack animatic for Iron man 3 (D’Alessandro 2013)

While going through the deleted scenes from Zootopia the majority of the animatics were made from 2D drawings, except one scene (Picture 16) where the plot was focusing more deeply on action with fast movement, and there were big changes in the environment. It’s a chase scene through the rodent city and many of the buildings get destroyed during the action. 3D was used to make this more complicated scene easier plan and to see the accurate destruction of the city.

One of the 3D's strengths is the accurate scaling of the objects in perspective. Zootopia's deleted scenes showed how 3D was used to make sure that the size differences between the mice, car of the mice and the fox stayed consistent.



PICTURE 16. Zootopia's deleted scenes (ZOOTOPIA 2016)

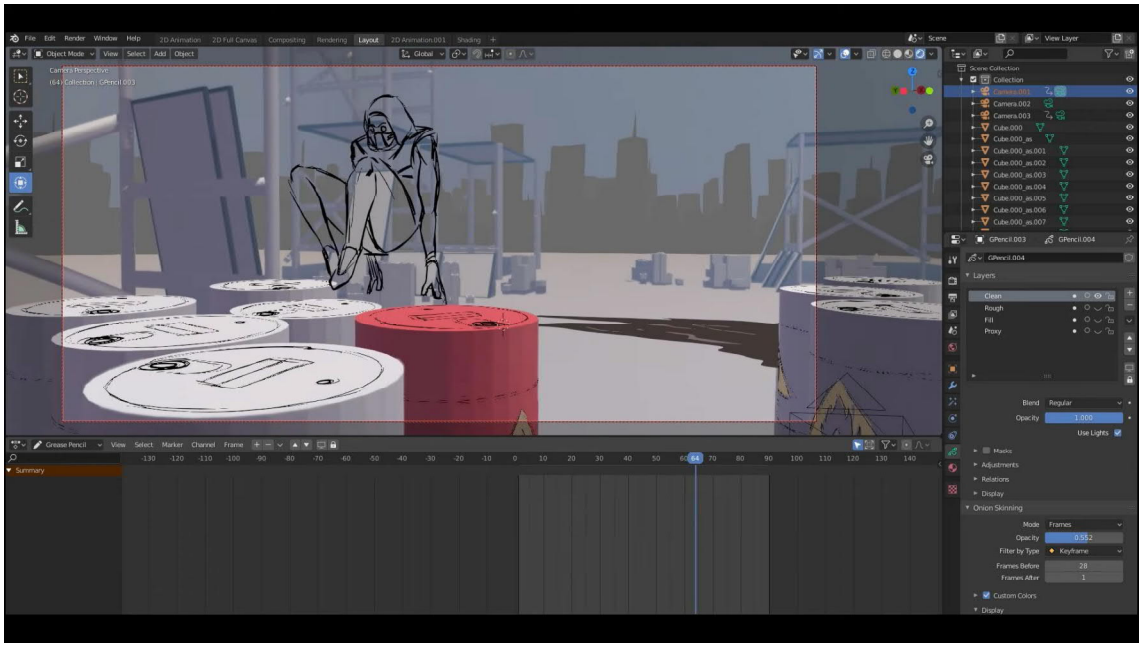
3.2.1 2D and 3D Combined

Scenes where 3D is used in animatics are often action themed, have complex environmental structure in them, or some complicated objects like cars in important role for the story. Many present animatics tend to be hybrids between 2D and 3D animation, mainly build out of 2D drawings and 3D used to enhance certain scenes or have more accurate background.

One interesting recent approach to animating storyboards became available to artists since Blender published a new version of the program and introduced the Grease Pencil Tool. This has shown some new compelling ways how to utilize 3D for animatics.

Paul Coulthard has presented an inclusive tutorial on YouTube in his Spitfire storyboards channel, which showcased this new tool. Basically, Grease pencil enables the user to have multiple 2D objects inside one 3D object which then navigates through 3D space. It works like a regular drawing tool, but the canvas is the 3D space and the perspective of the viewpoint determines which way the drawings point. Picture 17 presents how the 2D objects created with Grease pencil look like in the 3D environment. Picture 18 shows the interface of Blender 2.8.

PICTURE 17. Animatic made with Grease pencil tool in Blender (Coulthard 2020)



PICTURE 18. Animatic made with Grease pencil tool in Blender (Coulthard 2020)

3.2.2 Professionals Opinions about 3D in Animatics

In an online survey concerning the strengths and weakness of 3D as a tool for animated storyboard, professionals provided insight for this report. People who answered the questionnaire had been working in the animation field from 15 to

20 years. While the amount of answers was too few draw any industry-wide conclusion on how 3D is used by professionals in the animation industry, but it did provide a small insight from the field as it is in Finland in 2020.

The main point that came across from the answers was that 3D offers a more affordable and faster way of creating animation, but it might also lack in ways of showing real human emotion. The field you work on affects a lot whether 3D is a useful everyday tool or not. One of the answers indicated, that when working mainly on 2D animated films the 3D offers only little to no help to the production pipeline, making drawing 2D more practical for their projects. One individual who specialises in 2D animatics answered that they use 3D to enhance some of the shots but in the end still prefer 2D.

A person who works with 3D animated films was the only one who said they preferred using 3D for the whole creating process of animatics. They usually try to skip 2D storyboarding completely, if they can, which was interesting since the others seemed so keen on 2D storyboarding and used 3D only to enhance shots or not at all.

People who have recently started to use 3D found it helpful when using motion capture to capture the actor’s performances and when making more dynamic camera movement. Instances where 3D was seen more practical than 2D seemed to be times where perspective plays an important part of the story.

3D gives smoother animation for the high spaced movement and fast explosive storytelling. It makes it easier to comprehend the 3D space and to design the environment story takes place in.

Based on the survey, 3D animatics seem to take more knowledge to watch since it makes the viewer focus on the technical quality instead of the story. Meanwhile 2D animatics often get forgiven for a sketchy style since traditional drawings are commonly seen just as a work in process.

When talking about 3D’s weaknesses when used in animatics, the issue of optimisation was mentioned. If a 3D animated storyboard fails be clear and convey

needed information with demanded quality within the time frame given it could become too time consuming and expensive, making 3D counterproductive. In that sense 2D animatics could be better for small projects or if you are inexperienced with 3D.

Emotions seem to be one of the remaining issues when working with three-dimensional graphics. Human emotions are so subtle and complex that you need to first grasp the emotion itself, before we can visually express it. People found forwarding complex feelings to 3D without making it too time consuming one of the biggest challenges.

4 BIRD AND LION – PERSONAL PROJECT

4.1 Brainstorming

I wanted to do something that could utilize 3D for its practicality, artistic possibilities and storytelling properties. What is so extraordinary about 3D, is the adaptability it has through so many industries. I decided on making an animated storyboard relying on 3D, it felt like a relevant project to this study. It would give me firsthand experience and some more in-depth understanding about the subject in hand. I made quick sketches and fell in love with the idea where the lion and the bird were racing through the sand together (Picture 19).

PICTURE 19. Concept art of the characters

The purpose of the project was to find out how well the shot composition, action, and emotions would translate through a 3D animated storyboard, so I picked a

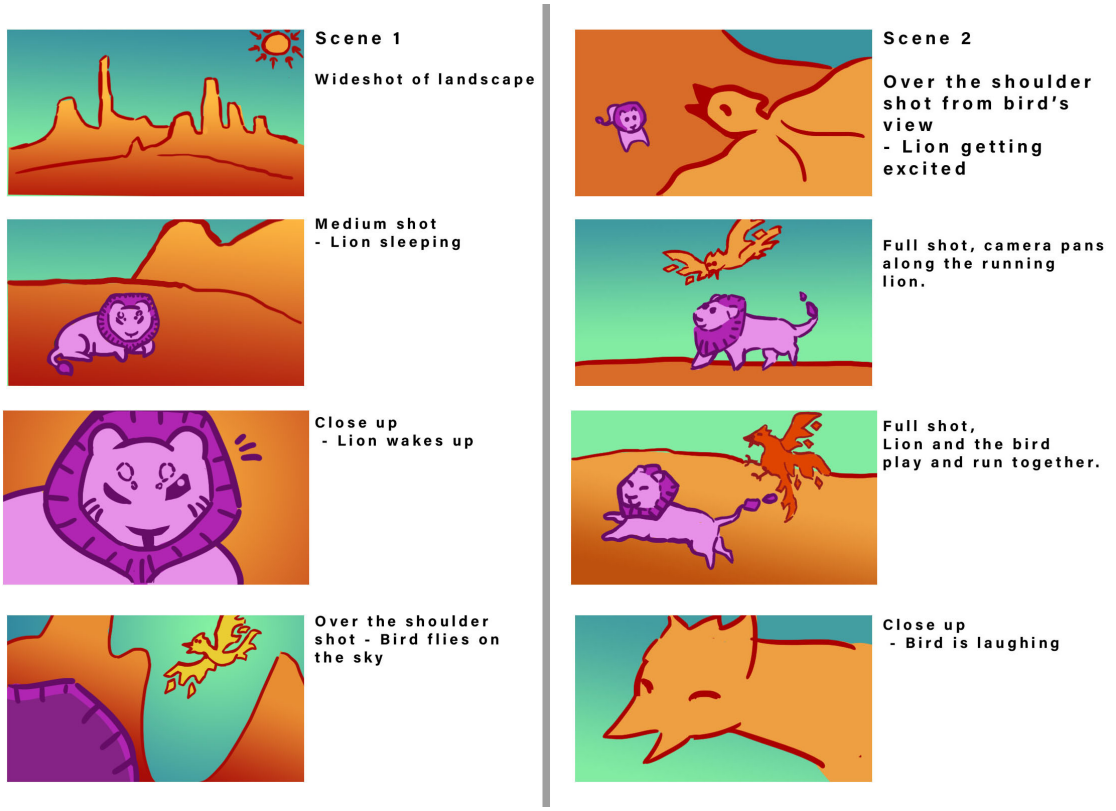
short story idea where there is first some cheerful action, and then emotions like shock, anger and sadness become an essential part of it. I was expecting the biggest challenge to be the clarity and visual look of the animatic. The goal was to keep the time spent on the animatic realistic to the time one would spend in a real pre-production stage. I kept optimization in mind through the whole process.

4.1.1 Sketching Out the Idea

Before I started making the scenes in Blender, I quickly sketched out the storyboards for the project with traditional drawings. I could have made the animatic out of these pictures that I just had drawn, like traditional animatics usually are but I felt that in this case the storyboard was more like a guide of objects I needed to model for my scenes. Having the space rendered from 3D would give me a more precise animatic since the animation is supposed to be made into a 3D animation in the future.

The bright colors and a fairy-tale like setting came naturally and the storyboarding process was a pleasant part of the project. Stories about unusual animal friends are endearing, that is why I chose a lion and a bird to the starring roles.

The general theme and atmosphere would appear from the colors and shapes of the characters. I was confident that I had visualized the actual style of the animation with my concept art and this animatic's purpose would be more about determining the camera movement, actions and framing of the scenes. The storyboard was drawn in color, in order to have better idea of the style and general direction the art style would go on in the future. The style I used for the storyboard is present in (Picture 20); the whole storyboard can be found from the appendices.

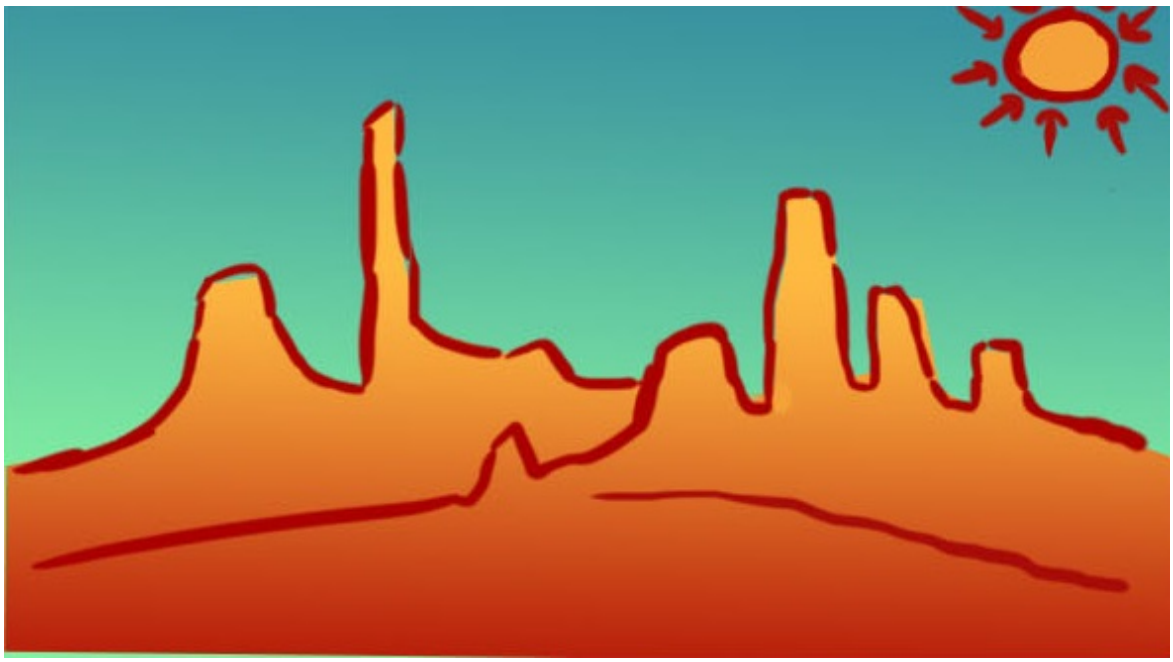


PICTURE 20. First two pages of the storyboard I made for this project

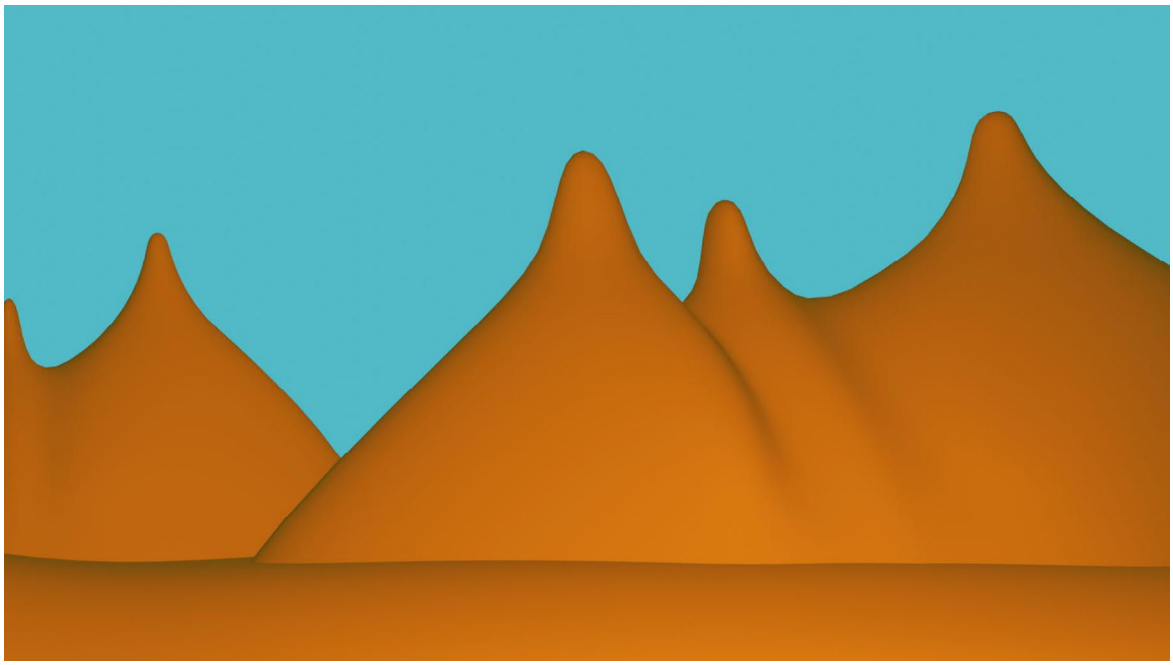
4.1.2 From 2D to 3D

Blender is an open-source 3D modelling program and I used it to execute this project. It is relatively easy to play around with the colours and see what works and what does not, so in that sense I found making changes to the colour scheme easier when working with 3D than 2D.

Working on the landscape and environment was easy and straightforward. Also, camera movements were easier to try out and implement in a 3D animatic. Picture 21 shows how the storyboard presents the landscape from the first scene. In (Picture 22) we see the same scene made in 3D; it does not look as detailed and finished as the drawing, but it does offer a more consistent environment in the future scenes. Like mentioned in Chapter 3, the 2D drawings get forgiven for their sketchy lines and messy colouring, where the 3D image seems bland and somehow plainer since it does not offer so much room for viewers' imagination which the sketch-like drawings usually offer.



PICTURE 21. Drawn version of the first scene



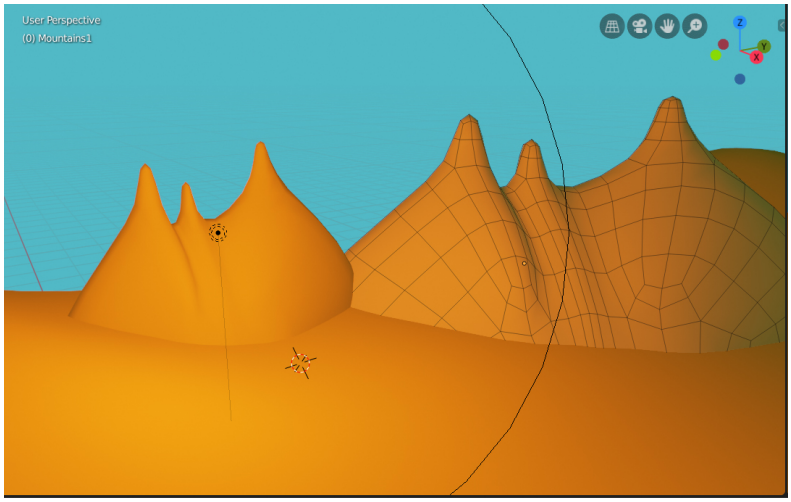
PICTURE 22. 3D modelled and rendered version of the scene

Animating the storyboard was easier for some scenes than others. I found that the close-ups were harder to make, because I could not transfer the exact same expressions from the 2D storyboard, partly because of my decision to not model mouths for the characters (Picture 23). Comparing the 2D storyboard to the 3D animatic, the original drawings did present the lion happier than the 3D model. But this issue was easily fixed when adding the soundtrack which helped to manifest the correct atmosphere for each scene.

PICTURE 23. Lion's expressions

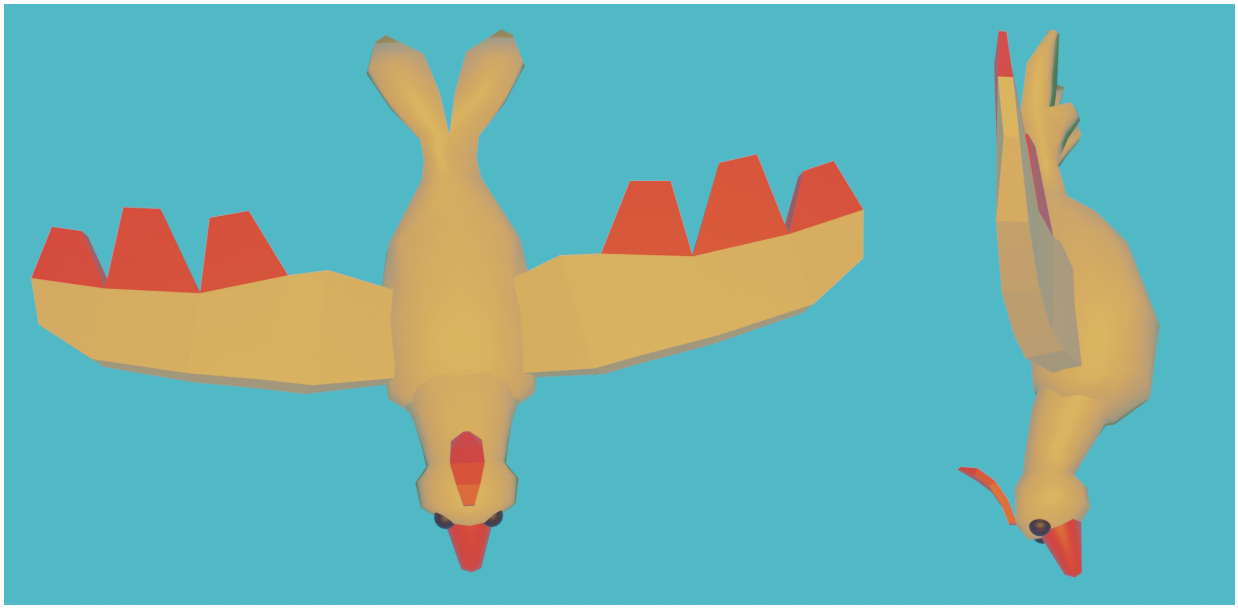
4.1.3 Building process

Simple backgrounds and the terrain were the first things I made for the scene (Picture 24). Then I modelled the characters, which only had simple shapes and basic face features to express the basic emotions. I attempted to keep it as simple as possible, so the rendering would stay fast and efficient. I added one bright lamp in the scene to create the illusion of bright midday sun that was main source of light.

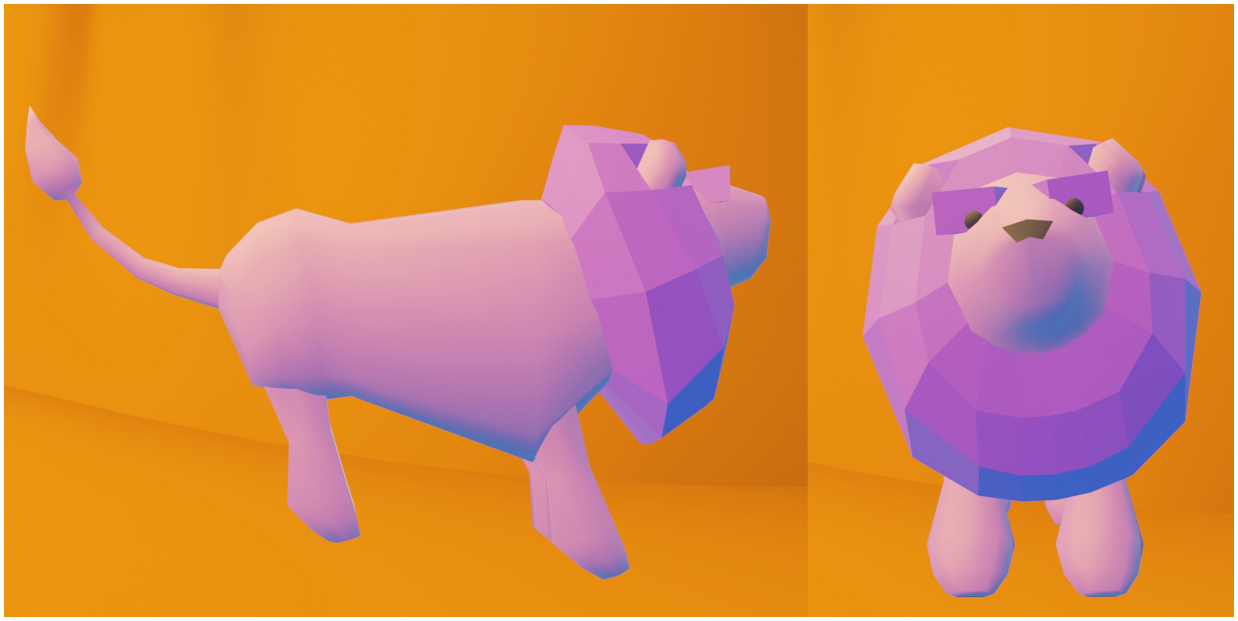


PICTURE 24. Building the environment in Blender

I wanted to maintain the recognisable shapes of the characters (Picture 25, 26) for them to pop out of the scene. With 3D, keeping the same shape for the characters was easier than when drawing the storyboard. I considered animating mouths for the characters but decided to keep it simple and only use the eyes, eyebrows and body language as a tool to display their feelings visually.

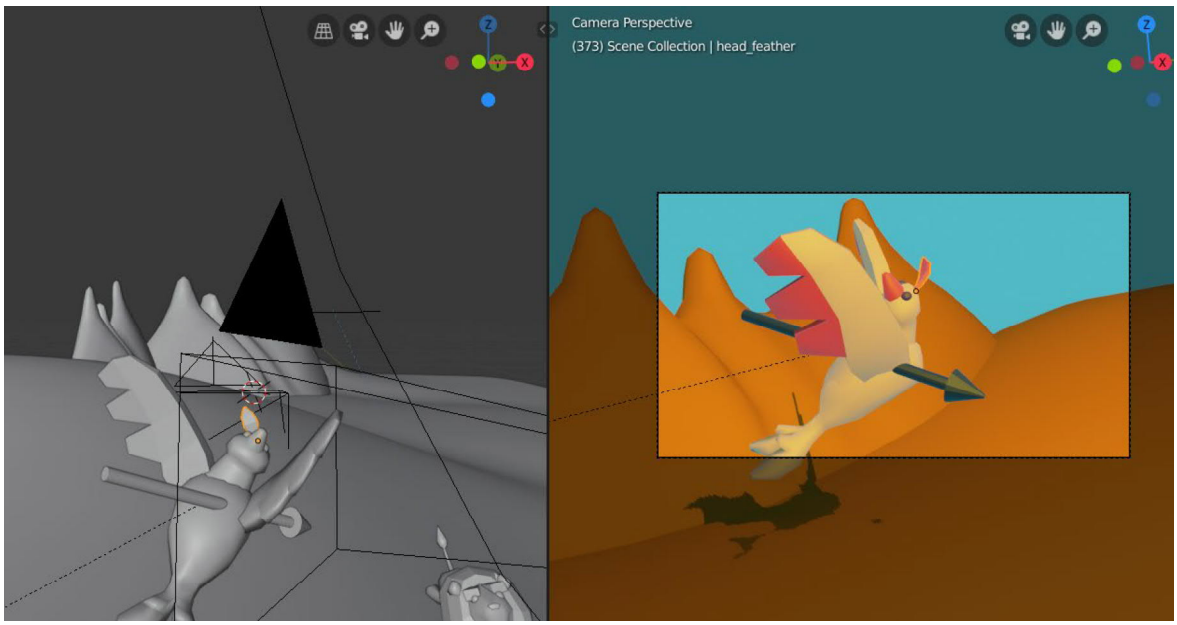


PICTURE 25. Bird’s model



PICTURE 26. Lion’s model

I was trying to keep the animation process fast and clear. But the truth is that animation always needs a lot of precision and skill, so even with all the shortcuts 3D has, it still needs time in order to look good, and what is most important in my experience is to set the correct pace for the movement. After adding the essential animations in the scene, I needed to look for the right camera angles in order render the imagery out of Blender (Picture 27).

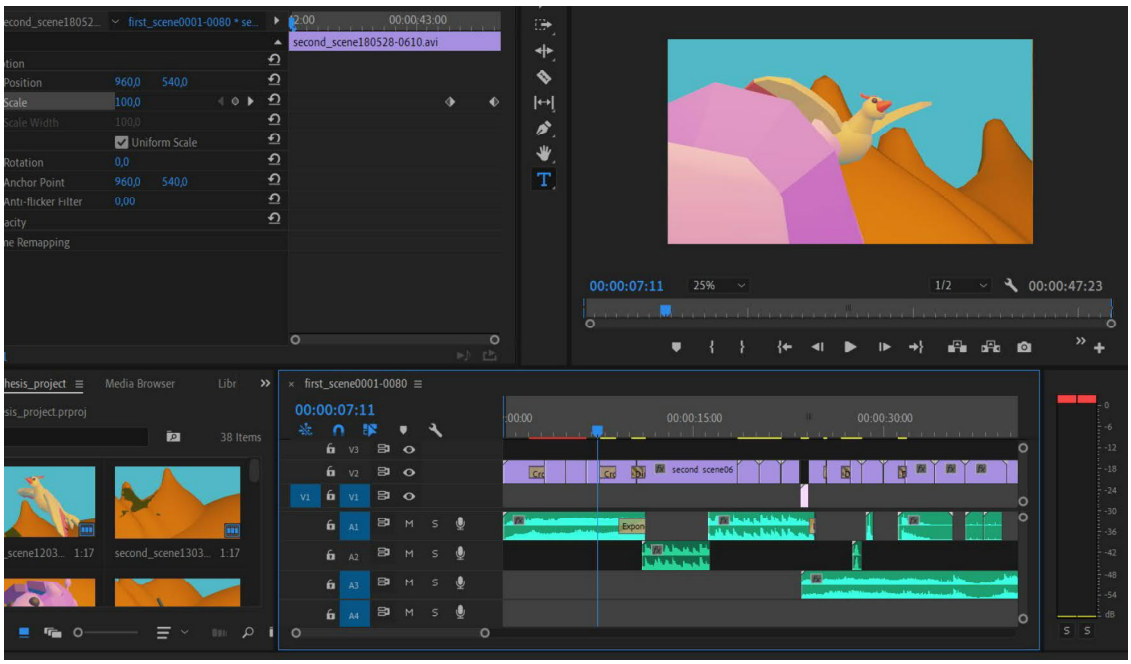


PICTURE 27. Staging process in Blender

4.2 Final cut

Building, animating and rendering the scenes were only the first half of my project, the last essential part was the editing. Editing the final cut is when it all comes together, and I got to fine-tune the pace of the story with correct cuts and transitions. I could think about angles and framing all day long while rendering the shots in Blender, but to make the story really tell itself I moved to work on it with video editing program which I was familiar with.

I edited the animatic with Adobe Premiere Pro 2020 (Picture 28). How you cut from one scene to another has a great importance to the flow of the story. Therefore, the editing process took some time, but it was needed in order to plan the flow for the final version. A good editing with the animated storyboard will help to save time when making the final animation.



PICTURE 28. Project open in Adobe Premiere Pro

4.2.1 Flow of the Story

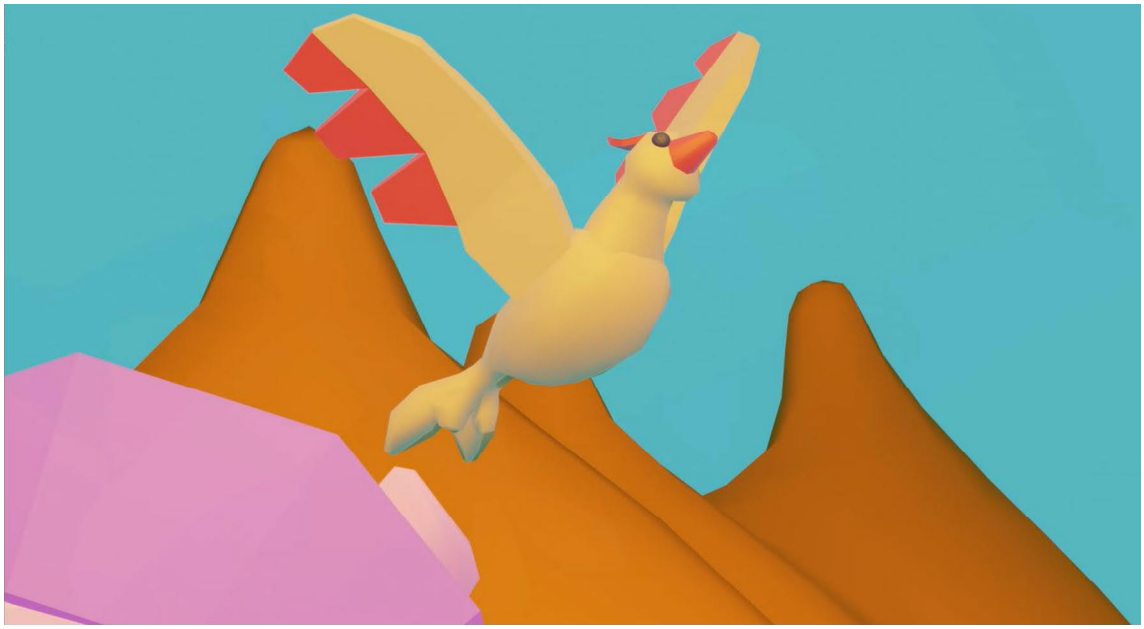
To make the flow of the story polished, I went through each scene and made sure they had the correct composition and relevant visual information. By jumping between full shots and close-ups I controlled the information the viewer would get from the scenes. For example, the scenes where suspense and strong emotions were essential parts of the story, close-ups were used.

The story started with a wide shot of the landscape seen on Picture 21 and cuts to full shot of the lion laying on the ground (Picture 29). As explained in Chapter 2, there are multiple ways to transition between scenes and I used cross-fade effect when I wanted to make the passage of time more evident. The scenes where there was something dramatic to be revealed had either black fade out or straight cut used, depending on how shocking and unsuspected the revelation would be.

PICTURE 29. Lion laying on the ground

The next scene cuts straight to a close-up shot of the lion's face, where it awakens and flutters its eyes as if something just startled it (Picture 30). With sounds effects I was able to demonstrate that it was indeed a voice from a bird that awoke the lion up. Over the shoulder shots are one of my personal favourites, so I wanted to add those in this animatic as well. The first time we see the bird, it emerges from the sky while the camera is looking over the lion's shoulder (Picture 31).

PICTURE 30. Close-up of the lion's face



PICTURE 31. The bird flies into the frame.

We cross-fade over to the bird's side of the view and look at the lion from the sky (Picture 32). During these scenes I found 3D especially helpful, since with 2D I would have ended up wondering about the rules of perspective far longer than I had to now. Since the bird and the lion are old friends they soon start running together through the landscape (Picture 33, 34). For this scene I needed a camera pan that would follow the characters as they run. This was easy to execute in Blender with a couple of keyframes.

PICTURE 32. Bird's point of view

PICTURE 33. Bird flies down to meet up with the lion

PICTURE 34. Bird and the lion run together through the sand

Since the facial expressions were solely depending on the eyes and body language, it was a relief to notice that with the music I was able to intensify the wanted expression. Regardless of the limited animations the models had, the playful feeling was relatively easy to accomplish with simple motions (Picture 35, 36).

PICTURE 35. Close-up to the bird's face

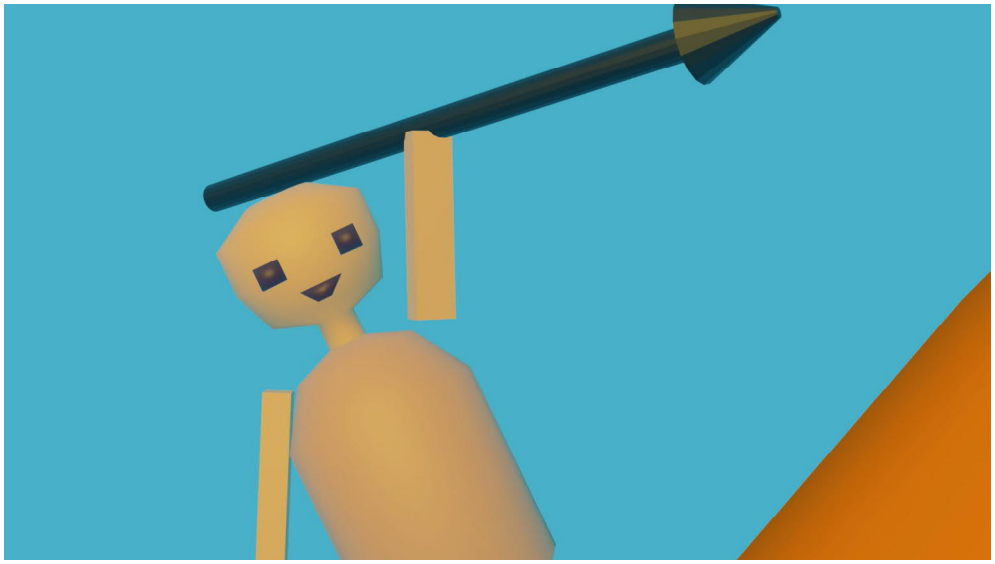
PICTURE 36. Close-up to the lion's face.

Originally there were two hunters in the storyboard, but I concluded that even with only one hunter the wanted action and movement could be demonstrated. The hunter ended up being a simple human shaped figure. The hunter is the antagonist, but the focus of the story is the bird and the lion, and especially how the lion goes through all different emotions. First happiness from meeting an old friend, joy from playing around, shock because of the loss of a friend, and finally the

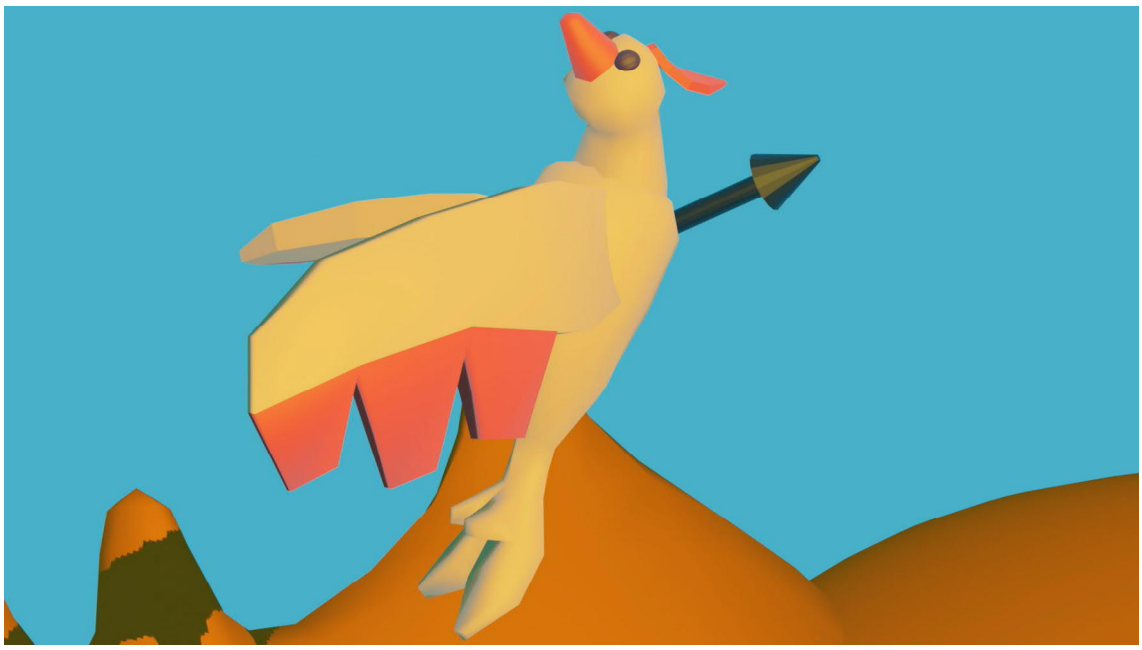
anger towards the hunter which turns into sadness after the revenge has been carried out. The hunter is seen for the first time during a wide-shot (Picture 37).

PICTURE 37. Wide shot reveals the close-by hunter

I switched the bow and arrow into a spear for sake of time (Picture 38). It seemed that a bow was not a critical part of the story and this way I did not have to worry about the mechanics of the bow and could focus on the more essential parts of the story at this point of the project. The moment when the spear hits the bird and makes the bird fall from the sky into the ground is the climax of the story (Picture 39, 40).



PICTURE 38. Close-up to the hunter as they get ready to shoot the spear

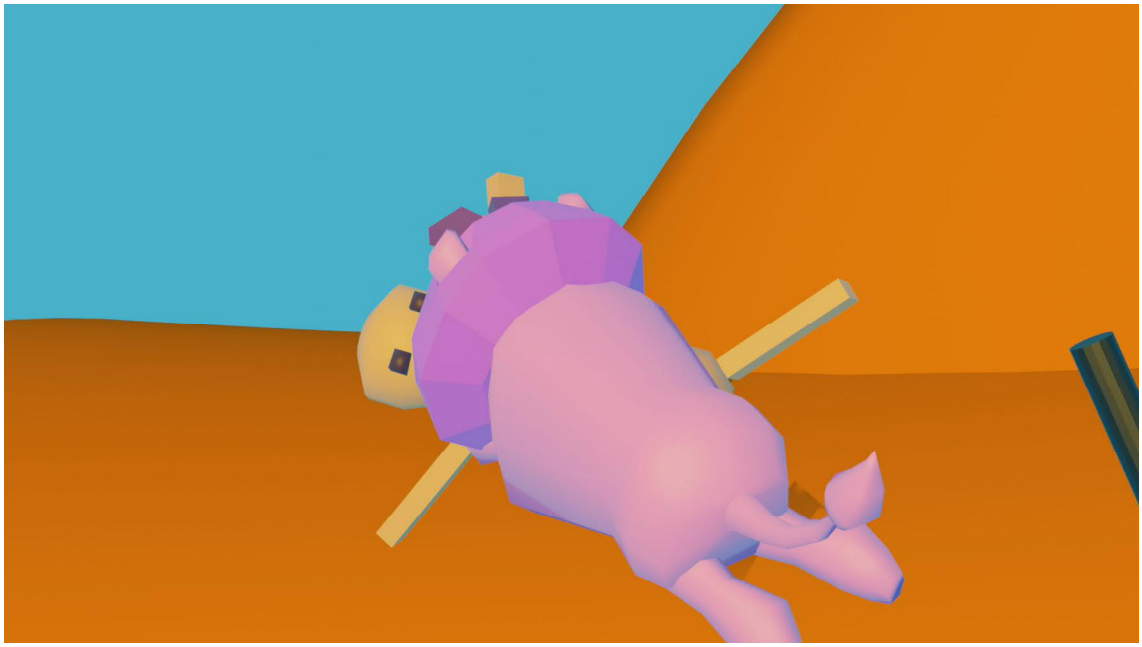


PICTURE 39. Spear hits the bird

PICTURE 40. The bird is flying on the ground

The unexpected happened and next we see how the lion reacts to this dramatic change of events. Expressing anger is thankfully probably the easiest emotion to show with only eyebrows (Picture 41). With 2D it could have been even more intense, but as an animatic is here simply to give you a direction and demonstrate the story I think 3D served its purpose well in this case. After the close-up, we see a full-shot of how the lion jumps on the hunter (Picture 42).

PICTURE 41. Close-up to the lion's angry face



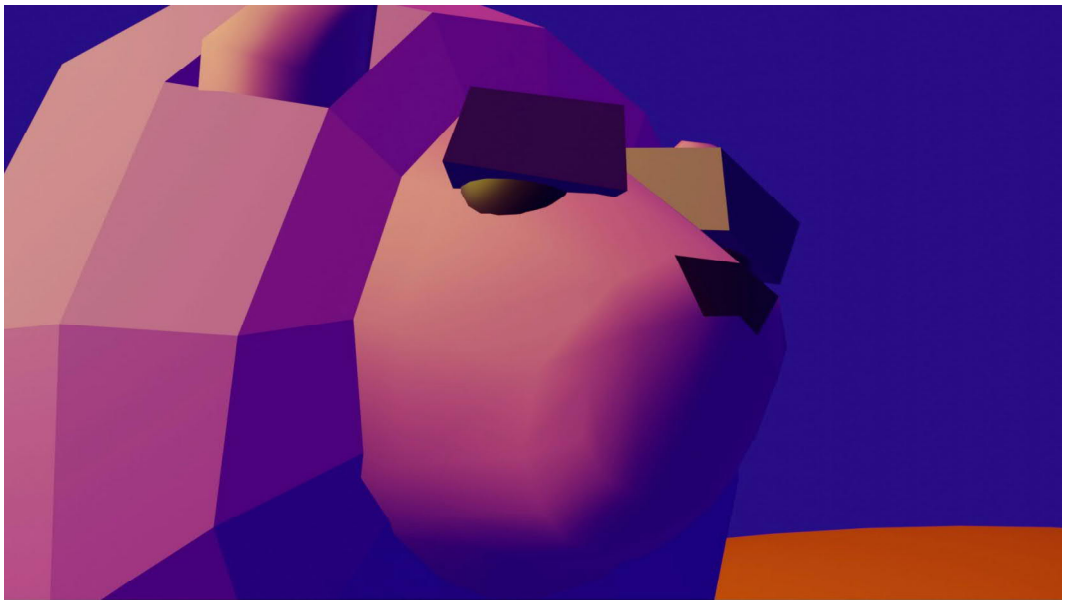
PICTURE 42. The lion jumps on the hunter

What exactly happens to the hunter is left for the viewers' imagination with a black out on the screen. The last scene fades in from a black screen and the grieving lion is sitting front of the dead bird (Picture 43). The dead hunter is displayed on the background but at this point the hunter is not relevant anymore. This scene is about how the lion is alone with its grief.

General day light on previous scenes served well for the previous shots, but for the last scene I wanted something more dramatic. As was mentioned in chapter 2, the lighting of the scene can have a huge impact to the atmosphere.

The night sky and warm light gave more intense feeling to the last scene and enchanted the lonely expression on the lion's face. The change in lighting also helped the viewers to realise that the lion had spent several hours by sitting front of the bird after taking revenge on the hunter. A close-up on the lion's face ends the animation (Picture 44).

PICTURE 43. The lion is grieving

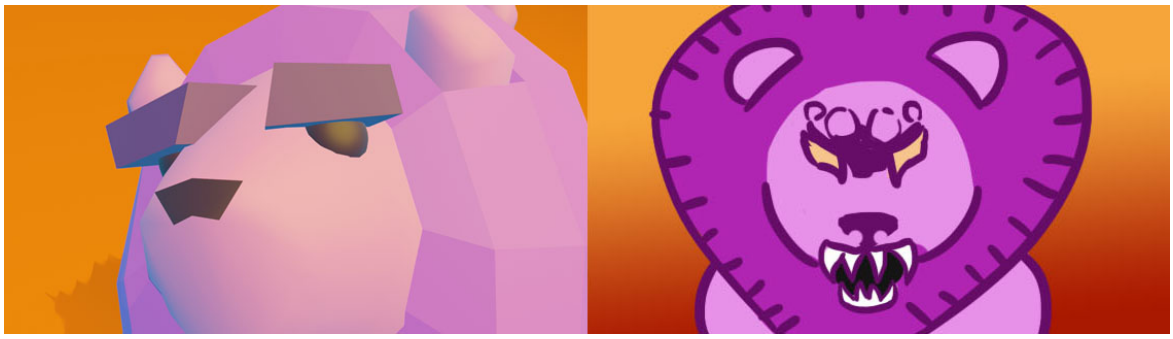


PICTURE 44. The last shot

4.2.2 Reflections from the Project

I had decided on the color scheme when I worked on the storyboard, so implementing the colors in Blender was an easy task. After adding models and lights in the scene it was time to start animating and working with the cameras. What I loved the most about working on the animatic with 3D was the freedom I had with perspective and camera movement. Because playing around with the camera was so easy, I ended up trying out even some crazy ideas I would not have even thought of if I had been working with 2D. This did backfire a little bit since the whole thing almost got too erratic with constant camera movement, and ended up wasting some time, but I think it was an important part of the creative thinking. Sometimes the best details of the story come up by an accident.

Animating the models was more time consuming than I had expected. Even with the simple shapes it was still something that took some precision. I did wonder if I should just move the characters around without adding any animation but that felt like it would not utilize all the good qualities of 3D. When working on the 3D programs, the angles changed a lot from the original storyboards. Originally the lion's expression was shot straight ahead, but while rendering the scene in Blender it had switched more to the side, making it into a 3/4 profile, as it felt more expressive angle with 3D models in play (Picture 45). I was able to do the whole animatic in 3D and it felt like a smooth and effective working method which I plan to use again in the future.



PICTURE 45. Comparison between the 3D and 2D storyboards

4.2.3 Sound Effects

Looking for high quality sound effects can be a bit tough for a one-man project, but thankfully the internet offers some adequate sounds. I wanted to get the right atmosphere and rhythm in the animatic, and sound plays an important part in order to achieve that. The animatic starts with a calm music, which turns into a more cheerful one. The lion and the bird are old friends who meet again, they run and fly together while enjoying the grand weather. This all suddenly gets destroyed by the nearby hunter. I needed to make the transition between the different tones smooth but dramatic. Sound effects helped me to get the wanted outcome.

Never underestimate the power of a good soundtrack. When you need to animate action scenes for your animatics, even a couple of frames are enough when the movement and sound are in sync. It is all about timing and making the illusion of movement.

5 DISCUSSION

Reading about animation and 3D art in order to collect relevant sources and information for this research was an engaging task. Finding books that solely focused on 3D as tool for animated storyboards was a challenge, so most of the examples come from online sources. Currently 3D seems to be a tool used to help the storyboarding process, but not many consider it as a main technique to execute the whole storyboard and animatic.

It was important to explore more than the technical details of creating models in 3D, so sources concerned with directing and visual storytelling were included in the research as well. Like a good interior designer tells a story with the shapes inside the room, the person responsible of the animatic must tell the story with the visuals the storyboard offers.

People who are enthusiastic about paintings could probably talk about the techniques and stories behind an art piece for hours if given opportunity. It is same with the people who are enthusiastic about 3D animation, art forms can tells us stories differently and it is the passion and knowledge that makes us able to notice all the small fine-tuned details that escape the eye if you do not know how to look out for it. It is easier to say that something is off about animation, instead of saying what it is exactly that is off. That is why I made the survey about 3D animated storyboards.

That survey gave a nice insight of 3D's place in some of the animation studios in Finland. I was lucky enough to get a couple of answers to and it helped me to comprehend the importance and impact 3D has had to professionals who have been working with animation for years. The answers were from people who all worked in different departments of the animation field, so it was enlightening to see where 3D stood from distinct point of views.

The Lion and the Bird project ended up being an important learning experience from the very beginning until the very end. The easiest part of it was creating the 3D models. There is something so straightforward about making the simple

shapes and rough landscapes. While working with the camera, it became apparent that some more planning could have done for the camera movement of each scene. The shots and scenes had clear ideas, but the camera movement itself had no firm plan to follow. The biggest challenge of the project was to keep the workflow consistent and clean, which could get messy if the scenes in 3D software were not correctly organized.

The evolution of 3D in the pre-production stage of the animation pipeline is ongoing. Methods for creating storyboards and animatics rely a lot on the personal preference. I believe if we got more open source programs like Blender, which makes 3D easy to access and use, it could become an even more popular tool used for animatics.

For traditional artists, 2D storyboards might feel more organic and be easier to organize, making them a more favorable technique when making animatics. Developing more programs that would have that organic touch that many drawing programs have and with simple, easy to approach user interfaces could make 3D tools more feasible even for those who have not familiarized themselves with any 3D programs yet. With present programs it is easy to implement 2D elements in the 3D environments but developing 3D in a way that it could be as flexible and intuitive as a drawing could be the next step of its evolution.

REFERENCES

Adib P. 2019. Dreamfarm Studios. https://dreamfarmstudios.com/blog/animatic-in-a-nutshell-the-storyboard-made-animated/

Ahearn, L. 2012. 3D game textures: create professional game art using photoshop. 2nd edition. Waltham, MA: Focal press.

Amigos3D. 2016. Exhibition-expo-3d-gallery-deco. https://pixabay.com/illustrations/exhibition-expo-3d-gallery-deco-1863344/

Baker, A. 2008. Tao – The ancient one. Digital Art masters: Volume 7. 1st edition. Adelaide, Australia. Ballistic Publishing.

Bancroft, T. 2014. Directing for animation. Everything you didn't learn in art school. 1st edition. Burlington: Focal Press.

Blazer, L. 2016. Animated storytelling. Simple steps for creating animation and motion graphics. 1st edition.

Cascarina, J. 2020. What is an animatic? https://animatic.squarespace.com/what-is-an-animatic/

Coulthard, P. 2020. Spitfire storyboards. Blender Grease Pencil–2D 3D Hybrid Storyboard–Animatic. https://www.youtube.com/watch?v=H10rQoSg41c&t=448s

Disney-Pixar. 2019. Crossing the Marigold Bridge from Coco. Pixar side by side. https://www.youtube.com/watch?v=FRLkTKDXuqY

Failes, I. 2019. Here's what made 2D animation in Klaus look like 3D. https://beforesandafters.com/2019/11/14/heres-what-made-the-2d-animation-in-klaus-look-3d/

Frozen 2. 2019. Into the Unknown (From “Frozen 2”/Storyboard to Final Frame Version). https://www.youtube.com/watch?v=bcgTuVNaoY8

D’Alessandro, F. 2013. IRON MAN 3 Animatic – Mansion attack. https://www.youtube.com/watch?time_continue=12&v=GiZRuOxiCGw&feature=emb_logo

Kennedy, S. 2013. How to become a video game artist – Insider’s guide to landing a job in the gaming world. 1st edition. New York: Watson-Guptill Publications

Paquette, A. 2008. Computer graphics for artists: an introduction. 1st edition. London: Springer

Phillips, P. 2012. Advertising – Storyboard: Cheerios keyframes. http://www.floobynooby.com/comp1.html

Raphael. 1511. The school of the Athens. https://en.wikipedia.org/wiki/The_School_of_Athens

Richardson, J. 2020 Six Essential Motion Graphic Transitions. https://www.schoolofmotion.com/blog/six-essential-motion-design-transitions-tutorial/

Schuller, O. 2019. Storyboards with 3D backgrounds. https://www.youtube.com/watch?v=9jqwF7CjkYs

Simon, M. 2006. Storyboards: Motion in art. 3rd edition. Focal Press cop.

Truby, J. 2007. The anatomy of story. 22 steps to becoming a master storyteller. 1st edition. New York: Faber and Faber, Inc.

Vagioo Ae. 2020. Pepsi-character. https://madmadly.cgsociety.org/ha1q/pepsi-character

Wyatt, A. 2010. The complete digital animation course. The principles, practice and techniques of successful digital animation. 1st edition. London: Thames & Hudson Ltd.

APPENDICES

Appendix 1. Survey – Anonymous answer

How long have you been working in the animation industry?
"20 years"

Do you often use 3D when making animatics? If yes, when did you start using 3D as a regular tool?
"Not often."

How has 3D affected/changed the workflow of creating animatics?
"It has allowed motion capture to enhance performance and the ability to include more dynamic camera moves."

Are there any instances where 3D has some specific qualities that makes it a better technique used for animatics instead of 2D?
"Generally, 3D animatics have smoother animation and are better used in scripts that have a lot of action."

Are there some cases where 3D has some qualities that make it a very poor choice for creating animated storyboards?
"There is still something very lovely and unique about artwork when it comes to showing emotions. Although 3D is now capable of creating almost life like humans and animation it is not yet possible to it with the tight time and budgets of an animatic."

Do you prefer making 3D over 2D animated storyboards?
"I am a specialist in 2d animatics, I use 3d to enhance some shots and use it for animated passion projects, but I prefer 2d animatics."

Any thoughts about the subject?
"I work in advertising so the answers you will get from someone working in feature films would be very different. Animatics for advertising are intense often quick productions. 2d is much better suited to making client changes on the fly."

Appendix 2. Survey – Antti Haikala

Your name & where you currently working (Optional, you can stay anonymous if you want): "*Antti Haikala"*

How long have you been working in the animation industry?
"20 years"

Do you often use 3D when making animatics? If yes, when did you start using 3D as a regular tool?
"So far in our own productions 3D has been the main tool - we usually try to skip 2D storyboards and such."

How has 3D affected/changed the workflow of creating animatics?
"It really hasn't as we haven't used anything else. Sometimes we use some toys like Lego to play around with storytelling before jumping on a computer."

Are there any instances where 3D has some specific qualities that makes it a better technique used for animatics instead of 2D?
"Action scenes are easier to do in 3D. However, comedy and emotion can be sometimes difficult. Also, 3D storyboard is more difficult to watch if you are not professional as 3D always invites you to look at the technical quality of the animatic whereas drawings and sketches are more easily seen as work in progress and leave more room for viewers imagination. 3D is extremely good also mapping locations and understand the geography of the story settings. It's also good for making budget friendly solution early on. "

Are there some cases where 3D has some qualities that make it a very poor choice for creating animated storyboards?
"It's difficult to set quality of the 3D animatic to be optimal. If it's not good enough, you can not really tell if story works or not. On the other hand, if you spend too much time on it, it's expensive. 2D might be better in shorter projects and ones with complex visual style that might require some elements to be 2D."

Do you prefer making 3D over 2D animated storyboards?
"Yes. "

Any thoughts about the subject?
"We have many good experiences of making 3D animatics so if we can develop a system where we can pick up all the good stuff from 2D animatics that would be optimal."

Appendix 3. Survey– Samppa Kukkonen

Your name & where you currently working (Optional, you can stay anonymous if you want): "*Samppa Kukkonen, Pyjama Films Ltd"*

How long have you been working in the animation industry?
"Since 2004"

Do you often use 3D when making animatics? If yes, when did you start using 3D as a regular tool?
"Never have."

How has 3D affected/changed the workflow of creating animatics?
-

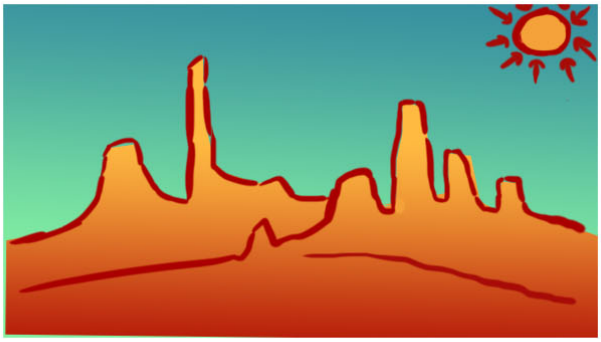
Are there any instances where 3D has some specific qualities that makes it a better technique used for animatics instead of 2D?
"I would imagine, from the perspective of traditional animation, that 3D animatic could be useful for making a rough animatic for a puppet animation where 3D space is also big part of story telling. Good way to plan something like what you propably must build."

Are there some cases where 3D has some qualities that make it a very poor choice for creating animated storyboards?
-

Do you prefer making 3D over 2D animated storyboards?
"Since we prefer and aim for a 2D look in our animations, it is more convenient to draw or photoshop our storyboards."

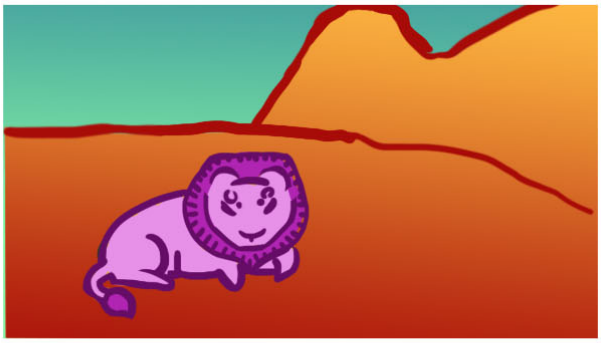
Any thoughts about the subject?
-

Appendix 4. Lion and the bird storyboard



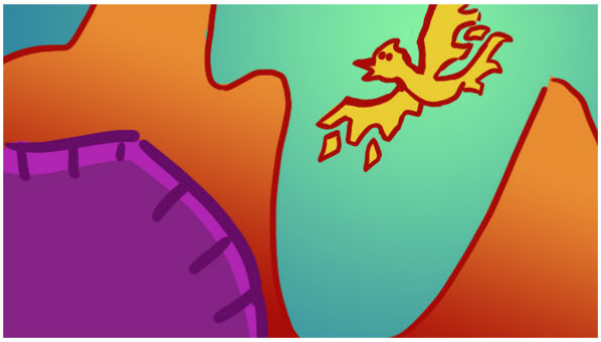
Scene 1

Wideshot of landscape



Medium shot
- Lion sleeping

Close up
- Lion wakes up

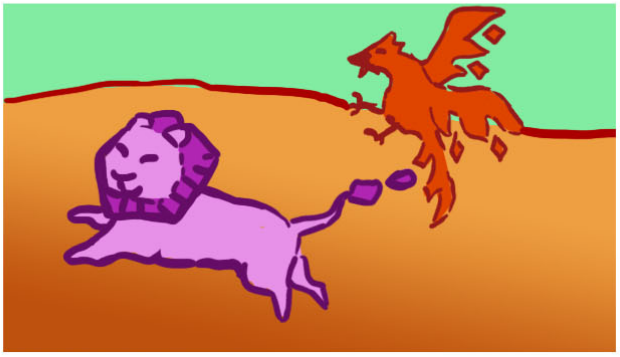


Over the shoulder shot - Bird flies on the sky

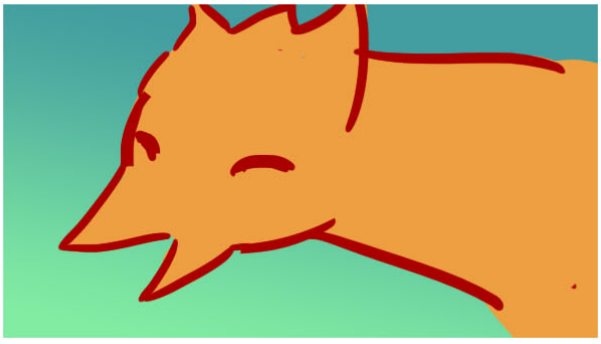
Scene 2

Over the shoulder shot from bird's view
- Lion getting excited

Full shot, camera pans along the running lion.



Full shot,
Lion and the bird play and run together.

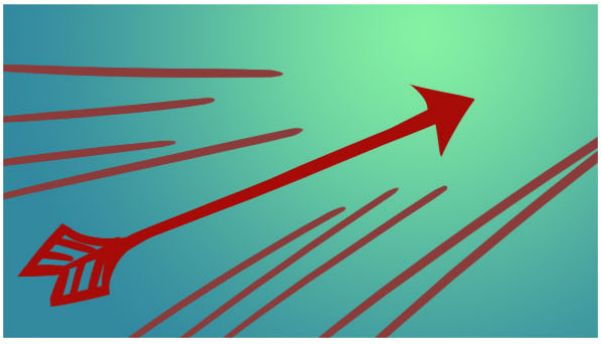


Close up
- Bird is laughing

Close up-
Laughing lion

Wide Shot
- reveals close by hunters

Close up
- Hunter draws an arrow



Close up
- Arrow flies through the air.

Medium shot-
Arrow hits the bird

Medium shot
-Bird falls from the sky

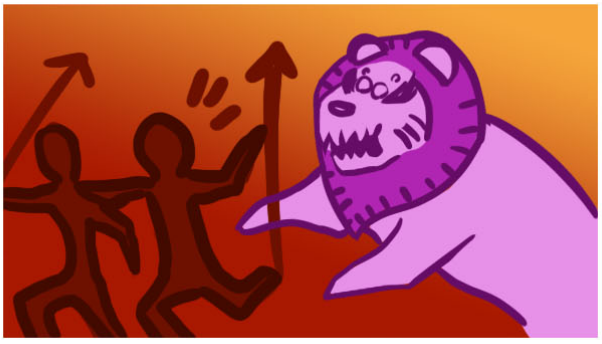
medium shot
- Behind the shoulder-
Bird hits the ground.

Close up-
Lion's shocked face.

Close up-
Lion's face turns angry

Medium shot
-over the should view-
hunters walking closer

Medium shot-
- Hunters shocked face when they see the lion.



Medium shot-
Lion jumps on the Hunters.

Appendix 5. The Lion and the Bird - Animatic

Video link: https://youtu.be/5aF4563scs0