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DIGITAL TOOLS AND ARTIFICIAL INTELLIGENCE IN CONCEPT ART

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Abstract
Concept art is a form of visual communication to express ideas and designs. In the video game industry and production pipeline, it is meant to solve the early design puzzles for other visual artists such as 3D modelers, texture artists, level designers and programmers. The term concepting is made for creating and visualizing something that has never existed before. Concept art is often discussed whether it is pure art or not because of its focus on conveying ideas rather than creating an art piece and whether it relies too much on shortcuts when it is expected to do the latter. This discussion is caused by a misunderstanding of the true meaning of the profession in practice. The common knowledge of the methods used in realistic looking concept art are often covered only in the field, miscommunicated in education. The information about the digital tools that could help creating realistic looking concept art are generally not taught. The beneficial use of photobashing and 3D models are essential shortcuts for fast visual imagery of ideas. Therefore, many people are not aware of how concept art is made most efficiently in tight deadlines and do not understand what is its importance in early production.

This thesis project was inspired by the author's interest towards the technical process of creating realistic looking concept art and finding ways to produce it more efficiently. The outcome of this thesis can help both experienced and beginner visual artists to learn about different methods and potentially inspire the use of them. A large portion of this thesis project also seeks the possibilities for people in the game industry with no previous skills with art or 3D to be able to express their ideas through AI. The thesis explores the usability of AI for concepting and studies if it could be beneficial in early game development process in its current state or possibly in the near future. This exploration has been done by analysing the effectiveness of currently existing AI concept art and producing new concepts with the AI for the sake of this thesis. Ethical analysis of the use of AI for creating art was made by performing empirical research online to gather data of its recognition as an art form. Lastly, the author of this thesis interviewed industry concept artists to share their experience and knowledge about the use of digital tools for concept art and gathered their opinions on using AI as a tool for their profession.

Keywords

concept art, digital tools, 3D, photobashing, AI, GAN, Artbreeder, time management

CONTENTS

GLOSSARY

AAA – High-budget video games created and released by major publishers

Abstract – Art that does not represent reality or nature

AI – Artificial intelligence

GAN – Generative adversarial network

Photobashing – Merging and blending of 2D or 3D assets to create an artwork

Iteration – Mathematical term for repeating tasks until desired results are generated

Kit-bashing – Blending parts from different model kits

NPC – Non-playable character

Paintover – Also known as overpainting that is painting over an artwork or a photo

Rendering – Refining details of 2D or 3D images

Sci-fi – Science fiction

Speed painting – Art done in short amount of time

Semi-realism – Stylised art that is partly realistic

Senior – A position for experienced industry workers

Thumbnail – Quick small sketch to plan out an artwork

1   INTRODUCTION

Concept art is continuously improving media in film and game industry, which requires both artistic background and technical skill. With higher demand for realistic result from improved graphics and tight production schedules, artists are learning new skills on digital mediums to produce concept art quicker and more efficient. Concept artists showcase a wide range of works from objects to environment concepts, but the technical knowledge to produce the high-quality product is seldom talked about. In some cases, viewers believe that the artwork they are looking at, made by a concept artist, is painted by hand from the beginning till the end. The process and knowledge of creating concept art are linked with the styles and methods, which are secret areas to many artists.

Concept art can be seen as a form of illustration itself, but by definition its purpose is to bring unusual and experimental ideas to life. Depending on the tools being used in the product and where it is shared in, it can be an illusion of a drawing. This thesis aims to research on which digital tools and methods are available for concept artists this day and how often these tools are considered as a standard in the industry. An ethical topic of this thesis is exploring the boundaries of these methods. Are these tools generally considered as a genuine and safe way of creating a product, or is it just a shortcut for making fast business? Is hard work more rewarding for artists than using shortcuts?

The main question this thesis will research on is to find out which digital tools are made for everyone, and how much about art fundamentals a person has to know to be able to produce concept art themselves. Subsidiary questions include comparison of various methods and analysis of how successful they are for the concept artist's job requirements. Ideally this thesis comes to closure with a conclusion to the most effective and rewarding working method for an artist, while benefiting the technology currently available. Additional questions seek answers for the potential of AI technology used in art form, in particular how much it can benefit the work of a concept artist and other designers today and the future.

Primarily this thesis will cover the theory of concept art and its development. Why is concept art shared and showcased in the social media? The beginning of the thesis will explain the various subcategories, and more specifically the realistic art styles that are often required in AAA game studios. To answer these questions, it is required to study the tools available for creating realism digitally and how to produce realistic artworks quickly enough to make it fit into the workflow of a concept artist. By viewing tutorials and speed paints from concept artists, one can study the workflow and tools being used. This also gives an idea if the artist can benefit from tutorials and brush sets, and if certain techniques and tools are more favoured than others. To give a more detailed preview of the workflow of a concept artist and the thought process, interviews in this research can give more answers than through inspecting. The results and conclusions aim to not state any styles or methods as superior to others, but to seek answers to which tools are suitable for concepting and require the least practise to start using.

One genre of the materials used for this study is tutorials. It is possible to review their educational worth. After gathering the knowledge for this study, it is necessary to review the contents through demonstration and comparing. Analysing demonstrations that are products of AI applications, one can compare them to hand-drawn pieces and make conclusions about their worth and usability for concepting. Interview questions for studio concept artists can be developed based on everything learned about current digital tools and general workflow. The answers and views of the professionals can be compared with the theoretical research material.

The risk for this project is the wide range of various styles and subgenres for concept art, which requires subjective comparison. This thesis is intended to focus on more realistic character and environmental concept art in video game industry, and the tools used to create them. Possibly, this research will not prove that any additional digital tools are in fact needed to create concept art, or that these tools will work for every studio or style. One cannot assume that every concept artist uses any additional tools, and there is a risk the author will not get to know most of the "artistic secrets" for this study. There is also a possibility that

AI generated artworks and concepts will not be generally accepted among artists or studios, resulting in discouragement of its use in professional environments. Despite all this, the results will end up gathering more current knowledge about the digital artwork process and its future possibilities.

2   CONCEPT ART IN PRACTICE

Concept artists, also known as conceptual artists, are designers in the entertainment industry and other media, whose primary objective is to visually communicate ideas. By practice it is communicating visual ideas rather than being an art form, and its name was created to describe the job assignment in the industry (Bucci 2017). The skills of a concept artist consists of a great understanding in art fundamentals, technical abilities, research skill, time management and strong communicational skills. The job of a concept artist may consist of designing characters, environments, objects and vehicles. There are multiple mediums for this position, but this thesis will focus on explaining the work of a character and environmental concept artist in the video game industry. In video game projects specifically, concept artist work is a key communication tool between other art and visual departments. Its importance is emphasised during the early stages of each project. (Indeed Editorial Team 2021.)

The use of conceptual art as a term has its roots in late 1960s, when an art movement was formed to pursue interest in idea-based art (The Art Story n.d.). Some of the early references for concept art however came from theatre in the late 1700s, as the field of costume and stage design began to develop and became a specialised craft. The art of costume designers aimed to either capture historical accuracy or visions purely made for production that has no connection to reality. This latter approach for designs was referred to as concept-driven. The work of costume designers is to go through collaboration processes during the production that required sketches and a finished drawing of the costumes for the characters. Similar tasks are given to character concept artists in video game industry. (Przybylek 2019.)

The idea of concept artist's job is different in the industry compared to the viewers of a product. To the public eye, concept art is what is presented online in galleries such as ArtStation, in promotional work as well as artbooks dedicated to video game concept art. Only a fraction of designs and concept art gets published and used in production, while others are omitted from ever making it to the public eye. That means the concept artworks that are polished and made representative are the only truth given to the audience, skewing the idea of what requirements and assignments concept artists have. (Anhut 2014.)

The rising devotion to become a concept artist, dedicated concept art schools and the skewed image of what the job is about, may have come along with the production being shared to public eye with glamouring artwork. The concept art books dedicated to video game titles have been a published media since 2009 and earlier but achieved a significant stage of publication and popularity in 2013 as consumer consumption (Teoh 2012). Typically, concept artworks were rarely pushed to be shared publicly. A major difference occurred when ArtStation, the platform to showcase and discover portfolios and industry work was founded in 2014 (ArtStation n.d.).

There is a high demand for concept artists in projects and early stages of planning because it is a financially sensible option in game design to plan visuals beforehand, therefore valuable for the production. This is specifically usual for video game projects that use 3D models. Character models that are in 3D can cost around 40-60 thousand dollars each for all the work that includes modelling, rigging, texturing and animating the characters to bring them to life. To draw multiple pieces of concept art for characters costs less and takes a shorter amount of time. Therefore, it is important that concept artists solve design problems early on the production pipeline, so no time or money is being wasted. (Rhodes 2016.)

Concept art as an occupation is also considered one of the greatest interests among digital artists who hope to step into game industry. As a result, it is believed the environment has become oversaturated and more competitive than

ever before. Are there currently too many concept artists? The answer to this question was pondered by Trent Kaniuga in 2018, an experienced concept artist who has worked on video game titles such as Fortnite (2017), World of Warcraft (2004) and League of Legends (2009). In one of his YouTube videos, he answered comments regarding the topic of differences in concept art and illustration. According to him it is apparent that there are not too many concept artists. The underlying problem is that not many artists understand in core level, what concept art is when they seek to be employed. Even recruiters for studios are not always sure what they are looking for in the art portfolios. The concept art is not often glamorous but production and breakdown art that is essential to the development. In this matter, the ability to prove their importance to the team is one crucial aspect for concept artists. (Kaniuga 2018b.)

The competition is high in the field but also consists of a great amount of misinformation. According to Kaniuga (2018b), some art schools can be at fault of this as well for teaching students incorrect methods and ideas of what concept art is in practice. There is a lot of competition, where only a handful of people know and do concept art as it is meant to serve a purpose in the development and product design. The value of concept art is to show the breakdown of how the artist can design and construct, the illustrating itself is considered as a finishing touch for the process. (Kaniuga 2018b.)

2.1 The importance of communication

It takes a great amount of skill to be able to produce high rendered and detailed works of art. But in concept art, being able to simplify work for a clearer picture is considered even more important in the pipeline of product design. Some studios require concept art to be high quality and match the game visuals, so it is easy to present to non-artist team members how the result would appear in the game engine. This also facilitates the workflow with other team members such as 3D modelers and helps them obtain more information for their work process. Character concept art is meant to orthographically present front, back and side views of a character and have simplified form for the details. The concept artists must be able to present their work as clearly as possible. The information they

will give to the modelers to build up the design for further process has to be easily understandable. Too-dynamic character presentations with many lighting and visual effects in an image makes it harder to interpret and may slow the production. If an artist gets too attached to details and takes too long to render their work, it will also slow down the whole process. Illustrators are expected to do more high-quality work that takes longer, and it is unrealistic to expect most concept artists to work the same quality in a shorter time. A common element that connects illustration and concept art is the purpose of selling an idea. (Kaniuga 2018a.) The purpose of fully rendered character concept art can be seen as a way to visually inform texture artists and animators as clearly as possible.

A way to speed up the process of concept art that anyone can learn and utilise, is to engage with the team to gather as much information as possible. Matt Rhodes is a known lead concept artist at BioWare in Canada. In his presentation for the Alberta University of arts in 2016, he shares his professional experience and insights about the video game industry. The experienced concept artist encourages new personnel in the industry inject themselves into the process. By this meaning, when acquired a task to create a concept, the concept artist must talk to everyone involved in the project. This includes discussing and asking questions from the writers and designers, who are able to give more detailed information about the project than the task at hand and will help the design reach its full potential. Negotiating and working together with those who will also be working with the design, help concept artists narrow the subject and restrictions early on to fasten the work process. (Rhodes 2016.)

The ability to communicate with the team can greatly improve the work of a concept artist. Rhodes (2016) gives an example of the character design of Han Solo from Star Wars in a space suit, whose purpose of design comes off as an aesthetic rather than supporting his character in the story (Figure 1). It is leaving only a little to work with for the writers and designers to build his character further. The design was solely produced with the expression of showing artistic skill in mind. To contrast this, another design for Han Solo is demonstrated in a more asymmetric design with multiple elements, that compliments his character

in the story as a confident adventurer and gunslinger. The result for more simple and memorable design was production of team work rather than only one vision. (Rhodes 2016.)

The only appeal this has is aesthetic. It may be 'cool', but it draws too much attention to itself and does nothing to support the character/story.

Ahhh... that's better.

Asymmetrical belt = swashbuckler/gunslinger
Open shirt = suave/cocksure
Boots and vest = adventurer
Scruffy/lack of adornment = not wealthy
Lack of armor = confident

Figure 1. Example of the importance of teamwork in character design (Rhodes 2016)

The more accurate and precise artists make the concepts and show how they work, understanding the technological or anatomical side of the design, the easier it is for further production to execute. Understanding 3D modelling workflow should come useful for concept artists to produce simple but effective designs that are not too complicated for the modelers and riggers to work with and take too long to execute. According to Rhodes, when it comes to expressing the skills for concept art, storytelling is what strikes the most in portfolios and stands out. It shows that artist can also do work that requires more than just following the basic guidelines and is capable of problem solving. This information can also be applied to that the artist is more capable of visual conveyance, that is the key factor of concept art. (Rhodes 2016.)

It is usual to learn the communication and limits in the studio and through work experience rather than academically. Secrets of industry knowledge were discussed by interviewer Bobby Chiu and concept artist Ashley Swidowski, who as a guest for the interview, shared her experience of working for Naughty Dog. In a YouTube video Chiu and Swidowski (2017) discuss what are the fundamentals of work for concept artist that are learned through studio

experience rather than education. Swidowski (2017) stated that some settings may come across as a surprise for the beginners.

Swidowski (2017) explained through her own experience that it is very important for a beginner to understand the technical aspects of creating concept art when pitching ideas. This means considering whether the designs are suitable for the game engine the studio is currently using. When it comes to professional knowledge that was not taught in her education, Swidowski found very early while working in a studio that her pitched ideas were not approved by technical artists in the same team due to technical complexity of the designs. One of the examples she gives is that her concept of a character having an open shirt, would have brought problems in 3D rigging the character. She stated that it is valuable to consider the limitations and challenges that may come with the designs and find ways to approach them with the team early enough. However, she stated that design limitations depend on every studio. From her video interview, a conclusion can be made that having previous knowledge in 3D and rigging can become useful in early stages of concepting, but it is not always limiting the concept. In the end, the limits are dependable on the studio's and game engine's capability of production. (Chiu & Swidowski 2017.)

2.2 Time management

One of the key factors for meeting deadlines for tight production schedules is planned time management. Concept artist Feng Zhu (2020) talked about the importance of time management in a video episode from his design school. In this lecture, Zhu talks about what he learned through experience and shares a plan chart of how it is possible to be efficient in tight production pipelines, where a design is expected in 5 days. Managing the design process from planning to deadline can be separated into three days that each focus on different steps of a design. The purpose of this schedule is to lower the amount of stress while still having time to polish a design. (Zhu 2020.)

Day one starts with roughly sketching as many ideas as possible. For Zhu (2020), the best time for this process is from 10 a.m. until 3 p.m. The reasoning he

expresses is that human brain is the most rested and active during these hours. Rough sketching of designs and coming up with constant new ideas can require a lot of brainwork and burn calories because of the intense thinking process. The purpose of the day one is to not finish a concept, but to create preliminary design choices for later decision making. (Zhu 2020.)

The rewarding mentality for this process, as Zhu (2020) explained, is that an artist can end the day one with a lot of confidence after producing multiple rough sketches, thumbnails and ideas. After one of the rough sketches has been approved, the thought process for detailing and experimenting can begin the next day. Zhu discourages artists to use multiple days to gather references for a design in early process, as in the end they do not require a lot of thinking and does not produce final designs. Finding references, according to Zhu, is ideal to execute during the free time outside of work and use the gathered materials as a helping tool for the planned rough ideas. (Zhu 2020.)

Day two is dedicated to cleaning up the chosen rough sketch and figuring out the technical aspects of the design. This process is once again time and energy consuming as it requires a lot of thinking. It is recommended to focus on detailing and designing elements early during the day, as the drawing process itself tends to be more autonomous to artists and requires less thinking. After having a clear plan for a design, the end of the second day can be used to block out any necessary 3D builds or to begin polishing the work. Ultimately, day three and further can solely be used to polish and finish the design to be presentable. (Zhu 2020.)

2.3   Requirements and realism

Realism as an art style aims to create a piece to look as natural and lifelike as possible, portraying something as if they were taken from real life. In art studies, realism is one of the first subjects to learn as it builds a base for visual library. When it comes to art fundamentals, it is required first to learn the rules of realism in nature before breaking the said rules for more stylised works. This is especially important in human anatomy, when applying the learned skills of realism to

experiment with character designs with exaggerated proportions. In the end, all stylised works have been based on the learned rules of reality. Developing technical skills for art have the same starting point of practising realism, some of which stick with it as a preferred art style. (Sawyer 2018.)

The ability to visually present breakdown in design has more value than illustration in production pipeline. However, this may vary in different studios where it is highly valued to produce realistically rendered art for the sole purpose of selling an idea instead. In this case, many talented concept art designers fail to get a chance in game development because of their lack of knowledge in realistic rendering. This is especially required in many AAA game studios, who seek for photorealistic works to match their already established visuals. If an artist desires a job in a certain studio, it is good to consider research on the pipeline of the studio in question to learn their methods of working and processing. (Kaniuga 2018a.)

Some studios prefer simplified and clear designs, while others require photorealism. For example, Riot Games for League of Legends (2009) may not require photorealistic styles but they use semi-realism in their visuals that require the ability to produce detailed and highly rendered artworks. It is also required to have character skin concepts in certain camera angles to showcase how the designs would appear in the game (Figure 2). This knowledge can be implemented early in the portfolio building, showing to the studio the potential fit for the team. (Kaniuga 2018a.)

Figure 2. League of Legends concept art (Bayura 2019)

Using too much time for rendering a single concept art is a risk to the whole production and might cause the artist to lose their job. How come some concept artworks, especially for AAA game studios, are required to have photorealistic rendering in that case? In video game industry, concept art is essential for the early production as it marks the style of the project's direction. Therefore, in high budget video games with the latest graphics, the possibility for realistically rendered environments and characters are made possible with high poly count. This can then be seen as a need for equally realistically looking concepts that will match the production and set a style and direction. Realistic concept art is the first design element to explore the immersion and mood that is important in video games that aim for realistically immersive experiences. (Park 2015.)

3 TOOLS FOR CONCEPT ART

Producing many designs in a short period of time can be challenging. As stated in the previous chapter, realistic concept art takes relatively much longer to produce yet it is a usual standard in major AAA studios. Photographically accurate character and environmental concept artworks are necessary for projects that aim for realistic outcome as they also help other technical artists such as modelers and texture artists to have a clearer vision for their part of the work. With the right tools, the work for concepting can be expedited and made clearer.

A good concept artist that is marketable for a wide range of studios, is a great visual communicator who can fuse a variety of skills. Studying to be employed in the industry that is a constantly changing environment, requires flexibility on tools. Students who focus on learning the use of certain software for concept art, might come across problems in the future as the software may already be outdated after graduation. (Bucci 2017.)

3.1   3D and kit-bashing

Quality and speed are essential for video game concept art and one of the time-consuming aspects of creating art is putting everything in scale and perspective. Whereas 2D designs are important in ideation and visualisation, the time management problems occur when designs are meant to present to 3D modelling department to interpret. To overcome this challenge and extra work in the production pipeline, concept artists have started to implement 3D elements and bases for their projects to try different angles and build concepts with final game production in mind. (ArtStation Magazine 2019.)

In game design, level designers use the method called *greyboxing* (Figure 3) to prototype a rough base for an environment that concept artists can also utilise. Blocking out a 3D scene to paintover afterwards expedites the environment designing process greatly (Figure 4), because it skips the process of planning a perspective and realistic lighting. (Kaniuga 2018c.) According to a concept artist and art director Shaddy Safadi (2015), it is considered as important industry knowledge for today's standard for concept artists to use 3D models as a base for art to paint over, especially when it comes to complexity and time management. The advantage of using 3D models as a base for characters and environment is that they can be reposed and rearranged as many times as possible in a short period of time, therefore skipping the process of early sketching and perspective drawing. There will be more time to focus on delivering the design and concept. The same 3D models can be used multiple times in different projects and the artist does not have to build the 3D models themselves. Using 3D models in artist's works are made easily accessible through

purchasable and downloadable readymade 3D models that are shared in asset libraries. (Safadi 2015.)
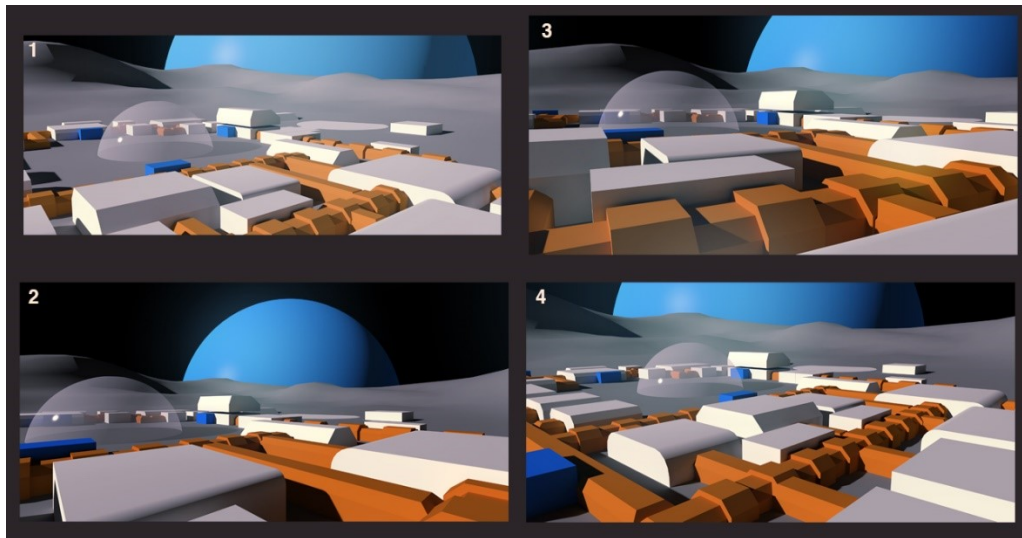

Figure 3. Tony Holmsten's blocked out composition of a base that is done in Modo 3D software (Holmsten 2016)

Figure 4. Final concept art (Holmsten 2016)

The technique where pre-existing 3D models are utilised to create something that has not existed before is called "kit-bashing". In theory kit-bashing as a technique is very similar to photobashing that merges and blends images together, except it is commonly associated with 3D software instead of Photoshop. It skips the process of using days to model multiple objects and lets the designer get into the workflow of building an environment faster and concentrate on conveying the idea. This has been made possible by providing collections of rigged 3D models

also known as assets for artists to use and assemble in their work. (KitBash3D 2020.)

Blender Market, Turbo Squid and Sketchfab Store are some of the many 3D asset stores that offer wide variety of rigged models that are ready to use in projects. Each model has their own licensing artists should be wary of before purchasing and using. Some of the 3D programs used for concept art that also provide presets for assembling a scene are Modo, Blender and SketchUp. (Petty 2018.)

Modo is a 3D software that is used to compose and block out complex scenes. It is especially useful for architectural concepts that require a lot of depth and perspective (Figure 5). Among environmental concept artists, Modo is considered as one of the easiest to work with because of its simple UI. It is a tool for 3D modelling but also for rendering, animation, texturing and constructing ideas for a scene. The access to highly rendered meshes, presets and materials eases the process of using Modo as a starting point for both fully rendered concept art and Photoshop paintovers. The possibilities for different shadings and fast rendering make it ideal to work on for both planning and rendering. (Harisova & Agrawal 2020.)
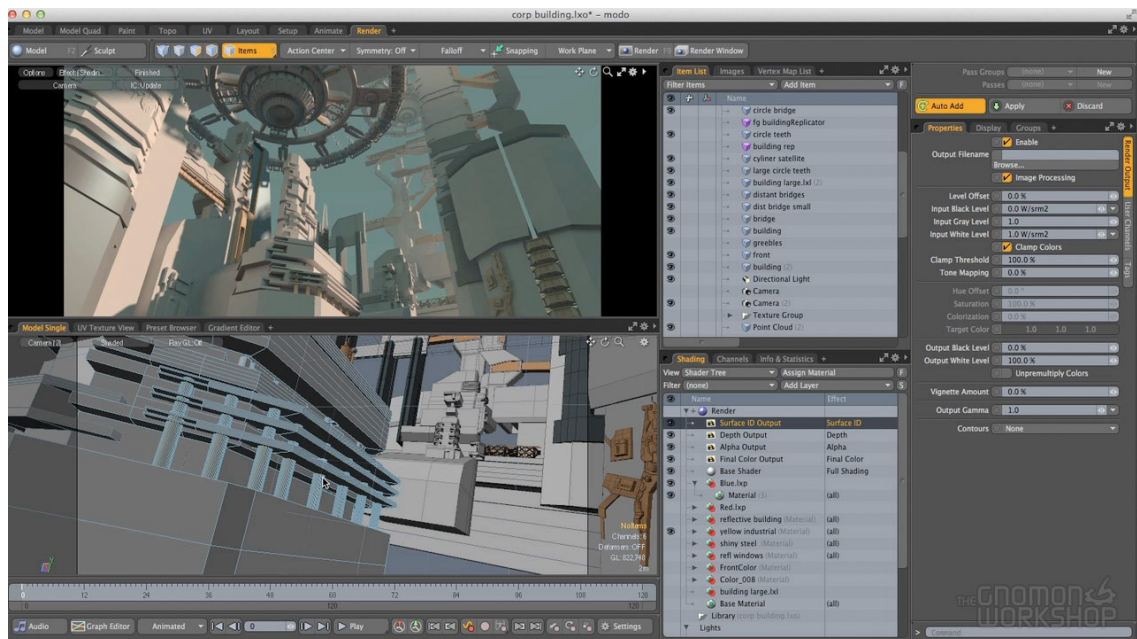

Figure 5. Screenshot of Modo layout (The Gnomon Workshop n.d.)

Blender differs from Modo by its free accessibility. It is a beginner friendly tool for being free to use and having plenty tutorials online to explain its use. Blender is also continuously updating its features and expanding its market by letting the users create addons to ease the user experience and production. Blender, just like Modo, is capable of rendering 3D scenes for concept art purpose in fast pace (Figure 6). By core, Blender is made for 3D modelling pipelines but it is also capable of texturing, shading, sculpting, animating and building with kit-bashing (Feghali 2021). Unlike in Modo however, the shaders and texturing in Blender are more complicated to execute and requires additional learning.

Figure 6. Example of using Blender for concept art (Feghali 2021)

SketchUp is a software that is accessible to use for free on personal projects but requires purchasing for commercial work. It is also possible to use a free version of SketchUp in the web browser instead of downloading a desktop software. (SketchUp 2022.) The workflow of using SketchUp is creating a base model and perspective to work on (Figure 7). It is a great tool to skip the process of working with perspective and simple shades.
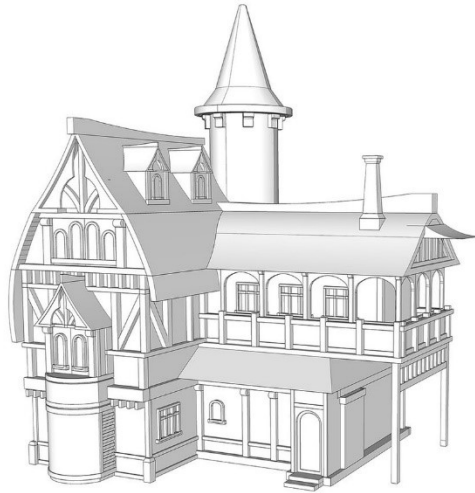
Figure 7. The use of SketchUp as a base for concept art demonstrated by Samantha Kung (Kung 2019)

As a software, SketchUp provides a simpler approach to blocking in designs and layouts, but it might not be as effective to create large scale scenes compared to Modo and Blender. The product requires more overpainting and texturing afterwards when it comes to producing a final design. Therefore, SketchUp is more popular in concepting buildings, interior design, vehicles and other geometrical designs. (Kung 2019.)

3.2 Photobashing

Photobashing is a form of digital art that utilises photo editing software such as Adobe Photoshop. The difference for regular photo editing and digital art is that in photobashing, multiple images are bashed together and painted over. This gives an instant access to highly rendered textures and realistic elements in an artwork. Photobashing is a great tool to produce realistic concepts quickly and make them as clear as possible for technical artists to understand. Photobashing requires a good understanding of light, composition and depth to be an effective tool to skip time consuming steps. In some cases, the use of photobashing is referred to as cheating compared to other techniques and its legitimacy as an art form is debated. Artists that lack experience and skills in general lighting and composition can find it difficult to produce works that use photobashing. This

brings respect to those who are capable of using it professionally. (Heginbotham 2018.)

Photobashing relies heavily on ready-made imagery and 3D models, thus there are both free and purchasable assets available online for artists to use. When creating photobashed artworks, the quality and resolution of an image must be considered. Most high-resolution images and 3D models are not available directly and not every source material is legally allowed to use either. When using this technique to create concept art, an artist must rely on copyright free images, paid licenses or own produced images. Some resource websites such as PhotoBash are dedicated to help artists with photobashing. (The Graphic Assembly 2020.)

Concept art consists of many sub-categories and photobashing as a technique proves itself to be flexible to serve many. Since its technical possibilities, it is favoured for character, creature, environment, object and costume designs. In video game industry and especially in AAA studios it serves as a purpose to match to the high visual graphics of a game project. To speed up the creation of photo realistic pieces in concept art, photobashing is a favoured technique by many concept artists. Picking up the right images and merging them together sounds like a simple task, but in reality, it requires a lot of processing and knowledge in art fundamentals. The imagery must be manipulated and edited to blend in together to create one harmonic and cohesive picture. (Justamante Jacobs 2018.)

To support the idea of photobashing being a technique that requires another type of learning besides photo editing, while also quickly producing ideas visually, the author of this thesis reviewed an art book that introduces the use of photobashing at a professional level. Artist Nivanh Chanthara (2019) has demonstrated his photobashing technique in his art book Dreaming in Mech The Art of Nivanh Chanthara. He demonstrates it through a visual tutorial, that includes multiple steps of his process of creating art and explains the steps with his own words. (Wade & Mon 2019.)

Nivanh Chanthara, is a senior concept designer and an artist who is known for his futuristic and post-apocalyptic robot designs and illustrations. His works are very technical and realistic, full of detailing. His passion for mechas came from Japanese anime cartoons he used to watch as a child (Wade & Mon 2019, 158). The art book Dreaming in Mech published by ArtStation in 2019 features his works, some of which have been using photobashing and kit-bashing. In this book he additionally shared a tutorial and an interview to explain his work process for both photobashing and drawing. (Wade & Mon 2019.)

For Chanthara, photobashing is a feature in one of the techniques he developed to create art. According to him (2019) in his artbook Dreaming in Mech, this workflow helps him to produce images quickly and get his ideas down before they change to something else. It is a strategy he can implement in many different projects. (Wade & Mon 2019, 148.)

The photobashing tutorial in the artbook features an environmental piece that became a cover art for Chanthara's friend's book about Honk Kong urban exploration (Figure 8). Chanthara explains that he started to work on this piece with a photo that was given to him, as it will already give him a perspective and theme. During the process, the image was first cleaned from loose objects and details through editing and some additional ideas were subtly transferred into the work. This step provides an artist a clear base to work on without unnecessary details that could ruin the immersion, while keeping the base of the environment. After that, the photobashing technique was used to add buildings in the scene as it needed to feel more oppressive. The buildings were made taller and toned to match the colour theme and lighting. The detailing of the piece was to compliment urban exploration as it was the theme for the artwork. For scaling purposes additional junk, dirt, steam, people and other details were edited in. This helps contrast the size difference of the buildings and the objects in the scene. Because of Chanthara's experience as a graffiti artist, he was also able to insert some of his friend's graffities into the artwork to bring life. This could be considered as a personal image bank for photobashing. (Wade & Mon 2019, 150–153.)

Figure 8. Book cover for HK Urbex, created by Nivanh Chanthara (Chanthara 2018)

Altogether, the process of producing a photobashed piece firstly requires cleaning any kind of unnecessary objects, tuning new added images to match the environment and lastly adding details into the environment. The process requires both editing and painting skills, while also having a good eye for tones, lighting and supportive detailing. During the whole process, the tone of the images and lighting must be always considered. Because Chanthara was given a photo that he could use for this work specifically, he was able to keep the mood and most of the image without worrying about the rights of using it as it was.

In the tutorial section for Nivanh Chantara's artbook, he also expresses the faults of photobashing. He sees photobashing as a powerful tool and a shortcut, but it does not give easy access to artistic development. He emphasises on the importance of learning the essential fundamentals of the art before learning to break the rules of it. (Wade & Mon 2019, 148.)

3.3 Boundaries for photobashing

Photobashing as a method is heavily reliant on photos and ready-made kits to construct a concept, so it has been a debate with artists to create photobashed artworks using third-party imagery due to copyright restrictions. It is a common practice for a photobashing artists to use stock photos in their works when necessary. While constructing concept art with this method, it is in the artist's responsibility to make sure that the imagery borrowed and used does not break the rules of plagiarism or copyright infringement. (Creative Bloq 2015.)

The discussion about the boundaries for photobashing were most present when the technique became more known by both artists and consumers. This was after the increasing online presence of concept art and digital painting, photobashing enabled quicky rendered digital art that used photographs. Adam Duffman, an experienced artist in the gaming industry also questioned the topic of photobashing in 2016 on his video "Is Photobashing Art?". Duffman (2016) questioned in his art talk if it is considered as real art as an example to use 3D models and assets in 2D artworks and concept art, or if it is considered as cheating as it has been debated. Duffman (2016) believes that since photobashing is a relatively new subject and technique in digital art, the most recent artists might lack the education to know where the photobashing originally came from and what is the limit of using it. (Duffman 2016.)

The concern for the misuse of the technique was expressed. One of the misuses of photobashed concept art is to edit a photograph only slightly with a software and call it concept art. It is considered misuse, because it does not serve its purpose in the skills of concept art that is to visualise ideas and could be mistaken as a product for photography instead. The same problems of misusing the technique could occur if an artist painted over a photo and called the outcome as a painting. Edited photograph with a filter is not considered as concept art, it is considered photography. But if asking opinions from photographers about this topic, they might call it amateur photography instead that uses a cheap filter. The work does not fit into established categories. (Duffman 2016.)

Adam Duffman (2016) introduces the use of photography in art through history in his art talk video about photobashing. Some of the early works that use a technique similar to photobashing could be found through the 1900s, more commonly known as an artform called collage. Collage is a traditional art form that uses photographs and textures from nature to form one cohesive art piece without the need to physically draw or paint. What differs collage from photobashing, is that collage is a more widely accepted art form and considered as fine art whereas photobashing is not. (Duffman 2016.)

The critique towards photobashing does not often come because of the technique used, but due to how honest the artist is about using photobashing in their work. A trained artist or someone with experience in Photoshop can see the use of photobashing because of the lack of hand painted brush strokes or differences in quality across the piece. In addition, falsely labelling artwork as something it is not hardly finds its appreciating main audience. (Duffman 2016.)

One of the examples for photobashing and concept art becoming a wide discourse in the social media, occurred after video game Resident Evil Village published by Capcom in 2021 released an art book along with the collector's edition. This art book had concept art of the game, including some of the character design concepts. One of the fans of the franchise found a reference photo that resembled a concept art used for one of the most fan favourite characters in the video game, Alcina Dimitrescu. A comparing picture (Figure 9) was posted on Twitter with no ill intention by J.J. the founder of Residence of Evil network, but it escalated into further conversations about whether the concept artist was faulty in breaking the boundaries for using a large portion of a photo for this character design. According to the conversation that took place, without knowing the original source for the photo and its copyrights, it could have been speculated the design was being guilty of plagiarism. (J.J. | RESIDENCE of EVIL 2021.)

Figure 9. Comparing the original photo from 1938 and the concept art of Alcina Dimitrescu that ended up being the final design (J.J. 2021)

Dimitrescu as a character gained much attention and admiration for her recognizable design even before the Resident Evil Village's release (2021). When the original reference photo was shared publicly, people were shocked by the similarity and reacted to the concept artist's work by questioning the ethics of it. A majority of people were accepting towards the working method stating it was normal to do in concept art, while others saw this as lazy design for copying too much of a singular photo. Her design and silhouette are almost identical to the historical photo, which makes her stand out from the other characters in the video game and not fitting to the usual style of the franchise's designs. Concept art being for visualising ideas, it is considered out of boundaries to use a singular photo for a considerable portion of a design that already exists. (LavenderTowne 2021.)

4 ARTIFICIAL INTELLIGENCE USED IN ART

According to what has been studied, photobashing is a favored technique for realistic concept art because of its time saving process and detailed output. However, the problems occur when the technique relies on pre-existing imagery. What if art could be made quicker while not having to concern about the rights of an image? The AI technology for creating art has been a growing trend since the introduction of Alexander Mordvintsev's research software Google DeepDream in 2015. (Schneider & Rea 2018). DeepDream was trained to identify visual features and shapes from photographs to generate digital images. The images generated with this AI were so fascinating, new and psychedelic that the art form was named "Inceptionism". The name was given after the algorithm used to generate the images. (AIArtists.org n.d.)

The technology behind these image generators is called Generative Adversarial Networks, shortly GAN. It uses two neural networks with opposite tasks to learn generate or manipulate an image that is formed from interaction of both. (Kulicki 2020.) The concept for GANs was first introduced in 2014 by Ian Goodfellow, but only became widely known afterwards in 2017 as artists started to see the potential of it. The tech was considered an improvement to Google DeepDream for being able to generate unique pieces instead of relying on pre-existing images. (Schneider & Rea 2018.)

In GAN's model (Figure 10), the first network called "Generator" tries to learn and produce an image that comes from a set of singular objects, carefully studying how they look and learning the boundaries. This can be applied to how the "Generator" learns what a cat looks like for example and tries to produce an image of it. Then the other network that is referenced as "Discriminator", studies the produced image, always questioning the rules and boundaries from the first network and whether the image is fake or real. This makes the "Generator" constantly iterate and learn better ways to generate cat images that are as true as possible. In the end, only the images that manage to fool the "Discriminator" pass as output for an image of a cat. GAN constantly requires new data to study

so it can be trained to be more accurate. Its results heavily depend on supervising its workability and providing new data to learn from. (Serrano 2020.)
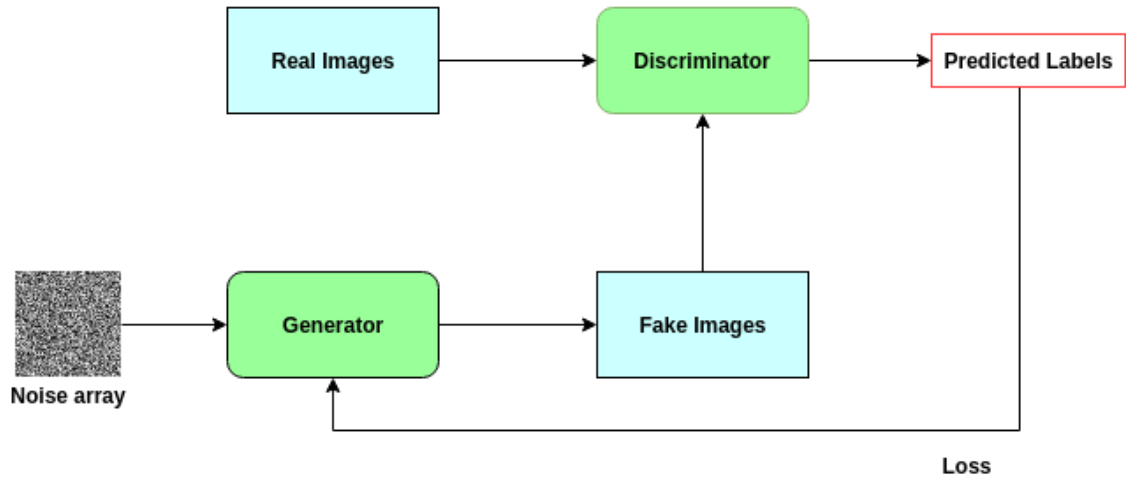

Figure 10. Diagram that visualises GAN's learning to generate given labels (Rehman 2020)

One of the well-known AI tools that is used for concept art is Artbreeder, formerly known as Ganbreeder. It uses evolutionary algorithms that produce "Genes" and cross breeds, when two or more "Parent" images are being fused. It benefits from user creativity, uploads and collaboration to expand its genes and learn the rules of generation. The models for this technology Artbreeder use are called BigGAN and StyleGAN, which both have been trained with images for different tasks. Artbreeder can be used to generate portraits, landscapes and characters for concepting. When using Artbreeder, it is possible to upload new images that will try to fit in the already existing database of features. (Simon n.d.)

Vizcom AI is also a developed experiment with GANs and it started as an assistant for car designers. Over time the AI was built to have an automatic rendering tool for 2D drawn cars. It could render car drawings made with markers, pencil and other traditional drawing tools once uploaded. Vizcom also has trained the AI to create character, object and environmental concept art. (Vizcom n.d.)

NVIDIA Canvas is an AI developed by NVIDIA that turns basic brushstrokes into realistic landscapes. It is powered by GauGAN2 AI model and requires RTX

graphics card to work properly. This AI is advertised as a shortcut for backgrounds and environmental concepts. The materials can be added by loosely drawing into the canvas with different colors. There are also different preset styles to modify the lighting and the look of the concept. (NVIDIA Studio 2022.)
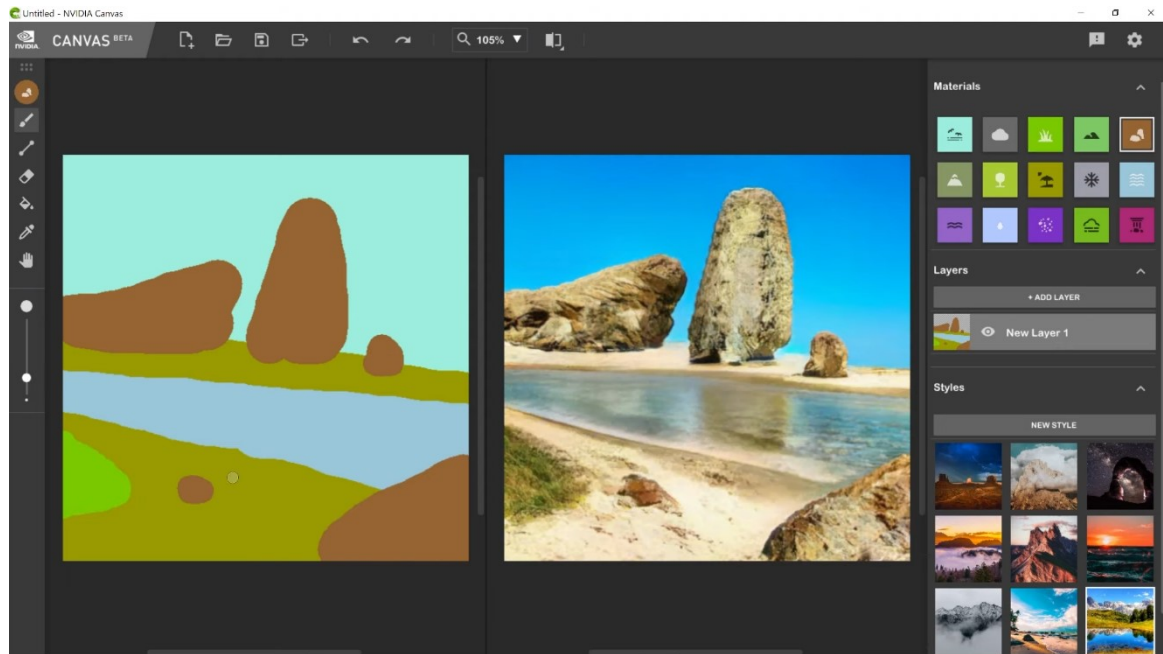

Figure 11. The layout of NVIDIA Canvas (NVIDIA Studio 2022)

4.1 Ethics of using AI

The imagery produced with Artbreeder is unique and all the images produced are public domain. Therefore, commercial products made with the help of Artbreeder are legally allowed, which allows concept artists and designers to use its tech for their own projects. The support however strongly encourages its users to cite the use of Artbreeder when it is obvious. (Simon n.d.)

The discourse of using AI to create art is still a subject of debate, because of being relatively new technology, neither boundaries nor rules of using it have been set for its use as a technique. The same shift of adjusting to new technology of creating art was discussed in Adam Duffman's video (2016) about the use of photobashing. In contrast to photobashing, the AI art can be done by anyone and does not require artistic expertise to create art with it. Because of the technology

still being new and comparable to artworks created by hand, many have not yet learned to distinguish the difference of handmade art compared to AI generated. The person sharing AI generated art online can omit the mention of the technique. This can lead to spreading misinformation, that is meant to convince the viewer to believe that the art portrays trained skill.

To prove that most people will not instantly think of the use of AI as an art technique, nor have knowledge of its range of use, the author of this thesis performed empirical research that used quantitative survey to collect data for analysis. The survey was performed on social media and gathered people randomly from diverse backgrounds. It was important to state in the survey that both artists and non-artistic people could participate in this research so the answers could differentiate the artistic knowledge from the general knowledge of art techniques. This way the research can prove whether it is easier to convince about the use of AI in art when it is presented to people who have no trained knowledge of using or recognizing different art techniques. After the results of the survey, it was also discussed and examined, what elements could have been recognizable as AI. Along with gathering data for the recognition of AI, the survey additionally gathered general knowledge of the use of photobashing and how many people recognised it as a technique. (Appendix 1.)

The survey, performed during April 12-13th in 2022, questioned participants' knowledge in art techniques. Participants were questioned if they were able to recognise the use of any art techniques from an artwork that was shown. Some answers to this question were already given to participants as multiple choices in random order, including an option to write their own answers. It was recommended that the participants would search the unfamiliar terms used in the survey to get a better idea of what the techniques looked like. In total, the survey gathered 83 answers from which 52 were given from people with artistic background and 31 with no artistic background (Figure 12). The first question of the survey was to differentiate the answers followed in two categories for further observation. (Appendix 1.)
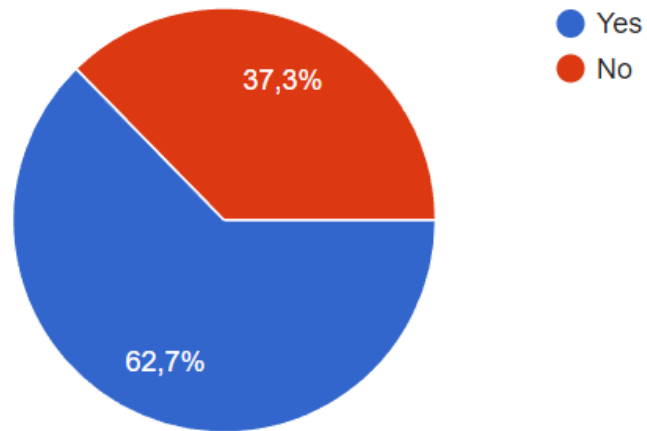
Are you an artist?

83 vastausta

Figure 12. Pie chart that shows the percentual number of participants of different categories

Followed by a picture of the artwork that had to be analysed (Figure 13), the participants could then either choose answers or write down their own. Some of the most used answers for this survey were "digital painting", "mixed media", "gouache painting" and "watercolor". The largest portion and 44,6% of the answers believed digital painting was used in the artwork (Figure 14). Because of the option to choose multiple answers, in total the survey gathered 121 different answers, where 2 of them directly told the use of AI and wrote this in an optional answer. Both answers came from artists (Figure 15).

Figure 13. Artwork created with Artbreeder shown to participants

How do you think this artwork was created?

83 vastausta

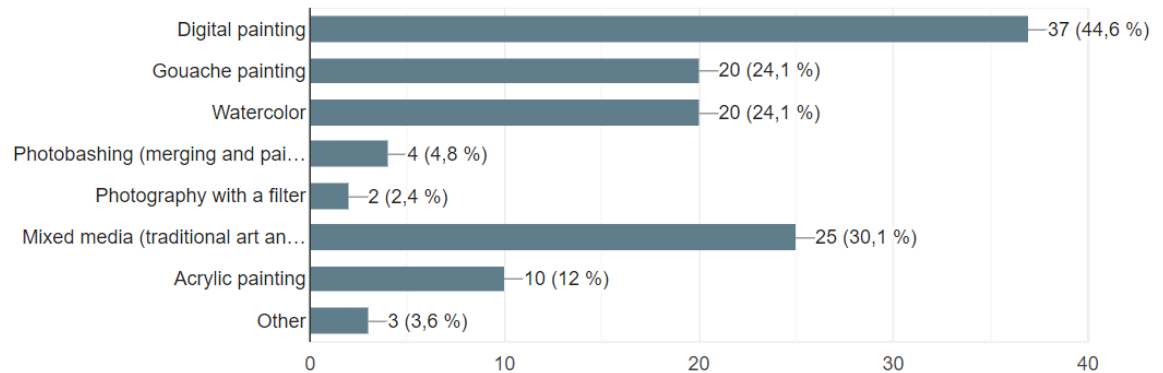|	
Digital painting	37 (44,6 %)
Gouache painting	20 (24,1 %)
Watercolor	20 (24,1 %)
Photobashing (merging and pai…	4 (4,8 %)
Photography with a filter	2 (2,4 %)
Mixed media (traditional art an…	25 (30,1 %)
Acrylic painting	10 (12 %)
Other	3 (3,6 %)

Figure 14. The percentual number of answers per person

The difference in answers regarding artistic and non-artistic knowledge was subtle so no obvious statements can be made from these answers alone. But considering the number of participants for both categories, it is possible to observe, where the minority brought more answers compared to the majority. It is apparent that the non-artist participants that were the minority were most likely to answer traditional art techniques as an answer for the survey. In comparison, artists were most likely to choose digital mediums and digital tools as answers for the survey. From these answers, a conclusion can be made of who is more likely

to be correct when it comes to seeking information in artwork. The answers can additionally reflect the general knowledge of art methods, and how for example digital tools such as brushes that imitate traditional art, could make the non-artist viewer believe the work was made with traditional medium. (Figure 14.)

	Artist	Not artist	Total
Amount	52	31	83
Percentage	62,70 %	37,30 %	
Digital painting	19	18	37
Gouache painting	11	9	20
Watercolor	8	12	20
Photobashing	3	1	4
Photography + filter	2		2
Mixed media	15	10	25
Acrylic painting	4	6	10
Other	3		3
Answers	65	56	121
AI answers	2		2
Written answers	3	1	4
Person 1	x		
Person 2	x		
Person 3		x	
Person 4	x		

Figure 15. All the answers given to the survey categorised by the first question

The question for art techniques allowed multiple answers and because of it, there is a separate category for the singular and combinations of answers that are presented in Figure 16. The most outstanding answer was "digital painting", which was used both in singular answers as well as in combination answers. Digital painting was mentioned in a single answer 18 times and in combinations 19 times. The least answers were gathered for the "filter" and both answers came from artists. This could be observed as the filter was believed to be used along with other techniques or the art piece was mainly done with a filter. Combination for "digital painting" and "mixed media" was used thrice by one artist and two non-artists, where only one non-artist gave a further answer that "pencil" was most likely used as a traditional technique for the piece, along with photobashing.

Otherwise, the use of photobashing got 4 answers, where it was heavily considered to be used with digital medium only. Photobashing as an answer appeared to be used more by artists (Figure 15).

Singular answers	Combination answers
18 Digital painting	4 Gouache painting + Watercolor
14 Mixed media	3 Digital painting + Watercolor
11 Gouache painting	3 Digital painting + Watercolor + Mixed media
5 Watercolor	2 Digital painting + Gouache painting
4 Acrylic painting	2 Digital painting + Mixed media
3 Other	2 Digital painting + Watercolor + Acrylic painting
1 Photography filter	2 Digital painting + Watercolor + Mixed media + Acrylic painting
1 Photobashing	2 Gouache painting + Mixed media
	1 Digital painting + Acrylic painting
	1 Digital painting + Photobashing
	1 Watercolor + Acrylic painting
	1 Digital painting + Gouache painting + Mixed media
	1 Digital painting + Photobashing + Mixed media
	1 Digital painting + Photobashing + Photography filter

Figure 16. The various answers for the survey's multi optional question

The correct answer for this survey (Appendix 1) was the mention of using AI that required critical thinking from the participants. It is apparent that the thought of AI being used is not present, when the answer of its existence is not directly given to the participants. This describes a normal environment for sharing art online or in concept art books, where techniques are not discussed or mentioned directly. From this survey, further research can be made where the participants are given the option to answer AI in multiple choices, simulating an environment where using AI is a common practice along with other art methods.

Certain answers related to what this AI generated piece was trying to imitate, would also be considered correct. As the author of this thesis made the piece with Artbreeder, the used elements in this work combined digital painting, photos and photobashing. Additionally, an "art" slider was used to make the piece appear more like it was meant to be artwork. Technically "filter" can also be

considered as one of the right answers due to it being computer generated technology.

The answers given in the survey were direct and did not engage in deeper thinking. One of the participants however gave a longer answer to the survey, stating that if the image resolution was better, it would perhaps be easier to explain the techniques used. The low-resolution picture however, proved to be a better option for this survey as it is not usual to view full-scaled art pieces on social media or art books. It could be researched how the image resolution would help the participants to recognise different art techniques. The participant additionally mentioned that the harsh contrast and duotone color palette make it difficult to tell what techniques were used in the work, but the content itself reminded of digital work. (Appendix 1.)

After the survey was done, the author engaged in discussion with some of the artist participants to gather more information about the thought process and choices they made. Person A shared information that they had suspected AI or filtering was used in the image (Figure 13), but they decided not to answer it directly, because they thought it would be insulting to the artist. One of the elements that raised suspicion to Person A was the water, as it seemed very computer- or filter generated. The rocks on the foreground also looked like they were made with AI and the dark "outlines" around them reinforced that argument. The next person who engaged in discussion was Person B, who confirmed that they did not think about the use of AI but felt like something was incorrect with the image. Person B as well saw something wrong with the foreground on bottom right on the image. To Person B, the piece looked like it was combined with photobashing from two or more different pieces. One of the discussing artists was Person C, a traditional artist who was surprised by the use of AI in the artwork and stated that they had not worked digitally for a very long time. (Appendix 1.)

The survey (Appendix 1) done was short but effective to gather quick information on how people perceive artworks upon seeing them. According to an empirical study published in 2001, average time to observe art is 27.2 seconds. When it

comes to a group of people, the art is observed more than double the time compared to as an individual. (Smith & Smith 2001, 229–334.) During that period, the viewer quickly creates a general idea of how the work in question was produced, unless it is explicitly stated. This reflects how people on social media usually view artworks and will not question the methods behind them unless discussion about them is formed. In a quick glance, AI generated art can blend in with other artworks. But after examining more closely and trying to recall the process of creating the piece, the harmony and logic are lacking. The author found it interesting that no participants expressed questions regarding the flying objects on the artwork (Figure 13), as they were produced by a failure in AI.

4.2   Using AI for concept art

The example of using AI for creating concept art comes from experienced concept artist Imad Awan's YouTube channel, where he shares tutorials and speed painting videos. The author of this thesis decided to review one of his videos about trying out Artbreeder and producing realistic looking character concepts with it. Afterwards these designs produced with AI were compared to other character concepts that were not made with AI, but by both drawing and photobashing. (Awan 2021.)

Awan's goal in trying out Artbreeder was to use the AI to generate interesting ideas that he would then later clean up and paint over, see if using this method would produce good concepts. Awan (2021) explains how Artbreeder works in his video, that will not be covered in this section as the author will eventually explore its use in more detail after the review. The first character he creates with Artbreeder is meant to be a female representative soldier with sci-fi and fantasy elements in it. The second character is a sci-fi soldier, with a great amount of detail in his armor. The third character resembles a sci-fi Viking and the fourth character was not described but fits in the same style as the rest. (Figure 17.) The problem with these AI generated characters however was that their faces were not clear enough that prompted Awan to try generating new faces with Artbreeder's portrait generator. He would then later Photoshop the new faces on these characters. (Awan 2021.)

Figure 17. The four character designs created with AI (Awan 2021)

The AI characters were refined with Photoshop afterwards. The shapes on the armor were made more visible and few details such as straps and ammo pouches were added. While refining the second character, Awan chose to give him a headgear that would resemble a turban. This idea was prompted because of the interesting head shape the AI generated. The Viking character needed most changes, including additional fur on shoulders, an eye patch and fixing the belt area. The last character was changed to have a skull helmet, as Awan saw this design reminiscent Deadshot-like character from DC comics. (Awan 2021.)

Figure 18. Final versions for the four character designs after overpainting them with Photoshop (Awan 2021)

Lastly to gather opinions on the AI character designs, the author asked colleagues with artistic and game development experience to discuss about the designs that Awan created in his experiment. This personal communication took place on April 12-13th in 2022 through Discord and part of it was a recorded call. During the conversation the designs were also compared to other character concepts that were made by hand instead of AI. The artworks picked for comparing had approximately the same amount of detail and similar theme. (Discord conversation 2022.)

First, the designs made by Awan (Figure 18) were shown in Discord without sharing the fact that they were made with AI. The author asked colleagues' opinions about these designs and their answers were that the designs looked very cool but also a bit too generic. It was stated clear that the designs were meant for futuristic or post-apocalyptic military game. After that the author revealed that the designs were made with AI that initiated wider discussion. The participants of the conversation thought that the AI designs would probably fit for realistic games, but when it comes to something more stylised it would require handmade consistency and creativity. In general, the designs made by Awan (2021) were impressive to the respondents but none of the designs felt unique,

which was surprising because it was thought that the AI could produce something unprecedented. The Viking was an exception for standing out from the rest that felt generic sci-fi characters. (Discord conversation 2022.)

The coloring and silhouette of the AI characters are neutral, which makes it harder to differentiate them. That brought further thoughts that AI characters lack visually striking color schemes. Some elements such as pouches, boots, knee pads and armor were also repetitive in these designs. During the discussion it was expressed that these characters could fit in a video game where camouflaging is essential. When asked, which one of these characters would be the main character, the participants of the conversation thought that these designs felt more like NPC characters. One of the respondents stated that the first character could be a main character because of her design being ordinary and neutral (Figure 18). The thought of these designs being made for a video game where the player could control all the four characters was excluded from the conversation. (Discord conversation 2022.)

The participants of the conversation were showed a character concept art from video game Metro Exodus (2019) by 4A Games (Figure 19) to compare with these AI generated characters, because the designs had close to equal number of details and similar looking refining technique. This character concept art that was showed was made by Vlad Tkach (2019) who has a very painterly and realistic art style. When comparing the details and visual expression to AI generated characters, the participants of the conversation thought that the AI designs were too sketchy and lacked three-dimensional clarity. The logic with detailing was also clearer in Tkach's concept art, as the AI characters had a lot of messy asymmetry and multiple layers of clothing that were hard to count and distinct. Some elements were left by the AI that were filler details but did not support the designs or explained their purpose. Therefore, AI concepts could be too difficult to understand and would require more refining and solving by an artist that takes extra time. (Discord conversation 2022.)

Figure 19. Metro Exodus concept art (Tkach 2019)

Overall, out of all the four character designs, participants of the conversation were mutually agreeing that the sci-fi Viking character was the most believable and clear design idea to take forward production. The author also paid attention that in Awan's video (2021) this character was most refined during the process and had described characteristics. The colleagues were interested in the future of AI as they believe that it will give artists more time and space to focus on specific parts of the designs. Any concept artist can create standing figures with general clothing or a base, but it takes greater amount of skill to provide a design that strikes as something new and unique. In their opinion, AI could be a tool to get to that part of the process faster, where artist can show their skill of creating memorable and unique designs. AI can be helpful to generate ideas, but it might push the designs in a too-general direction. Unique art styles are meant to be explored in game design, and AI does not have use for this feature yet. (Discord conversation 2022.)

During the video Awan (2021) wondered if the AI could improve and learn in few years so it would produce more refined designs with higher quality. He opened a discussion if concept artists would lose their jobs then. (Awan 2021.) At this state Artbreeder already proved to be great for new ideas, but the quality of the generations were not proper and would not qualify as is. This was the result of using AI to generate character designs with realism and many details in them, but it is still unsure if the AI would perform the same with designs that are not as complicated.

For the comparison purposes, the author of this thesis tried Artbreeder to generate a character design concept as an experiment. To differentiate the use of this AI software, the author focuses on creating a character design with a cartoon art style to see how useful it proves to be with more stylised work. The time used to generate the whole character will be recorded to form a conclusion of its speed for concepting.

When starting to use Artbreeder, it requires new users to register before starting any creation. After registration and proceeding to create new art, the site gives an option to select a category. Each category has its own database that cannot be mixed with each other. Some of the categories listed are portraits, landscapes, buildings, and characters. For landscapes and portraits, users can upload an image to use in their generation. After choosing to create a composed character for this experiment, the generating process starts immediately in a new layout. Minimum of two already existing designs in Artbreeder's gallery must be selected as "Parents" to start generating new designs. These can either be selected by hand or randomly. Both "Parents" for this experiment were chosen from the gallery, and they too were originally generated over time by other users by using this AI. Author chose the first design for the body form, art style, and hair. The second design was chosen for the genre and darker color palette. Further on, the purpose of these choices is to generate a cartoon design that is a short haired feminine character in sci-fi suit (Figure 20).

The first section of slides for "Parents" are vague and work best to choose certain starter elements to the design to form a base. The slider for "Content" appears to focus more on the form and pose of the design, while "Style" focuses on the coloring. The second section for "Genes" gives more detailed slider choices to change the design. Most effective slider is "Chaos" that never starts at zero. If this slider is put to minimum, it generates remarkably similar default looking characters with no influence from the "Parents". Overall, the sliders worked their purpose of description when used carefully, sometimes breaking the design too much. For this design, only slight tweaking was needed to generate a character in bodysuit while keeping the form and style as wanted. When the "Parents" for design are chosen, the AI gives 3 different variations. Each time edits are made to the "Parents" or "Genes", a button for refreshing the three options must be pressed (Figure 20).
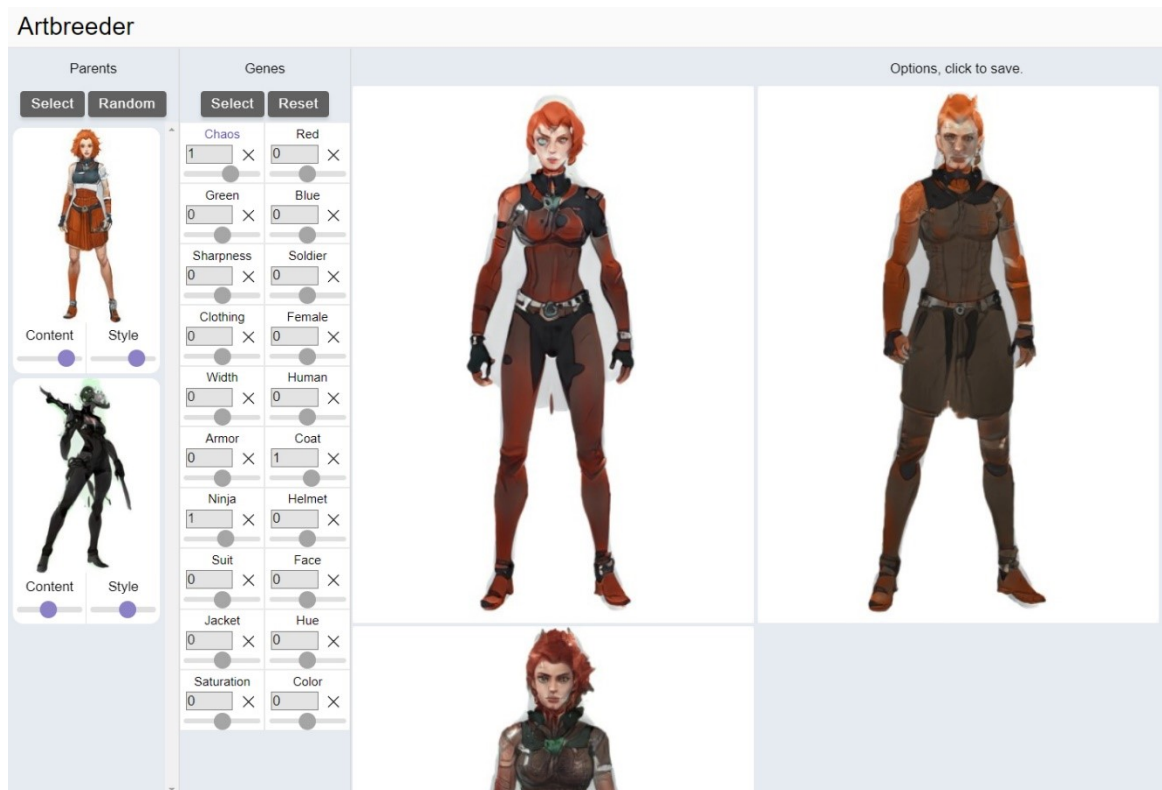

Figure 20. Layout of Artbreeder

After a few refreshed clicks for generations, the AI produced a character that became closest to the wanted criteria. This character would later then be used for overpainting and tweaking in Photoshop. Color scheme was not too interesting in

this generated design and some of the details lacked logic, which is a common feature when AI is being used. During the paintover in Photoshop, the suit was heavily simplified and additional details such as tattoos, nail polish, makeup, curls and pouches were added to bring personality and story elements to the character. The AI generated version already had a harmonic color scheme of red, black and green hues. However, the author decided afterwards to change the colors to give more contrast and personality to the design so it would be easier for viewers to distinguish the features and design elements. In the end, using the character generator took 10 minutes of use, while overpainting and finalising the design on Photoshop took 45 minutes. In total, this design was produced in under an hour, and it could still be redrawn or polished to match other art styles, or photobashed. Using this technique could provide approximately a design per hour (Figure 21).

Figure 21. The parents, generation and final version for the design

As a conclusion to this experiment, AI generated characters are quick to work with and they can be used as a base. However, getting a good base for a character might become time consuming, as most of the time AI does not generate something that instantly sparks interest, fills in the criteria or is ready to

use for further development. The author furthermore found it troublesome to use sliders in Artbreeder as they did not always work as intended. Overall, the AI generated design is adequate for this purpose, but without artistic touch it might look bland. It would require someone with the knowledge in design fundamentals to balance the work of AI. Before further production, it would require more visualisation and design solving, where the AI is still lacking. Solving these problems are necessary for 3D modelers to have a better understanding of the design. This experiment in addition proved that it is not possible to create designs from different angles, such as side view or back that are also mandatory for 3D.

When it comes to generating ideas, AI proved itself to make room for imagination and help trying things out of the comfort zone. Even when the author was painting over AI generated images, new ideas started coming in because of the abstract shapes that were in the design. These shapes could then provide different versions for the concept. The process of cleaning up the shapes was much guessing, and the result only reflects what the author saw in this picture. Some elements left by the AI in the final piece did not satisfy the author and would require re-designing.

5 INTERVIEW ANALYSIS

An online interview was created by the author of this thesis to gain more information about the concept artist workflow and use of digital tools. Its purpose was to research on different working techniques and skills required for them, so new and experienced artists have an idea of what would be useful skills to practice for today's standards. This interview was executed in written form in March 2022 and given to interviewees to fill on their spare time. Both interviewees have background of working in a video game studio that requires realistic styled concepts, so the answers are convenient for this thesis' research purposes to understand the requirements for AAA games. The interview gathered information with specific questions about the workflow of professional concept artists, personal experience in the field and advice for new concept artists. At the end of the interview, AI as a technique for concepting was introduced to the artists and then questions were asked regarding its use. (Appendix 2.)

The first interviewee is Sunshine Kim, who mainly has experience as a character concept artist. She has worked since 2015 on projects such as Halo: The Fall of Reach (2015), StarCraft Remastered (2017), Warcraft 3: Reforged (2020) and Tom Clancy's Rainbow Six Siege (2015). The second artist and interviewee, who will be referred to as Respondent B during this interview analysis, is a senior concept artist with 19 years of experience in game industry and whose past studios will not be mentioned in this thesis. Both artists work as character concept artists in similar subjects that consist of tactical designs. They both have different amount of experience, different approaches and techniques to produce concept art. All these answers can be observed to highlight important aspects and compare their preferred use of techniques.

The interviewees were asked about their art style and whether they thought the style differentiated within professional work. This question answers whether it matters to have variety and flexibility in the field, contrasted to having a personal art style that gets the artist hired. Kim considered her personal art style as semi-realistic painterly but depending on the project and art direction, she would have to change her work to fit the project's direction. She gives projects from Blizzard as an example that would require her to draw in different art style. Her current project does not require her to fit in certain art direction, so she is able to work in her personal art style. (Kim 2022.) Respondent B did not consider their personal art style as particular, and this can be interpreted as flexibility in art style and topics, as it does not fit for existing descriptions due to constant change or lack of description. It can also be interpreted as an answer to the professional style not having difference to personal work. The style was described in their own words as "realistic rendering of military inspired concepts". (Respondent B 2022.)

As stated earlier, both interviewees have different approach to create art that has put them on character concept artist positions in the industry. Both artists use Adobe Photoshop to create their works. When asked about the use of digital tools, Kim expresses that she does photobashing sparingly and does not use 3D programs (Kim 2022). Respondent B utilises custom brushes made for

Photoshop and does photo manipulation during the working process (Respondent B 2022). It can be examined that Adobe Photoshop is favored software in the industry for realistic concepting and speeding the process. The custom brushes help blending photos and Photoshop itself has tools to offer to alter photographs for manipulation and painting. (Heginbotham 2018.)

A question was asked about the time management and the work amount required for gathering references compared to producing art. Kim (2022) expresses that she spends one to two days gathering references first before starting the production. She is not the only person responsible for finishing the concepts, so she is given 4-6 weeks to finish a character that her art direction and team will give feedback to and revision. (Kim 2022.) In comparison, Respondent B (2022) answers that their time management varies. On average one week is given to produce a character concept from initial lineup of propositions to finished product that includes both front and back views. However, the research and material gathering will take almost half the total time to finalise a concept. (Respondent B 2022.)

Both interviewees have their own methods to be efficient and share information of having own reference materials. These references have been gathered over the years and work as personal libraries to expedite the work process, some of which are own reference material (Respondent B 2022). Kim specifically has a personal library for various tactical gear, such as magazine pouches and gun holsters that she can quickly photobash on the concepts. These items are usually established and detailed, so using imagery for them speeds up the work. In addition, she has gathered custom Photoshop brushes that she considers useful and efficient. (Kim 2022.)

Photobashing is a technique both interviewees were familiar with. Respondent B (2022) expressed that they rely strongly on photobashing as it is useful for the context of their work that is realistic military inspired concepts. They believed that the use of photobashing is quite common in the field. (Respondent B 2022.) Whereas Kim (2022) can work with painting, the use of photobashing is what

most concept artists rely on when it comes to realistic looking art. Kim (2022) also admits that she thinks the technique of photobashing is widely used. She uses photobashing sparingly, as stated before, for certain detailed equipment. She personally prefers painterly styles over photorealistic styles, but depending on project's art direction, the artist may use photobashing mainly instead and do painting and brush strokes sparingly. (Kim 2022.) In conclusion, both techniques and approaches are working perfectly in the industry, but it might be useful to have basic knowledge in photobashing for convenience and flexibility.

Continuing the topic of photobashing, the author was curious about its use and questioned what design rules artists must consider when gathering and connecting images. As photobashing consists of combining images, the lighting, materials and perspective must be considered. Interviewees ended up having different approaches to this question and explained their own thought and creative process. For Kim who uses photobashing sparingly in her paintings, the first rule is to make sure that the photobashed area blends with the rest of the work. This can be managed by switching the image to black and white, checking the value and adjusting the lighting. After that the image is switched back to color and adjusted to have matching tones. As the style of the work is originally painterly, in the end the photobashed parts are painted over with brushes and textures to make them adjust into the painted look. (Kim 2022.)

In contrast the same question was asked to Respondent B, who mainly does photobashing. First, they addressed that gathering the right materials is challenging for creating concepts, but it offers usefulness to create something realistic. Producing own photos ensures the uniformity of correct lighting and perspective in the photobashed artwork. As the interviewees interest is towards military realism, they rely on photo material of common military equipment that is ready-made and efficient to use. This has been made possible by gathering a collection of objects and uniforms for the purpose of photographing them and including in the work. (Respondent B 2022.)

What comes to the design rules of using photobashing, Respondent B as well believed that the technique is a good practice for already established equipment such as magazine pouches and plate carriers. In the end, the creative part is in final assembly, color and arrangement for these common parts. In this case when creating realistic military characters, the photobashing is a shortcut to that creative process as there is no need to re-invent the equipment. Respondent B's main design rule when it comes to photobashing is to make the piece to be coherent, purposeful and look accurate. After that, the final unifying process will be the paintover that utilises the custom brushes and color gradients. (Respondent B 2022.)

Both artists have different approach to creating concept art, so the author was curious to know whether the interviewees considered either drawing or photobashing to be more efficient. The advantage for drawing would be the ability to draw anything from any reference and the advantage for photobashing would be the ability to use any material, both options focus on speed (Appendix 2). The interviewees saw this to heavily depend on the topic and genre, it would require mixing of both. Kim expressed that everyone has a different way to approach the work, but for her she still sees it as a better option to photobash certain details rather than drawing them, even if she was able to draw them instead from references. Drawing these already established details simply would take too much time and the work time is limited. For personal work she has more time and would therefore draw the details for military gear instead. (Kim 2022.) Respondent B addressed that the approach would differ depending on task. When it comes to fantasy for example, everything would be most likely invented from scratch thus relying on ready-made photo materials would not be as efficient compared to drawing. When it comes to their work with realism, they give an example of existing camouflage patterns that are not worth redrawing and would only hint about them in the initial sketch. The same would not work in fantasy and would most likely require redrawing. (Respondent B 2022.)

So far, the answers have given an idea that photobashing can be a part of concept artist's work. Would it then be a better option to study photobashing only

instead of painting, and would it get just anyone hired as a concept artist? In Kim's opinion, photobashing is just another method but also a useful skill to have. It can be used for both technical and aesthetic purpose. However, learning only photobashing proves to not be useful on its own, as the result of its use requires strong fundamental in art. (Kim 2022.) Respondent B thought the same, learning photobashing alone is not enough and they advised junior concept artists to display painted works in their portfolio. Especially painted works that are supported by an artist's 3D modelling are far more qualifying than photobashed pieces. Respondent B sees photobashing as an expedient design tool like matte painting, except in their work it is meant for character concept art. They almost see themselves as a costume designer because their work is rather one of the stages in the production process of creating a 3D model for a video game. (Respondent B 2022.)

From these answers, it is apparent that photobashing proves its best use in already established designs that can be applied to realism. The use of it speeds up the process without having to reinvent or redraw certain elements in concept art when the purpose is to create realistic and convincing concepts. The author showed interviewees screenshots of the use of Artbreeder (Figure 22) and GauGAN from NVIDIA (Figure 23) and asked their opinion on using AI for concept art. (Appendix 2.)
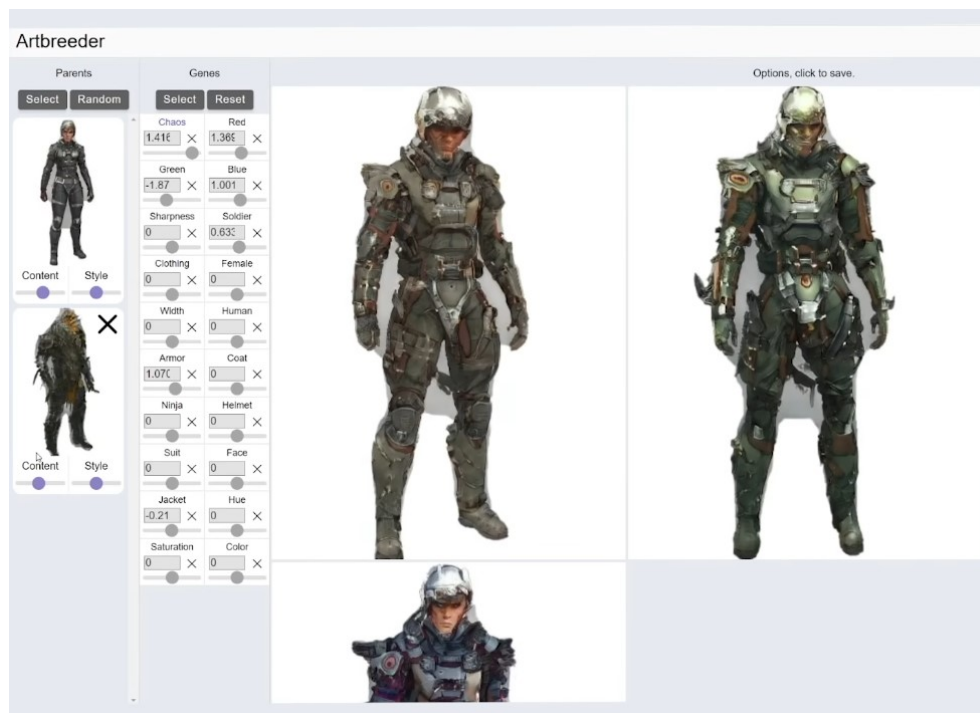
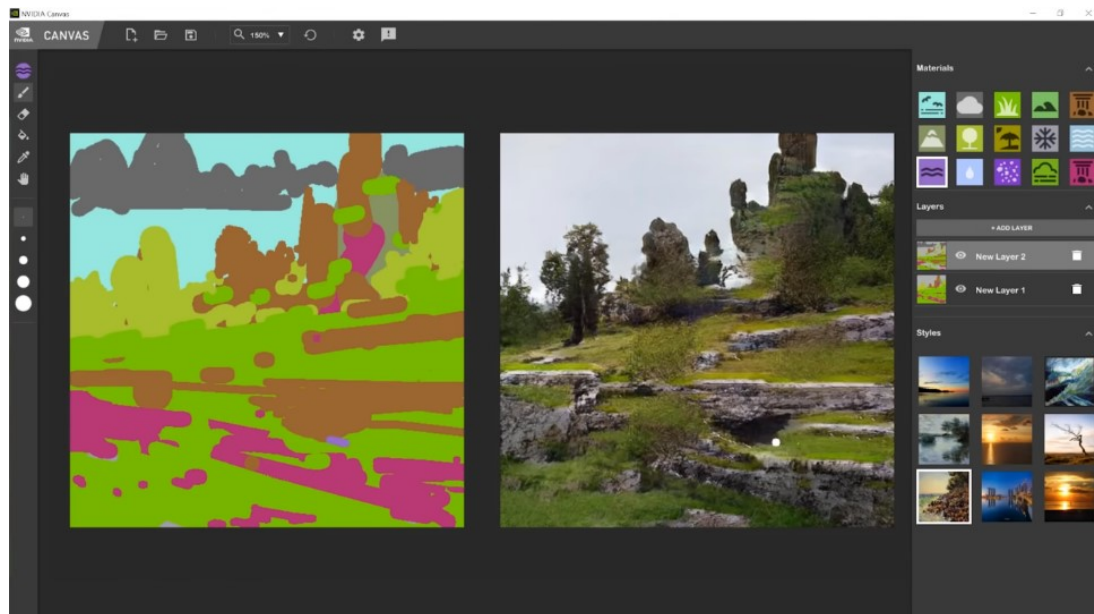Figure 22. Example of Artbreeder (Awan 2021)

Figure 23. Example of GauGAN (NVIDIA Studio 2021)

Neither of the interviewees were familiar with this AI software or used them before. Kim believes those who do mainly photobashing could find them useful as they seem to speed up the early stage of concepting (Kim 2022). Respondent B wondered if AI would be some use in professional work and showed interest to give photobashing AI software a try for the sake of exploration. However, they were concerned that the works produced with AI might make all the concepts to

look a lot alike regardless of the project. This would then require painting over the concepts afterwards to make them look unique. (Respondent B 2022.) This is likely to happen if the AI software does not have a rich data base. The paintover is something that the author also found to be necessary in previous chapter, when experimenting with Artbreeder (Using AI for concept art 4.2).

Besides painting and photobashing, 3D modelling is often useful in concept art. Respondent B stated that they would find use for 3D modelling skills, as those skills would be useful for creating concepts of props and accessories (Respondent B 2022). Kim specifically expressed that if she had more time, she would learn 3D programs such as Blender. It is a skill she wishes to have, as it would help her to plan lighting for her paintings better. Author asked what kind of automated tool she hoped there was available, and she answered that she would like to have a software that would automatically turn her 2D art into 3D. (Kim 2022.) It might not be too long until this can be possible, as NVIDIA has already been doing research on quickly turning 2D photos into 3D scenes with the help of AI (Salian 2022).

Lastly the interviewees gave advice to young concept artists who are stepping into the game industry. According to Kim (2022), she learned on the way that in her job, the artist needs to get used to failing. Sometimes the time, effort and hard work will not give the results that one hoped for. The industry is not about getting likes or getting a job in an industry leading studio at first try. By her own words "it is about not quitting after multiple fails". (Kim 2022.) Respondent B (2022) advises new concept artists to have an area of interest, something that they can think about all the time and cannot wait to put on canvas. Practicing art skills should be like practicing martial art forms, wanting to always reach the next level and to be better. Art can be learned by observing the world. And to be able to create fantasy, one must first require a solid knowledge in realism. Knowledge in anatomy is especially a necessity for artists. (Respondent B 2022.)

To summarise the interviews, it is apparent that from these answers the skills for photobashing and 3D modelling can become useful for concept artists to be more

efficient with. Even the artists who do mainly painting, might not be able to have the time to paint everything by hand, if applied in a project that requires realism. In the work of both interviewees, they have found solutions and shortcuts to produce their concept more quickly and this requires basic Photoshop and photobashing skills. It is however not a good idea to rely solely on photobashing, especially for unexperienced artists. Relying on too much on painting too is not a wise choice, considering how time is limited.

To speed up the process, gathering references upfront and having own visual libraries, photos and brushes proves to be useful. This can be easier if an artist has a specific area of interest that they have gathered materials for both digitally and physically. Answers for the questions might differ, if the author were to interview someone who does work in fantasy project, where everything must be created from scratch. Overall while both interviewees had different amount of experience and own ways to approach concept art, in the end their working process merged for same utilities that they have proved to help with their work.

6   CONCLUSION

The main question of this thesis was to find out which digital tools are made for everyone to use in their projects. When it comes to Photoshop and 3D programs, some learning is expected to be able to produce concepts with them. When it comes to more advanced designs and production, the skills in art fundamentals become a necessity. The least amount of learning is required with AI art, but it proved to produce lacking imagery and designs in its current state that would require previous skills mentioned to fix them. According to the research made, the digital tools are proved to be a safe shortcut with creating a product if the user is aware of the licenses that may come with relying on them. To avoid any possible licencing issues, the artist may use their own 3D models and imagery in their concepting work.

After analysing the interview and previous studies, it is apparent that photobashing is used in visually realistic concept art at least in some portion. When the task requires texturing or adding established details from real life into a

design, photobashing is a shortcut that can be learned to use effectively with the experience in digital painting or Photoshop. The use of 3D models as a base is also encouraged when it comes to concepting 3D shaped objects or environments. It skips a lot of time-consuming preparation for complicated perspectives and compositions. However, when working with 3D shortcuts it is important that the artist has also learned the fundamentals to compliment the 3D shapes with values and not break the established perspectives.

The conclusion to find the most effective and rewarding working method for a concept artist heavily depends on the task given and requirements. What has been gathered throughout the thesis, the most important skills for concept artists are communication, storytelling, time management, ability to use Photoshop, art fundamentals and understanding of 3D space. The most useful tools and skills for concept artists are to have personal libraries of their subject of niche and basic understanding in photobashing and 3D modelling. Therefore, additional digital tools are not a necessity for concept artists to imitate realism in their work, but they provide a greater potential and a shortcut in the hands of someone who already understands fundamentals or has the skills to deliver visually realistic work.

The idea of this thesis became from the author's curiosity to study the digital tools and find their amount of recognition and use in the game industry. The author studied the recognition of AI art and explored to find ways to recognise its use and its potential in professional environment. In addition, ethical problems that may appear in applying AI art were analysed. The AI art could be blended into video game industry in the same way as other digital art mediums such as 3D modelling and photobashing did in the past, providing a shortcut for experienced artists. Further surveys could be done to collect more data of the digital tools and specifically the use of AI. As the topic of this thesis mainly focused on realistic looking concept art, the research could be expanded to study the differences of genres and to discover how those affect the use of additional tools of creating concept art.

When it comes to artists that are new to creating art, according to the result of the thesis the professionals discouraged the use of shortcuts and advised to learn the fundamentals first. Art cannot be faked into 3D techniques, photobashing or AI without understanding perspective, values, composition, lighting and depth. All these combined must be considered simultaneously; and once mastering the fundamentals, an artist can use any kind of technological tools in favour of producing art. (Duffman 2016.)

Additionally, this thesis searched for an answer if it is possible to use AI in concepting or game development. The research confirmed that just as 3D modelling and photobashing, AI can be used as a base for concepting, but requires artistic skills and understanding of design to make the best use of it. In the game production pipeline, it can be further questioned if AI can be used for example, to produce unique textures for concepting or 3D modelling. Could AI be a tool for indie studios to for example gather up assets quicky without spending too much from the budget, or will there be adjusted copyright laws of using AI art for commercial products?

During the completion of this thesis in Summer 2022, the AI technology in artistic fields gained more attention and became more capable of giving technically advanced and believable results. The author of this thesis followed the AI art increasing its users on a large scale throughout the year 2022 and speculated how and why it gained sudden attention that year. The author of this thesis did not adjust this study to include all the newest AI art features that have been released during that time. The purpose was to see how fast AI art have developed during 2022 and to compare the developments to what has been there before. Some questions regarding the use of AI art may have gained answers after the sudden trend and its widespread debates among both amateur and professional artists. Therefore, up-to-date answers to these questions were left out for future researchers to fill and compare to.

Why did AI art as a digital tool become so widespread in 2022? As the author was studying the new AI features and platforms in 2022, it was found out that

their use was also linked to a platform to create and mint NFTs: Dream by WOMBO (2021). The rapid trend of NFTs, non-fungible tokens, in late 2021 provided a platform to auction unique pieces of digital goods for currencies. Some of the most known and valued goods were digital artworks. This trend may have increased the motivation to develop more advanced GANs to create aesthetically pleasing and graphically impressive AI art. This technology made it possible that anyone, even non-artistic people could use the AI as a feature to produce infinite number of digital artworks to exchange for currencies. More prominent answers to these questions can be considered for further studies of the rapid development of AI art. (Escalante-de Mattei 2021.)

As time passes and information about these shortcut features are spread to wider audience, more people are prone to learn about the various methods used to create digital art and concept art. After learning to distinct the features and repetitive patterns of AI generated artwork, the use of AI could be noticed with a trained eye, making it easier to forbid its use for unfavoured setting. This conclusion was formed by the author after performing the empirical research to recognise its use. New requirements could be applied to work offerings for artists in the video game industry, where hiring managers are taught to distinguish the use of AI in portfolios or ask the applicants draw in the interviews.

The use of AI may make it more difficult to differentiate experienced and trained artists from amateurs. As an example of the unfair use of AI art, one could ask if it is at the current time morally correct to take part to digital art competition with AI generated artwork without mentioning the use of AI. This was done in the Colorado State Fair art competition in 2022, where one of the contestants won the first prize and only later it was revealed that the artwork was AI generated. This created negative attention towards AI art and its wrong use, some accusing the contestant of cheating, but it also raised conversation whether AI art should have its own category to keep it separate from trained digital art methods. (Roose 2022.)

The thesis came to many conclusions on how to improve the speed of creating concept art for production pipeline. In the interview section for Nivanh Chantara's artbook, Chantara (2016) expressed that one of his defining learning experiences as a concept artist was his first contract in the industry. Chantara's mentor shared the important advice of being humble and timely. The production teaches artists to become fast because time is money, and to Chantara, at first, there was a frustration of not being able to visually show the polished ideas for his concepts. By staying humble and curious, he absorbed the criticism and learned new ways to work even faster. (Wade & Mon 2019, 158–159.)

REFERENCES

AIArtists.org. n.d. Timeline of AI Art. Web page. Available at:
https://aiartists.org/ai-timeline-art [Accessed 18 April 2022].

Anhut, A. 2014. Let's Get Real About Concept Art. Blog. 2 July 2014. Available
at: http://howtonotsuckatgamedesign.com/2014/02/lets-get-real-concept-art
[Accessed 1 May 2022].

ArtStation Magazine. 2019. The Benefits of Embracing 3D in your Concept Art
Workflow. E-magazine article. Available at:
https://magazine.artstation.com/2019/02/benefits-embracing-3d-concept-art-
workflow/ [Accessed 29 April 2022].

ArtStation. n.d. Empowering Artists to Thrive. Web page. Available at:
https://www.artstation.com/about/company [Accessed 2 May 2022].

Awan, I. 2021. I Tried Creating Concept Art using AI.. YouTube. Video clip. 2 July
2021. Available at: https://youtu.be/CSH2T6uKb1o [Accessed 25 April 2022].

Blizzard Entertainment. 2017. Starcraft Remastered. Video game. Irvine: Blizzard
Entertainment.

Blizzard Entertainment. 2020. Warcraft 3: Reforged. Video game. Irvine: Blizzard
Entertainment.

Blizzard Entertainment. 2004. World of Warcraft. Video game. Irvine: Blizzard
Entertainment.

Bucci, M. 2017. Art Industry Talk - Studying and Breaking into the Industry.
YouTube. Video clip. 11 August 2017. Available at:
https://youtu.be/405NGYVbBno [Accessed 5 April 2022].

Capcom. 2021. Resident Evil Village. Video game. Osaka: Capcom.

Chiu B. & Swidowski A. 2017. Working in games with concept artist Ashley
Swidowski. YouTube. Video interview. 25 May 2017. Available at:
https://youtu.be/4VGAeuRVizI [Accessed 4 April 2022].

Conversation. 2022. Discord. Personal communication. 12 April 2022.

Creative Bloq. 2015. When is copying another artist legitimate?. Blog article.
Available at: https://www.creativebloq.com/digital-art/when-copying-another-
artist-legitimate-31514372 [Accessed 2 May 2022].

Deep Silver. 2019. Metro Exodus. Video game. Höfen: Deep Silver.

Dream by WOMBO. 2021. High Quality Artwork In Seconds. Web application.
Available at: https://www.wombo.art/ [Accessed 26 October 2022].

Duffman, A. 2016. Is Photobashing Art? Art Talks with Duffman. Adam Duff LUCIDPIXUL. YouTube. Video clip. 23 August 2016. Available at: https://youtu.be/zMwkbJva1Go [Accessed 6 April 2022].

Escalante-de Mattei, S. 2021. The Year of the NFT: How an Emerging Medium Went Mainstream in 2021. *Artnews*, 21 December 2021. Electronic newspaper. Available at: https://www.artnews.com/list/art-news/artists/2021-year-of-the-nft-1234614022/cryptopunks-the-og-nfts/ [Accessed 26 October 2022].

Epic Games. 2017. Fortnite. Video game. Cary: Epic Games.

Feghali, W. 2021. Create Art Like This In Blender (For Beginners!). YouTube. Video clip. 7 June 2021. Available at: https://youtu.be/5qBl0ocM0ik [Accessed 22 May 2022].

Halo: The Fall of Reach. 2015. Directed by Ian Kirby. Available at: Amazon Prime [Accessed 12 October 2022].

Harisova E. & Agrawal A. 2020. Concept Art in MODO: Working on Hard-Surface Design & Materials. Article. Available at: https://80.lv/articles/concept-art-in-modo-working-on-hard-surface-design-materials [Accessed 22 May 2022].

Heginbotham, C. 2018. What is Photobashing? (With Free Beginner Tutorials). Web page. Available at: https://conceptartempire.com/photobashing/ [Accessed 8 April 2022].

Indeed Editorial Team. 2021. How To Become a Concept Artist: Steps and Tips. Web page. Available at: https://www.indeed.com/career-advice/career-development/how-to-become-a-concept-artist [Accessed 2 May 2022].

J.J. | RESIDENCE of EVIL. 2021. The picture on the left is a photo from 1938 found by @JC77829456. The photo on the right is Alcina Dimitrescu […]. Tweet. 8 May 2021. Available at: https://twitter.com/jjfromroe/status/1390844762182328320 [Accessed 17 April 2022].

Justamante Jacobs, T. 2018. What is Photobashing ? The Art & The Controversy. Blog. Available at: https://improveyourdrawings.com/2018/10/what-is-photobashing-the-art-the-controversy/ [Accessed 4 May 2022].

Kaniuga, T. 2018a. Illustration VS Concept - Why do some companies want Sketches and others want paintings? YouTube. Video clip. 3 July 2018. Available at: https://youtu.be/q05Ikl-uUB8 [Accessed 7 March 2022].

Kaniuga, T. 2018b. Are there too many Concept Artists? - Trent's Comment Corner #14 (July 13, 2018). YouTube. Video clip. 14 July 2018. Available at: https://youtu.be/iF78IAJGzoQ [Accessed 7 March 2022].

Kaniuga, T. 2018c. Do pro concept artists use geometry? - Concept artist tips. YouTube. Video clip. 19 October 2018. Available at: https://youtu.be/tHGduybF4TM [Accessed 5 June 2022].

Kim, S. 2022. Concept artist. Interview. 7 March 2022. Ubisoft.

KitBash3D. 2020. What Does Kitbashing Mean in 3D Software?. YouTube. Video clip. 29 May 2020. Available at: https://youtu.be/g89X33yfWww [Accessed 7 April 2022].

Kulicki, M. 2020. 3 Artificial Intelligence tools to enhance your creativity. Blog article. Available at: https://becominghuman.ai/3-artificial-intelligence-tools-to-enhance-your-creativity-adc9cbb8c388 [Accessed 15 April 2022].

Kung, S.K. 2019. How SketchUp and a Good Brief can Enhance your Concept Art. Web page. Available at: https://discover.therookies.co/2019/07/12/how-sketchup-and-a-good-brief-can-enhance-your-concept-art/ [Accessed 22 May 2022].

LavenderTowne. 2021. DID RESIDENT EVIL STEAL HER DESIGN? [Reference vs Copying]. YouTube. Video clip. 15 May 2021. Available at: https://youtu.be/UsROPbzP6gY [Accessed 17 April 2022].

NVIDIA Studio. 2022. NVIDIA Canvas: New Update | 4x Higher Resolution & 5 New Materials. YouTube. Video clip. 4 January 2022. Available at: https://youtu.be/wKztRskmsig [Accessed 29 April 2022].

Park, J. 2015. Guide to Realistic Game Art: Pros/Cons and Best Practices. Blog article. Available at: https://conceptarthouse.squarespace.com/news/2015/8/20/game-art-realistic-concept-art-house [Accessed 5 June 2022].

Petty, J. 2018. Top 12 Sites To Download 3D Models (Free + Premium). Blog article. Available at: https://conceptartempire.com/sites-for-3d-models/ [Accessed 7 April 2022].

Przybylek, S. 2019. Costume Design: Definition, History & Process. Study.com. Online lesson. Available at: https://study.com/academy/lesson/costume-design-definition-history-process.html [Accessed 21 April 2022].

Respondent B. 2022. Concept artist. Interview. 9 March 2022.

Rhodes, M. 2016. Matt Rhodes Artist Talk: The World of Concept Art (November 2016). AlbertaUArts. YouTube. Presentation. 27 March 2017. Available at: https://youtu.be/m2BRI1hWnn [Accessed 31 March 2022].

Riot Games. 2009. League of Legends. Video game. Los Angeles: Riot Games.

Roose, K. 2022. An A.I.-Generated Picture Won an Art Prize. Artists Aren't Happy. The New York Times, 2 September 2022. Electronic newspaper.

Available at: https://www.nytimes.com/2022/09/02/technology/ai-artificial-intelligence-artists.html [Accessed 22 October 2022].

Safadi, S. 2015. Concept Art is Dead. GDC. YouTube. Presentation. 19 April 2018. Available at: https://youtu.be/CYbYvImd7Bw [Accessed 7 April 2022].

Salian, I. 2022. NVIDIA Research Turns 2D Photos Into 3D Scenes in the Blink of an AI. Blog article. Available at: https://blogs.nvidia.com/blog/2022/03/25/instant-nerf-research-3d-ai/ [Accessed 24 April 2022].

Sawyer, M. 2018. Realism In Art: What It Means & Why It's Valuable For Practicing Artists. Blog article. Available at: https://conceptartempire.com/realism/ [Accessed 5 June 2022].

Schneider T. & Rea N. 2018. Has Artificial Intelligence Given Us the Next Great Art Movement? Experts Say Slow Down, the 'Field Is in Its Infancy'. *Artnet News*, 25 September 2018. Electronic newspaper. Available at: https://news.artnet.com/art-world/ai-art-comes-to-market-is-it-worth-the-hype-1352011 [Accessed 18 April 2022].

Serrano, L. 2020. A Friendly Introduction to Generative Adversarial Networks (GANs). YouTube. Lecture. 5 May 2020. Available at: https://youtu.be/8L11aMN5KY8 [Accessed 15 April 2022].

Simon, J. n.d. About. Artbreeder community. Web page. Available at: https://www.artbreeder.com/about [Accessed 15 April 2022].

SketchUp. 2020. Can I use SketchUp for free?. Web page. Available at: https://support.sketchup.com/s/article/Can-I-use-SketchUp-for-free [Accessed 22 May 2022].

Smith, J.K. & Smith, L.F. 2001. Spending Time on Art. Empirical Studies of the Arts, 19(2), 229–236. PDF document. Available at: https://www.researchgate.net/publication/279390313_Spending_Time_on_Art [Accessed 24 April 2022].

Teoh, Y.C. 2012. Video Game Art Books: The List. Blog. 4 December 2012. Available at: https://www.parkablogs.com/content/video-game-art-books-list [Accessed 2 May 2022].

The Art Story. n.d. Conceptual Art - History and Concepts. Web page. Available at: https://www.theartstory.org/movement/conceptual-art/history-and-concepts/ [Accessed 21 April 2022].

The Graphic Assembly. 2020. Photobashing: Is it Art? Techniques and Examples. Web page. Available at: https://thegraphicassembly.com/photobashing-art-techniques-examples/ [Accessed 4 May 2022].

Ubisoft. 2015. Tom Clancy's Rainbow Six Siege. Video game. Montreal: Ubisoft.

Vizcom. n.d. Ai creative tools that help bring ideas to life. Web page. Available at: https://www.vizcom.co/about [Accessed 29 April 2022].

Wade D. & Mon S. 2019. Dreaming in Mech The Art of Nivanh Chanthara. Quebec: Transcontinental Printing.

Zhu, F. 2020. Design Cinema - Episode 105 - Time Management. FZDSCHOOL. YouTube. Lecture. 26 June 2020. Available at: https://youtu.be/ejh4kkFF-sM [Accessed 22 May 2022].

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https://twitter.com/jjfromroe/status/1390844762182328320 [Accessed 17 April 2022].

Figure 10. Diagram that visualises GAN's learning to generate given labels. Rehman, J. 2020. Available at: https://twitter.com/jjfromroe/status/1390844762182328320 [Accessed 15 April 2022].

Figure 11. The layout of NVIDIA Canvas. NVIDIA Studio. 2022. Screenshot from: https://youtu.be/m2BRl1hWnnY [Accessed 29 April 2022].

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Figure 19. Metro Exodus concept art. Tkach, V. 2019. Copyright 4A Games, 2019. Available at: https://www.artstation.com/artwork/4b6KGq [Accessed 29 April 2022].

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SURVEY

What do you know about art techniques?

I will show you an artwork. You must answer how do you think it was made. Some art terms used in this survey might be new to you, so I recommend searching them up to see what they look like.

1. Are you an artist?

○ Yes

○ No

2. Picture of artwork

3. How do you think this artwork was created?

☐ Digital painting

☐ Gouache painting

☐ Watercolor

☐ Photobashing (merging and painting photos)

☐ Photography with a filter

☐ Mixed media (traditional art and digital art)

☐ Acrylic painting

☐ Other

4. If you chose "other", what do you think was used? _____

CONCEPT ARTIST WORKFLOW: RESPONDENT B'S INTERVIEW

Interviewee name:
Job title and studio:
Interviewer name: Sonja Heikkinen

Questions

1. **What is your experience in the field and what position do you currently work on?**

   19 years of concept art work for games.

   Currently employed as character concept artist.

2. **How would you describe your art style? Do you think that your professional work is different style?**

   Realistic rendering of military inspired concepts. I don't think my style is

   particular.

3. **What software do you use in your working process? Do you utilize digital tools such as 3D models, photoshop tools, brushes, grids, and photo manipulation in your work?**

   Photoshop, custom brushes, photo manipulation.

4. **How long does it usually take you to finish a concept? How do you manage time?**

   This varies greatly. On average 1 week for character concept from initial

   lineup (propositions) to finished front and back view.

5. **How much research you do on average before starting to generate a concept? What is your usual ratio for gathering materials compared to creating process?**

   Almost a half.

6. **How can you be more efficient in concept art? For example, do you have access to a library of references/assets/brushes?**

   Over the years I've compiled a lot of my own reference material.

7. **What do you know about photobashing? Have you done or considered using photobashing in your work? How common do you think it is in your field?**

   I rely strongly on photobashing as a very useful tool for the context my concepts fall into. I would say it's quite common.

8. **Additional questions for those who mainly use photobashing in their work: How do you make it work and look natural? What are some design rules you consider when it comes to composition and lighting source? Do you sometimes find it difficult to gather the right materials for your work?**

   Gathering the right material is challenging and useful to add realism in the concept. I parse that issue by making my own photos, thus ensuring uniformity in lighting and perspective. Like the old studio masters, I've acquired a collection of objects, uniforms - items I can photograph to include in my work. My main design rule is that it has to be coherent, purposeful and just looking "right". The final, unifying process is the paintover, hence the array of custom photoshop brushes and color unifying pass (gradiens).

9. **Do you think for a concept artist, it would be more efficient to be able to draw anything from references as opposed to photobashing from any material?**

   That really depends on my task- realism of pure fantasy.
   My area of interest is military realism. It is very efficient to rely on ready-made photo material of common military equipment, rather than to "reinvent" a magazine pouch, plate carrier, etc. Where the creative part comes in, is in final assembly, color, arrangement of those commonly known parts.

For instance, I wouldn't try to redraw an existing camo pattern in the final stage of the concept- I would use a proper photo sample for the final concept look (I would hint in the initial sketch :here will come the camo part with a drawing, psd custom brush.)
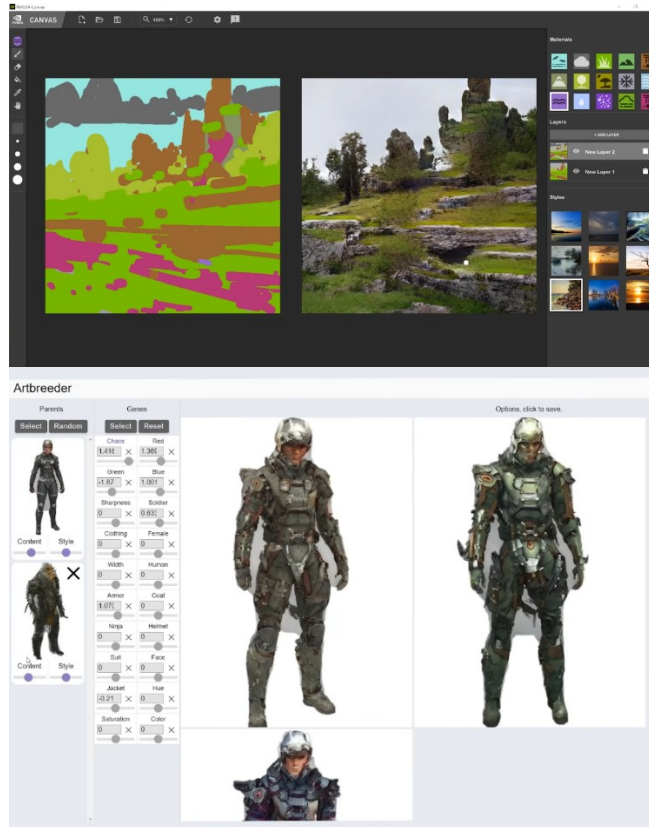
But this would not be possible for pure fantasy art, where everything is likely to be invented from scratch.

10. **Do you think photobashing is done for technical purposes or for a specific aesthetic? How useful technique do you think it is when searching to be employed in the game industry? Do you think learning only photobashing is enough to become a concept artist?**

Photobashing is an expedient design tool. It's almost like realistic matte painting but applied- in my case- to character concept art. The building blocks are photographs but the result is a realistic concept. Personally, I see myself almost as a costume designer because my concept is but a stage in the whole production process of a video game. The final product is a 3D model, not my concept work.

For a junior concepter, I would advise having a strong painting portfolio (or paintings supported by one's own 3D modeling), rather than photobashing pieces.

Relying on photobashing alone is by far not enough to become a concept artist.

11. **Nowadays artists have access to a few AI software that can do basic photobashing. Do you think these tools would be useful in your field, or do they limit the work and creativity too much? Would you ever see yourself using AI in your work, if yes, what kind of automated process would you like to have in your work?**

    I would definitely like to try those photobashing AI software for exploration's sake. It may indeed be of some use in the professional concept work but I'm afraid it would make all concept art look alike regardless of a project to be used "as is". Maybe through some further painting over it could be rendered unique enough.

12. **What skills would you like to have to help with your job? Where do you wish to improve?**

    Definitely more 3D modelling skills- especially in my prop tasks (objects, accessories).

13. What advice would you give to someone who aims to become a concept artist?

Have an area of interest- something you just think about all the time and that you can't wait to put on canvas. Practice your skills like you would practice martial art forms- never to be satisfied with your level and wanting to be better. Art can be learnt!

Observe the world- fantasy is not much without a solid knowledge of realism.

Knowledge of anatomy for artists is a must.

Do you wish to stay anonymous: Yes
Do you wish to keep your studio anonymous: Yes
Date: March 9th, 2022

CONCEPT ARTIST WORKFLOW: KIM'S INTERVIEW

Interviewee name: Sunshine Kim
Job title and studio: Concept Artist / Ubisoft Montreal
Interviewer name: Sonja Heikkinen

Questions

1. **What is your experience in the field and what position do you currently work on?**

   I've been working as a concept artist (mainly character) since 2015. I've worked on Halo:Fall of Reach, Starcraft Remastered, Warcraft 3: Reforged. My current project is Rainbow Six Siege at Ubisoft Montreal.

2. **How would you describe your art style? Do you think that your professional work is different style?**

   I would say it's a semi-realistic painterly style. Sometimes I do have to fit art direction to the project that could be fairly different from mine (ex. Blizzard projects), my current project doesn't require specific art direction, therefore I can work on it with my personal art style.

3. **What software do you use in your working process? Do you utilize digital tools such as 3D models, photoshop tools, brushes, grids, and photo manipulation in your work?**

   I use Adobe Photoshop CC. I do photobashing sparingly, and I don't use 3d programs.

4. **How long does it usually take you to finish a concept? How do you manage time?**

   It's not really up to me only to finish up a concept, it involved my AD and the team with feedback and revisions. I'm usually given 4~6weeks to finish a character.

5. **How much research you do on average before starting to generate a concept? What is your usual ratio for gathering materials compared to creating process?**

I spend 1,2 days just to gather references at the beginning of the production.

6. **How can you be more efficient in concept art? For example, do you have access to a library of references/assets/brushes?**

I have custom brushes pack that I downloaded here and there… I test them and keep the ones that I found useful and efficient. I have a personal library of references for military tactical gears, such as magazine pouches, plate carriers, gun holsters etc. I grab them and photobash when necessary, which significantly speeds up the process.

7. **What do you know about photobashing? Have you done or considered using photobashing in your work? How common do you think it is in your field?**

I personally prefer painterly styles over photo realistic styles. Therefore, I use photobashing technics sparingly for my work.
I think the technic is widely used. Depends on the project's art direction, the artist may use photobashing mainly, using brush strokes sparingly.

8. **Additional questions for those who mainly use photobashing in their work: How do you make it work and look natural? What are some design rules you consider when it comes to composition and lighting source? Do you sometimes find it difficult to gather the right materials for your work?**

In my particular case, I have to make sure the photobashed area blends in with the rest of the painting. First I adjust the lighting, switch the image to Black and White to check the value, then switch back to colour and match the colour tones. After then paint over on top of the photobashed area, adding brush stokes and brush texsture to make them look 'painted'.
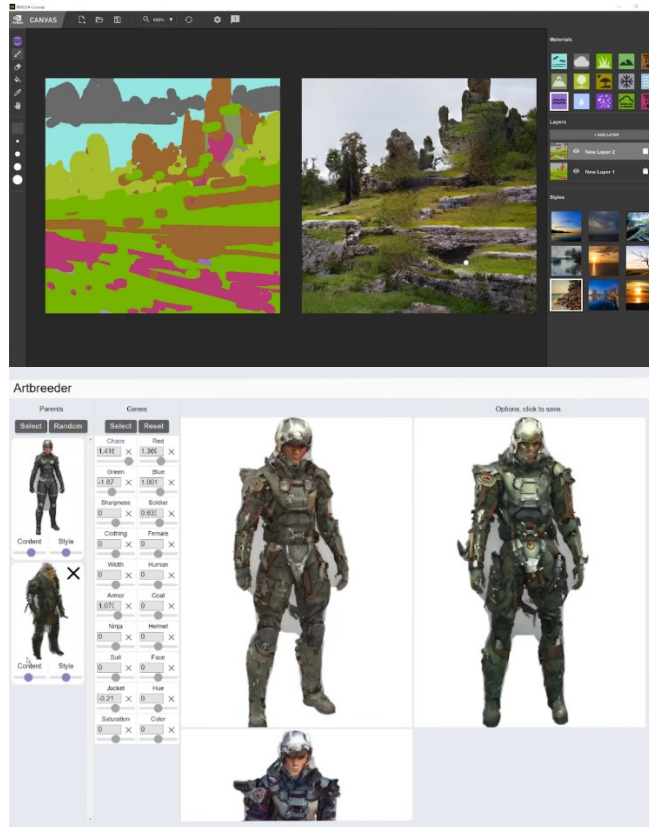
9. **Do you think for a concept artist, it would be more efficient to be able to draw anything from references as opposed to photobashing from any material?**

I think everyone has different ways to approach. I personally found that it's more efficient to use photobashing tactical gears instead of drawing the from scratch, as they often include lots of details, it will be time-consuming for me to draw everything. If it's a personal work, I can take as much as time I want but for work, there's a limited time and I need to find the most efficient and time saving method to deliver the product.

10. **Do you think photobashing is done for technical purposes or for a specific aesthetic? How useful technique do you think it is when searching to be employed in the game industry? Do you think learning only photobashing is enough to become a concept artist?**

Photobashing is just another method to complete a digital art. It can be used for both technical purpose and a specific aesthetic depends on the project's direction. It's a definitely useful skill to have.

To meet the successful result, I believe you need a strong fundamental in art. Learning 'only' photobashing doesn't sound smart to me…

11. Nowadays artists have access to a few AI software that can do basic photobashing. Do you think these tools would be useful in your field, or do they limit the work and creativity too much? Would you ever see yourself using AI in your work, if yes, what kind of automated process would you like to have in your work?

This looks incredibly useful for sure, although I've never heard and used it before. My art styles doesn't require heavy photobashing, but for those who do photobashing mainly, like matte painters, it seems to speed up the early stage of process.

12. What skills would you like to have to help with your job? Where do you wish to improve?

If I have time to spare, I'd like to learn a 3d program like Blender, just enough help my 2d art. It can help me to plan lighting better.

13. **What advice would you give to someone who aims to become a concept artist?**

One thing that I learnd is that sometimes your time and effort betray you. No matter how many hours and hard work you put in… you may still not get the result you hoped. You need to get used to fail. I believe this industry isn't about getting many likes and thumbs up, or getting a job in an industry leading studio at first try… I think it's about not quitting after multiple fails.

Do you wish to stay anonymous: No need to
Do you wish to keep your studio anonymous:
Date: March 7th, 2022