

# Pixel Graphics in Indie Games

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## ABSTRACT

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Pixel Graphics in Indie Games gives a brief introduction to the definitions and history of pixel graphics and showcases the variety of different styles it can be used to create through example games. The purpose of this study was to gain more knowledge about the already existing pixel art styles and the way these artistic choices impact the game as a whole. The focus was in games created by independent developers, since they have been essential for the growth of the genre. All games depicted in the thesis were played through and analysed while doing that. Because of the subject being scarcely written about in printed books, articles and blog posts of experienced independent developers were often used as sources and learning material.

In addition to the research part, a short game demo called *The Order of Soul* was created, to combine the knowledge gained. The project met all the goals quite well, and the result takes after the puzzle solving, story driven games created with the game development software RPG Maker, but also adds a modern twist to it.

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Key words: pixel graphics, video games, pixel art

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**ABBREVIATIONS AND TERMS**

|           |  |
|-----------|--|
| Pixel     | Shortening of picture element  |
| RPG       | Role-playing game, a genre of video games                                    |
| RPG Maker | Game development software, generally used to create role-playing games       |
| HUD       | Head-up display. Graphics that show information to the player on the screen. |
| Map       | The area or room where the player can move around and progress the game.     |
| Sprite    | A small representation of the character that is seen on the map.             |
| NPC       | Non-playable character   |
| Event     | An action or occurrence recognised by a program.                             |

## 1 INTRODUCTION

Pixel art has been used in video games for as long as digital graphics have existed. Over the years, it has evolved from a technological necessity to a genre of its own, and has stayed popular despite the growing number of options as technology has developed. The unique look and feel of an old pixel game comes from many factors, such as the colour palette limitations that consoles used to have, and the blocky animations of the tiny player sprites (picture 1). From old side scrolling platformers to horror games, pixel graphics can be made to work for many styles. Newer games from the recent years have built on the traditions laid by the older generations, while also inventing new ways to create within the same limitations, or to subvert them entirely. (Sayer, 2017)



PICTURE 1. Stage 3 boss of Touhou: Mystic Square (ZUN Soft, 1998)

Pixel games have gathered communities of both players and developers alike, such as the one formed around RPG Maker, a series of game developing programs. Despite not being the most well known engine, RPG Maker and the games made with it have their own place in both the past and present of indie games, and especially pixel games (Sayer, 2017). Because of this, special focus is given to this corner of the scene.

This thesis will go over the basics of pixel graphics and discuss some notable examples of indie games that use them, to give a good view of the wide range of different, innovative and unique styles. For this, games with varying styles have been chosen for closer inspection. This thesis also aims to serve as research to create an art style and overall visual look for a pixel game that is currently in development. The project *The Order of Soul* is a short demo of the game that uses the information gained from this research, and aims to combine it with my personal art style in illustrating, to create a pixel style that fits this particular project and possibly similar ones in the future. The demo contains a short puzzle to solve, a few rooms to explore, and dialogue between the main character and two other characters.

## 2 PIXEL GRAPHICS

### 2.1 Defining pixel art

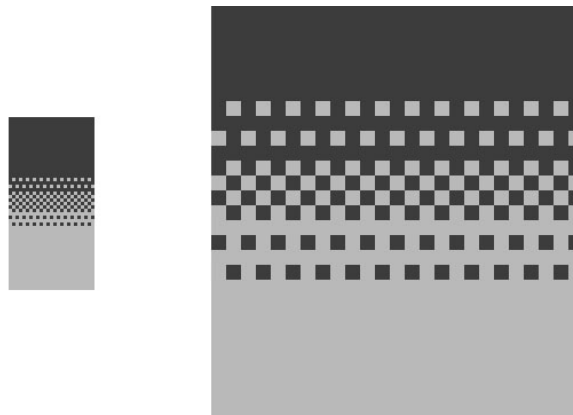
Picture element, often shortened to pixel, is the smallest element a digital image is comprised of. Each pixel can vary in colour and opacity, depending on what kind of an image is in question. Pixel based graphics are called raster images, and they are resolution specific, which means that they can not be freely scaled without losing visual quality in the process. Photographs are raster images, as are most digital paintings. The common alternative, vectors, work very differently. Instead of being tangible dots drawn on the screen, they exist as mathematical calculations, as invisible paths between points to form shapes. They can be scaled and zoomed freely, and will always adapt and retain the same quality. (What's the Difference Between Pixels and Vectors? 2010)

Raster images are used when dealing with photographs, or creating graphics that imitate techniques and textures used in traditional art, such as painting and sketching. Using pixels allows all sorts of different blending, from smooth and subtle to painterly and rough, and especially with the use of a drawing tablet they can be used in versatile ways to achieve similar results as with traditional tools. Vector graphics are often used for typography, and advertisements that need to be printed on huge canvases. It also works well for line art and logos, and certain types of illustrations. These two types can also be mixed, but if the vector properties want to be retained, adding raster elements should be done while keeping the differences in mind. (What's the Difference Between Pixels and Vectors? 2010)

When the individual pixels in the image can be seen, it is often referred to as pixel art. The level of detail and colour it can have varies greatly, depending on what kind of limitations the artist is working with, and what kind of style has been chosen. In the early years of video games, pixels were the only tool available to work with, and it only became a separate style as the improvement of technology started offering better resolutions, more colours and a third dimension to work with. Even though the exact definition of pixel art is not

agreed on by all, it can be said that it is digital art where images are created by manipulating individual pixels. (Pixel Art: Where to Start? 2018)

The usual way to blend colours with pixels is by dithering, which is possible to do with just two different colours or monochrome shades, as seen in picture 2. More unconventional styles exist as well, such as painting with pixels, by using low opacity and layering colours on top of each other, like in picture 3. The result is a mixture of digital painting and the traditional blocky pixel style, and some do not count it as proper pixel art.



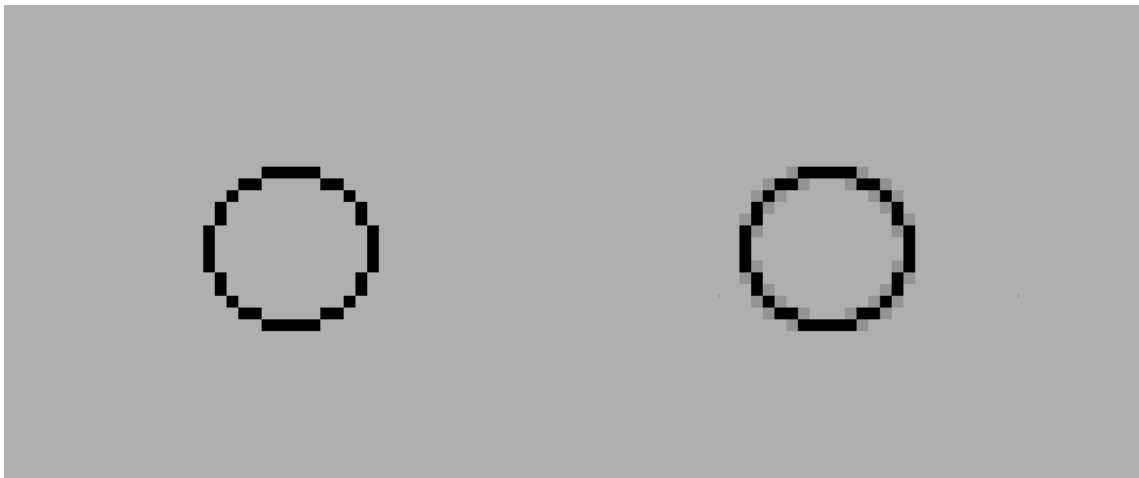
PICTURE 2. Dithering



PICTURE 3. Painting with pixels



To soften the shape of pixel objects, anti-aliasing can be used. There are different methods for it depending on the resources available, but it is for example used to soften the edges of 3D models in video games. For pixel graphics, it is a good tool to make shapes appear softer and more round. Some programs do it automatically if the option is checked, but the effect can also be created manually by placing pixels around the edges to make the transition to the background smoother. An example can be seen in picture 4, where the circle on the right has anti-aliasing while the circle on the left does not. (Digital Foundry, 2018)



PICTURE 4. Anti-aliasing

## 2.2 Hardware limitations

Video game graphics have changed a lot through the years since the first commercially available arcade game in 1971 (Early Video Game History (1948 – 1972)). Each console and platform has had its own set of limitations that developers have had to work with, and this has defined a different graphic look for each era of video games. The earliest home consoles show well that even working with a small screen and a very limited amount of colours, memorable and easily recognisable character designs and environments can be created.

Nintendo Entertainment System, often abbreviated to NES, released in 1985. It was an 8-bit console featuring many iconic games, such as entries for the Super Mario Bros and The Legend of Zelda by Nintendo, and Final Fantasy

series by Square (NES n.d.). Even though an 8-bit palette 256 colours, the console had a palette of 52 colours, out of which 25 could be shown on screen at the same time due to technological limitations. The sprites primarily used three colours, sometimes four with transparency, which led to the graphics having a very simplified look (The NES that never was...2012). An example can be seen in picture 5.



PICTURE 5. Sprite made with the palette available in NES games

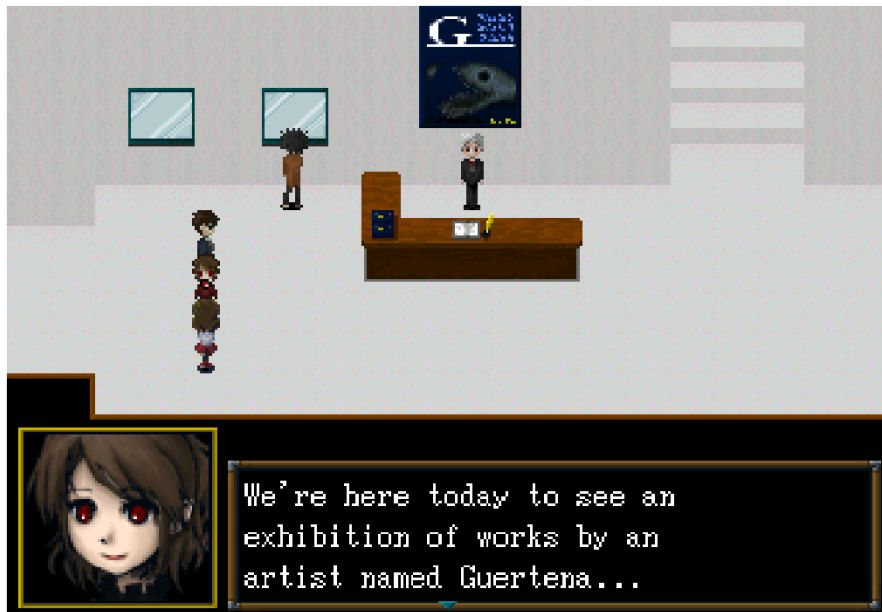
Another console that had an important impact on video games was the Game Boy, released in 1989. Designed as a mixture of Game & Watch and NES, it also used an 8-bit processor. With only a 2-bit colour palette, it allowed very limited 4 monochrome shades to work with. The screen also had a distinct green tint, giving Gameboy's graphics a very unique look. Game Boy Color, released in 1998 could handle an 8-bit colour palette. (Albatross, 2009). The first Pokemon games by Game Freak were released on the Gameboy, and have gone on to influence many games and other media alike. Even with the 2-bit palette, the games managed to create a whole range of different sprites and environments that players still recognise today.

Super Nintendo Entertainment system or SNES, released in 1991, had a 16-bit CPU and could handle 32768 colours, which was a huge difference to the predecessor NES (Super NES n.d.). SNES limitations were flexible enough to allow many styles and innovative uses for the resources available, such as pseudo-3D environments and very detailed pixel graphics (Games That Pushed the Limits of the Super Nintendo 2011). Example of what these limitations allowed can be seen in picture 6.



PICTURE 6. Sprite made with the palette available in SNES games

Since the introduction of 32-bit graphics, the amount of colours available to use is no longer a limitation. Modern computers, consoles and smart phones can handle very advanced graphics and display a huge amount of colours at the same time, allowing artists to create very freely. Pixel graphics can have a palette as diverse as digital paintings and different styles can even be mixed (picture 7). It is not uncommon for games to have pixel art sprites and environments, but painted or drawn character busts or head shots for the conversations, menu screens or battles. Despite technology no longer limiting the use of colours, many artists choose to willingly follow the restrictions set by the older generation consoles, to create retro graphics for their games.



PICTURE 7. Mixed style. (Ib, Kouri 2012)

### 2.3 Use of colour

As in all visual arts, considering which colours to use is an essential part of pixel art as well. When most of the graphics are small in size, and often also full of details, it is especially important that everything is readable and the player can see what is going on. The artist will have to find ways to fit lots of information into small space, and convey emotions, atmospheres and movement as clearly as possible. Colours help with this, as long as the artist makes every pixel count. When using limited colours, such as the NES palette, the most basic rules of colour theory are important. Complementary colours are on the opposing sides of the colour wheel such as red and green, and they can help certain parts to stand out, and create contrast where it is needed. Analogous colours are next to each other on the colour wheel, and they can be used to make a harmonious colour scheme. The limited colour palettes of old consoles created a recognisable style for the games of that era that is still often imitated when creating retro inspired games. Restrictions can in a way also make it easier for the artist to choose colours, when there are few optimal options to go with. When the values are right, and the colours chosen give the background

and character enough contrast, the image is already readable to the player, and everything else is an added bonus.

Working with just one or two colours, either in black and white or shades of some other colour has its own set of limitations and advantages. Using solid blocks of colour, clear line arts and dithering to create texture, very detailed images can still be created. When there is no colour to help identify the objects on the screen, all shapes need to be especially readable. Well made simple graphics can deliver the intended ideas and images effectively.

According to Josh Chen (One-color Graphics 8-9), one-colour graphics are not easier, amateur, or restrictive, but can be memorable, ambitious and witty. In a world where people are constantly surrounded by media trying to capture the attention of potential customers with over the top stunts, it is important for designers of all kinds to keep their integrity and to seek to present their ideas in the most effective way. Sometimes an elegant one-colour solution is all that is needed to get the message across.

## **2.4 Consistency**

Even though mixing pixel graphics with other types of digital art is possible these days, it should be done purposefully and consistently to avoid clashing styles. Creating all the HUDs and menus to fit the same style is often a good choice, especially if the artist is going for a retro aesthetic. Several different pixel fonts can also be found on the internet, either free to use or available to buy, and one can also be made by the artist to fit the game in question. Consistency in the colour palette and amount of detail in the graphics between different areas help tie game together as well. If the overall palettes in the game are very bright and colourful, a darker area can look jarring to the player. This can also be done on purpose, but it is good to keep in mind how effective a change in colour scheme and style can be in creating impressions and evoking emotions, both in good and bad.

## **2.5 Animating pixel graphics**

Animating with pixels has some differences compared to working with vectors or hand drawn images, but the 12 principles of animation made famous by Disney's Ollie Johnston and Frank Thomas apply to animating pretty much anything. Some adaptations are needed when applying them to pixel art, but things like squash and stretch and anticipation, for example, work the same as with any animation (Thomas & Johnston 1981, 47). One of the hardest parts with pixels is to create consistent, round shapes, especially without the use of path tools, since drawing something as simple as a circle one pixel at a time is very time consuming.

With pixels everything is small, and details need to be shown with very few pixels, sometimes even just one. When animating a tile that is used in a set, such as a patch of moving grass or water, it is important to make sure it remains seamless so that it fits into the environment. It can be challenging to create movement patterns that look good when several identical copies are placed next to each other, but it speeds up animating large areas at once.

Animating sprites takes a lot of work, especially if the game has a top-down view and the character can move into all four directions. Tiny pixel sprites are more forgiving with some generally difficult to animate movements, such as the walk cycle, but very complicated actions can be hard to convey in the small size. Context is important and gives the players clues about what is going on, even if the animation only shows small shifts in the pixels. It is possible to use more advanced animating techniques with pixel graphics as well, depending on the program being used and possible plug-ins needed to make it work. Motion capture and skeletal animation, for example, can create very fluid and realistic movement for bigger sprites.

## **2.6 Viewpoint**

The viewpoint that the player is given of the environment is a big part of the experience, defining and limiting the graphics possible for the game quite a bit.

Each option comes with both pros and cons, so the choice depends on the type of game being made and what the developer considers important to focus on. The view can change between different parts of the game. It is common, for role-playing games especially, to have a world map that is seen from above, and a fight screen that is from a side view.

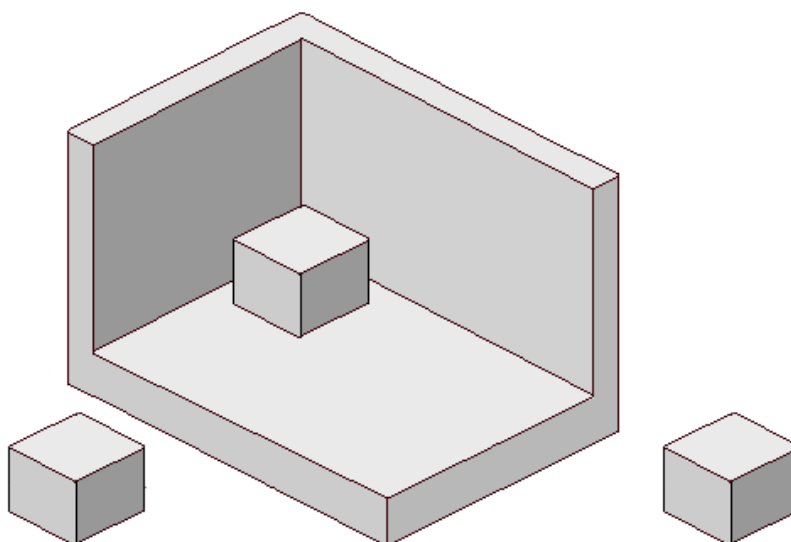
A top-down view, familiar from the very first video games ever made, is still popular in similar shooter games, such as the bullet hell genre (Manzos 2017, 21). It gives a simple view of often several characters at once, while keeping the playable one as the focus. The surroundings are easy to navigate, since it gives an essentially map-like view of the area. On the other hand, it also limits the graphics, especially for the environment that can only show what is underneath the characters. The background can either be static or scroll with the player to give a feeling of vertical movement. Bright colours and abstract shapes, as well as space themes are often popular for this genre, as seen in picture 8.



PICTURE 8. A top-down view of Touhou: Mystic Square (ZUN Soft 1998)

Some games, especially certain massive online multiplayer games tilt the view just a little bit, still keeping it close to a top-down view, but also giving it a more three-dimensional feel. Even just a hint of perspective is enough to give the environment a very different feel, compared to a completely flat surface seen from above. Simple pixel graphics combined with a top-down view can give an old-fashioned and retro feel to a game, if that is the intention.

Isometric view (picture 9) is popular especially in pixel games. Isometric projection is a method to visually represent 3D objects in a way where the angle between any two of the three coordinate axes (x, y and z) is 120 degrees. Even though the view used in games is often not truly isometric in the definition of the word, it comes close and the term is used in general for graphics where the camera is in an angle, displaying three dimensions (Retronauts, 2014). This method helps keep a uniform look to the graphics, and makes the use of tilesets easier, since there is no perspective to consider. All tiles can be placed anywhere without having to resize or set them in perspective. It can also show more of the landscape at once, even on a smaller screen, to create the feeling of space and larger areas.



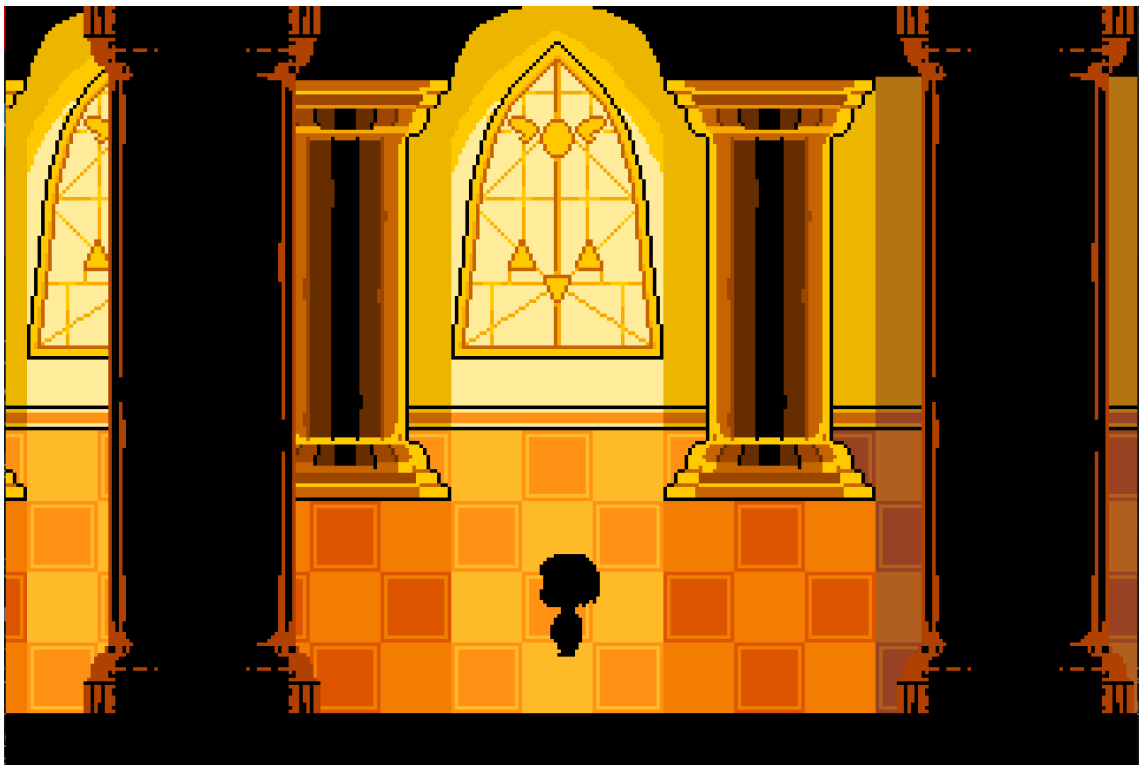
PICTURE 9. Isometric view

Even though there is no perspective to worry about, creating isometric graphics can be difficult for a beginner, as it takes some time to get used to. Some structures will inevitably look different than with a perspective, especially in the tileset out of the environment where it will be placed in, so the artist has to trust that the rules apply and the result will look good once everything has been put together. With the development of graphics, as objects and characters got more detailed and finely textured, the isometric view started to get pushed aside in favour of the first person view and a third person view where the camera is placed right behind the character, to give a better and closer view of everything.



Despite this, it is still widely used in pixel graphics, both in video games and illustrations, for its unique advantages and nostalgia value. (Retronauts 2014)

The problem that often arises with isometric view is that structures can sometimes block parts of the environment or the player character, so some adjustments often need to be done. With indoor spaces, walls need to be constructed so that the characters do not get hidden behind them, and objects can be placed on the screen on separate layers that go over the player, so that walking behind them is possible, keeping the illusion of three dimensions, despite being 2D graphics.



PICTURE 10. Side view in Undertale (Fox, 2015)

Another way to show the scene is the side-view (picture 10), used in games commonly referred to as side-scrollers. In these games the scene is seen from a side-view camera, and the player can only move to the left and right, and often also up and down by jumping. Platforming games are a common use of the side-scrolling, but RPGs and fighting games have used it too. The view fits well into games where the main focus is in timing jumps from one platform to another, and either avoiding or fighting enemies, often in close range. Seeing

the environment only from the side can make the world feel flat, but with clever level design and fitting graphics very impressive maps can be created.

Some games are also outside of these traditional definitions and choose different approaches. Touhou Project, a series of vertical shooter games by an independent developer ZUN, are an interesting example of this. The first five games in the series were made in pixel graphics, and while the player is depicted from a top-down view, the enemies have full-body sprites, as if the camera was in front of them. The backgrounds are mostly abstract, but when environments can be recognised, they seem to be seen from above as well. This creates a feeling of depth, as if the player was flying high in the air, as the enemies and backgrounds move around.

## **2.7 Brief history of influential pixel indie games**

In the early days of video games in the 1970s there was no industry, and nearly all developers were working alone or in very small teams (Michael 2003, 6). The games created were simple, but with luck and the right connections some became popular hits that went on to influence the games that came after them. The Oregon Trail is a good example of this. It was first created by Don Rawitsch, Bill Heinemann, and Paul Dillenberger in 1971 as a learning material for schools, but became extremely popular and has since been released under several publishers and on different platforms, often with improved graphics (picture 11). In the game, the player takes on the role of a wagon leader, and the mission is to guide the party to the goal while trying to keep everyone alive. (Shea, 2014)

After the growth of the computer game market in late 1970, the distinction between big developers and independent creators started emerging. As games began moving from the PC to specialised consoles, and cartridges became a common form to sell games in, it was difficult for small teams to be able to afford the production costs. While this made it difficult to compete with bigger companies in quality, independent developers had the advantage that their lower production costs allowed more experimenting and risk taking since the

games did not have to sell nearly as many copies to turn profit as games made by bigger companies. (Michael 2003, 8)



PICTURE 11. The Oregon Trail 1990 version by MECC

With digital distribution becoming popular in the 2010s, and the addition of services such as Steam and console exclusive sharing platforms for PlayStation, Xbox and Nintendo consoles, the indie game scene has grown even more. Older titles are being re-released and new ones now have the chance to compete equally with big production games. The line between indie games and studio games has gotten harder to distinguish, and the definitions are not easy to make. (Meitzler, 2014)

Arguably the most well known pixel art indie game is Cave Story by Daisuke Amaya, first released in 2004 for the PC. It has since gotten multiple ports and remakes both in 2D and 3D, including a Steam release. Cave Story is a platforming game made in the old NES style, inspired by titles such as Metroid. It was one of the first indie titles to compete with the big companies and receive a large amount of attention and is thus considered important for the rise of the indie game scene as a whole. (Bycer, n.d.)

Fez by Polytron Corporation, released in 2012, is a combination of a 2D and 3D game with a rotation mechanic that allows the player to rotate the map while moving around it. The game was in development for five years and had several controversies surrounding its production. Its developer Phil Fish took part in a documentary movie Indie Game: The Movie which gave the audience a look behind the scenes to see what was going on during the development of the game. Although a sequel to the game was never released Fez received critical acclaim and several ports, including a Steam version. (Makuch, 2012)

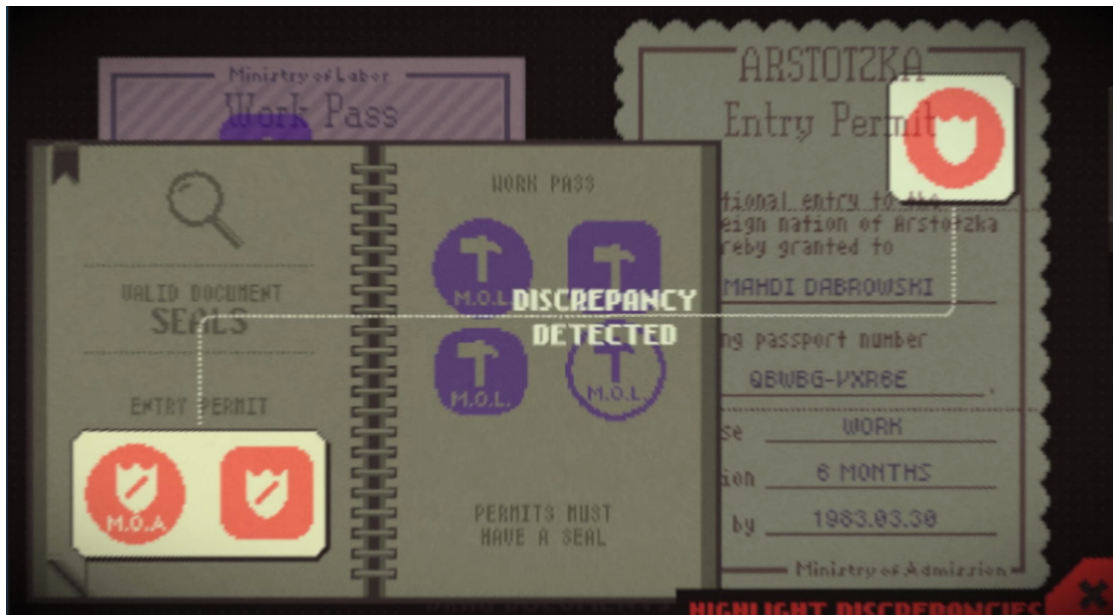
The art style in Fez uses the blocky nature of pixel graphics to its advantage, creating an eccentric world where trees and other vegetations grow in cubes (picture 12). The backgrounds and characters all have a very distinct look to them and the cubical graphics work perfectly for the rotation mechanic, making it visually very clear when the objects are turning and the environment is changing. Even though the graphics are simple the bright colours and textures on the blocks create a vibrant world to explore.



PICTURE 12. Cubical style in Fez (Polytron Corporation, 2012)

Another good example of a game that was created by a single developer is Papers, Please. It was released on the PC in 2013 and it puts the player in the shoes of a border control officer tasked to check the papers of anyone attempting to pass through. The gloomy art drawing inspiration from the Soviet

time aesthetic with its murky colours is fitting to the setting, and the clever use of pixel graphics makes the game appear older than it actually is (picture 13).



PICTURE 13. Papers, Please (Lucas Pope, 2013)

Even though Papers, Please was released after the first wave of successful indie games, it owes a lot to the games that came before. Aleksandr Manzos claims in his book *Kaikkien Aikojen Pelit* (2017) that a game like Papers, Please could not be created by a committee, and can only be the work of a single mind. In the end, that sums up the indie spirit well — passion projects and quirky ideas executed by people that wanted to see those ideas come to life, rather than products born from marketing research and large corporations. Digital distributing channels like Steam and crowdfunding platforms such as Kickstarter have been vital to the scene as well, allowing players to choose which games they want to see happen and to support the developers directly.

### 3 RPG MAKER GAMES

#### 3.1 The RPG Maker editor

RPG Maker is a series of game development programs by ASCII and later Enterbrain. They are mostly used for creating pixel games, and have been used to make several of the most popular titles in the genre. The programs have been released for many different consoles, and can also be found on the game and software sharing platform Steam. Starting from the first program in the series, RPG Tsukūru Dante 98 released in 1992, RPG Maker was a tool used mostly by hobbyists creating fan games and other small projects for their own use, but has since become a viable choice for developers of bigger commercial games as well. (Sayer, 2017)

There are version differences between the titles, but in general the program is intuitive to use and contains lots of ready-made assets, but allows extensive modifications as well, with the help of scripts and plug-ins for those who wish to deviate further from the presets. The ready made assets that come with the game include pixel graphic tiles and sprites made in a rather detailed style, and these stock graphics set the visual tone for many games created with the program. While there have always been online communities for sharing and discussing the games, they were small and mostly within the Japanese circles. With the popularity of titles such as *Off (Mortis Ghost)*, released in 2008 and *To the Moon (Freebird Games)*, released in 2011, the engine has gained more visibility. (Sayer, 2017)

Crowdfunding has made collecting money for projects easier for independent creators, and thanks to that RPG Maker games have expanded their audience past a small niche into more mainstream gaming. Developers can aim to sell their games on places such as software distribution platform Steam, which has a Greenlight program that features games from independent creators. While the amount of RPG Maker games on Steam is still relatively small, 2.6% of all games released on the platform in 2016, it has been growing steadily in the

recent years, and can be expected to continue growing in the coming years as well. (Sayer, 2017)

Even though RPG Maker is not as well known and popular as other engines such as GameMaker and Unity, the games created with it are often recognisable and have certain qualities that set them apart from the mass, because the restrictions of the engine, some of which are impossible to get around without proper knowledge of programming, are not all negative. The basic design structures for the games are all quite similar because the engine gives the developer a frame to work with rather than just a blank canvas and tools, which makes them easy to get into. After playing one RPG Maker game it is easy to jump into the next one. This on the other hand also gives developers a chance to surprise the players. Even though the amount of blocks available to use for an inexperienced programmer can feel limiting, it is possible to arrange them in many ways, and to create something they were not originally meant for. A good example would be the story driven or exploration based games such as Yume Nikki (Kikiyama, 2004) and Ib (Kouri, 2012) that have removed almost all traditional RPG elements from the games, and used the engine to create clever puzzles instead.

Games like Omori, developed by the artist and designer Omo Cat, show another side of this. An easy to use program that requires little tutorials and learning to start using works well for artists who want to focus more on the aesthetics, graphics and story rather than programming. Matt Sayer calls RPG Maker the "most accessible game engine around" in his article *The Surprising Explosion of RPG Maker on Steam* (2017), and notes that its availability on Steam is an important factor to this. In the same article, video game developer Ross Tunney comments that the learning curve for softwares such as Unity and GameMaker is much steeper, which he feels limits the scope of what can be created. Even though full scale games require lots of work and knowledge put into them, it's easier to take the first step towards creating that game when the basic functionalities for it are extremely easy to create.

### 3.2 Tilesets

A tileset is an image file with several objects and parts of environment placed on it, in a grid of certain sized squares, as seen in picture 14. They can then in RPG Maker be used as tiles, and arranged to create maps. In addition to being used to create ground materials such as grass, sand, or wooden floors, they can also contain objects on a transparent background, that can then be placed over the background on another layer. Tiles also often control where the player character can walk, depending on the tile's setting. The player character either can or cannot walk over a certain tile, limiting the play area and preventing them from walking over objects that are not meant to be passable.



PICTURE 14. Part of a RPG Maker MV default tileset

Tilesets are an important part of creating pixel games, and especially so in the case of RPG Maker. Stock assets are used especially by beginners and those without a proper artist for their game, but many developers choose to either make their own, or use some of the many available ones on the internet, made by independent artists. Creating a tileset completely from the beginning takes a long time, especially for pixel art where every individual pixel needs to be in the exact right place. In addition to drawing the graphics, arranging them on the



image file so that they all fit and no stray pixels are left outside the bounds of each tile is a time consuming task. (Creating tilesets 2013).

In addition to tilesets, both backgrounds and objects that go over it can be added through parallax mapping, where an image is created outside the program, and then imported onto the map. This process allows full control over the entire area. Creating enough unique tiles to make a huge, detailed area would take a lot more time and would in some cases not even be possible, so the use of this technique allows more freedom when designing maps. With imported backgrounds, scrolling has to be set separately with a script to ensure it moves accordingly with the player. This can be done with community created plug-ins.

### **3.3 Sprites**

The character sprites in RPG Maker games often follow a similar style, since they generally fit into a square that is the size of one tile. This causes the characters to have a very small body and large head, and a short and squished appearance, in order to be able show facial expressions and details, like in picture 15. Making characters easy to recognise when everything has to fit in such a small space can be a challenge. Conveying emotions also relies quite heavily on the text, especially when there is a limit to the amount of unique expressions the sprites and possible avatar accompanying the dialogue can have.

Animating the sprites can help with this, since full body gestures make reading the situation easier for the player. It is also possible to create bigger sprites, as long as they are correctly placed onto the animation grid, with proper dimensions. The program automatically divides the file into four columns and two rows, unless it is specified that sprites for only one character are included in it. The basic sprite sheet generally contains the walking animation for each character, in all four directions.



PICTURE 15. RPG Maker MV default sprite style

### 3.4 Notable RPG Maker games

#### 3.4.1 Yume Nikki

The surrealistic exploration game *Yume Nikki* was released in 2004 by Kikiyama, made on the *RPG Maker 2003*. The player controls a young girl named Madotsuki through various dreams, with no other tangible goal than exploring and experiencing them. There is no proper story, and the only thing to do in the game besides wander around is to collect several different objects called “effects” that can be found throughout the game. These effects change Madotsuki’s appearance or give her other modifiers, such as let her ride a bicycle, or use a knife or an umbrella.

The player can wake up and return to the room where the game begins at any moment, and venture through a different door into another dream. The room is done in a very traditional style, with detailed objects and an everyday feel to it. It is a regular room (picture 16), and a stark contrast to the surreal environments inside the dream world, like the one in picture 17. The player sprite does not show emotion and is just an avatar walking through the areas, which makes her feel more like a representation of the player rather than an actual character. There are instances where other sprites that appear human can be seen, and they have very different proportions, closer to realistic, which strengthens the feeling of exploring a completely different world as an outsider.



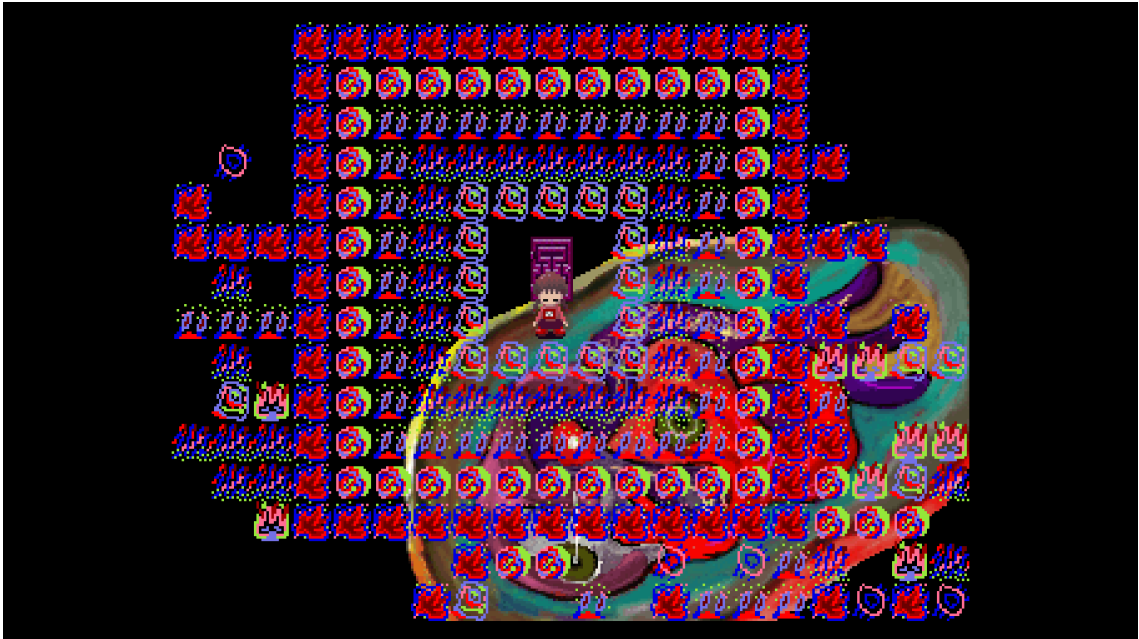
PICTURE 16. Madotsuki's room (Kikiyama, 2004)



PICTURE 17. An area in the dream world (Kikiyama, 2004)

The graphics in the dream world part of the game vary greatly. Some areas are very simple and done only in black and white with basic line art and not much else, while some are detailed and more realistic. Perspective changes from area to another, and while most of the maps are from top down view with isometric buildings and other structures, some rooms even imitate 3D art with an illusion of depth. Most of the environments are unsettling and dreamlike in style, and even though few enemies in the game will harm the player, the atmosphere is often reminiscent of a nightmare.

Bright colours on dark backgrounds, especially black, are used a lot, and the choice of colours and patterns gives a feeling that they are not even meant to fit together to create something aesthetically pleasing, but are highly random which fits the theme of the game being set inside dreams. At times, the colours and animations have a similar feeling to them as early websites filled with flashing GIF animations, moving text and overly saturated colours, as seen in picture 18. It could be said that the game looks like the era it was made in.

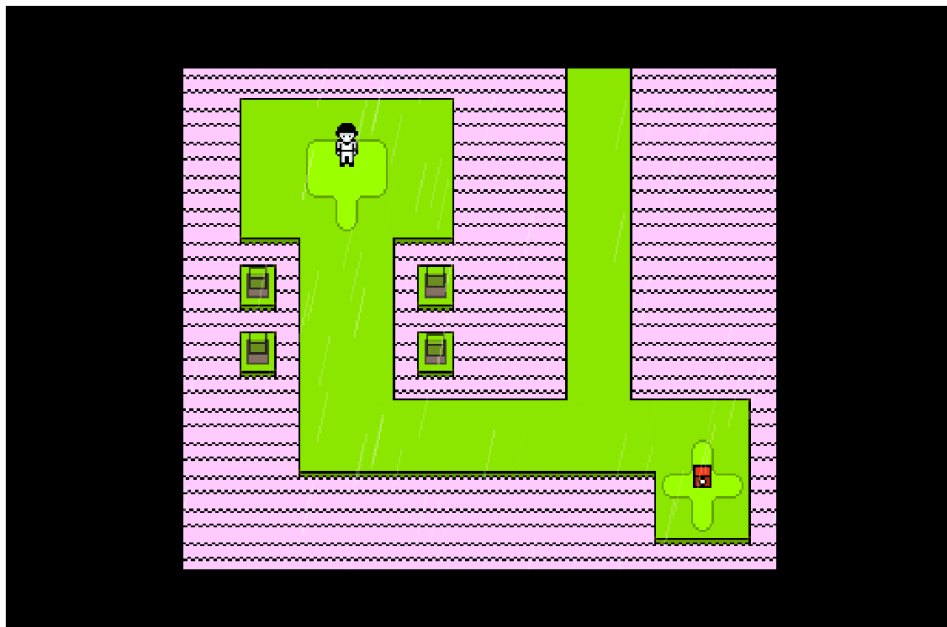


PICTURE 18. Bright coloured tiles filling the screen (Kikiyama, 2004)

Yume Nikki is a well known game in the pixel game genre, and has remained popular throughout the years. Little is known about its creator, Kikiyama, who has remained mysterious. In 2018 a reboot of the original game with 3D graphics was released on Steam, after more than 10 years since the last update on the original game. Yume Nikki has inspired several fan-made games over the years, and Madotsuki's design, although simple, is easily recognised and she is popular in fanart as well. The game has influenced creators since, and is cited as inspiration for games such as Lisa by the developer Dingaling. (Zavarise, 2017)

### 3.4.2 OFF

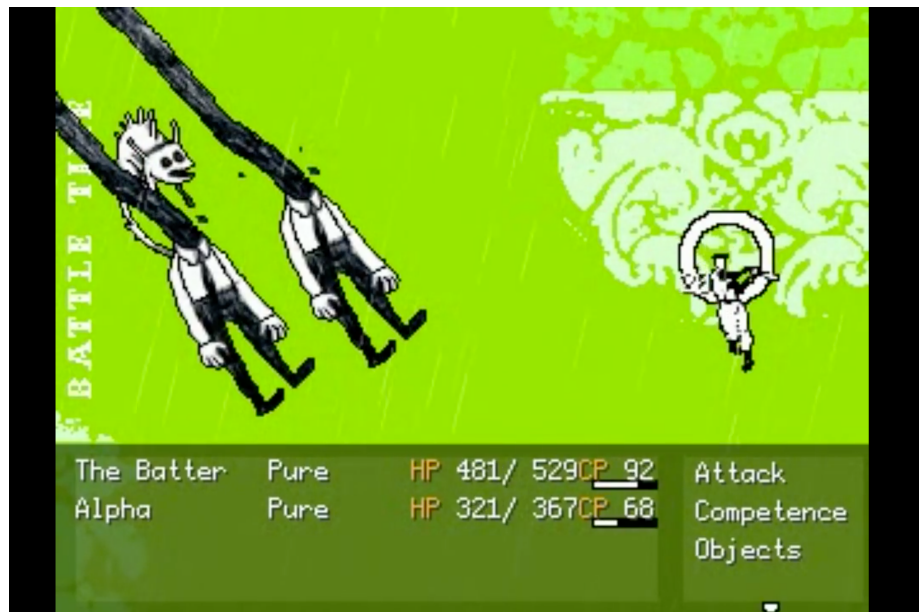
OFF, released in 2008, is an adventure game created by Mortis Ghost on the RPG Maker 2003 engine. The player controls a character named Batter through various areas known as Zones, while fighting enemies and solving puzzles. The art style is mostly very simple, with just line art and flat colours (picture 19), but more detailed illustrations and photographs sometimes appear as backgrounds during dialogue. Even though the areas are seen from top-down view and follow the basic RPG Maker game structure, OFF is very different stylistically from the default assets and majority of games created with the engine. The surrealistic atmosphere carries throughout all the areas of the game, from music and dialogue to visuals, and makes it a unique experience.



PICTURE 19. Zone 1 (Mortis Ghost 2008)

The colour scheme is colourful and surrealistic, fitting the overall theme and feel of the game. In contrast to the simple character sprites and very minimalistic environments, the enemy battle sprites, shown in picture 20, are stylish and unique, and sometimes quite detailed. The background colour changes depending on the area, and occasional effects such as rain are overlaid on the battle screen. The symbol that can be seen on the right side of the battle screen stays there, as a permanent feature behind the character sprites during all combat scenes, and text appears on the left side.

The layout of the battle screen is very simple, but the colours all stand out well and the compositions seem well thought out and planned, giving the gritty graphics structure. The enemy sprites show good examples of dithering, but also often have more haphazard textures, giving them a sketchy feeling, as if a pencil drawing. The contrast between map sprites and battle screen graphics is nothing new, but the way everything is presented in Off feels very fresh, despite it already being an older game.



PICTURE 20. Battle screen (OFF, Mortis Ghost 2008)

Pixel graphics work well with this type of art, because the small sprites and simple environments leave a lot up to the imagination of the player, to fill in the gaps and make connections between things. It presents concepts, rather than finished visuals that already contain all the information, letting the player interpret them through their own experiences and views. Strong colours also set the mood very effectively. A solid red background, for example, is enough to create an association with certain emotions and set expectations, although these will always be influenced by cultural and personal differences between players as well.

### 3.4.3 To The Moon series

The first entry of the currently three game series by Freebird Games, titled To The Moon, was released in 2011. A short chapter, A Bird Story, came out in 2014, and it connected the first game to the sequel Finding Paradise, which was released in 2017. All three were made on the RPG Maker XP engine. The games revolve around a pair of scientists who venture into dying people's dreams to fulfil their final wishes. The graphics in the series are very detailed, and lots of attention has gone into the environments. Paintings on the walls, patterns on fabrics and many unique objects create a believable, modern world. The characters, even though stylised, have more realistic proportions than the default RPG Maker sprites. One of the most recognisable things in the artistic style of the games is the soft lighting of especially indoors spaces. Natural light is used a lot, giving the scenes a serene feeling which fits the mood and theme of the game (picture 21). The colours are often muted and worn, and they change into a monochrome palette during certain sections of the game.



PICTURE 21. Finding Paradise (Freebird Games, 2017)

The furnitures in the games all have rounded corners, which is often done to create a more three-dimensional look to the objects, making them appear less blocky and more natural. This also adds to the soft feeling the visuals overall have. Doormats are used as cues for where doors are placed on the vertical walls that can not be seen from the perspective that is used, which is an interesting choice, but one that works. The parts of the map that are not in the focus are often blurred to black, which helps immerse more into the current scene, and makes exploring more interesting when the entire map can not be seen at a glance.

To The Moon and its sequel both have a large amount of unique animations, which is more rare with games of this type, since they all need to be drawn frame by frame. Starting from the first scenes of Finding Paradise, it is clear that a lot of time and effort has been put into these animations, to make the characters act as naturally as possible. It is common, especially with pixel games, to express actions through text rather than animation, since it is easier to get away with not moving the characters when the sprites are small. Lack of animation is something that is often expected of these games and it rarely detracts from the experience, but adding it in does give the characters more personality right from the start, when the player can see them gesture and react to what is happening.



## 4 PIXEL GAMES NOW

### 4.1 Pixel art as a movement

In their relatively short history of around 50 years, video games have been slowly developing into an art form of their own, with unique ways to present ideas and tell stories. Even though games are still often not recognised as influential landmarks in the cultural history in the same way as paintings, sculptures or novels are, this has been changing in the recent years. Daniel Podgorski proposes in his article *Style by Necessity: On FTL: Faster Than Light, and Pixel Art as an Art Movement* that this is also the reason for why pixel art has not so easily been considered the art movement that it is, since it is predominantly used in video games.

Though originally born from hardware limitations, and still easily associated with the early days of video games, the term pixel game now often brings to mind a story-driven indie game with simple but effective graphics and memorable characters. There is an abundance of cheap and free-to-play games of this type available on Steam and other various sharing platforms, which has in a way given pixel games a reputation of being amateurish and low-effort. However, the most well-known games that set the stage for this new wave of content were received well by a wide audience, and some games in the recent years have already made an impact in the scene as well, showing that pixel games are more than just the first attempts of a beginning developer, or a niche genre for specific kinds of games. (Sayer, 2017)

With the popularity of gameplay videos on Youtube rising, smaller pixel games gained visibility as well. Similar to *Ib*, other games also abandoned the traditional RPG format and took a different approach. *Witch's House* (Fummy, 2012) and *Mad Father* (Sen, 2012) are two examples of this, both story driven games with horror elements, where most of the gameplay involves solving puzzles to advance the plot. Simplistic pixel graphics might actually have an advantage when it comes to creating a scary atmosphere, since humans tend to in general fear the unknown, and with the game offering less detailed visual

descriptions of the scenes and especially the monsters, the player has to fill in the rest themselves. The object of fear is often more scary when it has not been seen yet, and a simple rendition of it keeps more of this sense of unknown intact. Pixel graphics have been used for games of many different genres, but it could be said that pixel games are also a genre of its own. Although very different in content, the games share the same retro feel that the use of pixel graphics creates.

As Aleksandr Manzos explains it in *Kaikkien Aikojen Pelit* (2017), not even the best graphics can imitate perfect photorealism, so it is better to focus on ways to help the player complete the rest of it themselves with their imagination. In the early coin-operated arcade games this was done by including detailed illustrations on the machines, but music, colour choices, dialogue and direction of the scenes can go a long way to do the same without the need for flashy visuals. With the development of technology, it is possible that someday graphics realistic enough to be indistinguishable from reality could be used in video games, but this comes with the question whether or not that will really be necessary. Will it add something to the experience, that the player could not add themselves, with much less visual cues to go on, and possibly with better results?

## **4.2 Notable recent pixel games**

### **4.2.1 Stardew Valley**

*Stardew Valley*, a combination of a farming simulator and a roleplaying game, created by Eric Barone under the name ConcernedApe, was released in 2016. Following in the footsteps of games such as *Harvest Moon*, *Stardew Valley* started off as a simple programming exercise, but quickly grew in scope, and ended up as one of the best selling games of 2016. In his interview with *PC Games* (2016), Barone speculates that one of the reasons for the immense popularity of the game lies in the more personal relationship players have with the game when it is created by one developer, instead of a big faceless

corporation. This summarises the spirit of indie gaming well, since creating passion projects instead of focus group targeted products has often been credited as one of the biggest merits of the scene.

Stardew Valley's art style is colourful and expressive, and quite impressive when considering the developer had little prior experience in pixel art. The game runs well in full screen, and the graphics, even though retaining a pixel style, are in a bigger scale than games of this style usually are. Pixel art can be created in any size, as long as the individual pixels are distinguishable on screen. In reality, one visible "pixel" on the art can be several pixels on the screen. This can be done by using blocks of for example 2x2 pixels, to keep the ratio the same. (Marks, 2016)

Everything in Stardew Valley, including the HUDs, text and menus keep the same style, creating a unified visual look for it. The game has changing seasons, which affect not only gameplay, but the graphics as well, and each season the entire environment looks different. Colour change, tree sprites are altered and during winter snow covers the whole town. Creating unique graphics for four seasons is no small task, and attention to details is something that carries through the whole game. Finding and gathering resources is an essential part of the game, and the environment has been crafted to support this. Any elements that are placed above the player become transparent when walking behind them, making sure no items are left hidden behind them, as seen in picture 22. (Marks, 2016)



PICTURE 22. Tree turning transparent (ConcernedApe, 2016)

Stardew Valley has a large amount of items not only to collect, but to also display in the house that can be modified and decorated as the player wishes. Simple pixel graphics have been used well to portray the wide array of different objects, and they can with few exceptions be recognised easily. However, because of the often unavoidable blocky nature of tile based graphics, some items float awkwardly in the space. The graphics have still overall been handled very well, and the traditional top-down view fits the game perfectly. Bright colours, round edges and sometimes unrealistic proportions, like the crib in picture 23, give the game a cheerful and slightly childish look, which fits the carefree and calm nature of the game.



PICTURE 23. The player character and her wife in their child's room (ConcernedApe 2016)

#### 4.2.2 Rakuen

The story driven adventure and exploration game Rakuen was released on Steam in 2017, made on the RPG Maker XP engine. It was created by Laura Shigihara, who wanted to expand the story of a song she had composed further, and felt that a game would be the right medium for this (Rakuen FAQ, n.d). Rakuen tells the story of a young boy living in a hospital, and his mother who gives him a book that takes the boy to a magical world. There he goes on a

journey to come to terms with his own situation by helping other patients deal with their problems, both in the hospital and in the other world. The game is in a way split into two parts, with the other part taking place in the hospital, and the other in the magical world. Even though there are several narrative and visual links between the worlds, the art style and especially atmosphere are very different. The hospital, as seen in picture 24 is plain and ordinary looking, which works as a contrast to the colourful other world, making sure the player always knows which world they are in.

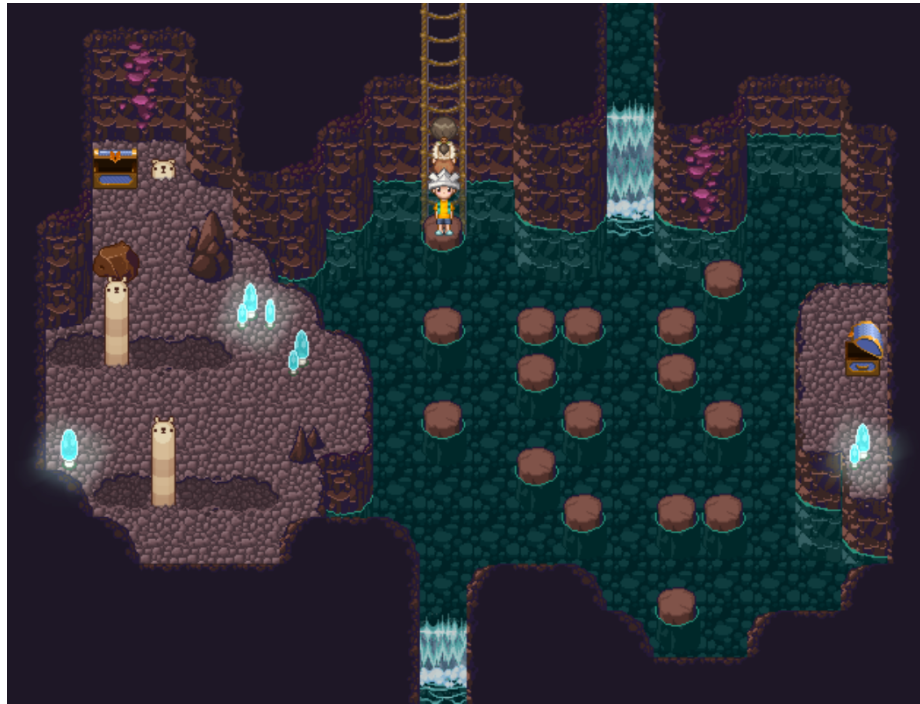


PICTURE 24. Hospital storage area (Shigihara, 2017)

Compared to the round and soft art style of *To The Moon*, which similarly takes place in a realistic environment, the hospital areas in *Rakuen* have more hard edges and sharp corners, and the edges to indicate walls of the rooms are often left out completely. This gives the areas where the map does not fill the entire screen a feeling that the room is floating in darkness, rather than part of a larger building. The transitions from one room to another are also sometimes done with a narrow corridor, rather than an indication of a door, which looks a bit jarring in the otherwise realistic environment (picture 25).

The other world has a traditional RPG style, with ground and water areas that clearly consist of tiles, which is not a bad thing, but rather gives the maps a familiar feeling of the early adventure games. The environments are colourful,

but not as bright as in *Stardew Valley*. The palettes are more harmonious and the colours soft, and the world has very fittingly a similar feeling to a fairytale or a children’s book.



PICTURE 25. A cave in the magical world (Shigihara, 2017)

### 4.2.3 Undertale

*Undertale*, released in 2015 and created by Toby Fox, is a roleplaying-game with a unique combat system that combines turn-based action with bullet hell, inspired by the *Touhou* series. The game follows a young child traveling through a world full of different monsters. The story and interactions change drastically based on the player’s decisions to either fight their way through the areas, or to try and negotiate with the enemies. The game has received multiple awards and high critical acclaim, as well as a large fanbase, demonstrating what indie games can achieve.

The visuals in the game are very simple, with little details. The sprites of both NPCs and enemies are however done with a distinctive art style, and even the most simple characters with only one line, if even that, have a unique and personal look and characteristics (picture 26). This makes them feel closer to

the player, and more alive, and makes it easier to get attached to them, even if their appearances are brief. The designs are imaginative and have great variety, with most of the characters having clear silhouettes and colour palettes that make them easily recognisable. Each area of the game has a different colour scheme, and varying levels of details, which at times can feel a bit disjoint.



PICTURE 26. NPC designs (Fox, 2015)

Nearly everything in the game, including the HUDs are done in pixel graphics. The text boxes and menus, even though very simple, have been made unique by using the small heart icon that throughout the game represents the player's will, as a cursor. This has allowed fans to recreate scenes and make other content that can be recognised to be Undertale related, by using this same detail. One exception to the otherwise uniform graphical style however is a boss fight in one of the possible routes, which uses mixed media elements and has a significantly different look than the rest of the game.

## 5 GAME PROJECT

### 5.1 Background and goals

*The Order of Soul* is a short demo for a puzzle solving RPG that aims to combine everything learned about pixel graphics so far. It consists of two rooms and has simple interaction with the environment, but mainly focuses on the visual style that the rest of the game will follow. The player controls Lacie, one of the main characters exploring a classroom that is located on the second floor of the school building. This location was chosen because the puzzle that was planned to take place in it fits the purpose of showcasing the different styles the game will have. The puzzle is also simple to create, which makes it good for getting used to the new engine. All graphics were made in Photoshop CC, since that is the program I am most familiar with.

The project had three main goals:

- Creating a consistent visual style for the sprites, environments and menus
- Learning to use the RPG Maker MV engine
- Learning to create good looking pixel graphics

Development of the game will continue after the demo is complete, and the finished work will contain several hours of gameplay. The main inspirations for the project include games discussed in this thesis, such as *Ib* (Kouri, 2012) and the possible combat system planned takes after several entries from the Touhou Project series by ZUN. Games based on exploring and solving puzzles have added a new twist on what can be created with an engine designed for RPGs and this project aims to build on that by adding some more traditional elements, and using best of both worlds. Bonding with the team-mates is essential to survival, similar to the Persona series (Atlus), and depending on the player's choices, the story can have several different ending. Whether the game will have combat sequences or not, the main focus will be on solving puzzles and getting to know the other characters and befriending them.



## 5.2 Designing the maps

The classroom that the demo takes place in is used for geography classes, so the design was created with that in mind. The game switches between normal and surreal parts, but the art style will mostly stay the same in both of them. A very stylised approach was considered for the overall art style as well, but since the school is supposed to be completely normal and act as a contrast to the dreamlike sequences, it was decided that a more realistic style would be used. Creating the background with the placement of tiles in mind was difficult, since some of the objects on the table were supposed to go over the player, giving the illusion of walking behind them. This meant that those images needed to be either placed on the map via an event, or as a part of tileset. Since most tiles can only be set as passable or impassable, an already existing tileset was chosen as a template. Some of the art that was reserved for objects going over the player were then replaced by my own graphics.

Because of the limitations that large tiles places on the movement of the player, it was important to choose the placement of every object in the scene well, to make sure there are as few awkward parts where the player seems to hit an invisible wall as possible. It is extremely difficult to avoid completely, but filling empty spaces with objects to make them more believably impassable helps with this issue. Most of the objects were first sketched on the map to test how the character moves around them and to make sure the proportions work. An example can be seen in picture 27.



PICTURE 27. Early sketches of objects in the room

Details make scenes more interesting to look at, so they were added in as much as was possible. Exploring the environment is an important part of the game, so plenty of events to do just that were created. Jim Thompson lists reward as one of the key elements of level design in the book *The Computer Game Design Course* (2007, 108). Whether the reward should be a tangible item or an increase in level, or simply the satisfaction of solving a difficult task depends on the situation, but it is important to give the player response for interacting with the environment.

A technical issue that arose early on when creating the first map was the terrible scaling of the visual assets when changing the window size. The entire game became slightly blurry, which was especially detrimental because of pixel graphics relying on the crisp and blocky look. Even though it is possible to optimise everything to a specific size, for example full screen or the default windowed size of RPG Maker MV, it is better to make the graphics look at least tolerable even when the screen size is changed by the player. Luckily the RPG Maker community is great when it comes to plugins and solutions to problems such as these, and a way to change how the graphics scale with simple changes to the code was not hard to find. As a result, the pixels stay crisp and perfect in the intended window size, but do not get blurry in fullscreen mode either. The finished classroom, in full screen, can be seen in picture 28.



PICTURE 28. Classroom 203 in fullscreen mode

### 5.3 HUD and menu design

An area to focus on that was decided very early, was that both the HUD that is visible on the map view, and the menus that can be opened will be made as stylish and unique as possible. This was largely inspired by the game Persona 5 (Atlus 2016), known for its well designed and beautiful interface. Many games, especially RPGs, often overlook menus, but even though their most important quality is to be clear and functional, they can be much more than just that. The visual style of the game is created by everything the player sees and putting in extra effort to create a unified style that is more than just the bare minimum adds to the experience.

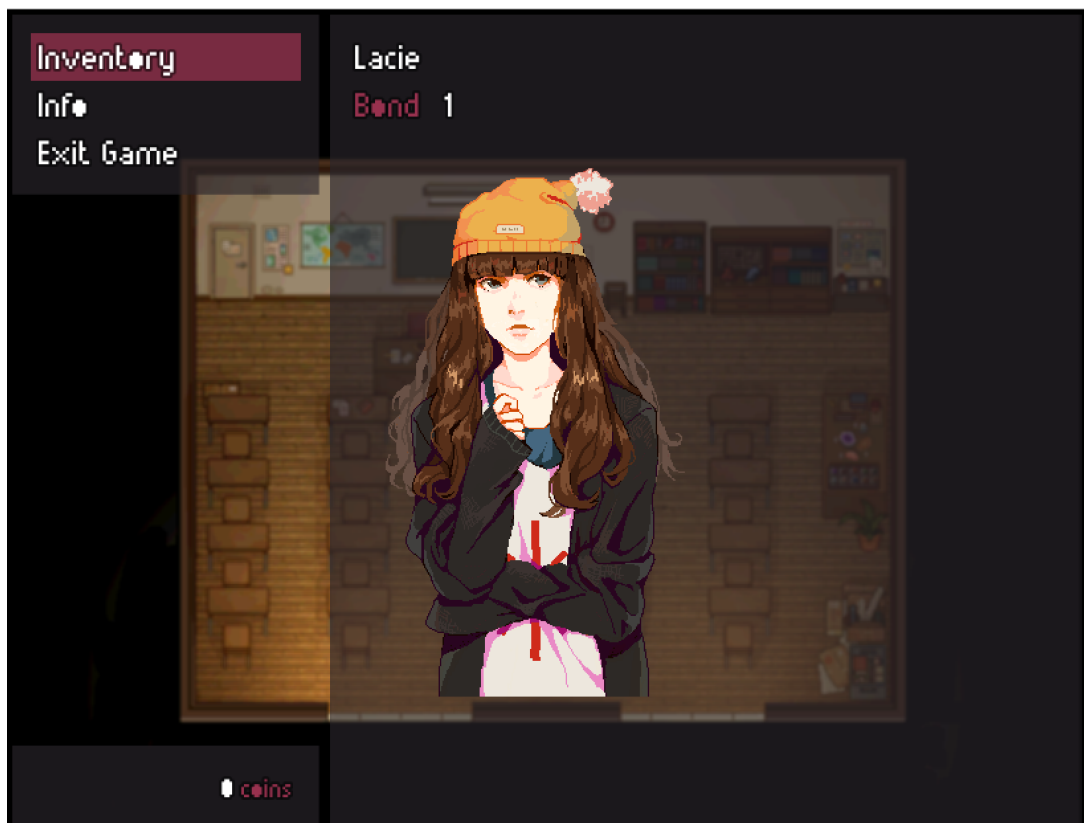
The initial idea for the menu was text that resembles letters cut out from printed text, such as magazines. It would have a patchwork type style, with lots of colours that would change depending on the area. The image used for it has to be something that fits both the black background that will be present in all smaller maps, and the various rooms that fill the entire screen. It should also not take too much space, or block anything essential. For this, a first versions were made, which can be seen in picture 29.



PICTURE 29. HUD designs for the rooms

The finished game will be divided into several days, and the current day was planned to be displayed in the upper left corner at all times, along with the name of the room or area that the player is currently in. The patterns and colours in the patchwork will change depending on situation, so two separate ones had to be made for the demo, one for each room. The goal was to make the palettes colourful, but not overly bright. Muted colours work best for this, and keep the intended mood the whole game should have. In the end the HUD designs were scrapped and the demo plays without them. A different design will be used for the full-scale game.

Due to the way RPG Maker MV handles windows, creating a unique menu was unfortunately difficult. The program draws all window styles and backgrounds from a single image file (Appendix 1), so changing an individual window, such as one used in the menu, would require more complex knowledge of programming than is possible for this project. In addition, the background picture for both menus and cursors stretches to fit the area instead of tiling and looping the images, which makes it impossible to use anything other than a single solid colour for them. In the end, a reddish purple was chosen as the highlight colour for the menus (picture 30).



Picture 30. Finished main menu

While this changed the original plans considerably, it was still possible to create a simple menu that fits the overall style of the game by removing all the window borders and similar default effects, to keep the windows minimalistic. RPG Maker, despite its many good sides, is still a restricting program in many ways due to forcing several defaults on the player that can only be removed through plugins or directly tampering with the code. Some features like the bond level and mementos tab in the inventory that will be used for the full game were left in the demo, even though they have no direct purpose in it.

#### **5.4 Character design**

The Order of Soul tells the story of six young adults who are stuck in a bizarre dimension between their school and another world. For this demo, only one character was chosen. The first one that was considered was Lysander, since he could technically be considered the main character, but because of his plain colour palette Lacie was chosen instead to represent the whole group (picture 31). The beanie she is always wearing was originally going to be red, but it felt too predictable to be the highlight colour, so yellow was chosen in the end. Her design was made to be a regular school girl, but to still have interesting colours and to stand out from the background. It was clear from the beginning that the character sprite style would not follow the basic RPG Maker proportions, and would look as realistic as was possible while still staying simple and stylish as well (picture 32). Everything in the game was made in pixel graphics, from fonts to character art, so Lacie's bust picture for the menu was no exception. Finding out the exact dimensions of the picture that would fit into the menu was no easy task, since the picture generally scales itself to fit it, but that of course is unacceptable with pixel art.

The other character, The Door, was designed for this map in specific, and is not a major character in the full game. He is briefly encountered by Lacie who is looking for two of her friends, and the two share a conversation. The scene as it is in the script of the full game would not have made sense in the context of this demo, so it was changed completely to fit the different situation. The Door keeps his polite but rather selfish personality, as well as the tree-like

appearance. Another character that the player can interact with, called Starpiece, was added last, to create more interest for the dark version of the classroom that has little interaction otherwise. The design was kept simple, since its main purpose was to just give Lacie more dialogue, to make her more of a character in the very short time that the player is with her in the demo.



PICTURE 31. Sketches of Lacie's design



PICTURE 32. Lacie's sprite sheet

Lacie's clear and simple colour palette translated well into the small sprite, so the main challenge was the walk cycle. Because of the more realistic proportions the distance the character travels from one tile to another feels longer than it would with a more stylised sprite with short and stubby legs, so it was difficult timing the animation correctly. The character should clearly be walking, not running, but too little movement would make it appear more like gliding, so balance was the key.

## 6 CONCLUSION

Pixel graphics can be made to fit almost any type of 2D game, as seen in the examples presented in this thesis. Whether the goal is to give the game a nostalgic retro feel or to just go for a simple aesthetic, pixel graphics can do that, with or without hardware restrictions. RPG Maker games have set the genre forward by making it easier for beginning developers to create their first games with the support of a strong community, and an intuitive and easy to use engine. Thanks to the innovative games made by independent creators, pixel games these days do not only make people think of old console graphics from decades ago, but also horror games and role-playing games with clever puzzles and well-written stories.

In the era of high definition and hyper realistic graphics, the simplicity and charm of art that aims for a unique style, and often the easiest and most bare bone presentation, definitely has demand. Letting the player work harder with their imagination to fill in the gaps and immerse into the world of the game may actually benefit the story and allows lots of creative freedom. Both environments and concepts can be given to the player the way they are supposed to feel, rather than the way they are supposed to look. Atmosphere is the key, and pixel graphics convey it well, keeping it simple when needed, but always providing texture and grit even in the most simple pictures, without risking it to look lifeless and sterile which can happen with vector graphics. With pixels, the viewer can see the handiwork of the artist, each pixel placed where it belongs, with no shortcuts.

*The Order of Soul* turned out as intended for the most part and showcases what was learned from the research work. The themes and atmosphere take inspiration from classic pixel RPGs like *Yume Nikki* (Kikiyama, 2004), but the art style has a more modern take on it, and aims to combine the best of both. Unlike most games included in this thesis, the main character is not silent, or in any way a representation of the player. Lacie is a character that retains her personality no matter what choices the player makes. The menus, even though simple, keep the same style that the rest of the game has, and contains as



much visual graphics as was possible within the limitations of the engine. Further looking into the matter and trying to find a way to customise the menus even more is an important priority for the future development of the game. Plans for the HUD that will be used in the full game are also in progress, and several other features that use the menu functions will be included as well.

Even though RPG Maker MV has several differences compared to the previous engines in the series it did not take too long to learn to use it well enough for the scope of this project. Despite certain limitations and restrictions it has the existing tools can be used to create lots of diverse gameplay features beyond what they were originally intended for. This game project was a good way to learn the basics and prepare for the future production that will continue with the same engine.

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**APPENDICES**

Appendix 1. A modified Window.png file

