

Saxion XR Lab

Internship 2023-2024



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Contents

Introduction 3

Company and Culture 3

Learning Goals..... 4

Competencies 5

 1. Communication..... 5

 2. Enterprising Attitude 5

 3. Learning Ability and Reflectivity..... 5

 4. Technical Research and Analysis 6

Projects 6

 Bariatric Care..... 6

 EUREGIO..... 17

Burnout Reintegration 17

Twinmotion Project..... 18

Conclusion..... 19

References..... 20

Introduction

Even before the day I joined CMGT, I knew I wanted to be a designer. I was always fascinated by how game/level designers guide the users/players to do what they want in the most subtle ways. I was in awe from how much little changes and decisions designers make can impact people's experiences. I still remember watching "Why Nathan Drake Doesn't Need a Compass" by Game Maker's Toolkit on YouTube (Game Maker's Toolkit, 2015). A video where the creator breaks down how using level design techniques like lighting, composition, colours and etc, the designers from Naughty Dog were able to guide the player to the right location without needing to use common mechanics like a mini-map, compass or UI overlay to indicate where they need to go. I was always interested in how the human brains work and what motivates us to do things that we do, so after watching that video I knew that design was what I wanted to do.

After 3 years at CMGT, my conviction to become a designer only got stronger. I found out what I was good at and what I need to improve at on top of gaining very valuable knowledge like how to work off of user's needs and how to think about the business side of game development. I also gained a lot of technical skills like programming, 3D modelling, Texturing and working within an engine which actually allows me to bring my ideas to fruition.

Hence, when it came for me to choose a place for my internship, I knew I needed a place which would:

- Give me exciting projects to work on.
- Trust me with the responsibility to make design choices that will actually impact the experience instead of me working on a tiny part of the product.
- Allow me to further develop both my design and technical skills.
- Have a positive and progress-oriented work environment.

I went through a lot of Internship Interviews and the environment that satisfied all of my major criteria came from a very surprising place to me.

Company and Culture

Saxion XR Lab is a company based in the Ariensplein building consisting of 10 team members and a everchanging cast of interns. They are mostly working on projects that come directly from clients like hospitals, schools and etc.

During the interview there were a few things that caught my eye:

- People there seemed very friendly.
- I was going to get assigned to multiple projects.
- I would be expected to work very closely with the users to satisfy their needs.
- People interviewing me seemed very open to feedback.
- I would have room to grow and acquire new skills.

Those were the main reasons why I decided to choose this company.

During the first day, I got assigned to one major project: “Bariatric Care”, which is a VR game made in Unreal Engine, which aims to aid people who had gotten a bariatric (stomach reduction) surgery better balance their diet and adapt to their new dietary needs.

The very first thing that the people from XR Lab emphasized during our introductory meetings was that we were not bound to our projects only and were encouraged and expected to help out with other projects as well if the need arises.

A few weeks after I got assigned to another project for “EUREGIO”, which is a school chain located all across the Netherlands and Germany. They wanted us to make a Unity game that would connect German and Dutch classes to put them in scenarios where they will need to collaborate and then use that to educate students on different topics like the housing crisis, flus and etc.

In the second half of the internship, I got asked to help out with the “Burnout Reintegration”. It is a VR project where you’re put through a scenario of being an overworked youth care worker currently experiencing a burnout. This project is going to be used for training people on how to deal with a it.

By the end, I was also asked to take a look at a project they work working on alongside some other studies from Saxion. The project currently doesn’t have a name so I’m just going to refer to it as “Water Lab”. People from other studies made a 3D replica of Saxion Main Building in Twinmotion and they wanted to get it into Unreal Engine and make it playable in VR. In order to do that it needed some optimization work to be done. The only interactions they needed was walking around and opening doors.

The culture in the company is very collaborative and result oriented. We are expected to arrive between 9-9:30 and are free to take a lunch break and smoke breaks freely. What matters is that we get the job done, which has honestly manifested a very stress-free and friendly environment which is one of the keys to achieving a healthy workplace primed for success. It is also very common across everyone to ask for help if faced with a challenge which not only makes us more efficient as a team, but also builds a strong foundation for the relationships between the workers, which makes the workplace even more welcoming.

Learning Goals

These are the learning goals I decided to pick for my internship:

1. I would like to experience what it’s like to be a designer at an actual company.
2. I want to learn Unreal Engine, because before this week, I have only used it a few times to check out the visual aspects of it. I would like to delve more into Blueprint and the overall structure of Unreal.
3. I want to improve at prototyping and user interaction.
4. I would like to learn how to work on VR products.
5. If possible, I want to get more experience in 3D modelling and environment art.

Originally, I was thinking to put what I did to satisfy these learning goals so far in this chapter, but I feel like it will make more sense if I cover that in context when I talk about the individual projects in the upcoming chapters.

Competencies

In this chapter I will give a basic outline of how I satisfied all the competencies. In the upcoming chapters, when I talk about the projects and the things I did, I will go further detail and specify which competencies they satisfy.

1. Communication

Throughout the projects, I tried my best to stay in constant touch with my coworkers about the state of our projects. It spanned all the way from simple asking for feedback from my coworkers and project managers to making documents that contain a step-by-step user journey while interacting with our product.

I looked at what my colleagues were good at and did my best to learn from them, whether it came passively by observing them or directly, by asking them to teach me something I needed for a project.

On top of that, we had weekly meetings of our whole team for the bariatric care to discuss our progress so far, future plans and potential design changes we thought might benefit the final product.

I also tried to make our planning better by organizing an asset list consisting of 128 objects that we needed sorted by priority.

2. Enterprising Attitude

Since the XR Lab is mostly a client-oriented company, there's quite a lot of back-and-forth going on between us and clients. On the projects I'm assigned to, I asked my project managers to participate in meetings with our clients. I did my best to stay active during those said meetings, share my perspective and ask for their feedback. I was always prepared for the meetings with a list of questions we had for the clients and a list of things we wanted to show them. During those meetings, I made sure to try to put myself in their shoes and approach the matters from their point of view.

3. Learning Ability and Reflectivity

In the ever-expanding game development industry, being able to learn and do it quickly is a key to success. So far into my internship, I have obtained a lot of new skills. For the bariatric care, I learned how to work within Unreal Engine. I had to delve into how Blueprint operates and what's possible. I also did some work with UI in Unreal Engine. On top of that I got some experience of working on standard materials in Unreal Engine and I got to experiment with Substrate, which is a new shading and blending method from Epic Games used only in Unreal Engine. Getting to work on a VR game was also something new for me. I got to learn the specifics of how virtual reality works and its little hidden details and requirements.

Throughout all of the projects and especially in the EUREGIO game, I deepened my knowledge of UI/UX and how it works in Unity. Specifically I learned how to make adaptive UI. On top of that, I did my best to ask my project managers for feedback on how I can improve.

For the burnout reintegration project, I had to learn how to work with Sound in Unreal Engine and it also helped me get better at fast prototyping and testing, since it constantly required me iterate on sound effects, volume, pitch, eq and etc.

Thanks to the Water Lab project, I now know the pipeline between Twinmotion and Unreal Engine. Since the assets in Twinmotion were not really made for game engine use, they were not very optimized. Because of that, it gave me an opportunity to learn more about optimization since I had to go into project setting and adjust the values in order to squeeze just a tad bit more performance.

4. Technical Research and Analysis

During the projects, there was a lot of technical research I needed to do. For the Bariatric care, I didn't really know how to use Unreal Engine before, so I made sure to do proper research using mostly Unreal Engine documentation and some YouTube tutorials.

For the EUREGIO game, I needed to do a lot of work with API's. Thankfully I already had some experience with it, so it made my life easier. On top of that I had my project manager, who is an engineer and built the back end if there were some issues arising.

For the Burnout Reintegration project, I had to figure out the technical aspects of live sound editing within an engine, since we wanted the sound effects to be adaptive and get more overwhelming over the time.

Projects

In this chapter I will be discussing the projects I've worked on so far. After each applicable paragraph, I will be noting which competencies and learning goals I satisfied with it.

Bariatric Care

Originally, this project was pitched to me as a VR game/application for patients who had bariatric surgery where they needed to go to a supermarket and purchase products from the list presented in front of them.

I had been asked to come up with a way to showcase the nutritional values of a product on the label. The problem currently was that if we did that by using a texture, the text on the label in some cases was not readable.



Figure 1 Displaying nutritional value through textures

They previously had also tested putting an UI widget on the back of a product, but they didn't like the way it looked. It tried to fake being a part of the model, hence playtesters felt like it was off. They like the fact that putting the label with a texture made it look realistic, but they also liked the readability of a widget.



Figure 2 Displaying nutritional values through an overlay UI

So I made a widget that would be displayed on top of the object and always look at the player, which would give people the choice to either try reading it from the back of the object or look up and read it from the widget. This way we combine the best of two worlds. It gives easily readable data to users without intruding the physical space of the product.

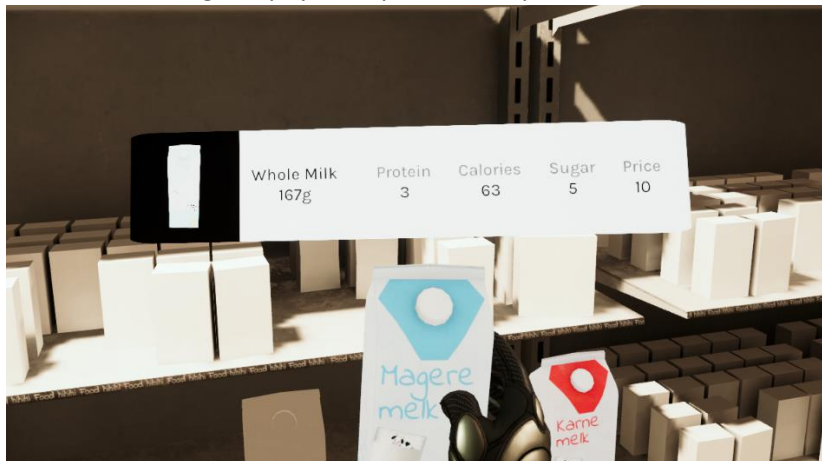


Figure 3 Displaying nutritional values on top

Learning Goals:1,2,3,4 Competencies: 3,4

In the next week we had a team meeting discussing task division and design choices. I didn't like that the way the gameplay loop was set up currently, it didn't give players any interesting choices or anything that would engage them. All they needed to do is look at the list and put the objects on the list in a basket. I suggested we gamify it more to keep the user engaged. I suggested that instead of them just picking items and putting in a basket, we task them to obtain correct number of macros. That's when we decided to turn it into a management game where players would have a budget to work with and they need to purchase products that would contain enough calories, protein, carbs and etc.

Learning Goals:1,3

Shortly after, we had a meeting with our clients, representatives from ZGT, a hospital in Hengelo and Almelo. We presented them the new idea with a management game, and they really liked it. I also prepared a list of questions to ask them. We found out about the specific dietary needs for the patients. Patients after a bariatric surgery need to make sure that they get enough protein, control their calorie intake and they must stay away from sugar. On top of that, a lot of patients after the surgery develop lactose intolerance. Those are the values we decided to focus on and show to the players.

Learning Goals:1 Competencies: 1,2

The proceeding week, we had another team meeting. A big topic of discussion was how we were going to handle the "inventory system" which is basically a shopping cart in our case. Originally, since our target audience isn't really familiar with modern technology, we thought it might be best to have the products actually be put in and out of the shopping cart/basket. However, we faced some issues. We were discussing two ways of putting products in the shopping cart: First would be hyper realistic, we would have a collider in the shopping cart and people would be able to throw in the products. The problem is that as Daniel, our engineer noted, there might be some issues with colliders of the products themselves and some of the products might fall out, some of them might fall over, which would do nothing but confuse people. Additionally, it would be super difficult to take things out of the shopping cart in case you want to get rid of some items if they were all piled on top of each other. The second idea we had was to make a snapping system, where we would have pre-designated spaces for the products to go in the shopping cart and when the player holds the product close to it, it would automatically snap in space. It would fix the issues with colliders misbehaving or having to dig through a pile of items, however since the number of items the player might purchase can be vastly varied, we decided to scrap the idea. At the same meeting we were discussing how navigation throughout the supermarket would work. We had talked about this with our clients before and they mentioned that the users will have quite limited physical space available to play the game. That's why we decided splitting up the supermarket in aisles would be the best idea. We decided that people would have a physical tablet close to them, using which they would be able teleport between aisles. That's when it hit us that we could kill two birds with one stone and combine the basket and the navigation into one tablet. The way it's going to work is people will put the products in the shopping cart and then, they will be able to add or subtract the number of them on the tablet itself. It will also contain the overall stats, which will help them out with keeping track of their progress.

Learning Goals:1,3 Competencies: 1

Afterwards I proceeded to model and texture the tablet and make a simple UI widget so that we can prototype with people using the shopping cart section in the tablet. Currently only the shopping cart part is done, and it displays the nutritional values.

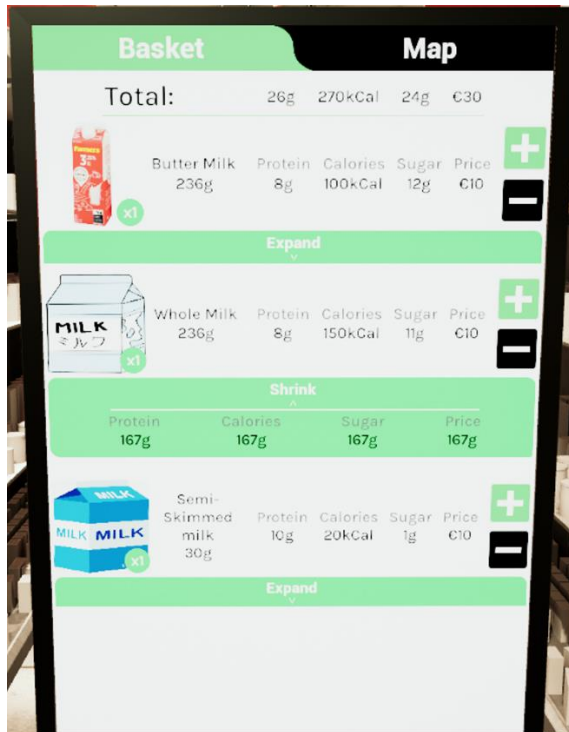


Figure 4 The first version of the basket tab in the tablet

Learning Goals:1,2,3,4,5 Competencies: 4

As it worked at this point, the basket and the tablet were separate both visually and positionally. This created scenarios where people would put products in the basket but would be confused when it would disappear and couldn't immediately make the connection between the basket and the tablet. We wanted the connection to be immediate so we got to brainstorming. At first, we thought it might be a good idea to make a particle vfx that upon the product being registered in the basket would go towards the tablet and guide players' eyes. After playing around with it a little bit more, we found out that not everyone, especially people who have little experience with video games, could get the message we were trying to convey. This was a signal that we needed to make it much more obvious.

We decided it would help if the basket would be a part of the tablet. We discussed this idea with our client and they said they would like to keep it as realistic as possible, so I sat down with our concept artist and our hard-surface artist and we started coming up with different concepts for our tablet. A huge

inspiration for our design were robot waiters from New York (**Figure 5**).



Figure 5 Robot waiter (Fortney, 2022)

Since the tablet was going to take quite a lot of space in the game world, we knew one thing we should avoid is making it visually overwhelming. We tried using more round shapes and tried to make it look partially like a pet. After discussing with our client, we decided to settle on this general shape (**Figure 6**). The vault on the left side of the tablet is the new basket.

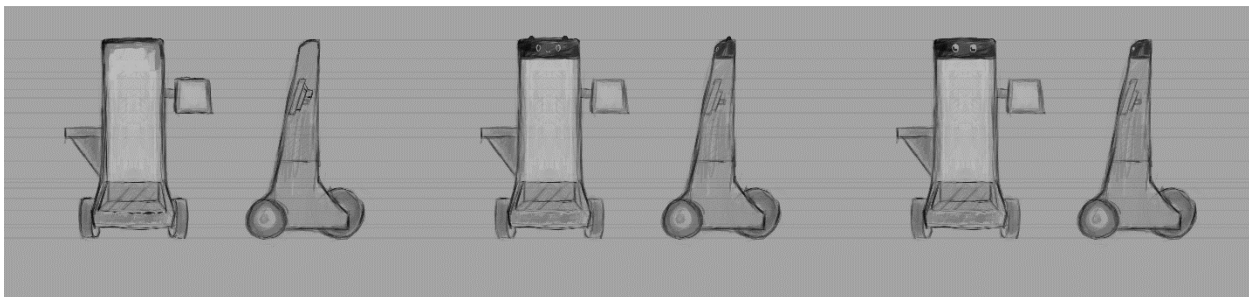


Figure 6 Concept for the tablet

We made a quick blockout of the tablet to test how people would respond to the new design (**Figure 7**). The main thing we were concerned about how clear it would be to the playtesters where the new basket is. Surprisingly, 11 out of 12 playtesters immediately understood what to do without any directions from us or from the game. In order to prevent even that one misunderstanding, we decided we were going to give the basket either a text overlay or a shader effect when the player picks up the product for the first time.

Learning Goals:1,3 Competencies: 3

At the same playtest, we saw a huge issue with the UX of our tablet. Since people were not as familiar with video games and user interfaces in general, it was more difficult for them to tell which elements of the UI are buttons. We reworked the icons and wording on the buttons in order to make it more apparent what they were. One thing we did with wording was instead of having a “basket” icon, we

made a “Go to the basket” button. That was it was easier for people to understand the functions of the buttons.

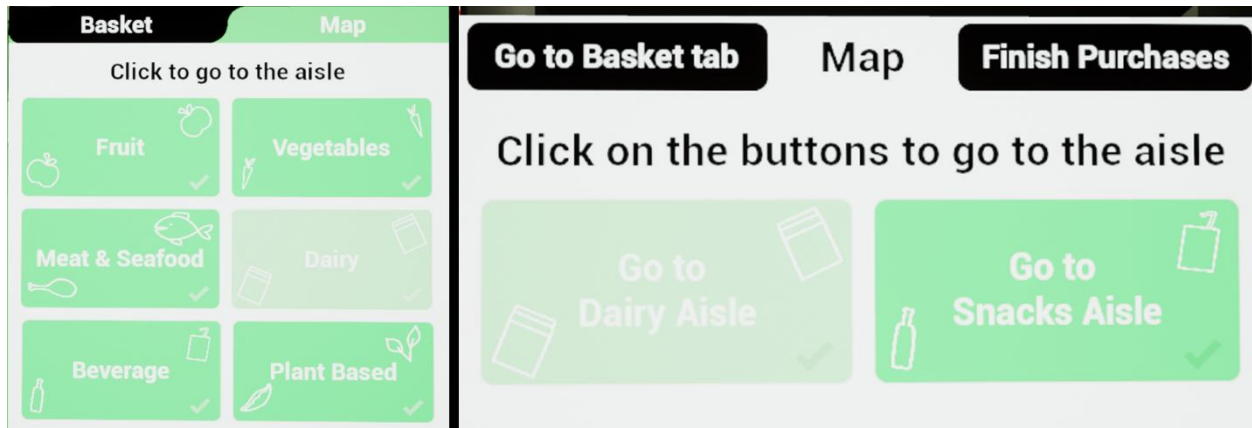


Figure 7 Previous UI layout(left) compared to the new one(right)

Learning Goals:1,3 Competencies: 1,2,3

There were some minor issues we discovered during that playtest as well. We had some issues with the boundary. In VR, people first need to draw a boundary in the physical space in real life so that if they leave that space, they will be notified by the headset and won't be allowed to continue to play(Figure 8). This is done so that the player doesn't bump into something while playing. The way teleporting worked in the game beforehand was people would press the aisle they would like to go to on the tablet and they would be transported to the center of that aisle. The issue is that our tablet is on the edge of the aisle which means that if a person went towards the edge of the aisle they would also be on the edge of their VR boundary. This caused people not being able to even get to the tablet. We fixed this by saving the relative position of the player at the point of the aisle change and placing them in the same relative point in another aisle. This way every point of the play area was always accessible.



Figure 8 Boundary in VR

Before that playtest, the button to grab was L3 and R3(**Figure 9**), however during the playtest we discovered that a lot of people instinctively press L2 and R2. Because of this, we made it so that all of those buttons grab an object.

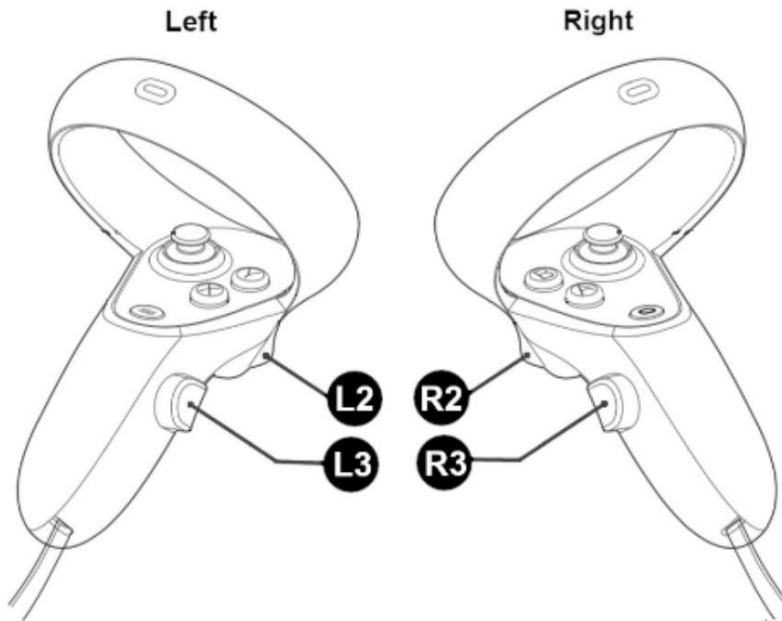


Figure 9 VR controller buttons

Afterwards, we spoke with a dietician to get some more insight into what else we could implement into the game. We came to a conclusion that everyone's dietary needs are so different that we needed some way for people to set their own macro goals. We decided to integrate it within the tablet, so now the game begins with people setting their dietary and budget goals(**Figure 10**).

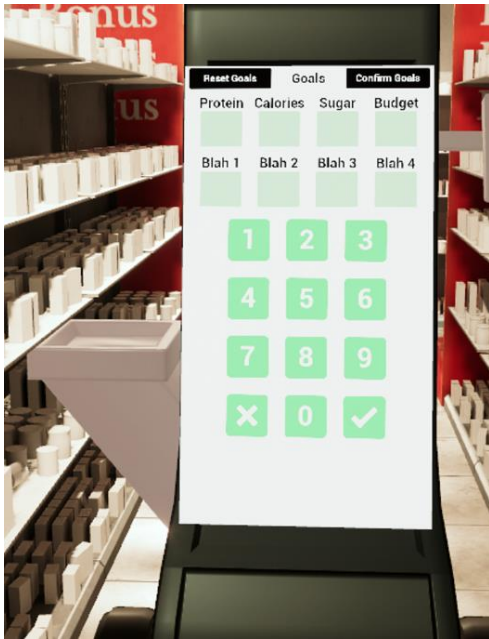


Figure 10 Goals menu

After people set their goals, they will be able to keep track of them on the bottom of the basket tab(Figure 11).

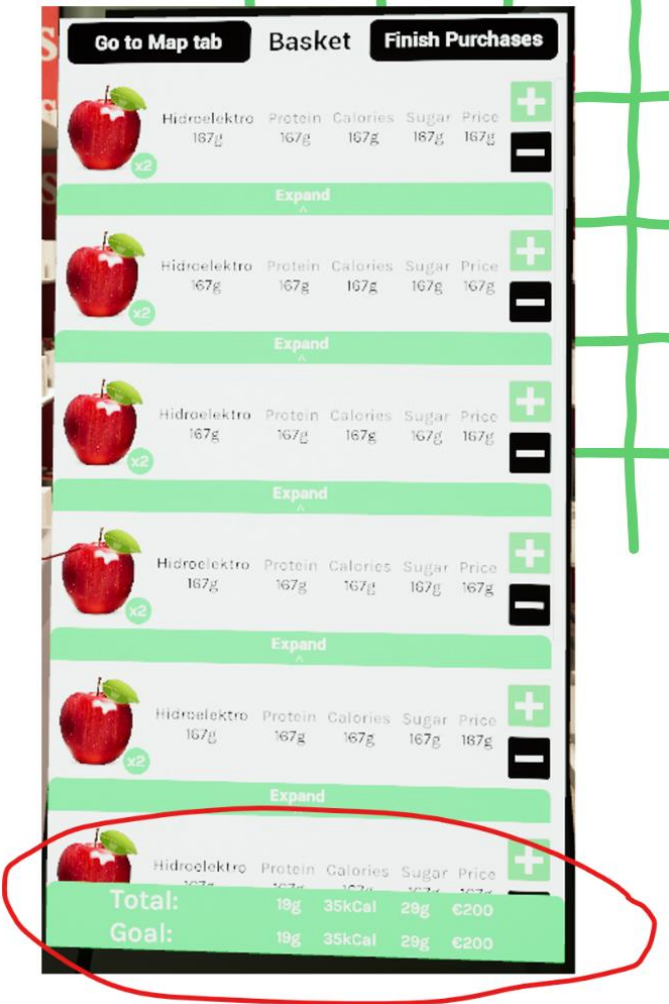


Figure 11 Tracking goals in the basket tab

Learning Goals:1,3 Competencies: 1,4

Since so many of our products are wrapped in plastic, we knew we needed to figure out a quick way to make those containers, because otherwise they would take too long to model individually. I researched some ways to achieve that and this is the pipeline I figured out. It all begins with a model ready to be shrink wrapped. There are two ways you can go with the first step, you can either go to Blender and use it's Shrinkwrap feature(**Figure 12**) or go to Marvelous Designer and simulate two plastic planes being sewn on top of the model(**Figure 13**).

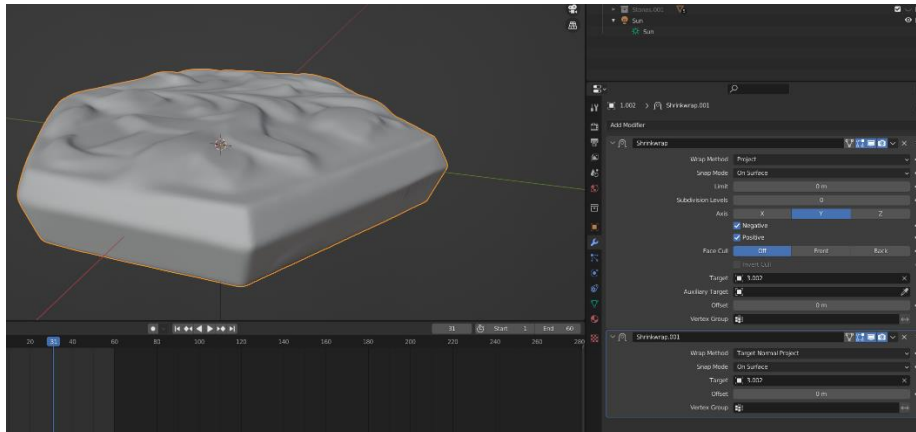


Figure 12 Shrinkwrap in Blender

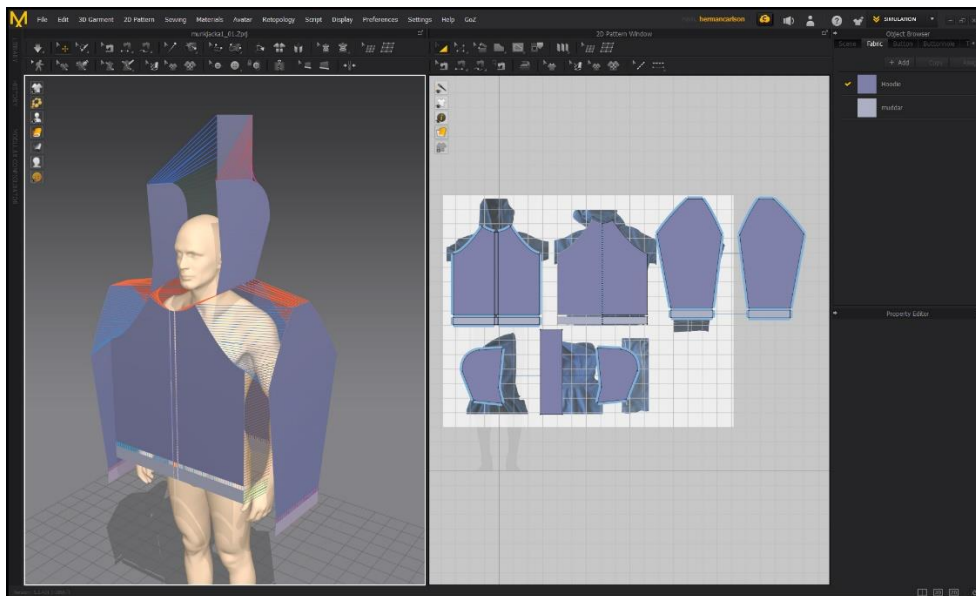


Figure 13 Simulation in blender. In our case there is usually a product inside instead of a person

Personally I prefer to go with Marvelous due to the level of customization you get while simulating and plus because you can readjust little things where the model might be clipping. Afterwards, you go into Substance Painter and apply the Shrinkwrap generator which does a great job at showing little wrinkles plastic usually has through normal maps. In the end, the products look something like this(**Figure 14**):



Figure 14 An example of a shrink wrapped mushroom packaging from our game

Learning Goals:5 Competencies: 4

Since we need to make a lot of assets for the supermarket game, I also tried helping out with 3D Modelling, UV-ing and Texturing. Here's the list of the 3D models I modelled, UV'd or Textured:

1. Apple
2. Ariel
3. Ben & Jerry's
4. Butter
5. Chips
6. Chocolate Milk
7. Coca Cola
8. Coolbest
9. Cucumber
10. Greek Yoghurt
11. Jam
12. Mushroom
13. Meat Container
14. Peanut Butter
15. Pork Chop
16. Potato
17. Price Tag
18. Pringles
19. Red Bull
20. Rye Bread
21. Soy Milk
22. Spaghetti Box
23. Tablet
24. Toast Bread

25. Tomato
26. Tony's chocolonely
27. Wine Bottle

Learning Goals:5 Competencies: 4

EUREGIO

This is a game made for a company that connects schools in Germany border area, EUREGIO. The idea behind it is two classes across The Netherlands and Germany working together to solve issues and gain points for it. They would be presented with scenarios, hear from different people, like a businessman's perspective, a politician's perspective, an activist's perspective and then they will need to choose one of the options offered to them. They will only get points if they collaborate with the second class and agree on a solution. This project was worked on by the previous interns, however there were some issues with it, which made it necessary for us to completely remake it from ground up. There were three people working on the project, Bram, the project lead and an engineer, Robin, who helped out with some icons that were absent and finally me. Currently in the studio, we don't have engineer interns and I was the most experienced with coding in Unity and working with API's so Bram asked me to stand in as an engineer and Front-End designer. We already had most of the icons and art. We also had a Figma prototype that we needed to base the project off of. The rest needed to be built from scratch. Bram was mostly working on the back end. He made a database where all the scores, scenarios, classes and users data are saved. My job was to build the front-end part. I had to work with the API that Bram made and integrate that data into the game. Here's the list of functionalities that I needed to implement:

- Make a log-in screen where the user(teacher) inputs their email and password and receives an authentication token.
- Retrieve and display classes assigned to the specific user that just logged in.
- Send back the class that the user chose.
- Retrieve and display the pair of the class that the user just chose.
- Retrieve and display the scores for both classes.
- Retrieve and display the active scenario.
- Retrieve and display the conversations (hearing different people's perspectives).
- Retrieve and display the available options for the current scenario.
- Send back the option that the user chose.

Learning Goals:3 Competencies: 3,4

We had a meeting with the client and they seemed really happy with the product we have at the moment since we practically rebuilt the entire project in 3 weeks.

Burnout Reintegration

This project is an interactive experience about what it's like to have a burnout. I served a role of an artist for this project. This was also a project worked on by previous interns. It had severe performance issues. After some debugging, we found out that the problem was insanely high poly models, which is mostly

the thing I helped the most with. I was presented with a list of assets I need to optimize:

Optimization Assets ***

Aa Object	Polycount
SM_WaterBottle01	remake
SM_Carpet	BAKE
SM_Plantpot	8k
SM_CableManager	8k
SM_OfficeChair	7k
SM_CheewingGum	7k
SM_Lamp01	6k
SM_Glasses_Folded	6k
SM_Plantpot	50k
SM_Keyboard	4k
SM_PlantPot	4k
SM_Headphones	3k
SM_Standinglemp	3k
SM_OldWoodenCabinet	3k
SM_Fruitbowl	2k
SM_Radiator	10k

With most of them, I made low poly versions and baked them, but with some I had to completely remake.

Learning Goals:5 Competencies: 4

In the second half of the internship, I got assigned to be the main sound designer on this project as well. The goal of the project was to make people feel what it's like to have a burnout. We had to make people feel overwhelmed, stressed and annoyed. I needed to make the audio in the game complementary to the main goal. I researched what sounds made people feel those emotions , as well as what frequencies usually cause that response. In order to increase the speed of prototyping, I decided to make a sketch audio that would convey the overall feeling. I did this in premiere pro while using the storyboard that was made before as a video feed. After some testing and tweaking, I decided to put it in the engine. The main editing that was done in the engine itself was concerning changing the speed of sounds, the pitch, the volume and the frequency of specific annoying sounds. The changes are tied to the actions that players take and are triggered by what they do. The game starts out with a pretty standard office ambiance, however the further the player goes, the calming sounds get quieter and the annoying ones come to the foreground. On top of that, some reoccurring sounds that people might consider to be annoying or stressful start happening more often. However I do know that no matter how much I describe what I did with sounds, it won't be as clear until you see it, so I'm going to upload the video of the playthrough on Blackboard.

Learning Goals:1,2,3 Competencies: 3,4

Twinmotion Project

Saxion is opening a new room which I will refer to as "Water Lab". Students from the architecture course made a 3D representation of that room. My task was to import it from Twinmotion into Unreal Engine. They wanted people to be able to walk around the room in VR. I found a plugin that reads the files from

Twinmotion and translates them into your Unreal project. It was not perfect, I had to do some lightmap and LOD adjustments, since it had issues rendering trees, but in the end it worked pretty good and what's most important, pretty quickly. Afterwards, I set up everything so that it could be played in VR and made an interactible door that can be opened by pressing a button. It was the shortest project by far but I did learn a lot like how to set up LOD's, how to optimize the project settings and how to import Twinmotion projects into Unreal.

Learning Goals:2,4 Competencies: 4

Conclusion

Overall, I think the internship has been very successful. I did not expect it to be so educational, in the first two weeks of the internship, I feel like I learned more than I did in months worth of lectures(no offence to the teachers, I love most of you). I learned a lot and it feels like I satisfied my learning goals. There were some lessons I learned that I didn't even expect. For example I learned that I have a tendency of getting carried away by what I'm working on at that specific moment and trying to make it as perfect as possible, that I sometimes lose focus on the bigger picture. There were some times when I caught myself fixing a very small detail when there were much bigger issues to worry about. I am actively trying to work on it and will continue to do so. I hope this document was not too tedious for whoever's reading it. Thank you for your attention if you got this far.

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