DCB100-FROM IDEA TO DESIGN

By Team 22

TUTOR

Dan Lockton

Team

Iordanis Prodromou-1706950

Elena Pronk- 1655493

Joanna Pomorska- 1598619

Jeroen Polderman-1693042

Konstantin Popov-

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I. Preface

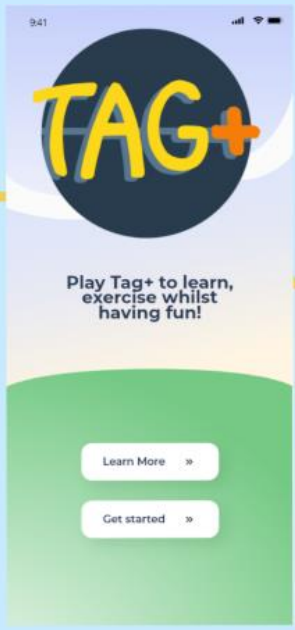
This report is a deliverable for the course “From Idea to Design (DCB100)”, part of the TU/e Industrial Design BSc curriculum. The report’s purpose is to demonstrate our project upon the given design brief “Design a physical-digital hybrid educational game.” It illuminates our final design along with an insight to our design process and decisions which are regulated by the given guidelines. At the end of the report there are individual reflections referring to our learning experience, group process, role and contribution.

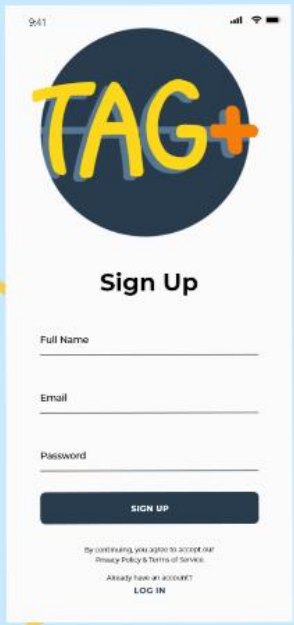
Tag + is an innovative educational quiz game for primary school students inspired by the traditional Tag game we all played when we were younger. The players wear a glove and a vest, on the glove’s screen questions are displayed and at the opponents vests screens are the possible answers. Through the app teachers can find game presets uploaded by the Tag+ app community or create their own, see their students’ stats and manage games. Students are initiated to a fast problem-solving environment while concomitantly memorize and process information better.

II. Game Manual and Rules

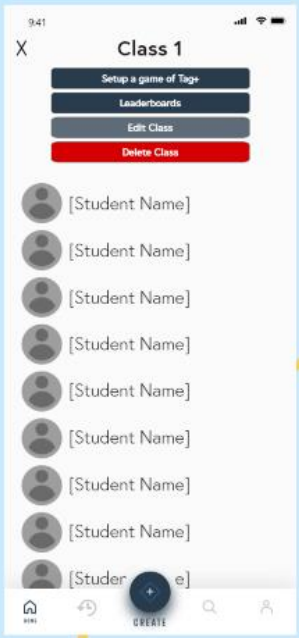
Download TAG+ app.

4 Start by creating your teacher account.





2 Setup the game and make new classes.



3 Choose one of the games prepared for you or create your own.

4 Select players.

5 Ready to have fun?
Give students their TAG+ kits!

How to wear TAG+

6 Place the front part of the glove with TAG+ logo on your palm and adjust single stripe on the back of your hand.

7 Close two stripes of the bracelet on your wrist, while making sure the screen is facing upwards.

8. Adjust all stripes until the glove fits comfortably and stays in place.

9. Put the vest on in the way that the screen is placed on your back and the triangle with tag+ logo on the front.

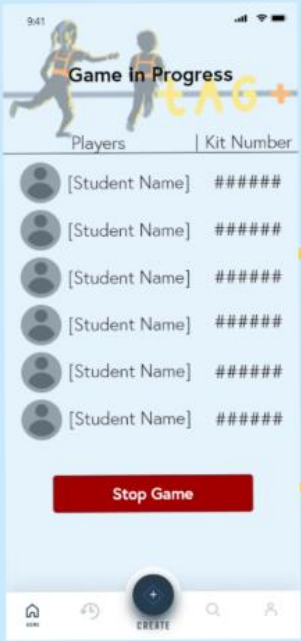
10. Fasten the vest belt around your waist, adjust the screen placement on the stripe and make sure the fit is tight, but comfortable.

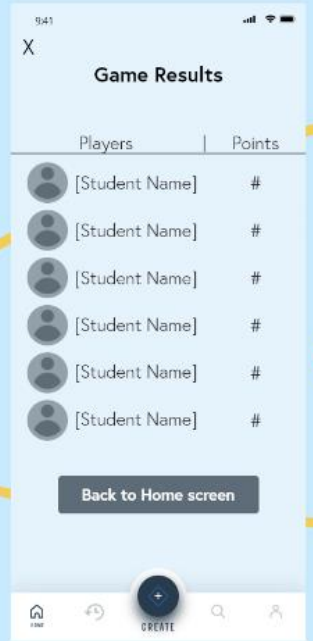
11. Than adjust the length of front stripes by pulling them down.

12. The vest should allow freedom of movement, but hold in place while running.

Let's start the game!

13. Track you students progress live at any stage of the game.





14. View results and improve education of your students.

with TAG+

1. When the game starts each player is assigned with a question on the glove screen and an answer on the vest screen.

2. Students don't know the answers on their back.

3. Each player tags another student with a matching answer to their question, e. g. if the question is Europe you can tag another player with Bulgaria, Portugal etc.

4. Once you tag another player you gain a point, or lose it if the answer is wrong.

5. When someone gets successfully tagged the question and answer on the glove and vest changes and they can look for another match.

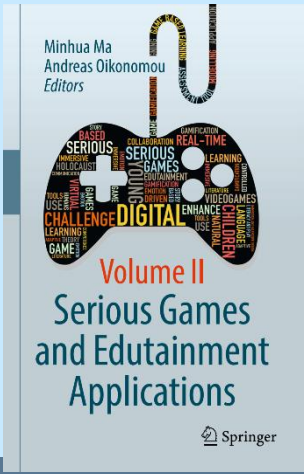
6. After tagging someone there is a three second cooldown when both players can't tag or be tagged to prevent spam tagging.

7. Teachers can keep track of the game in the app and see in which subjects students require additional attention.

III. Exploring the brief

Case Research

Even though the brief was clearly expressed, everything seemed so indefinite in the first week. Therefore, we all agreed upon doing a lot of research on educational games during our ideation process.



Looking back now it is distinct that our initial research strongly contributed towards our decisions and final design.

DELIVERY METHODS BY KNOWLEDGE TYPE

Knowledge	Traditional Delivery	Gaming Elements
Declarative Knowledge	• Presentation (instructor or e-learning delivery) • Reference or job aid • Quiz or knowledge checks	• Trivia games • Card/board games • Puzzle games • Examples: Trivial Pursuit, Wits and Wages, 5 Seconds

Serious games
Serious games are those that can still be fun but are more focused on training and education over selling a brand. This field contains subject matter that can involve religious games, political games, simulation and education.

Edutainment and simulation
Games can communicate a message in a way that's far more engaging to audiences than a video, lecture or other media. For example, the game *America's Army*, developed by the U.S. Army, is a free downloadable video game that looks and feels like other militaristic-style games. The difference is that America's Army is an outreach tool aimed at men and women interested in joining the U.S. Army. The production values are high, but you cannot play this game the same way you would a traditional console shooting game. The game educates the player on the goals and principles of being a U.S. Soldier.

Research shows that when a person plays a game, chemicals called endorphins are released in the brain. Endorphins help us manage pain and stress. They are also the chemical released after physical activity. This chemical reduction of stress after playing games opens the brain paths to learn new concepts or content. Instructors have recognized this, and when participation in the classroom slows down, they ask everyone to get up and move around. When delivering

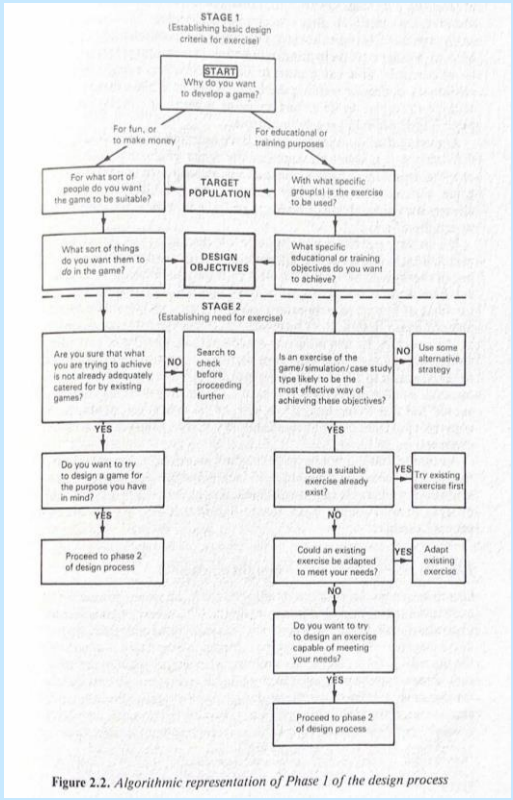
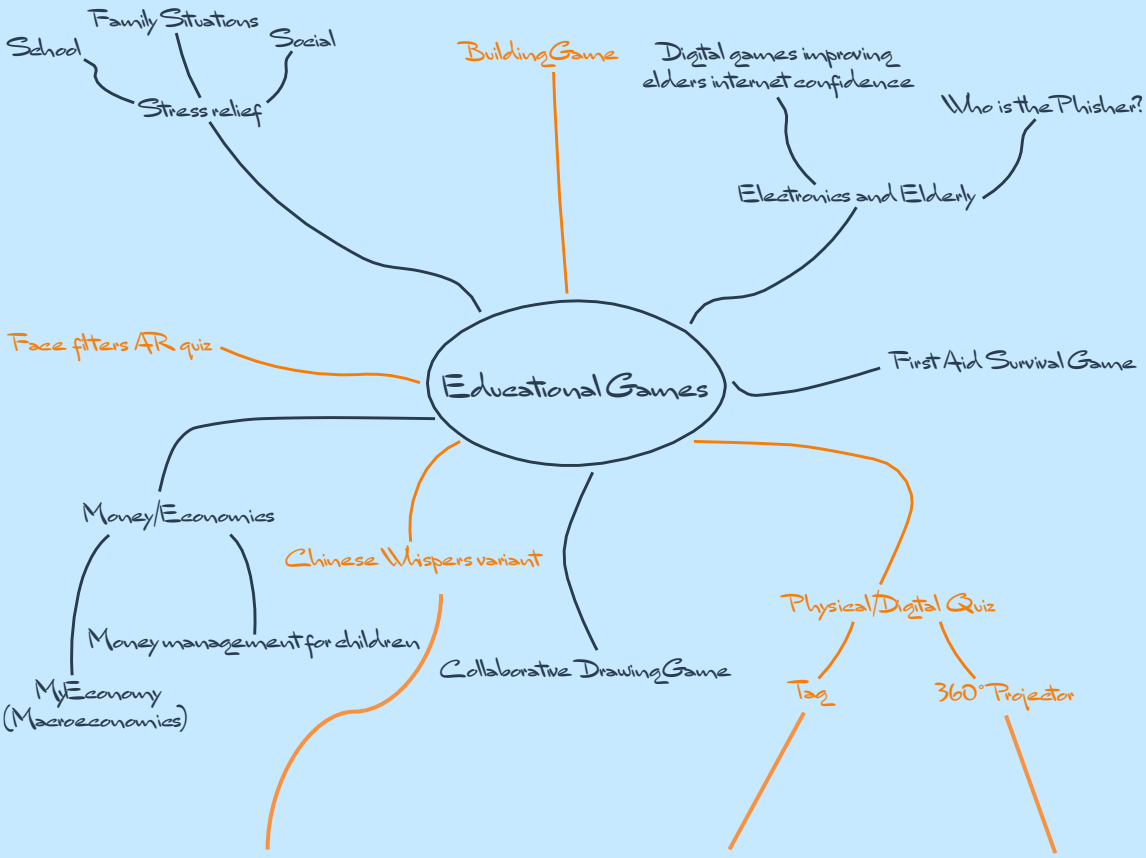
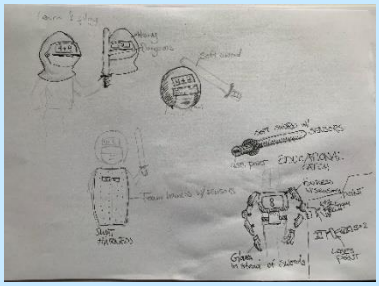


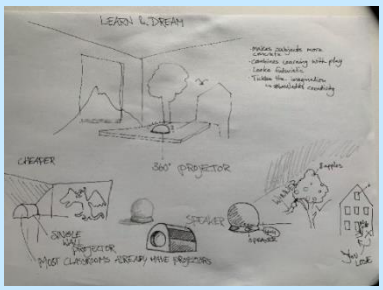
Figure 2.2. *Algorithmic representation of Phase 1 of the design process*

Ideation

Using brainstorming, literature research, sketching, and low-fi prototyping we developed different ideas. In some cases, we were inspired from other games, both physical and digital.

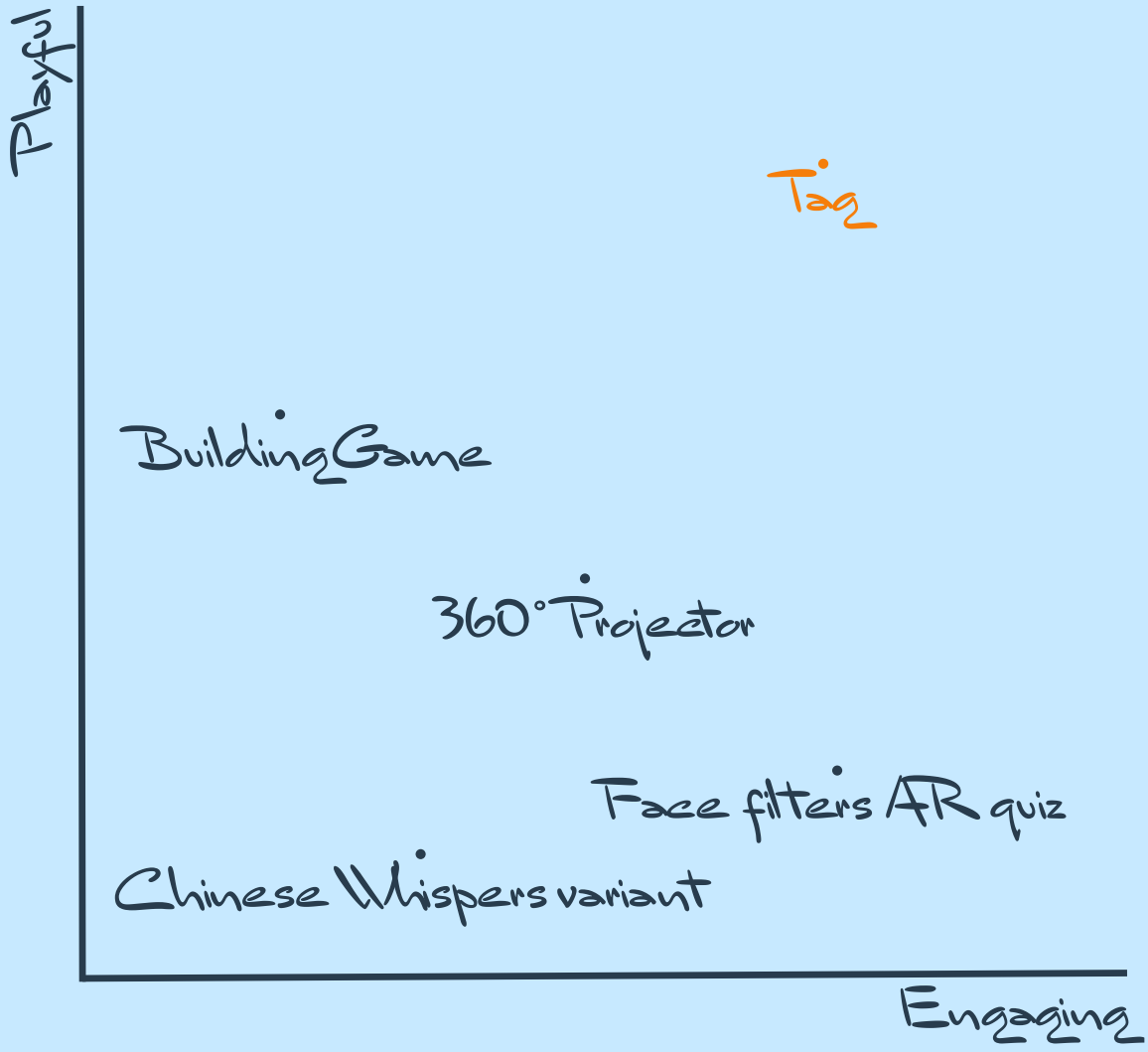






To determine what we wanted to accomplish with our design we continued doing literature research.

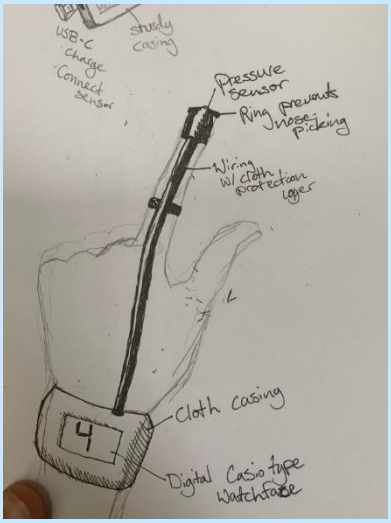
Choosing a game concept

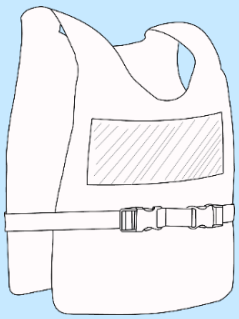


We decided on middle schoolers as our target group, so we wanted to choose a game that would be valuable for them. For children it is important for games to be playful and engaging, otherwise they would not voluntarily play our game. Based off those two values we chose the tag game.

IV. Conceptualization

Developing Concept

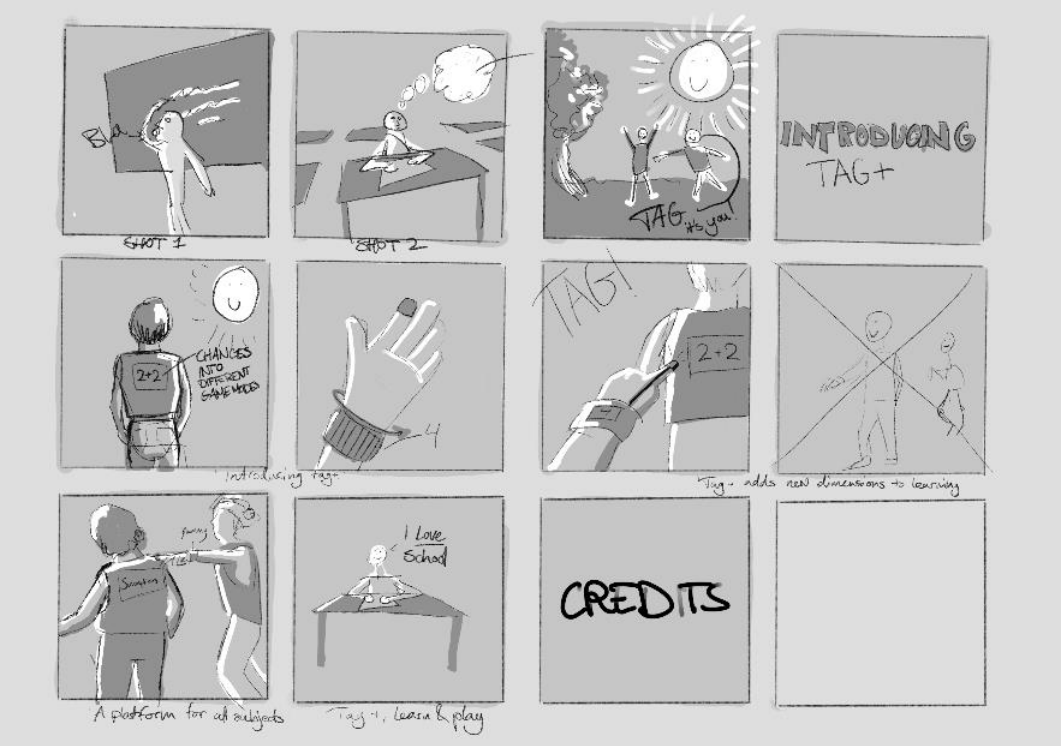




As we had to prepare for the midterms we started thinking more about the practicalities of our design. We had to choose between making a laser game version or tag. We chose tag, as it is a far more physical game. This fit our initial ideas better. We also decided on a name, Tag+. Our game is more than just tag, and the first iteration of our game used mathematics, hence the plus.

We also had to decide on a logo.

Midterm Video

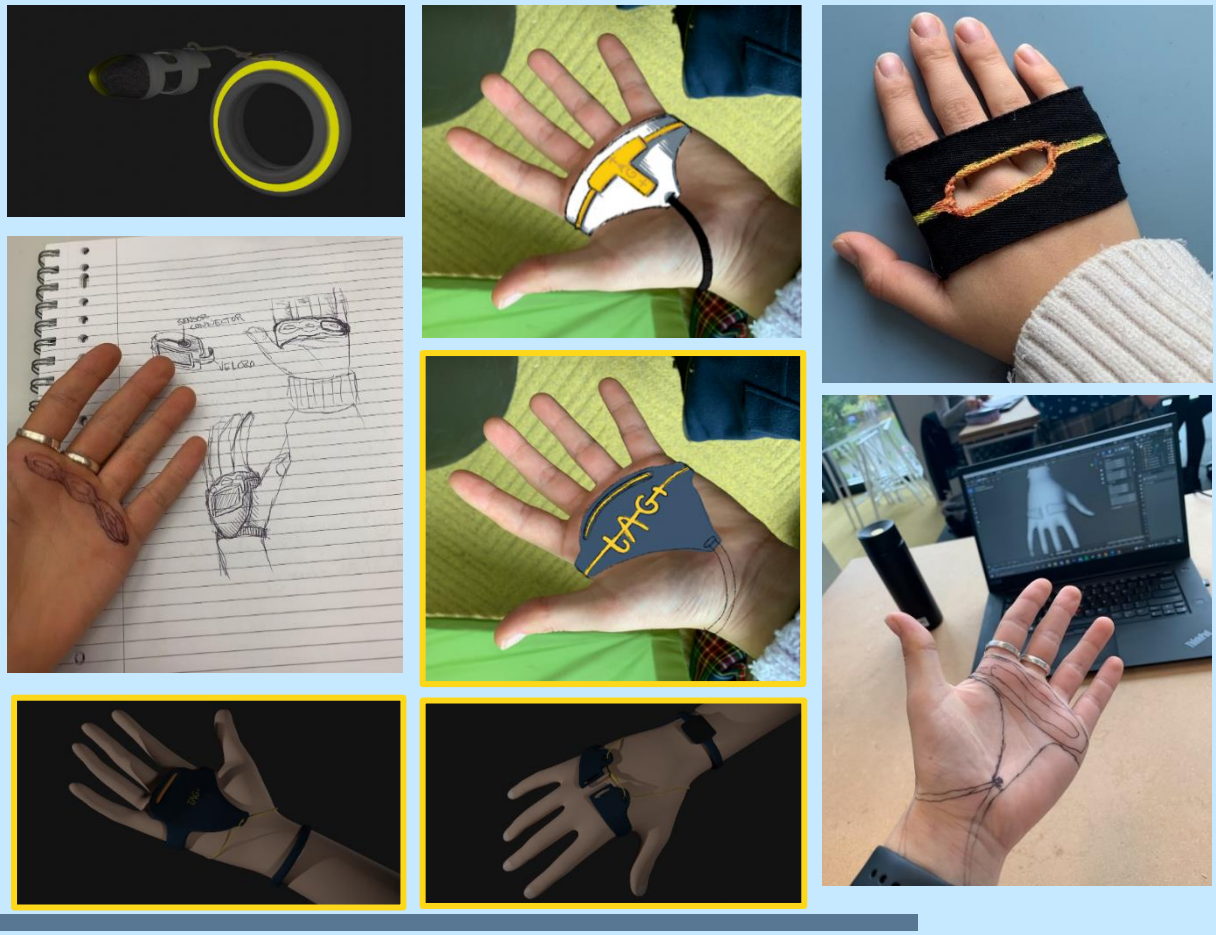


To showcase our work, we shot a video showing our design. As we did not have any good prototypes yet, we had to improvise. To make sure the product was presented well and the shooting of the video went smoothly, we made a storyboard beforehand. We also divided the work. We had actors, a director, a camera man and someone taking care of props on our 'set.'

V. Iteration

Final Design

Glove

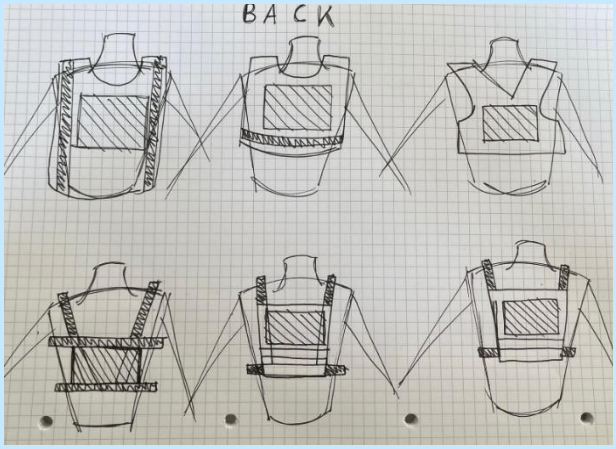


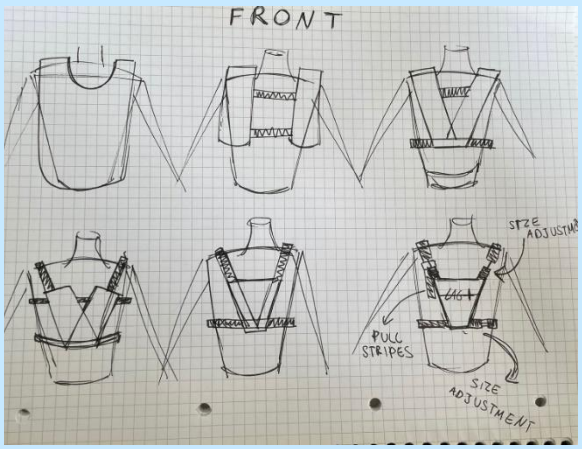
We decided to relocate the sensors from the finger(s) to the palm of the hand, making the glove easier to wash. With the pressure sensors on the fingers, we were afraid of the glove getting dirty from nose picking. This

was our way of solving that as well. The sensor would still pick up ‘tags’ from the fingers.

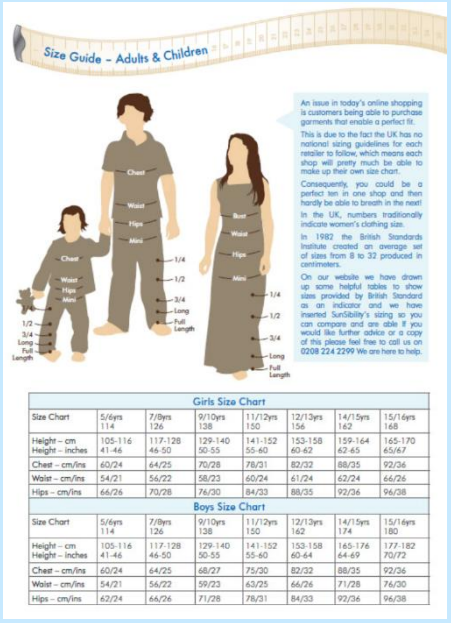
The lo-fi prototype that uses this new location would not stay on the hand while playing tag, but we designed a solution for this, by making a wristband.

Vest



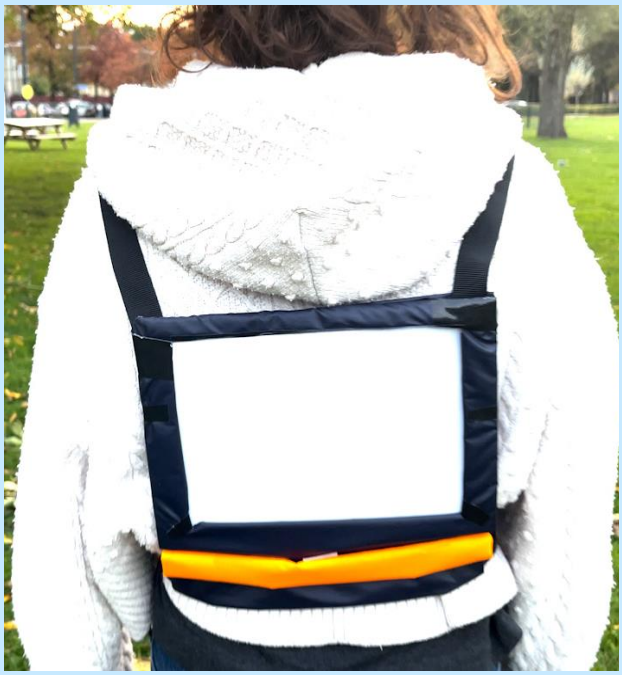


As children between the ages of 8 and 12 grow a lot, it was important to make a very adjustable vest. We started off with a basic sports vest for our design, for our midterm video. This however wouldn't offer enough support for the screen. In order to solve this and have a one size fits all vest, we looked at laser gaming vests and running vests. It inspired us to come up with a solution of making the base of the vest on three stripes which length can be adjusted by ~20 centimeters and does not limit the range of movements. We also looked at what size the screen would have to be, by looking at what fits on the backs of our age group and what would still



be readable from a distance. We also used each other's backs to determine the perfect size.

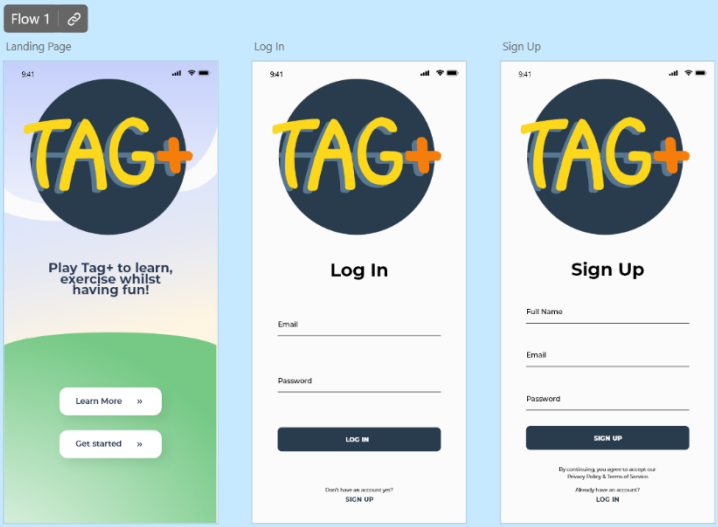
Combining this knowledge, we came to a final design as seen in the pictures. The vest is also designed to allow kids to run, possibly fall on the ground and have fun. For that reason, the screen is slipped into the vest, making it possible to wash it or replace, it is also flexible to ensure it does not break and hurt children while playing. Such design is durable and adjusted to kid's needs.



App

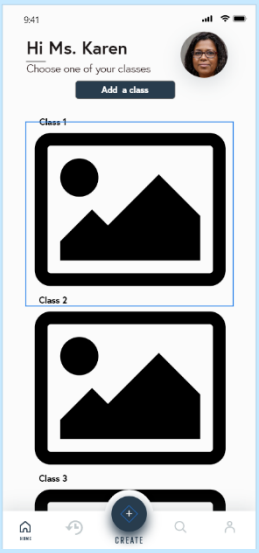
Our initial idea didn't include an app, late at the conceptualization process we realized that it would expand the possibilities of the product. The app was underdeveloped during the midterm, hence resulting to more work, additions and changes during the remaining time.

Landing page & Login/Sign Up:



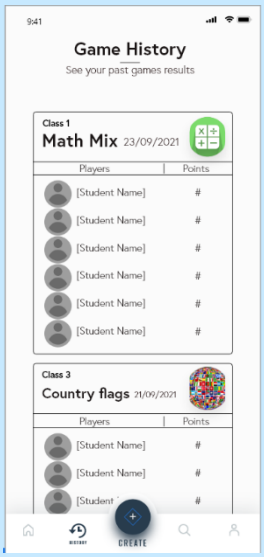
The landing page has an appealing background and our product's logo. The user experiences a warm introduction accompanied with a simplistic interface by having only 2 options. By pressing the Get Started button the user is redirected to the Log In screen where he can enter the app if he already has an account. If not, by pressing the SIGN UP he is redirected to the Sign Up screen where he can create an account.

Home Page:



After Logging In/Signing up the user is redirected to the homepage. The user is welcomed and instructed on the homepage's main function ("Choose one of your classes"). One of the classes images is not fully shown, conveying the user to scroll downwards to see the other classes and select one of them. He can also create new classes by pressing add a class. The Dashboard (which has a fixed position at all pages) has 5 sections: Home, History, Create, Discover, Profile. To indicate to the user where he is located, the icon changes to our main color (dark blue) and the section's title appears. Also, another shortcut to the profile page is included on the top right, mostly for better page aesthetics.

Game History:

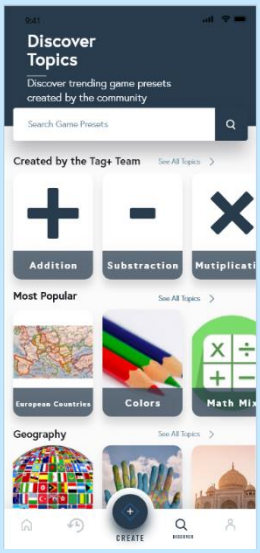


When pressing the history icon on the dashboard the user is redirected to this page. Here he can be informed on previous Tag+ games. He is shown which class played the game, the game's preset, the date of the game and the stats of the participating players. Again, a game is not fully shown conveying the user to scroll.

Create:

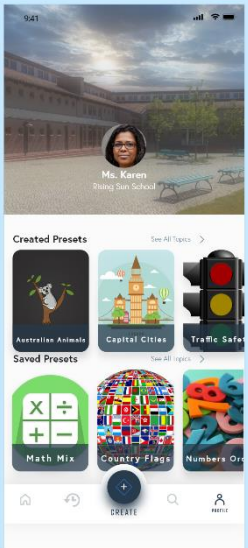
When pressing the + icon on the middle of the dashboard the user is redirected here. Here the user can create new game presets with his own questions and answers, at the end of the page he has the choice to make them public or private.

Discover:



When pressing the search icon on the dashboard the user is redirected here. Here he can discover game presets uploaded by the Tag+ team or the app's community. Presets are categorized by most popular, the ones created by us and subject wise. Also, the user can search specific things by writing some keywords. Again, some presets are not fully shown conveying the user to scroll.

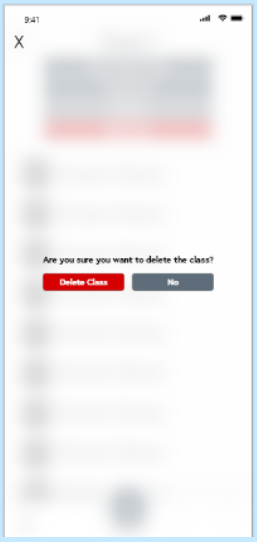
Profile:



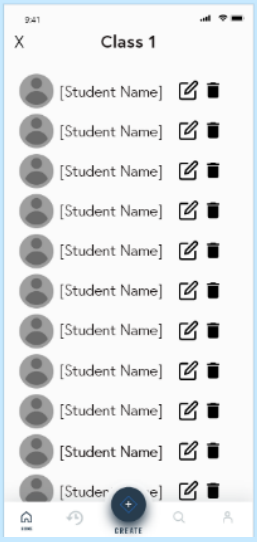
When pressing the profile icon on the dashboard the user is redirected here. Here he can see his saved and created presets.

Class/Game Setup:

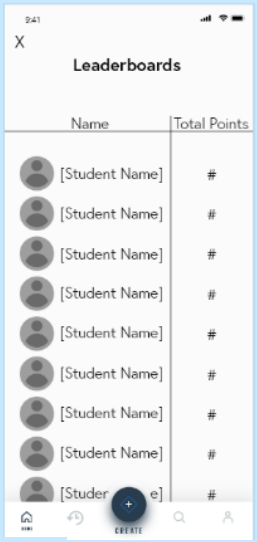
Delete Class

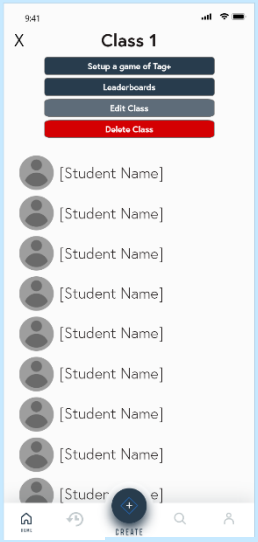


Edit Class

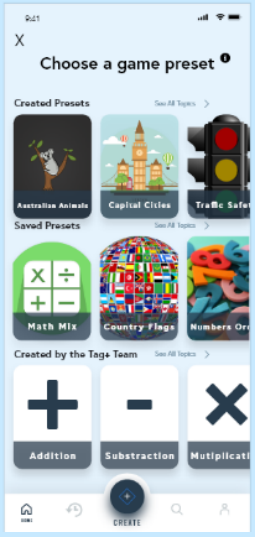


Leaderboards

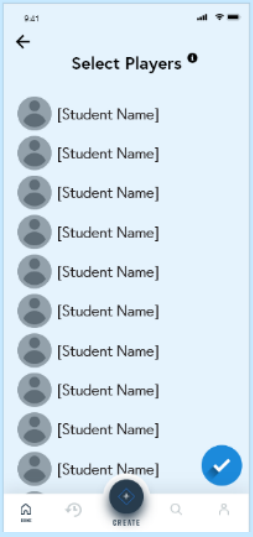




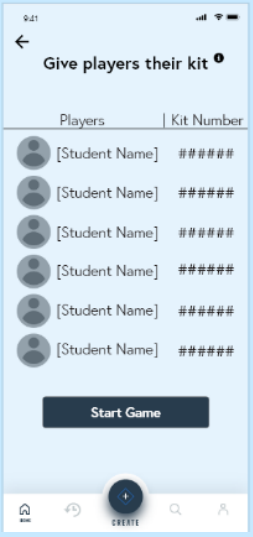
Setup 1



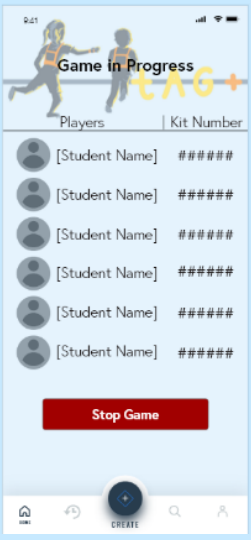
Setup 2



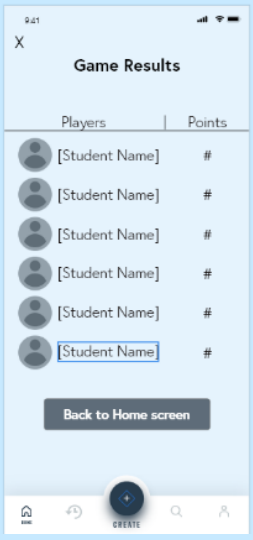
Setup 3



Setup 4

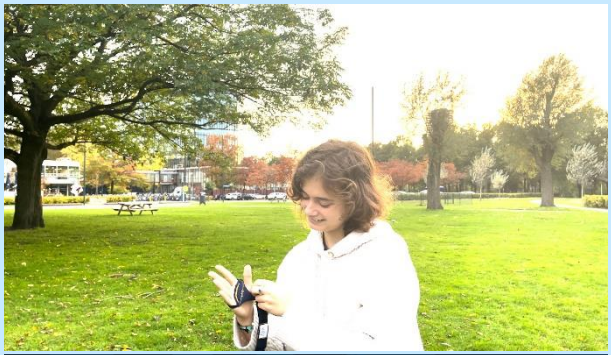


Setup 5



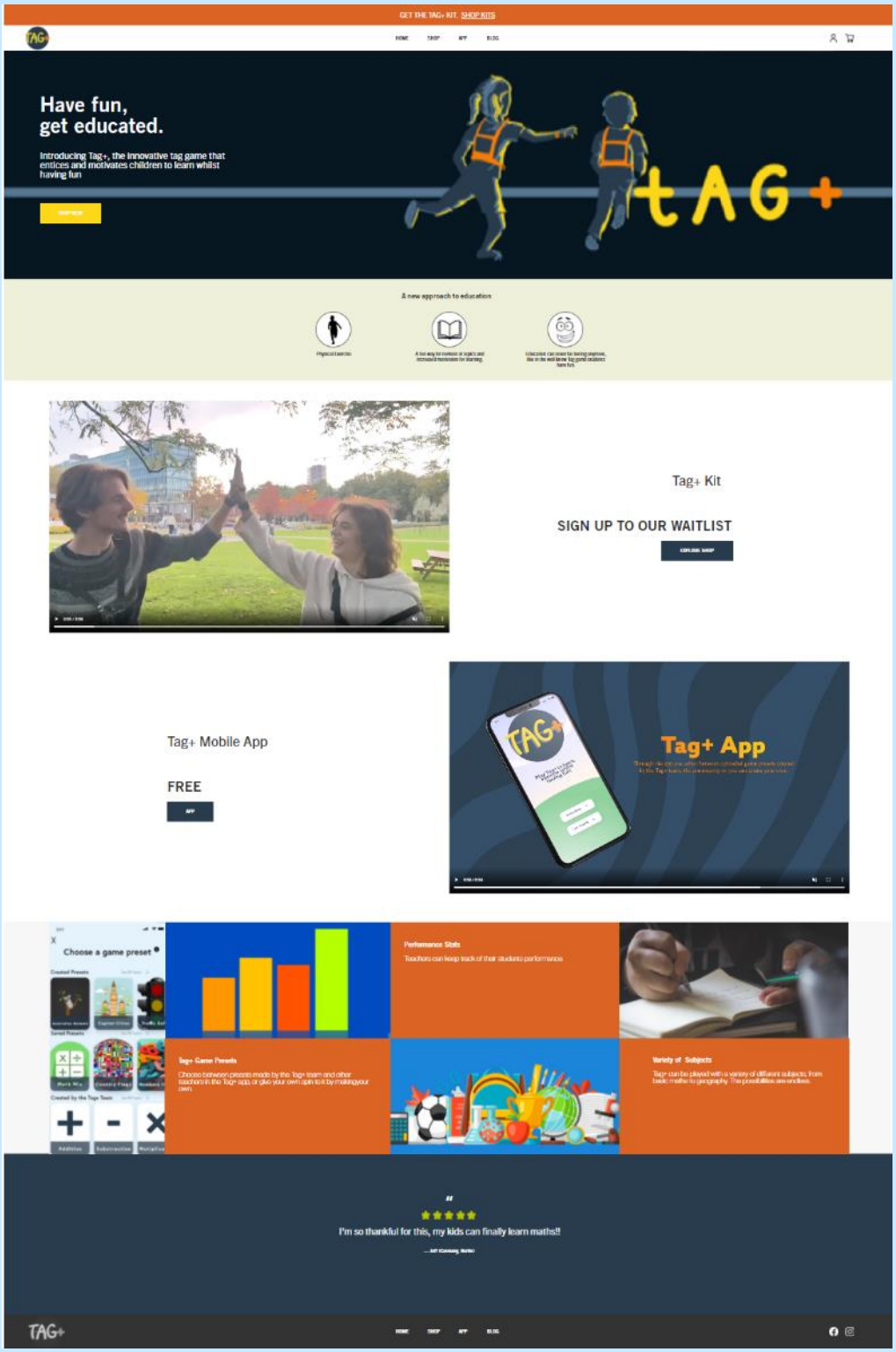
Final Video

The day before the exhibition day we had to deliver another video showcasing our finished product. Learning by our mistakes from our previous video (voiceover poor sound quality & a bit unclear product explanation) we strived towards having a better outcome.



Preparation for exhibition day

Webshop



Packaging

Business Cards

VI. Exhibition day

Everything we made in this quartile was shown at the exhibition day. We showed our app, website, vests and gloves, but also (+-shaped) business cards, packaging and our final video showcasing our game. The exhibition was a success, it felt good to present our work and to see the projects of other teams.

VII. Work Division

Name	Most important contribution
Iordanis	• Webshop UX & UI design: Adobe XD (Design) • Webshop prototype: Adobe XD (Prototype) & Anima https://tag-plus.animaapp.io/web-1920-2 • App wireframes: Miro • App UX & UI design: Adobe XD (Design) • App functional prototype: Adobe XD (Prototype) https://xd.adobe.com/view/9460cb1d-48a2-4653-9e10-37c376bde703-c133/?fullscreen&hints=off • Midterm video: shooting, editing (Premiere Pro), story board, voiceover. https://youtu.be/vqnztbfBWlI • Final video: shooting, editing (Premiere Pro), voiceover script. https://www.youtube.com/watch?v=xSDHJg1S1LQ • Final report: part 1 and template design
Elena	• Digital and pencil sketches: design process • Prototype development: glove • Final prototype: glove • Logo design

	• Game packaging • Midterm video: acting, story board • Business cards • Final video: acting, story board • Final report: part 1 and process documentation
Joanna	• Pencil sketches: design process • Digital sketches: game manual, rules, work division, prototype sketches • Vest prototype development: material selection, hand sewing, screen prototype • Final vest prototype: exhibition working prototype • Midterm video: acting, recording equipment • Final video: example game mode • Final report: game manual and rules visual, part 1
Jeroen	• Final report: game rules and manual • Final video: voiceover, acting, voiceover script. • Midterm video: acting, script.
Konstantin	• Visual representation: blender

VIII.Reflections

Iordanis Prodromou

As a first-year bachelor student, this was my first course within the expertise area Creativity and Aesthetics. Before starting this course I was already aware that it would meet my personal interests because the past years I always thought of product ideas, but I never really knew how to develop them. At the start of course I planned out some personal goals I wanted to achieve by the end of it besides the study guide learning outcomes. I already had previous experience with video editing, but I never learnt how to use Adobe Premiere Pro, one of my goals was to learn how to use this software since it will turn out handy in the future of my studies. Being an independent worker most of the time, I wanted to develop my teamworking skills through this course since my future studies and career will include a lot of teamworking projects. Looking back at the whole experience it is obvious that I learnt more than that. When introduced to the design brief I wasn't familiar with physical-digital education games. Growing up I used games as a getaway from school, I had never though of them as a tool to encourage and improve learning. Therefore, after thoroughly reading the design brief's requirements I started researching on serious games. I did my research on already existing serious games, articles and books. Looking back now it is plain to see that research not only broadened my knowledge but had a tremendous effect towards decisions I made during the project. For example, in the book "Interactive Design Fundamentals" there was a paragraph regarding wireframes, it seemed interesting to me, so I decided to sketch some digital wireframes which led to the decision of me designing the app and the webshop. Not yet knowing what I want my future role as a designer to be, I realized that one of the keys to discovering my identity and role as a designer is doing research and not fear to stay out of my comfort zone to learn new things.
During the first half of the course, we worked with ideation methods and techniques. In the lectures we were informed on ways to ideate I

didn’t know before. Most of my life I only used brainstorming mind maps, though in this project we used more methods such as tinkering, sketching and lo-fi prototyping. Now I have realized that by using different ideation methods you can see things from a different perspective and therefore see the larger picture when developing ideas. As a designer I plan to mostly use sketches and lo-fi prototypes in order to develop better and more ideas. Although, there were some ideation techniques we didn’t use. In my next project I plan on being more experimentative during the ideation process.
After using value-based conceptualization to decide which idea was the strongest between the most distinguished ones, we had to develop our concept. Before the midterm I mostly built ideas upon my teammates ideas and it didn’t feel very productive. After we proposed the app and I was assigned to do it I tried my best with it. Not having any previous experience with app design and testing I read some books and searched on how to create an app. I found out about Adobe XD and I immediately started watching tutorials on how to use it. The workload was heave since I had work for other course and was assigned to the video editing (which was kinda new too) but I tried my best to get through it. Judging by the end result of the app I am happy but it could have added even more stuff that I didn’t got too due to poor time management mostly. Now, I feel more comfortable with group projects and look forwards to doing more in the future. Some of my future goals after this course are learning how to sketch, have better time management and learn how to use Adobe Illustrator. All this has

Elena Pronk

This very first group design project I've ever worked on went very well overall. It was nice to get a sense of what the design process looks like from beginning to end. My previous projects had never taken more than two weeks. Apart from the learning objectives in the study guide, I also set some goals for myself. I wanted to learn what role I typically take in group work. I also set the goal for myself to be more outspoken, as I'm usually quite shy.

The first half of the course was all about generating ideas and keeping them structured. In a team with five people, you can easily lose track of which idea belongs to whom. We also often lost focus and got a bit off topic. Those moments were actually pretty useful, as that is where I found my role in a group. I'd often take a notebook of sorts and try to contribute to the session by sketching or writing ideas down, taking the role of communicator. Making sketches and writing things down made it easier to remain structured, and it helped in the communication of ideas. It also helped with one of the goals of this course; researching and arriving at a brief. It helped keeping our decisions grounded.

The design brief was very broad, so to come to one finished design, we first chose a problem we wanted to solve. Through brainstorming we chose to tackle motivation of middle schoolers. This was in my opinion not the most exciting direction to go into. The other subjects we discussed sparked my imagination more, so it would've been easier for me to come up with a design for those. The fact that I was a bit unhappy with the direction of the design made me work harder to find a way to turn it into something I did like. I came up with a few ideas. One of

these ideas was really good in my opinion, and when I presented it, the rest of the group agreed. We used this idea for our final design. This was very rewarding, more so than if I'd worked alone, and had chosen the design myself. I learned that group work can be disappointing, but it gives back more than it takes.

For the midterm I really tried to use as many ideation methods as possible (as it is one of the goals of the course). However, I used just sketching, prototyping and brainstorming until then. To make up for it, I tried to do more different things after the midterm. I had to design the glove for our game, so I made sketches on my hands (3D sketching), and on pictures of my hand (I call those phototypes). I also made another prototype, which I tested by playing tag with a teammate. It came off, so I had to revisit the design. I would not have known this if I'd just made a drawing. I hope to do more acting out as a way of coming up with ideas in the future, especially in earlier phases of the process.

One thing I had to do which I'd never done was think about branding. It was challenging to be consistent, but it made everything look more satisfying. I did like thinking about presentation, but I think I need to develop these skills more. The packaging for our design looked fun and was interesting to open, but it did not look nice enough in my opinion. I think more of my energy went into making it interesting, than into making it look good.

Now that I've had a taste of what my future design assignments will look like, I look forward to doing more of this work. I hope to keep practicing what I already do (like sketching and brainstorming), but I also hope to work with new methods. I do think I need to put more effort into using different ideation methods. It comes to me easier to

make sketches. I learned a lot about myself and the way I function within a team, but this does not mean that I won't try taking on different roles in the future. I also achieved most of the goals, both personal and given by the course, but that does not mean that I can cross them of the list. I will keep working on them.

Joanna Pomorska

At the beginning of the course, I have set myself certain goals to ensure that I can get the most out of this course, as well as develop some crucial skills as a designer. Amongst those were being able to come up with ideas using different tools and techniques and develop them into a design. Together with learning how to research and present a design with my group.

The first part of the course gave me an opportunity to experience the process of researching and arriving at a design brief. I have learned how to use new techniques to generate ideas. Brainstorming with my group helped me understand the value of different tools. Applying for example sketches and low fidelity prototypes in the creative process improved the communication of ideas by expressing the shape or feelings of a product. In order to arrive at our choice of the design we have also experimented with acting out games and scenes, which helped us evaluate which values were the most important for the design. It allowed me to learn how to see the design not just as a product, but also an experience around it. Moreover, I improved my understanding of the needs and interests of a potential user. For example, while creating a game to encourage motivation I tried to combine the researched knowledge about factors increasing motivation with such things as what kids like to do from my personal experience. I came to realize the value of using scientific sources and papers fluently, which is why I would like to develop my knowledge in the area of understanding data and finding reliable sources. As a designer I would like to create things that are not

only practical, but also address user's needs on multiple levels. Therefore, the process of arriving at the design brief helped taught me not to be afraid to try out many ideas and experiment before making a final choice.

In the weeks after the midterm presentation, I started focusing on developing the concept into the final design followed by presenting and reporting my work and progress. In this part my goal was to successfully pitch the design and make the game believable. I felt satisfied with the extent to which we managed to fulfill this goal, because I could see our target group benefiting from tag+ in their education. The exhibition day was a new experience for me. It felt slightly intimidating to present our design publicly, while seeing the quality of the other groups' work. I have found it really inspiring and it taught me not to be afraid of the opinion of others, since any kind of feedback, positive or negative, could only help us improve. During the work on the report, I realized although I documented most of my work it was saved in different files, which required first collecting all the pieces together. It taoutch me to be more organized and choose one way of storing the process in the beginning. Moreover, the process of creating a vest prototype challenged me to do more hands-on work. I learnt the basics of sawing and working with materials. It pushed me to go out of my comfort zone and learn a new skill in a limited time. In the end even though it was stressful I have found the results even more rewarding.

In the future I would like to work on prototypes and ideas alone before sharing with the group more, since I felt like it can improve the communication process and encourage more feedback from

groupmates. It was easy for me to lose my identity when working in a group and in further designs I would like to work on finding a balance between effective cooperation and developing myself as an individual. The group work was both challenging and rewarding. We had a fixed schedule of meetings every Tuesday and when it was necessary. This helped me introduce some structure to my planning, since I find it hard to maintain a weekly routine. On the other hand, I did my best to suggest work division and set goals for next week to make sure we deliver good quality work. I have found it easy to discuss ideas with my groupmates, as well as achieve compromise. Having an international group helped me develop a better understanding of diverse views and ways of expressing them. I look forward to working with other teams and gaining skills in the Creativity and Esthetics development path.

Jeroen Polderman

This is my first design project I have worked on alongside other group members, one of my goals quickly became to improve working in a team setting, knowing group work will be a common occurrence during the years of this bachelor. I think our group's teamwork started off a bit wonky but we quickly learned from our first get-together. After planning the first meeting without any discussed prep work it became clear that the meeting was not optimised that well. After that meeting we expressed our expectations of each other and learned that it is important to communicate and assign tasks, so we actually have stuff to discuss when we gather in person again. All the meetings from that point onwards have been efficient and insightful for me in what the others have been up to. I also learned how important good communication is, due to some personal reasons I sometimes could not contribute as much as I wanted, but after explaining the circumstances to my group they were really supportive and helped out by landing a hand wherever needed. In this project my role mainly consisted of brainstorming and doing research on the design, I also helped quite a bit with the production of the video and, of course, have done work for the final report.

A more course focused skill I wanted to improve was the quality of my approach and the ability to reiterate a design brief. In the past I usually got tunnel visioned when coming up with a somewhat eligible idea and chose to fully work that out neglecting any other

potentially outmatching idea's. When brainstorming a concept for this course I was not easily satisfied thanks to the somewhat intricate design brief from Bart. As a result I did not just write down the best solution I could think of in the first few minutes, but I reworked them using diverse techniques that got covered in the lectures. One of these techniques was sketching in the early stages. Sketching used to not really be my forte, but while working on this brief I found that it stimulated my flow of thoughts and made it easier to go back to previous ideas to rework them with newfound insights as well as envisioning the possible capabilities and the overall feasibility. I also liked the value-based assessments by making a graph and putting desirable traits on the x and y-axis, this helped comparing ideas and correctly evaluating them. All these different ideation methods helped immensely for getting a better grasp of the requirements of the brief but I would still like to improve in them.

I think this course was a good start to get to know what my future design projects will look like, I look forward to other group assignments and hope to be as proud with the result as I do this time. But even though I am satisfied with the outcome I still think there is room to improve, I still want to get better at being able to use diverse techniques to generate concepts. I would have also liked to improve more in refining the designs and make them more realistic and achievable, due to experienced team members in sketching and 3D modeling there was not really an opportunity to greatly influence the final designs and hone my skills

The course helped me see that there are a lot more effective ways to come up with ideas than I initially thought and I am planning on using these ideation techniques in the future.

Konstantin Popov

For the past 2 months the work and study process has been a completely new territory every day. In the beginning of the course I had no idea what I was supposed to do and everything seemed pretty chaotic and I was uncertain about how I should approach the task. The work flow of the team was all over the place and none of our ideas were really cohesive. As we were reaching the first third of the course, we managed to set on an idea we all liked and started branching off of it. I was reassured that there was hope for our project to work out.
Since I had prior experience in 3D modeling in Blender and acceptable drawing skills I volunteered to take on the part of visualization. I started working off of some ideas and really loved the part where we could all look at what I've done from all directions figuratively and literally and real time changes were quite possible. I was surprised how many changes the initial prototype went through until we reached the final product. For me this was my sense of progression and it brought me joy. As for the group effort, I liked how open everyone was and the moment we set our sights on the final idea, everyone started putting in a lot of effort into their assigned work. The nature of my work was pretty solitary and no one was familiar with 3D models so there was no way to really figure out how to consult with the others on some matters so I improvised on some parts of the models. When I started seeing the end of the tunnel on my part I began to lose motivation and I became a dead

weight to the team. In the end I feel that my contribution to the overall work was insufficient. I want to obtain some generalist skills so I can properly communicate with my team and see through the process without getting lost in it.

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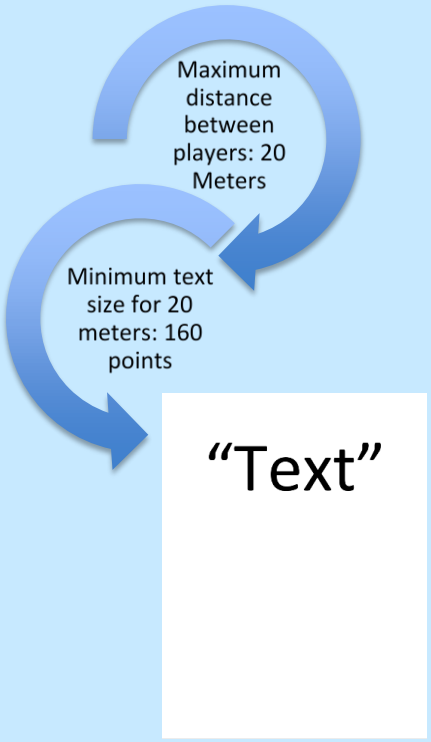
X. Appendix

Vest/Screen sizing

A highly important requirement for the vest was to determine the right size fit for our target group while at the same time having a screen/text size that is always readable. A lot of factors were taken into consideration for this.

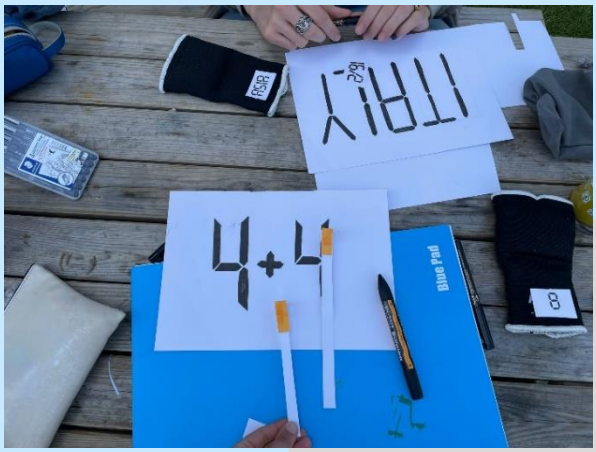
Girls Size Chart							
Size Chart	5/6yrs 114	7/8yrs 126	9/10yrs 138	11/12yrs 150	12/13yrs 156	14/15yrs 162	15/16yrs 168
Height – cm Height – inches	105-116 41-46	117-128 46-50	129-140 50-55	141-152 55-60	153-158 60-62	159-164 62-65	165-170 65/67
Chest – cm/ins	60/24	64/25	70/28	78/31	82/32	88/35	92/36
Waist – cm/ins	54/21	56/22	58/23	60/24	61/24	62/24	66/26
Hips – cm/ins	66/26	70/28	76/30	84/33	88/35	92/36	96/38
Boys Size Chart							
Size Chart	5/6yrs 114	7/8yrs 126	9/10yrs 138	11/12yrs 150	12/13yrs 162	14/15yrs 174	15/16yrs 180
Height – cm Height – inches	105-116 41-46	117-128 46-50	129-140 50-55	141-152 55-60	153-158 60-64	165-176 64-69	177-182 70/72
Chest – cm/ins	60/24	64/25	68/27	75/30	82/32	88/35	92/36
Waist – cm/ins	54/21	56/22	59/23	63/25	66/26	71/28	76/30
Hips – cm/ins	62/24	66/26	71/28	78/31	84/33	92/36	96/38

Viewing Distance	Minimum Text Size
0.6m / 2ft	5pt
1m / 3.3ft	8pt
1.5m / 5ft	13pt
2m / 6.5ft	16pt
3m / 10ft	25pt
5m / 16ft	41pt
10m / 33ft	82pt
15m / 50ft	125pt
50m / 160ft	410pt
60m / 200ft	500pt
200m / 650ft	1640pt

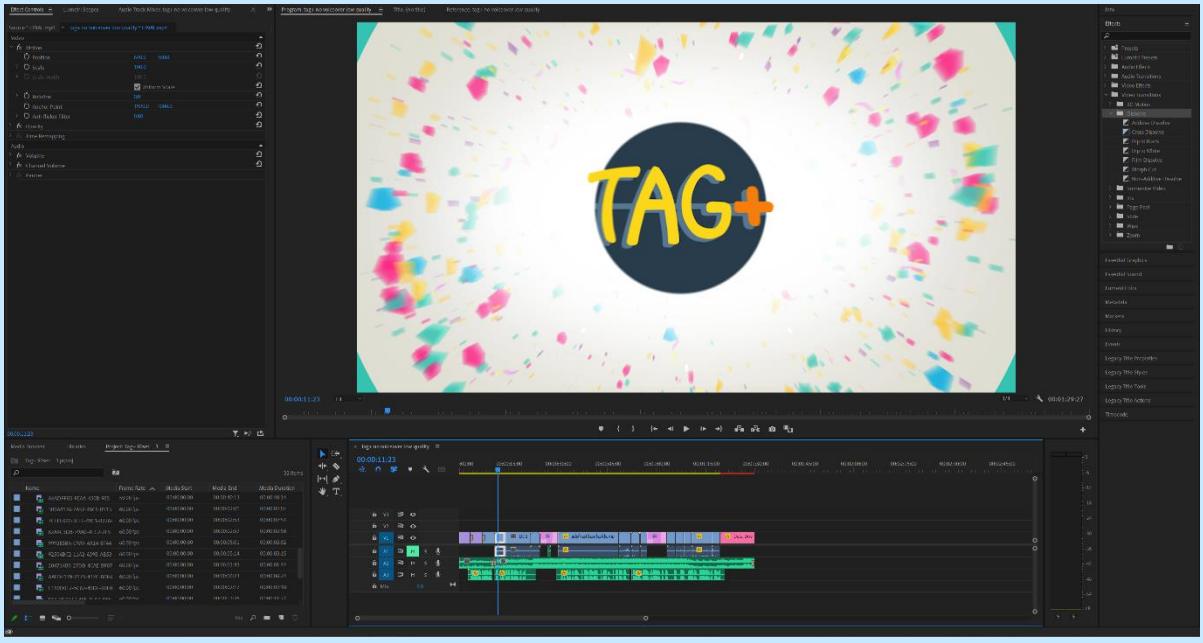


Hall type	W x L x H	Number of individual courts
Single hall	15 x 27 x 5.5 m	1 x (15 x 27) m
Dual hall	22 x 44 x 7.0 m	2 x (22 x 22) m
Triple hall	27 x 45 x 7.0 m	3 x (15 x 27) m

Midterm video BTS



Final video BTS



App pages (all of them)