Final Report

Creating a board game for ABB

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European Project Semester – Autumn 2016

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1. Introduction

All the students within the EPS-minor are required to complete and deliver two reports. The midterm report consists of a thorough progress description made during the first term of the project to present to their supervisors. The midterm report also includes ways of working, preliminary results of the work and explains alternative solutions for the tasks. The final reports builds on this and includes all the progress that is made in the second half of the EPS.

The goal of our project is to create a board game for the multinational corporation ABB. ABB is looking for an engaging way to get (engineering) students interested in their company. Therefore, ABB made an appeal to students from the Novia University of Applied Sciences to design an engaging and fun board game to reach the students in an interactive way.

This final report will cover all content regarding the project, starting with the methods we used to conduct the project. In addition to the methods we formed a plan of action to describe the tasks we see fit to achieve our objective. After that comes the project plan to state the project management aspects within this project such as the members of the team, the mission, vision and a budget plan.

Next, we included the research report containing the research plan and our findings. The findings are used to form the design principles chapter that describe the design guidelines of the board game.

Moving forward to the creative phase in which we describe the process of generating concepts and making them concrete. Because the final concept needs to be tested, a description and guide about the upcoming test phase can be found after the creative phase chapters.

In the following chapter we describe the process of designing the details for the game. This chapter will include a lot of play testing and will cover the process of changing the game according to the results of said play tests.

Finally, when we have created a complete and functioning board game, we focus on the eventual design and transfer to the employer. We discuss the manual, the visual design and the reaction of the employer on our game.

After the report is finished, we compile the information into a presentable format and present it to our supervisors.

1.1 European Project Semester

The European Project Semester is a program offered by 17 universities spread out over 14 European cities. It focusses on engineering based subjects but also allows students from different fields to participate. It covers subjects such as environmentalism, marketing, language, project management, intercultural communication and it stimulates innovative thinking.

The program aims to prepare students for working life and the universities try to create a realistic multidisciplinary environment. The working language is English and the projects are meant for third or fourth year students, even though it is also appropriate for Master students.

1.2 Introduction ABB Board Game

This project is a cooperation between ABB and Yrkeshögskolan Novia of Vaasa, Finland. ABB is a multinational corporation specializing in power, robotics and automation. ABB made an appeal on students from Novia UAS to help them in realization of this project.

The core reason for this project is the difficulty for ABB to get students introduced to the company and company values in a social and interactive way. Besides solving this problem, we also want to focus on showing the possibilities ABB can provide for students after they finished their studies. Because the ABB Group is so big and diverse there's a lot of information which can be overwhelming for people interested in the company, especially students.

For this reason the team has to distill all the best, condensed and human information about the company as ABB is looking for more well informed, well educated and motivated engineering students to show interest, participate through an internship or even apply for a job in the future.

To achieve the goal we will deliver a high fidelity prototype of an easy-to-use board game, enclosed with manuals, visual design-concepts and full documentation. The board game provides all the information regarding ABB and their specializations through a fun, interactive and especially social gaming experience.

During this process the team monitors its progress, possible problems and work done in weekly meetings with the project supervisors Roger Nylund and Mikael Ehrs.

1.3 Debriefing

As an introduction to the project and the company, ABB invited us to their Vaasa branch for a tour of the factory and a presentation about their expectations for the project.
To ensure we understood each other, we make a debriefing and send it to ABB.

Background and reason for the project

ABB is a multinational corporation specializing in power, robotics and automation. Their headquarter is situated in Zürich, Switzerland, with branches in many countries like Sweden, Finland and Germany and more worldwide.

Because the ABB Group is so big and diverse, there is a lot of information that can be overwhelming for people interested in the company, especially students. Therefore ABB made an appeal on students from the Novia University of Applied Sciences to help them reach these students to meet the company through a social, interactive way.

Problem

ABB finds it difficult to get one of their most valued target audiences - students - briefly introduced to the company and company values, as well as the possibilities the company can provide for them.

Goal

ABB is looking for an engaging, fun and social way to get people, especially students, interested in the company and show the best, condensed and human information about the company.
ABB is looking for more well informed, well educated and motivated engineering students to show interest, participate through an internship or even apply for a job in the future.

Deliverables

To achieve the goal the team will deliver a high fidelity prototype of an easy-to-use board game, enclosed with manuals, optional visual design and full documentation. The board game provides all the information regarding ABB and their specializations through a fun, interactive and especially social approach.

Target audience

The core audience for the game are students, mainly from engineering fields. Also visitors and people interested in the company should get information and fun out of the game.

Success factors

Playing the board game should be a fun and a social experience after which people will continue to think about ABB and will be interested in a job or traineeship at the company. Full success will be achieved when both sides are happy with the gaming experience of the finalized product.

Team

The following four students made up the team for this project:

Image 1.

Samira el Messaoudi	samira.elm94@gmail.com	+31641924916
Romy Koch	romylouisekoch@gmail.com	+358417293670
Mathis Delrue	mathis.delrue@enit.fr	+33678555690
Eric Fürstmann	eric@fuerstmann.eu	+491712799875

1.4 Methods

Scrum

To be able to implement this project management method, we have decided to use scrum. Scrum is a very popular method used for making products in multidisciplinary teams (IT, design, media or mechanical engineering) that uses very short *sprints* to deliver results quickly. Though this the team is be able to respond to changes very quickly, keeping the team, concept and project flexible. This is necessary in this case because the team has to do a lot of iterations, which can have varying results. We might have to make quite a few changes during the process.
When using Scrum, a Scrum board is needed for planning. This board is kept up to date by the Scrum master, in our case this is the project manager. On the Scrum board we see the names of all the members of the project group and also two extra lines for *everyone* and *no one*. Behind these names we can see exactly what everybody in the group has to do, what they are doing right now and what they have already done.

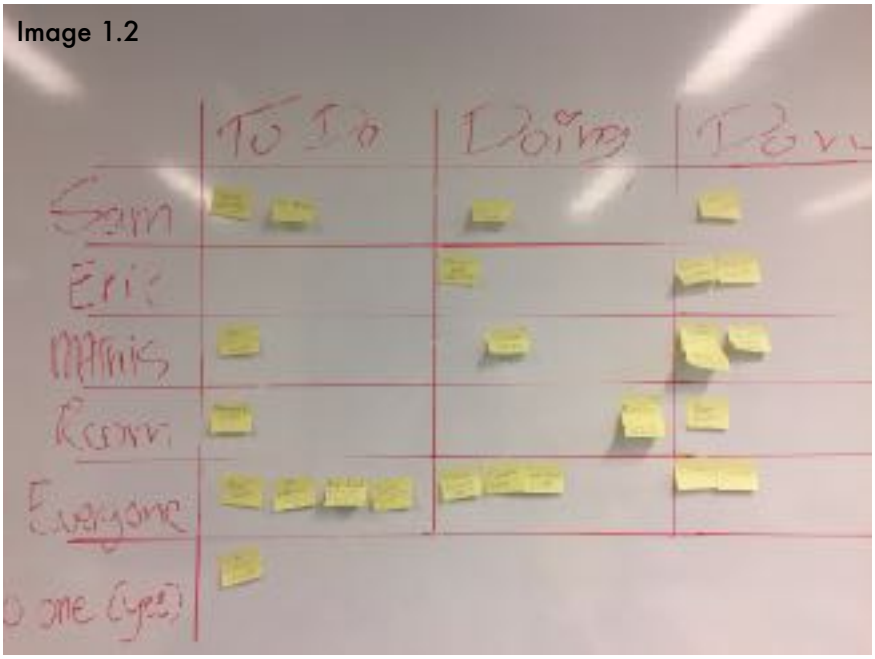


Image 1.2

The board is managed by daily stand-ups. Every day, before the team starts working, we have a daily stand-up lead by the Scrum master. In these stand-ups we update the board and talk about what we've done and how this progress went, to ensure that everyone is equally informed about every performed task. Tasks are noted on post-its, which are moved from *doing* to *to do* or *done*, or even move tasks back to *doing* or *to do* according to the work done.

Phases

We've decided to implement a method used in creative processes that involves four phases to clear up the project schedule and clearly define the work to be done. The first phase is called the *look & listen* phase.

In this phase the team defines the project and get a clear view of all the goals the employer wants us to achieve. Here we also define the research we want to do to get enough information to achieve these goals and execute it. The results and other data are written down and clustered into groups of similar results. Based on these groups of data, we draw conclusions of the functionalities and demands of the concepts we want to create.

This brings us to the second phase of the process, the *create concepts* phase. In this phase the team brainstorms or uses other creative techniques to think out of the box and we try to figure out a new and exciting solution to the problem that the project brings along. In this phase we implement conceptual thinking to get a few concepts that we can present to the employer.

After this, the team sits down with the employer and goes over all the ideas. The employer and the team will have preferences which have to be balanced out. Based on these, and obviously on the results of the research, we decide on a concept together. This concepts gets more depth and we start to think about the design and interaction. This phase is called *designing details*, and at the end of this phase, the team will have a first lo-fi prototype, ready for extensive testing.

Testing can take a long time and can be put into the fourth phase, *realize*. This phase consists largely of iterations; testing, improving, implementing and back to testing. If it turns out we change so much that even the mechanics of the game change drastically, we go back to phase three and meet with the employer again. This process can go on until a desirable result is reached. What exactly a desirable result is, is at this point specified by the employer. When the team has a well functioning lo-fi prototype that meets our demands, we develop it into a hi-fi prototype. This prototype will be presented to the employer, after another iteration, as the end result of our project.

1.5 Plan of Action

Introduction

The ABB Board Game-project is a collaboration between ABB and students of the European Project Semester offered by Novia University of Applied Sciences in Vaasa, Finland. The employer and contact of ABB for this assignment is Heidi Saarinen (heidi.saarinen@fi.abb.com).
The ABB group is a well-known multinational company but a lot of applicants, especially students or recent graduates, know generally what the company does but don’t have a clear image of the sheer amount of fields ABB covers. Also the human side of ABB seems to be lacking in the public image and the relevant information students receive.

We want to change that for the better and provide a good introduction to the company, because how can someone possibly wrap their head around all the information ABB offers?

Defining the project

The platform to teach people about ABB we will produce is a board game. This is based on the idea that this speaks to the target audience and because it differs from the online communication platforms other big companies offer, which makes this game stand out.
The target audience for this project are students, mainly from engineering fields, but also from all other areas of study. This will be our core group of people, because ABB wishes to reach them with the board game.
We will perform a research to find out what the target audience would look for in future employers and base our design on this. We will write a report on the process of this research and this will include the results and conclusions.
After this research we will begin a concept phase where we brainstorm and use other conceptual thinking techniques to find a creative solution to the problem previously stated in this plan of action and based on the results of our research. This process will also be documented.
After this the concept will be made into one or multiple lo-fi prototypes that are ready for testing. After a certain number of iterations and improvements to our concept, we will present a hi-fi prototype to the employer.

Risks

Because the project takes a long time and we have to finish our first prototype relatively soon, we're not sure how long we have for all the tasks before this. To combat this problem, we will use a method called time-boxing where we set strict deadlines for ourselves. This way, we can be sure we don't spend too much time on every task.

Quality Demands

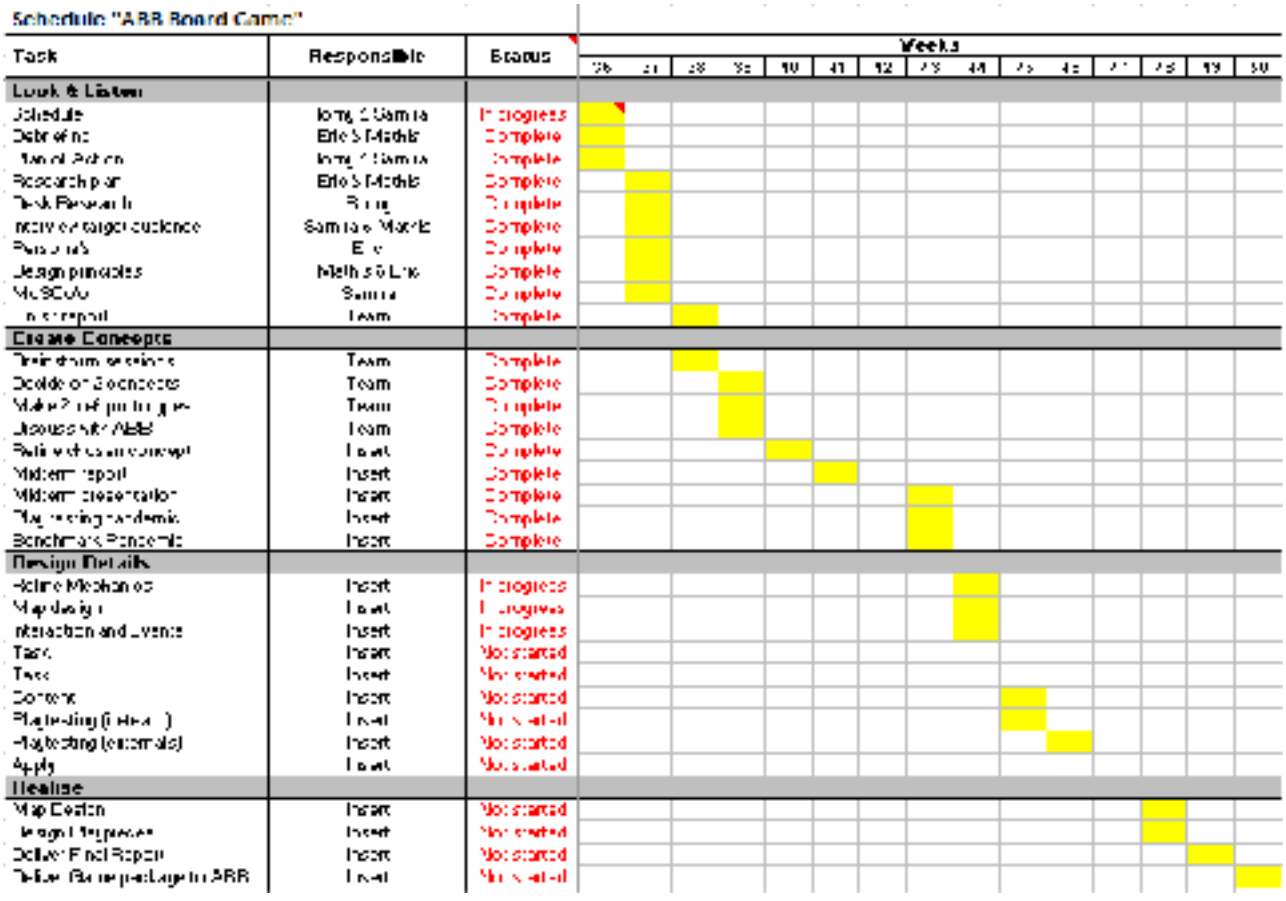
The deliverables have to be in line with the quality and design principles a customer is used to receive from ABB. As a possible first contact to the company the materials and image we need to communicate to the player have to be clear and top-notch – like the material already in use internally and externally with ABB.
We guarantee quality like this by relying on our own experience in design work as well as extensive communication with Heidi Saarinen (ABB Group) and Mikko Niiniketo (Buorre design + marketing). By this we will keep the quality standard at a level they are already used to perform on, an we get clear feedback on subjects we have to improve.
Content will be thoroughly researched and doubled checked via the four-eyes principle. We will rely heavily on existing ABB materials for this, but for certain situations we will also do our own research or ask questions to the knowledgeable workers at ABB Vaasa.

Planning

The team has decided to only specify the planning of every phase when we reach it. We do this to remain flexible and prepared for unexpected changes that might have to be made.

Below you can see the planning for the first phase, *look & listen*, for which the team took two weeks to get a clear vision of the assignment and focus on clear communication with ABB to make sure there's no difference between our expectations. This involved some documentation and research in the target audience, mapping out their opinions, demands and expectations. Without this the project wouldn't wok out fine, because we would be in the dark about how far our ideas differ from the target audience. We wanted to rather be well-prepared in the beginning than sorry later, where we might have to make a large amount of adjustments in the concepts during the iterations.

Image 1.3



1.6 Plan of Research

1. Objective

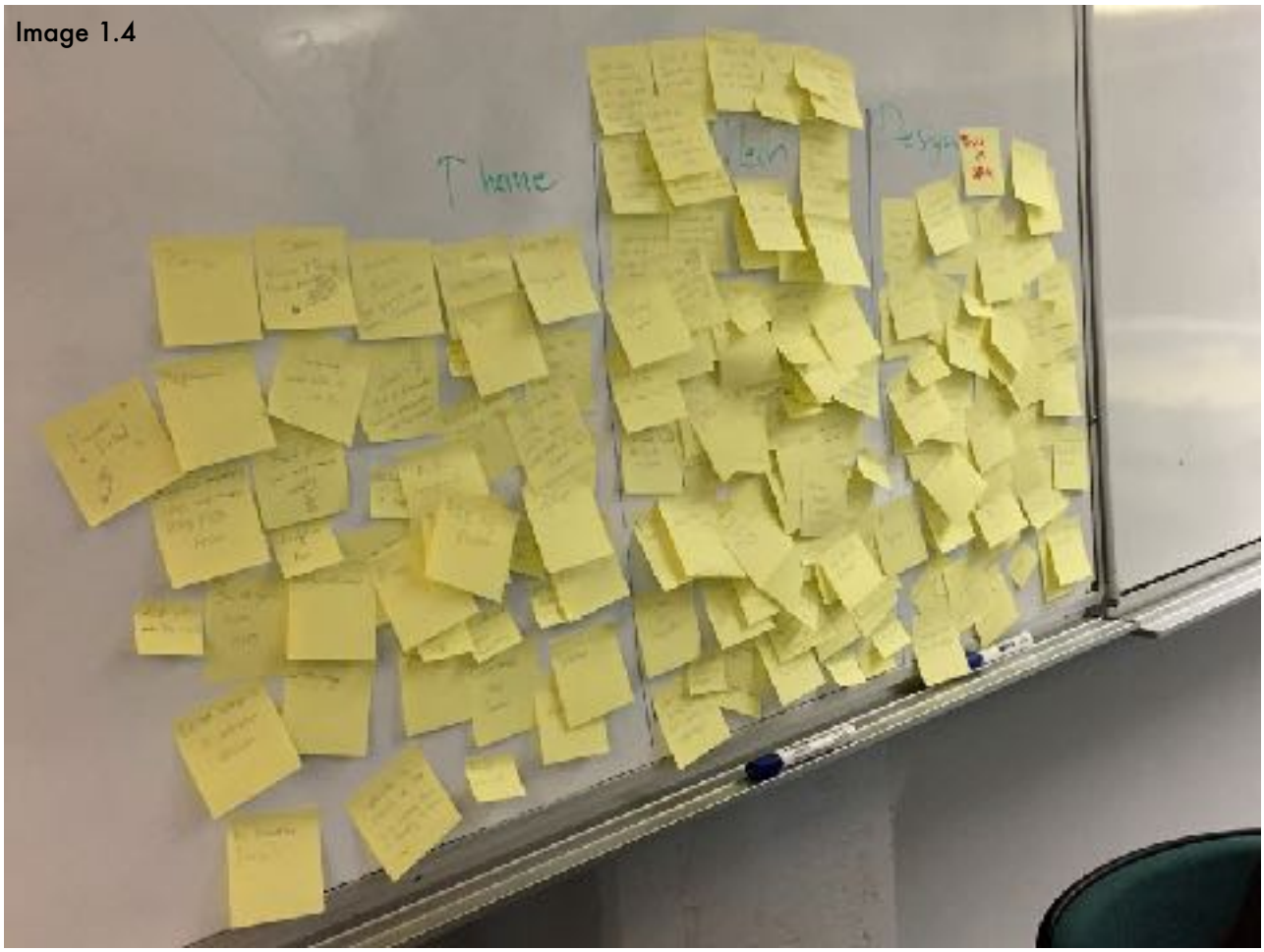
To optimize the board game as good as possible, the main objective of our research was learning more about our target audience. This was key to produce a game that caters to the interests and needs of our target audience, especially when it comes to knowledge about their potential future employer.

2. Research Questions

One of our first steps in our research was creating research questions. These questions formed the base of our research and lead us to our goals and objectives. The following questions were used as foundation of our research:

- Who is the average student in the target audience?
- What do the students know about ABB?
- What do the students look for in a future employer?
- What are their favorite board games?
- How do we make students remember ABB even after the board game has finished?

Image 1.4



3. Material and Methodology

We wanted to use a short questionnaire, with specific enough questions to get precise answers for our needs, but overall be brief and casual enough to not be overly annoying for the interviewees.
The questionnaire was used at hotspots around the Vaasa Campus area, e.g. Café Oskar in Tritonia and spots in front of the cafeterias and common areas. We hoped to get diverse basis of answers this way. The answers were evaluated in Excel to get a clear representation of the points the asked students lean towards.

4. Expected Results and Output

We expected clarification of the issues at hand to get better design-input for further planning and hoped to get a clear image about the information a student wants, needs and expects from an employer as well as the method they enjoy receiving that information - and if that could be a game or not.

5. Question catalogue

The question catalogue was very similar to our research questions. By keeping them closely connected we could easily answer our research questions by getting answers from students.

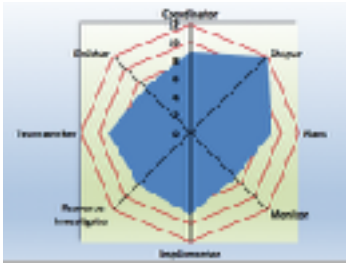
- Who is the average engineering student? (age, sex, hobbies, …)
- What do you know about ABB?
- What do you look for in a future employer? (e.g. pay, projects, social activities, meeting outside the workplace, …)
- What is your favorite board game?
- How would you describe a memorable experience you'd like to have with a potential employer? (e.g. personal talks, open house days, information material, …)

1.7 Project Plan

Project Team

Samira

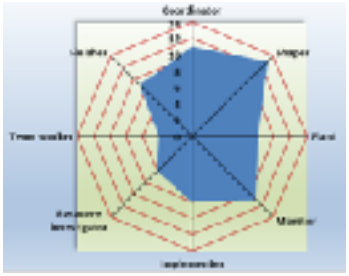
Image 1.5



My name is Samira El Messaoudi. I'm a Dutch Communication and Multimedia student studying at the Hague University of Applied Sciences. I choose Finland for the beautiful nature surroundings and calm environment.
My preference regarding the EPS-projects went to the ABB-board game because I believed this project provides me with new insights and challenges within the design field. Furthermore this project is a great addition to my resumé since I'll be doing it for a leading technology company called ABB.
The project will be carried out by a project group consisting of four group members. In addition to personal contribution within the team I did a Belbin test to detect which role I'm within the group. The test clarifies that I'm a *Team Worker*, an *Implementer* but mostly a *Shaper*. This role is up for challenges and can be dynamic in many ways, which meet my opinion fits my own expectations and ideas as well.

Eric

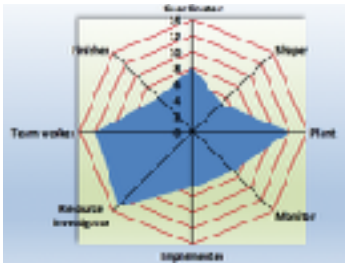
Image 1.6



I'm Eric Fürstmann from Amberg in Germany. I'm 23 years old and back home in Germany I study Media Engineering and Media Production at Ostbayerische Technische Hochschule Amberg-Weiden.
I came to Finland to get new experiences with new people in a beautiful and interesting country. I tried to genuinely weigh the pro's and con's of my own skills and in which project I can be most useful for the team. After considering both options my preferred project was the Board Game for ABB.
I've always been an avid gamer since I was young – offline board games as well as online games or Pen&Paper-RPGs – and I really like it to try out new games and game mechanics. The Belbin questionnaire gave me the *Shaper* role as a result, but I also had a emphasis on the *Coordinator* and *Monitor*. I think I can contribute to the project very well in the actual organizing and doing of tasks.

Romy

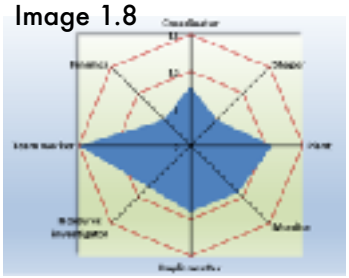
Image 1.7



My name is Romy Koch and I'm from a place called Naaldwijk in the west of the Netherlands. I moved to the Hague three years ago to study Communication and Multimedia Design at the Hague University of Applied Sciences.
I chose to do the ABB board game project because, compared to the other project, it was a little different from projects I would do in my home university. Because the project lets us design a board game, I could gain some experience in designing for print and just generally designing offline interaction.
While doing the Belbin test, I noticed that I identified with multiple answers usually and that I had trouble properly dividing the points. When looking at the results, this shows because the results are pretty diverse. According to the test results, I'm mostly a *Resource Investigator* but also have *Plant* and *Team Worker* tendencies. This means I find ideas and get creative easily and bring this to the team, but after this I start to lose interest.

Mathis

Image 1.8



Hi, my name is Mathis Delrue and I'm a 21 year old student from France. I'm studying Mechanical and Industrial Engineering at the ENIT (Ecole Nationale d'Ingénieurs de Tarbes). I chose to do an EPS in Finland to work on a project with other students from different nationalities .
I chose to work on the ABB Board game project because this project looks very different from what I'm use to and I can learn about ABB which is a company in my field of study, I also really like board games and have the possibility now to develop my own.
In the Belbin questionnaire I appeared to be *Team Worker*, it means that I will cooperate easily with my teammates, I will be able to listen well to them and be diplomatic in order to build good connections inside the team.

Conclusion

The Belbin test suggested, that we will make overall a good team: Mathis can add great value to the overall teamwork in general and keep the work process flowing, as result of his team worker role. Whereas Romy is the creative mind within the group and solves difficult problems due to her plant role while Eric and Samira are the shapers of the team. They highly value challenges and are most likely to put their group through pressures and obstacles. Even though two shapers can be a good addition to the team, the Belbin questionnaire suggests there might be some room for conflict between Eric and Samira.

In addition to the Belbin tests, every member in the team has their own personal contribution to the project group according to their personal interests. Each team member

has their own field of studies and interests, that they can apply in their own way on this project. Mathis studies in the fields of engineering, he has a more advanced skill set of problem solving and logical thinking. Romy and Samira operate in interaction and visual design, which also makes them contribute a great deal in generating creative ideas, solutions and design. Eric is the Jack of All Trades within the group, he adds a lot of value to every project phase as result of his broad media production and engineering background.

Mission

A mission is defined as the statement about the problem that needs to be addressed. In our case, we've defined this as follows:
Inform students about all the possibilities that ABB offers as a future employer.

Vision

The difference between a mission and a vision is that a vision describes a desired situation whereas a mission describes how you will achieve this desired situation and with what. We defined this as follows:
Our board game will properly spread information directed at students, that realistically reflects the opportunities ABB can offer them.

Work Breakdown Structure

We used the Scrum method to divide the tasks and decided along the way who is most capable of performing this task.

Phase 1: Look & Listen

- Organize schedule
- Form a Debriefing
- Plan of Action
- Plan of Research
- Interview target audience / research target audience
- Benchmarking
- Create a persona
- Define Design Principles
- Apply MoSCoW method
- Finish Research Report

Phase 2: Create Concepts

- Brainstorm sessions
- Create lo-fi prototype-concepts
- Deliver first concepts to ABB

- Determine (final) concepts
- Create a lo-fi prototype
- Iterations
- Moodboard
- Style tile
- Make a manual

Phase 3: Design Details

- Create concept / concrete scenario's (description of task setups)
- Create storyboards (describes a solution to the task)
- Make flowcharts
- Styleguide

Phase 4: Realize

- Create hi-fi prototype
- More & multiple iterations
- Finalize the product
- Finalize the manual
- Finish all documentation

Image 1.9

Budget plan

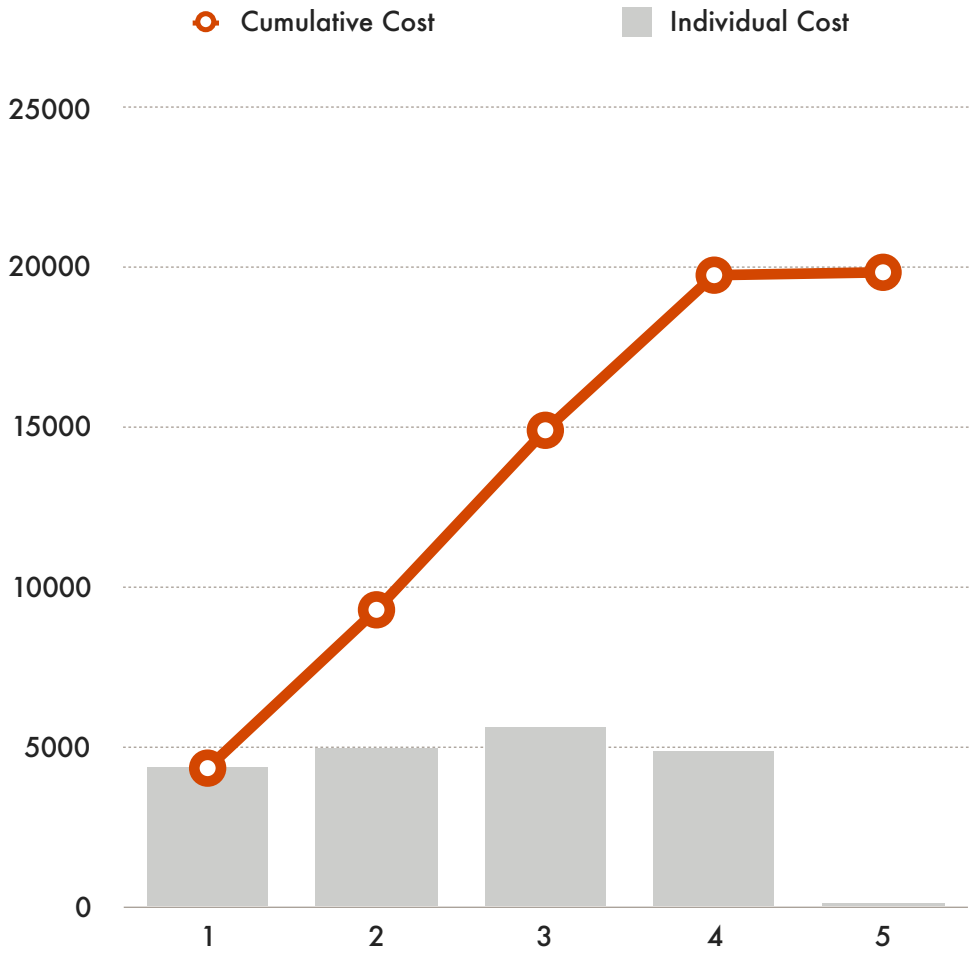
We are doing an EPS (European Project Semester) at Novia University of Applied Sciences. The subject of our project is to make a board game to present ABB Company. For this project we don't have a budget in the classic sense because ABB will take care of all the costs. In order to have an idea of what our board game could cost and when we would have to pay for something, we made a theoretical budget plan for our project. We won't have any weekly cost but we will have to pay for the fabrication of the pieces and printing the physical assets.
During the first part of our project we didn't have any cost because we were defining our goals on the project, doing a lot of researches about board games and brainstorming to make different concepts. During those parts of the project we used only manpower to produce two concepts so we had only the cost of time use by the different actors in the project, the team members. Based on the normal salary for outside experts, we took that number in half and figured a fair salary would be 20 euros/hour.

Now that we agreed on one concept with ABB, we will have to present a playable prototype to ABB. Working on the mechanics and the design of our prototype won't cost us anything but creating a playable version with the board and all the pieces will produce some costs for our project. It doesn't have to be in very good quality because the design will be preliminary and many things will change during the testing part of our project so it won't be really expensive. To be able to play our prototype for the testing part, we will create a few different boards, cards and pieces until we have a final playable prototype. We evaluated this cost around 10 euros for the cards and the pieces and 15 euros for the boards.

When our prototype will be ready we will test it with different people. During those testing sessions we will have to provide foods and drinks as thanks to people for their time, buying the food will be one of our most expensive spending due to the numerous testing sessions we will have to do, we evaluated the cost of the food around 50 euros for all the testing sessions. We will also have to modify our game during the testing part to improve it according to people's comments. Since we won't have to do a lot of modifications, it will only cost a little, around 10 euros for the creation of new pieces, boards and cards.

Finally we will have to provide ABB a full playable game with all pieces needed to play it. It will be the final design of the game so we have to make it attractive and use good materials to realize it. We want our board game to be fully printed, so we will have the cards, the board and the manual printed in high-quality print and we want our pieces to be 3D printed because it will be less expensive. We won't have to do the final version of the board in a real good quality but according to a 3D printing club and some website about creating your own board game, all the 3D printed pieces will cost 50 euros, the board will cost 20 euros and the cards will cost 15 euros.

Image 1.10



Sources:

- Interviewing people from a 3D printing club
- https://www.thegamecrafter.com/publish/products
- http://www.plasticsforgames.co.uk/en/en_prod_directory.asp

Image 1.11

Task Nr	Task		Hours	Cost (€)	Individual Cost	Cumulative Cost
1	Defining goals	experts salary	4	320	4320	4320
	Researches	experts salary	50	4000		
2	Brainstorming	experts salary	12	960	4960	9280
	Concepts	experts salary	50	4000		
3	Prototype	Pieces		10	5625	14905
		Board		15		

		experts salary	70	5600		
4	Testing/Changing	Food		40		
		New material		5	4860	19765
		experts salary	60	4800		
5	Final game	Pieces		50		
		Board		20	90	19855
		Cards		15		
		Manual		5		

1.8 Risk management

Definition of all possible risks the team could have stumbled over during the duration of the project.

Team management

Team member leaving the project
Differences between the cultures and studies
Language barriers
Bad planning/scheduling
Conflicts inside the team
Losing motivation/laziness

Gathering information

Lack of knowledge
Lack of time
Lack of money
Lack of testers

External events

Missing support/guidance
Illness/sickness
Losing the link with the company's coordinator/no response from the contact
Meteorological conditions

Evaluating the risks

The following table outlines the probability and the following impact if one of the risks should manifest in the project. The scores are multiplied with each other to form the *Total*-score, which represents the actual risk. Our highest risks are on top.

Image 1.12

Risk	Probability (1-10)	Impact (1-10)	Total	Mitigated	Prevented
Lack of testers	6	7	42		x
Lack of knowledge	5	8	40	x	
Lack of time	5	6	30		x
Losing motivation/ laziness	5	5	25	x	
Conflict inside the team	4	6	24		x
Illness/Sickness	7	3	21	x	
Bad planning/schedule	4	4	16		x
Team member leaving the project	2	7	14	x	
Missing support/ guidance	3	4	12	x	
Differences between cultures and studies	8	1	8	x	
Language barriers	3	2	6	x	
Losing link with the company	1	6	6		x
Meteorological Conditions	3	2	6	x	
Lack of money	1	2	2	x	

Definition of the actions to be taken if a risk becomes reality

Based on the evaluation of the risks with the combination of probability and the impact, we figured out that the most important risks in our project were the lack of knowledge, the lack of testers, the lack of time, losing motivation on the project or a conflict inside the team.

The lack of knowledge

We need to have as much knowledge as possible on board games and on ABB to make a game interesting and educational at the same time. To avoid this problem we have to do a lot of research before developing the game.

The lack of testers

We need many testers to have a different and external point of view on our board game. We have to use means like social media and ask people directly to play-test our game and organize play-test sessions with as many people as we can.

The lack of time

This can happen due to many factors added together and we can prevent this by doing a good scheduling of our project and anticipate the possible problems in the future as much as we can for our project.

Losing motivation on the project

A big part of our project is testing, and doing the same thing again and again. This repetitiveness can lead the team to lose motivation at some part. To mitigate this we can mix the work to do and ask people to test our game with us.

Conflict inside the team

A conflict inside the team can happen if one is not working or if team members have different points of view. To prevent or mitigate it we can make compromises on some choices and engage discussion inside the team.

2. Introduction to research

To get a better understanding of our goal and the target audience we design the game for, the team went through a research process outlined in the following report. Generally speaking the team split and one half focused on the more technical desk research into game mechanics while the other half went to students in Vaasa to get direct input. We wanted to do this because we felt – being gamers and students ourselves – we could imagine the foundation of the board game, but being from different cultures and different fields than those ABB is mainly interested in, we quickly agreed that additional information in a field as vast and complex as this is always welcome and will of course be beneficial to the end result.
After that research process we compared the human results with our desk research and drew conclusions for the optimal progress of the project.

2.1 Research report

Methods

One of our first steps was to prepare the research questions. These questions guide us through our research and form the foundation of knowledge and information regarding our goals and most importantly: our target audience. We prepared the following research questions:

- Who is the average student in the target audience?
- What do the students know about ABB?
- What do the students look for in a future employer?
- What are their favorite board games?
- How do we make students remember ABB even after the board game has finished?

As one of our next few steps we prepared and carried out a questionnaire. A short interview was held with many students spread around the campus to get vital information about their behavior, preferences, favorite boardgames and other information that was important to our research questions. More information about these interviews can be viewed in the designated subject in this report.
In our next step we did desk research about different game mechanics, gamification and theories. Information about these specific subjects help us to target the students better with our yet-to-be-developed game board. Other than the approach, desk research provided vital information on the designing process of the game and helped us deliver a better gaming experience. More about gamification and mechanics can be read in the designated subject in this report.

Interviews

We used a short questionnaire to get specific answers from our target group for our needs. We made the questionnaire short and casual so we won't be taking up too much times from our interviewees. We held interviews because of a better understanding of our target group after analyzing the questionnaires.

We went around the Vaasa Campus area to interview as many students possible. Most of them had time to assist us on our project and were happy to help us. After the interviews we evaluated our results and were able to answer the research questions. Below you'll find answers on each research question based on the interview results. The actual interview results can be viewed as attachments.

Desk research

We did a lot of desk research in preparation to our human research and to be able to understand and analyze all the possible game mechanics we might stumble upon. Desk research into game and gamification theory was an integral part for us to get a better overview of directions we might take the board game in, due to the sheer endless possibilities and already existing games.
When we went looking for information online, we stumbled upon countless blogs and websites about the subject. While we had received a tip about looking for information on www.boardgamegeeks.com, we quickly found another website, www.leagueofgamemakers.com. Here, instead of discussing existing games, people discuss the process of designing the mechanics and theme of board games. This information is spread by using blogposts written by visitors and the staff of the website.

From this website, we gathered a lot of useful information and tips that we could use in our project. We felt this was not enough, so we went looking for books about game design and gamification. Because we learned the target audience is more familiar with video games than with board games, we figured there might be an option for online game mechanics in a board game format.

The first book we found was *Game Mechanics; Advanced Game Design* by Ernest Adams and Joris Dormans. This book was aimed at both online and offline game play, and held a lot of interesting theory about the design and the experience of the game, with more scientific evidence to back up than the website, which was based solely on experience.

The second book was aimed at offline games. It's titled *Tabletop; Analog Game Design* by Greg Costikyan and Drew Davidson. Here we learned a lot about implementing strategy in our board game.

In the end we compiled a concluding document to be able to easily review mechanics when we talk about them.

2.2 Mechanics and Gamification Theory

Reasons for implementing these forms of gamification:

- Create an urge to finish the game, keep it interesting throughout
- Increase engagement
- Encourage and reward players

Reminders:

- Be unpredictable
- Remember to use every medium to the max; the board, the pieces, the cards etc.
- Maybe use more online game mechanics (like the psychology behind them) in this board game because that's what the target audience is probably pretty familiar with
- Eliminate the option for human error that messes up the gameplay and the outcome.

Gamification theory

Cascading information theory

> The theory that information should be released in the minimum possible snippets to gain the appropriate level of understanding at each point during a game narrative.

Community collaboration

> The game dynamic wherein an entire community is rallied to work together to solve a riddle, a problem or a challenge. Immensely viral and very fun. -> immersive

Countdown

> The dynamic in which players are only given a certain amount of time to do something. This will create an activity graph that causes increased initial activity increasing frenetically until time runs out, which is a forced extinction.

Discovery

> Also called Exploration, players love to discover something, to be surprised.

Epic Meaning

> Players will be highly motivated if they believe they are working to achieve something great, something awe-inspiring, something bigger than themselves.

Ownership

> Creating something that you *own* in a game created loyalty and immersion, feel involved and responsible. (quick example: build your own company and make it successful).

Progression

A dynamic in which success is granularly displayed and measured through the process of completing itemized tasks.

Urgent optimism

Extreme self motivation. The desire to act immediately to tackle an obstacle combined with the belief that we have a reasonable hope of success.

In-game mechanics

Internal economy

The mechanics of transactions involving game elements that are collected, consumed, and traded constitute a game's internal economy.
The internal economy of a game typically encompasses items easily identified as resources: money, energy, ammunition, and so on. However, a game's economy is not limited to concrete, tangible items; it can also include abstractions such as health, popularity, and magical power. In any Zelda game, Link's hearts – a visible measure of his life energy – are part of the internal economy. Skill points and other quantified abilities in many role-playing games also qualify; these games have very complex internal economies.

Social interaction

Until recently, most video games did not govern social interaction among the players, apart from prohibiting collusion or requiring that players keep certain knowledge secret. Now, however, many online games include mechanics that reward giving gifts, inviting new friends to join, and participating in other social interactions. In addition, role-playing games might have rules that govern the play-acting of a character, and a strategy game might include rules that govern the forming and breaking of alliances between players. Board games and folk games played by children have a longer history of game mechanisms that guide the interactions among players.

Mixing Physical Mechanics with Strategic Gameplay

With discrete rules, it is possible to look ahead, to plan moves, and to create and execute complex strategies. Although this isn't always easy, it is possible, and many players enjoy doing it. Players interact with discrete mechanics on a mental, strategic level. Once players grasp the physics of a game, they can intuitively predict movements and results, but with less certainty. Skill and dexterity become a more important aspect of the interaction.

Looking at some possible options to avoid the »ganging-up« problem:

- Dodge the question by limiting play to 2 players or teams. Magic the Gathering did this (with 3 or more players, the gang-up issue is severe, and blunted only by the amount of alcohol consumed during the game).
- Make player interaction negligible or non-existent, as in Take-It-Easy. Player interaction may be simply limited to the question of “who’s ahead”, or who makes the best strategic (but non-interactive) decisions, as in Dominion.
- Make player interactions positive, so that players involved in any encounter both gain something, as in Settlers of Catan or Bohnanza. This is a fundamental characteristic of many successful Eurogames.
- Make the losing player invulnerable while in last place, or make “last place” a way to get certain gains no other player gets. For example, if you lose an auction, you get part of the money that your opponents have bid.
- When a player attacks, distribute the effects equally among opponents (like the Thief or Witch in Dominion).
- In a 3 or 4 player war game, offer a “compromise” or surrender or occupation scenario, where the occupied player gains a free defense from the opponent's forces and keeps his population, but essentially loses his territory, while the attacker gets the resources and points for that territory. The loser maintains the chance for revolt, also. Or, offer ways for players to share territories.
- Players compete for a limited pool of resources, as in Carcassonne or Kingdom Builder. Player interaction is dependent upon an individual’s choice each turn upon a common pool of resources, thus limiting the options available to all other opponents equally. There is no real chance for “ganging-up”.
- Create a game where the players work together for a common goal, like Shadows Over Camelot, or almost any RPG.

Game design process

Mechanics and the Game Design Process

There are almost as many different ways to design a game as there are game companies. In Fundamentals of Game Design, Ernest Adams advocates an approach called player-centric game design, which concentrates on the players’ roles and the gameplay that they will experience. Adams defines gameplay as consisting of the challenges the game imposes on the player and the actions the game permits the player to perform. The mechanics create the gameplay. When Mario jumps across a canyon, the level design may define the shape of the canyon, but it is the game’s laws of physics – its physical mechanics – that determine how far he jumps, how gravity behaves, and whether he succeeds or fails.

Because the mechanics generate the gameplay, we encourage you to start designing the mechanics as soon as you know what gameplay you want to offer.

The development process outlined in this section is player-centric game design with an extra emphasis on creating complex, but balanced, game mechanic

Designing Mechanics early on

Game mechanics are not easy to create. It is advised that you start working on your game's mechanics early in the elaboration phase. There are two reasons for this:

- Gameplay emerges from game mechanics. It is difficult, if not impossible, to tell whether your gameplay will be fun simply by looking at the rules. The only way to find out whether your mechanics work is by playing them or, even better, by having somebody else play them for you. To make this possible, you may need to create a number of prototypes.

- The game mechanics that we focus on are complex systems; gameplay relies on a delicate balance within this system. Once you have mechanics that work, it is easy to destroy that balance by adding new features late in the development process or by making changes to existing mechanisms.

Once you have the core mechanics working and you are sure they are balanced and fun, you can start working on levels and art assets to go with them.

The World of the Play

A good game always creates a new world in which the players exist for some amount of time. That's one reason we play games, to escape reality and play in a new world for a while. Sometimes this world is obvious; in RPGs, the point is to take on a role inside a world different from our own. But even games like Apples to Apples and Scrabble offer their own world of the play. At the very least, all who are playing agree to work within a set of rules and abide by them together. Rules, that in everyday life, do not apply. That is a new world created!

So, if a good game always creates a new world, then a good mechanic always supports and enhances that world.

So, when designing your mechanics, consider the world in which they must function. And then be willing to give up a mechanic if it just doesn't work. File it, and use it in another game, perhaps. But stay true to the experience, the story, you're creating in a game. Keep the world of the play, and your players will want to experience that world over and over again.

Paper Prototyping

Because software prototypes are relatively slow and expensive to create, more and more game studios are using paper prototyping techniques. A paper prototype is a non computerized, tabletop game that resembles your game. Some game mechanics are media-independent. If your game does not rely too heavily on precise timing, physics, or other computation-intensive mechanics, you should be able to create a board game from your video game concept. If your game does rely heavily on computation-intensive mechanics, it can still be worth your time and effort to create a paper prototype for those aspects of the game that don't. Remember, a prototype typically zooms in on a particular aspect of the game, and you just might want to zoom in on the internal economy of a game that otherwise derives most of its game- play from its extended physics simulation. It's important to know what aspect you want to explore before you start designing a paper prototype.

Paper prototyping is not trivial. Designing good board games is an art in itself, at least as difficult as designing a good video game. It helps if you are familiar with a wide variety of board games yourself. There are many more board game mechanics than "roll a die and move that many spaces."

Image 2.

Paper prototyping has two important advantages: It is fast, and a paper prototype is inherently customizable. Paper prototypes are quick to make because they do not need to be programmed. When creating a paper prototype, you should not waste time on creating nice art for cards or boards; instead, you should spend your time drafting rules and testing them. With some skill and experience, you can put together a decent paper prototype for any game in a matter of hours. That leaves you a lot of time to start play-testing and balancing the mechanics.

With a paper prototype, it is easy to change the rules. You can even do this on the go. If during play you notice something does not work as intended, change it immediately. This way, you can almost create the game as you play. Iteration cycles do not get shorter than this.

Paper prototyping has disadvantages: It is more difficult to involve test players, and not all mechanics translate to board games easily. If you are going to test a paper prototype with new players, you will need to explain the rules to them yourself – it's not worth the time to write them down, because you'll be changing them all the time. In addition, test players, especially if they have little testing or board game experience, might find it difficult to see how your paper prototype is related to a video game.

What are the core aesthetics of a game?

In their paper *MDA: A Formal Approach to Game Design and Game Research*, Hunicke, LeBlanc and Zubek reference 8 aesthetics of a game that define player experience:

- Sensation: Game as sense-pleasure
- Fantasy: Game as make-believe
- Narrative: Game as drama
- Challenge: Game as obstacle course
- Fellowship: Game as social framework
- Discovery: Game as uncharted territory
- Expression: Game as self-discovery
- Submission: Game as pastime

When you consider them together, you get a great framework for understanding what the appeal is for all kinds of games. Lords of Waterdeep invests heavily in narrative and fantasy, where party games like Apples to Apples or Pictionary are almost all about fellowship and expression. But even in heavy games, you can see elements of both worlds at play. Eclipse and similar 4X games (explore, expand, exploit, and exterminate) have a narrative and are challenging, but there's discovery as you expand the board, and even expression of play style (choosing an offensive/defensive play style and being validated in your choice when it works out).

How can we use this as designers? How do we figure out which mechanics create the experience we want players to have? And is it wrong or bad when we want to create one experience and end up creating something else? These are important questions, and ones we might discuss in a future post. But for now, it starts with breaking down the games you know/love and seeing what combinations of mechanics drive what experiences.

Transmogrify your mechanics

Sometimes when designing a game the mechanic that seems like an obvious fit is actually constraining you, preventing you from exploring interesting paths and alternatives.

Mechanics are more important than theme

When talking non-RPG tabletop games, mechanics make the game. Mechanics ARE the game. Themes and components can enhance games and create more immersive experiences, but the core of a game is ultimately the mechanics. If you are a designer, that's where you should channel the vast majority of your creative energy. In situations where you must choose between preserving your theme and using the most solid, fun mechanics, go with the mechanics.

Each element of a game should have a mechanical purpose and function. It shouldn't be included solely because the theme demands it. Combining mechanics and theme creates context.

Winning mechanics

Winner and losers

> In a traditional game, there is only one winner. This is often the player who plays best or it's determined by luck.

Cooperative games

> Cooperative games have become very popular in recent years. In these games, everyone at the table wins together, or loses together. The primary conflict in the game is against the challenges created by the game itself. The popularity of these games has shown that people do enjoy games where there can be more than one winner, and they can enjoy a victory, even if no one loses!

Traitor games

> Traitor games add a twist. Everyone seems to be working together on the surface, but one or more players are secretly working against everyone else. Generally, in these games, either the traitor(s) win, or everyone else does, together, as a team.

A game where everyone can win or everyone can lose

Every player has a unique set of secret objectives. No one is pursuing exactly the same combination of results. The game allows players to choose freely when to cooperate and when to oppose other players, in order to achieve their objectives. This game is still in development as of the time of this writing.

Polylaurus system

Everyone has different objectives and by decision making within the game, you can try to achieve your own goal. This could interfere with others achieving theirs and their decisions could influence you in a negative or positive way. This works because of two things: secrecy, and a voting system which allows all players to influence the outcome of actions.

2.3 Interview Results

Interview questions

- What are you studying?
- How old are you?
- Do you have to do an internship?
    - If yes, where would that be?
- What do you look for in a future employer? What do you want to know about the company?
- Do you know ABB?
    - If yes, how do you know it?
    - What do you know about it?
    - Would you be interested in working at ABB?
- What kind of board games do you like?

Answers

Student 1 (male)		Student 2 (male)
Machine & Production		Machine & Production
20		22
Yes		Yes
No idea		Car engineering
He wants his future employer to propose activities for the employees		Be able to get a promotion. Start his own business
Yes		Yes
His brother is working at ABB (electric field)		It's a big company in Vaasa
Not that much, it's a big company in Vaasa which is global		Not that much
No because he thinks it's mostly electrical		Yes
Chess		Risk - Monopoly
Student 3 (male)		**Student 4 (female)**
Electrical/Automation		Economics
23		25
Yes		Yes

Not yet		she is doing one now in a recycling company
Good colleagues - Felling needed, not one among a lot		Good colleagues - When the company is well structured
Yes		Not really
It's a big company in Vaasa		-
Don't know a lot		-
Yes but he lives far (100km in the North of Vaasa)		Yes working in a big company would be interesting
None		None
Student 5 (male)		Student 6 (male)
Construction engineering		Machine and production
25		21
Already done in a construction company		Not yet
An interesting job, the location is important (close to the city), and money		Interesting job and good colleagues
Yes		Yes
A friend is working at ABB		With school
Not that much		Machine for the production
Yes if it would be in his field (he thinks that ABB is a good company)		Maybe
The star of Africa - Monopoly - Strategy games		Cards - Monopoly
Student 7 (male)		Student 8 (male)
Electrical		Electrical
23		23
Yes		Yes
He already did it at ABB		He already did it in an electrical company
Enjoyable company and environment		Good environment and nice boss
Yes		Yes
He found his internship on a message board and he applied		His friend worked at ABB

He enjoyed working there		Not that much
Yes he wants to work on projects with ABB		Not really, he enjoyed working in the company where he did his internship
Monopoly - Chess - Strategy games		None

Student 9 (male)
Electrical engineering
22
Yes
Anywhere as long as it's relevant with the study program
To get responsibility
Yes
Advertisements
Large engineering company
Yes
Kimble

Who is the average student in the target audience?

Most of the target audience we've interviewed fit a specific profile. They were in their early to mid twenties and primarily male. Most of them are studying to become engineers in fields like electronics, automation and machine production.

Those who have already done an internship, have done this with a company that offers projects or assignments that include subjects that are relevant in their field of study. The ones who hadn't yet done an internship are still unsure what company they want to do this with.

What do the students know about ABB?

When we mentioned ABB, people showed a lot of signs of recognition. This is not strange, considering the size of the ABB branch in Vaasa. While they knew the company and knew some basic information, we noticed only a few students had more knowledge about the

company and knew how diverse ABB really is and the possibilities that this diversity brings along.

Still the vast majority of them would be interested in working at ABB and they all seemed interested to gain more knowledge about the company. This is a good foundation for the board game, because now we know the interest already exists. We just have to provide information and make sure that they don’t lose their enthusiasm.

What do the students look for in a future employer?

The answers to this question were diverse and very useful. There were several answers that shared some similarity, which we'll discuss here.

Opportunities for promotion and financial stability

This is a very logical and understandable answer. Pretty much anyone who starts a new job wants to be able to grow within the company and get the promotions that this growth involves. They want to be able to get rewarded (in this case, financially) if they rise above the other employees and do excellent work.

Open mindedness and influence

The students seemed to find it very important that they could practice some form of influence over projects or solutions and wanted to work for a company that has an open mind about these things. Long story short; they want to be able to express themselves and be heard. This answer goes very nicely with the next answer we received.

Importance and individuality

They want to be treated as individuals and feel like the work that they do is important. No one wants to be a number in a big company, and it's quite natural to feel, in a company as big as ABB, intimidated by the amount of employees. In order to work around this, we have to emphasize the opportunity to express individuality that ABB offers.

Colleagues and extra activities

They want to work in an environment that offers the possibility for outside of work activities, or at least the possibility to organize these themselves. They want to be able to work closely together with their colleagues.

What are their favorite board games?

The first answer we got was usually the classic Monopoly. A lot of students didn't seem to have a favorite board game and didn't play board games often. We did notice that strategy-based games and card games were mentioned a lot.

How do we make students remember ABB even after the board game has finished?

It's hard to answer this question, since we're not sure what form the board game is going to take yet and we don't have time to properly research different methods and conclude on the best one before we start the concept phase. We can, of course, give our own opinions and share some of our knowledge, since we're a part of the target audience ourselves.

Interacting with information

We all agree that drily receiving information is not enough to make us remember it. If we're able to interact with the information, for example by having to apply it in a simulated situation, we're much more prone to remember information.

Visualizing

It's been proven endlessly that visualizing information makes it easier for us to interpret and remember. If we can see what is meant by something, or we get a visual that we can connect to a word of definition, we're more likely to absorb the information.

Interesting

It's quite obvious that we react more to, and remember more of the subjects we find interesting. If we can create such a subject (or even better; let the students create this themselves), we can assume that the students will remember more of the information given and the company over all.

In conclusion

Our target audience fits a specific profile; mostly men in their early to mid twenties. Most of them have done an internship at a company in a field that matches their field of study. The ones who haven't done an internship yet, don't know where to do this yet, but do have some demands of the future companies they want to work at. The most common ones were opportunities for promotions and financial stability, open mindedness and influence, importance and individuality and colleagues and extra activities.

They know what ABB is but have a little unclarity about what ABB does. They are interested in learning about what ABB can do for them and gaining some more general knowledge about the company.

Board game wise, they are not very familiar with a lot of diverse board games. The first board game that came to mind most of the time was Monopoly. They also seemed to like strategy-based games and card games.

In our own experience, we need to be focused on interaction with information, visualizing information and making it interesting to ensure that the players remember ABB even after the game is finished.

2.4 Conclusion and transfer look & listen phase

From this first phase in the project - the “look and listen” phase - the team gained valuable and needed information about all aspects involved in the game making process and could deepen its understanding of the underlying game mechanics. By also actually interviewing Finnish students we could get a clearer picture on what the game should look like, more than what would have just been possible with only desk research. A thorough look into game strategies we could deploy in our own game, based on the research we did ourselves, was very helpful for the remainder of the project and the following, more creative aspects of the designing process.

3. Design Principles

Design principles form the fundamental goals of the overall project on which decisions can be based on. We made the design principles based on the Look & Listen phase and the conclusion of the research results. These principles are our guiding lights throughout the project and keep every piece of work moving towards the end-product. Together they ensure a level of quality the employer demands. The following principles will be applied to the board game for ABB.

Engaging

The game needs to be attractive and pleasing so it can hold the player’s attention. This will result in a more immersive gaming experience overall and will make the game interesting and engaging and therefore, make the information about ABB more memorable.

Simple

The game mechanics must be simplified to ensure that everyone understands the game in order to be able to win, but have to be hard enough so students won’t get bored quickly. These is no need for too much complexness since this will make the game harder to learn and play. The rules have to be understandable for everyone and be pretty self-explanatory.

Educational

The game must contain educational value. Through interactive and informative gameplay, the students gain knowledge about ABB and their many specializations. Besides that, the educational part of the game should also be fun and challenging.

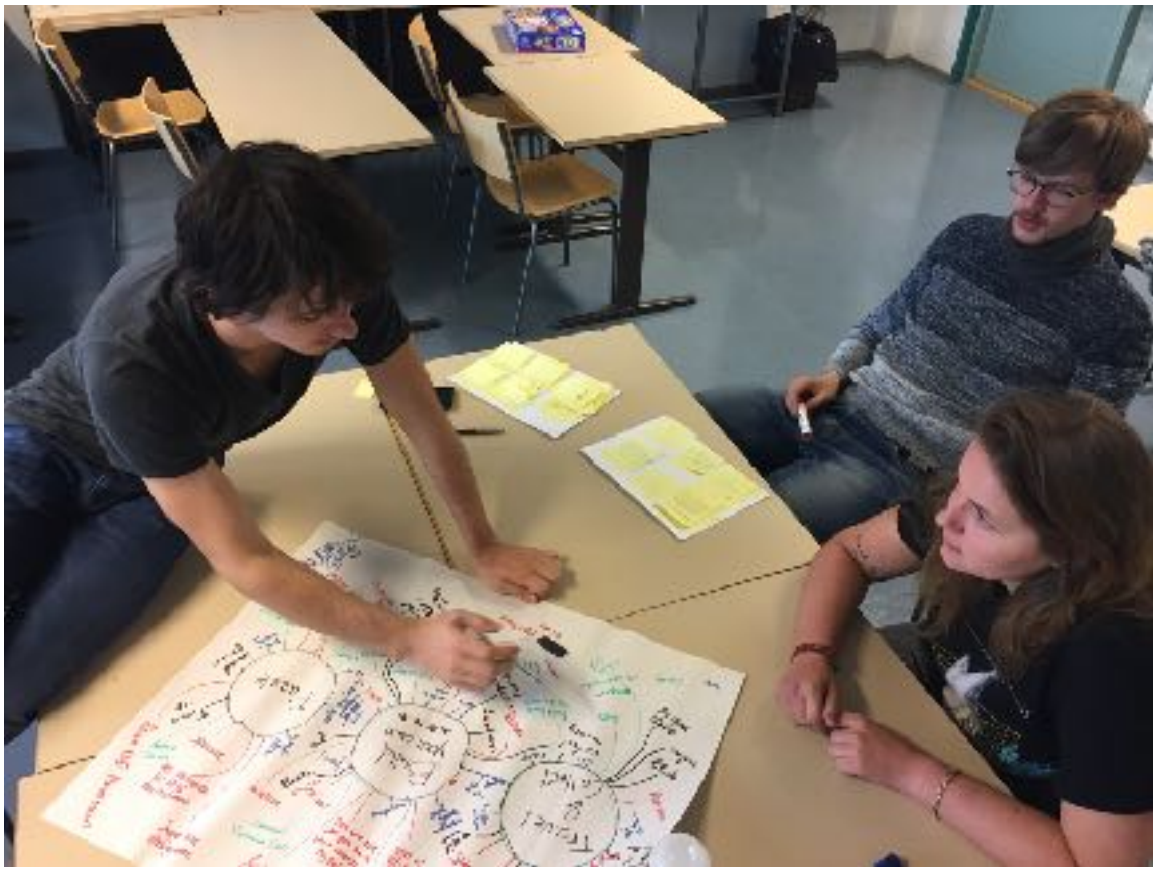
3.1 Brainstorm one

Introduction

After the research phase, we suddenly found ourselves with an overload of information and endless options to put this information to use. To stimulate our creative thinking and to make sure we find a solution to all the problems we've found in the research phase, we decided to do a brainstorm session. In this session it was our intention to let our creativity run free and to create a huge amount of ideas, realistic or not, for our board game.

We made a brainstorm preparation sheet, with all the details of this specific brainstorm, rules for brainstorming in general and the phases we would go through.

Image 3.



Brainstorm session from 21. September 2016

This document also functions as a template for future brainstorms, which might include more participants or have different goals or phases.

Participants

The project team.

Goal of the brainstorm

The primary goal of this session is to challenge ourselves creatively to come up with as many possible concepts that we can think of. The participants are asked to think about the possibilities within the field of board game theme's, mechanics and possibly design.
A secondary goal of this session is to gain an insight into each other's creative abilities and to engage in creative development to improve conceptual thinking.

Phases of the brainstorm

Phase one: Problem phase

Is it clear to everyone what the problem (and therefore goal) of this brainstorm is?

Phase two: Idea phase

This is where the brainstorm begins. This is where a limited amount of information gets transformed into an unlimited amount of ideas by diverging. These ideas don't have to be in the form of concepts, but could be in abstract words or terms or drawings.

Phase three: Evaluation phase

In this phase we take a look at the outcomes of the brainstorm and try to converge. Double ideas get taken out and we try to find clusters of outcomes that fit the same 'category'.

Phase four: Selection phase

We look at the results from the third phase and select ideas that we like (most importantly though we pick the ones that fit the criteria).

Rules

- Freewheel; take away all mental barriers and try to never limit yourself.
- Quantity over quality; just come up with as many ideas as possible and not just the ones you think are good.
- Inspire yourself; look at what the others are doing or what happens around you, your first impression of things often leads to new ideas.
- Never judge; never ever ever shoot someone's ideas down or do something else to block their creativity.
- Write everything down; everything that comes to mind is appropriate.
- Think outside the box; don't get stuck on what you know, don't think in patterns

Rounds of the brainstorm

Round one: Theme
Time: 20 mins (15 brainstorm, 5 evaluate)

Round two: Mechanics
Time: 20 mins (15 brainstorm, 5 evaluate)

Round three: Design?
Time: 20 mins (15 brainstorm, 5 evaluate)

Repeat when necessary.

Finish off by discussion and selection

Toolkit

Paper
A1 paper
Markers
Post-its

Process

The entire project team was participating in the brainstorm that took place on 21 September. The primary goal of this session was to challenge ourselves creatively to come up with as many possible concepts that we can think of. A secondary goal of the session was to gain an insight into each other's creative abilities and to engage in creative development to improve conceptual thinking.

We decided to divide the session into four phases. During the first phase, we made sure everyone knew what the problem and the goals of the brainstorm were and we were all on the same page.

After this we started the second phase, where we started brainstorming. This is where a limited amount of information gets transformed into an unlimited amount of ideas by diverging. These ideas don't have to be in the form of concepts, but could be in abstract words or terms or drawings. We wrote and/or draw all of these ideas on post its and put them on a big A1 piece of paper.

This phase was divided into three round, all of which had a different focus point. During the first round, we tried to focus on (but not completely limit ourselves to) the theme of the game. During the second round, we focussed on mechanics and gameplay and during the third one we thought about the design.

During the third phase, which took place after every round, we went through an evaluation phase to see what everyone had written down and to put it up on the whiteboard under the

right categories (theme, mechanics, design). Because we tried not to completely limit ourselves, we ended up having some ideas outside of the category we were focussing on and we needed to evaluate in between rounds.

After, we begun to categorize more efficiently. We took out double ideas and we tried to cluster certain similar ideas. Out of these clusters, we decided which ideas we liked the most and chose three types of games we wanted to pursue, together with a wide variety of inspiration for themes and design.

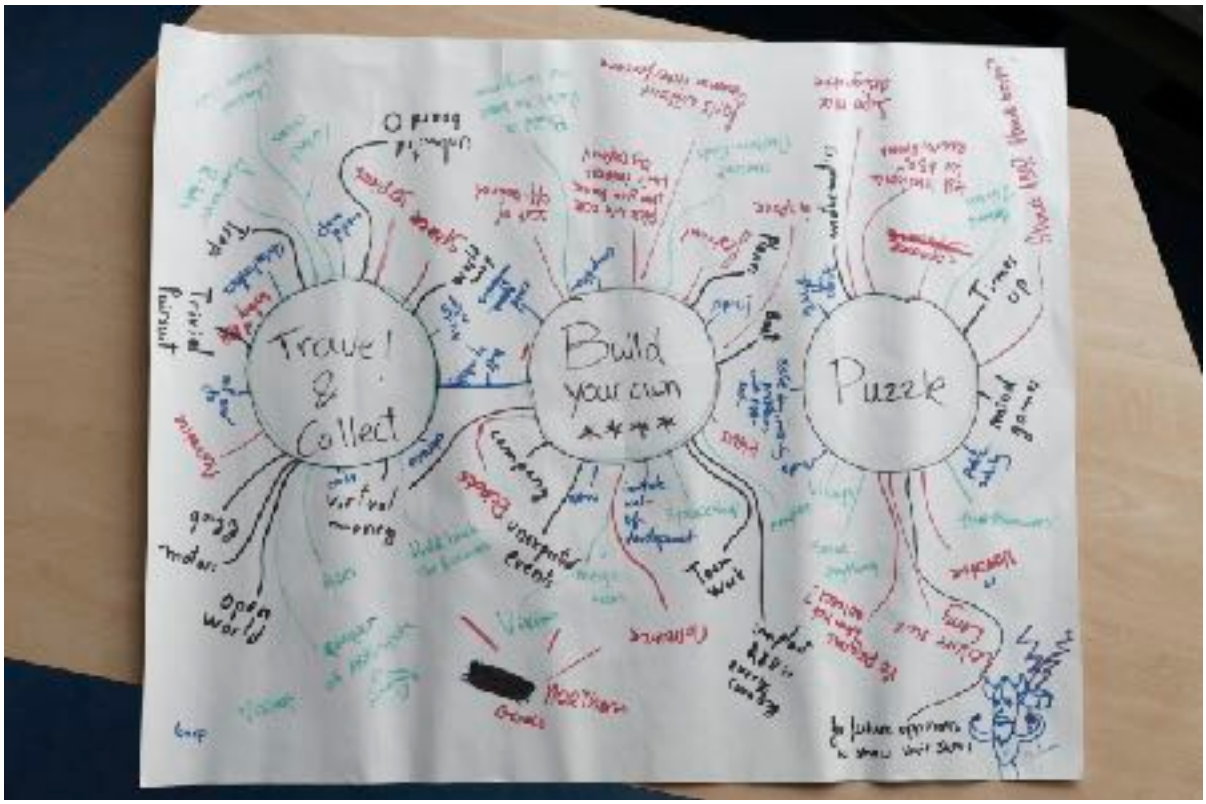
Conclusion

After the very tiring brainstorm session, we were able to take three general concepts to our concept phase for further brainstorming and development. These three concepts were:

- Travel & Collect
- Build your own something
- Puzzle

With these concepts in mind we could start developing more of the game and start figuring out more of the mechanics and design. When we would be done developing these concepts, we would present them to ABB.

Image 3.1



3.2 Three concepts

After our brainstorming session we figured out that there were three different general concepts we wanted to develop for our board game: Travel and collect, Build your own something, and Puzzle. In order to develop those concepts we did another brainstorming session, focusing on each concept, writing down everything which could possibly be in a board game with those themes. We came out with many ideas then we discussed about it in team, we listened to the one who had the idea and add comments, what can or cannot be done with this idea. After our discussion we had a result of three concepts and what we thought could be included in those concepts.

Concept A: Travel and Collect

- Open world
- World conquering
- No ending

Concept B: Build your own ****

- Off board experience
- Focusing on development
- Use materials

Concept C: Puzzle

- Quiz
- Barriers
- Showing off skills
- Discover information
- Minigames

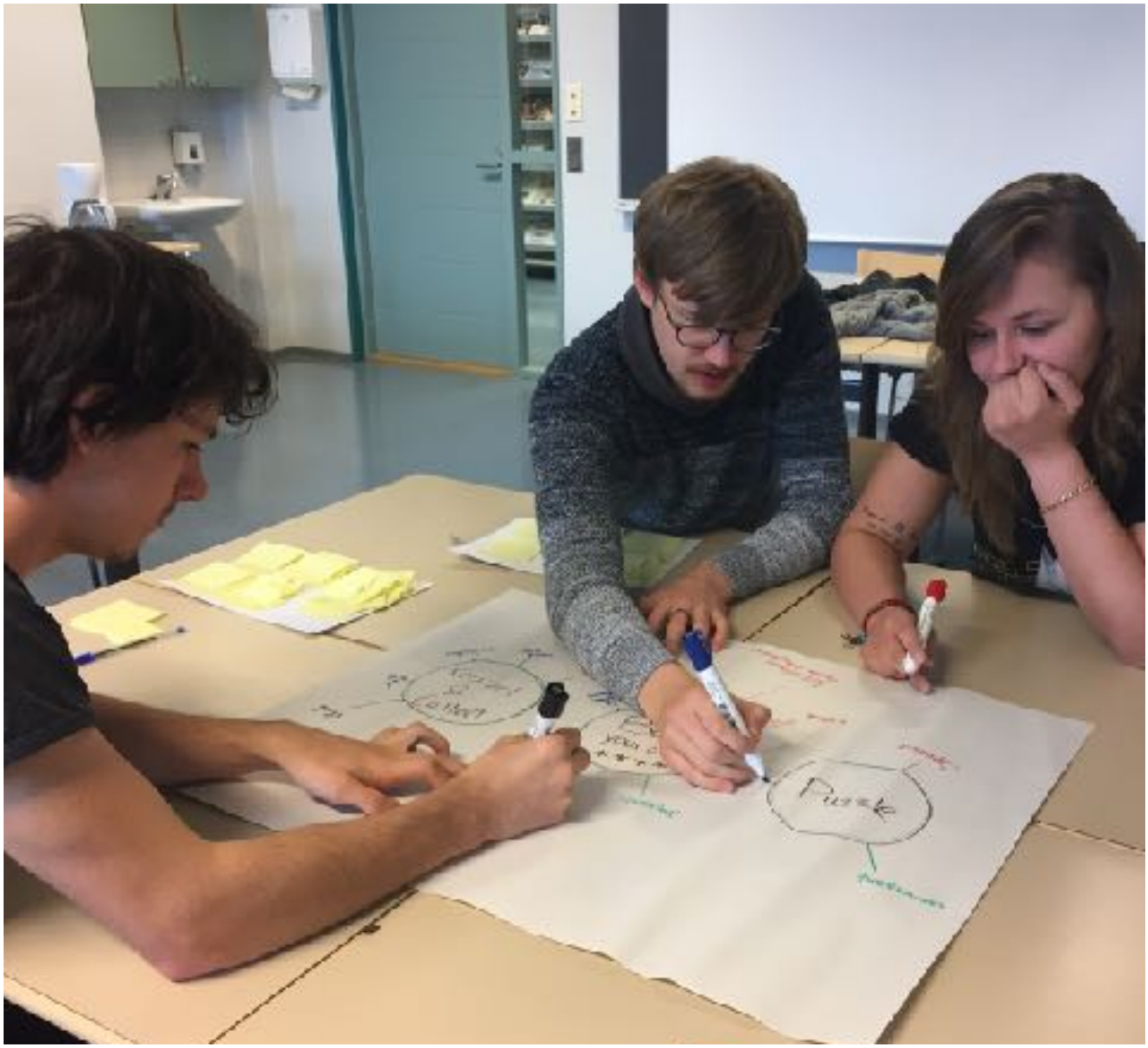
Then we developed those concept to be able to present them to ABB during a future meeting. We used the elements selected during the brainstorming to develop those. Firstly we focused on the development of one concept then another, but during the process we finally picked some ideas from one concept and added them into another to make them more interesting and because we really liked those ideas.

Our first concept was *Travel and collect*, we wanted the players to evolve in an open world map, to let them choose where they want to go. They have to move on the map to different location in order to collect objects on the map, we wanted to use a world map with ABB locations. In this game they have to collect objects in order to complete a set of ABB technologies, it's a game in which there is a competition between the players because the first player who reach his objective will win and it will be the end of the game.

The second concept was based more on the imagination and the creativity of the players, it was a *Build you own something*. We wanted the players to be able to choose to build something they are really interested in, it would made them a lot more focus and interested in the game and it would gave them a better and more memorable experience. In this game, the players would have to collect resources and trade with other players to develop their project, it's more a cooperative game because there is no losers and no winners, everyone has his own goal to reach and he has to think about how he can use ABB technologies to do his project.

And our last concept was *Puzzle*, in this game the players would have to cooperate within the time set at the beginning of the game, and they would have to go as far as possible in order to reach the end of the board. To do so the players would have to cooperate all together and resolve different mind games and small puzzles in which we could add ABB information. In this kind of game the players can show their skills and they can see that at ABB working in team is important.

Image 3.2



3.3 Two concepts

The most important part of a brainstorm session is to know what happens in the end. While making up hundreds of good ideas, what use is there when none of these ideas goes anywhere? We felt quite overwhelmed by the amount of ideas we have put into our first three concepts. Yet these three concept still remained vague and unspecified.
Working up to the future ABB-meeting, in which the ABB-representatives Heidi and Johanna would pay us a visit, we figured out it would be better to present two concepts instead of three. We didn't want to overwhelm them with too much information nor ideas, but rather with two highly recommended, worked out concepts that would fit their wishes.
Before we slimmed down we had another closer look at our current concepts.
The three concepts specify which route we want to take but are quite vague in context. All these concepts consist of the right objectives that meet our final product requirements such as educational, teamwork and personal development.

Having a look at our research conclusions it came to our attention that most of our interviewees prefer a strategic game as one of their favorites. We took this into consideration and decided to remove concept C, the puzzle concept, because concept A and B contain adjustable educational elements to make the game both strategic and informative with their own puzzle elements.
While we slimmed down our three concepts into two, the final two still remained unspecific. With the ABB-meeting coming our way, we've decided to look into a few other exciting games to provide us with inspiration into specifying our own ideas. We searched for games sharing the same objectives we want to put into our own game.

One of these games was *Pandemic*. A cooperative board game in which four diseases have broken out in the world. Each of these diseases threatens to wipe out a region on earth. The goal is to discover a cure for each of the four diseases while holding back their growing ratio. This can be achieved through the combined effort of all players. Each player contributes to the game through their own identical role containing their own special abilities to withhold the spread of each disease.
Because the game is both cooperative and strategic we have decided to use this board game as inspiration for concept A. The brainstorming started for Concept A in which we heavily discussed with each other which elements of *Pandemic* contributed to our product requirements and would make up a great cooperative ABB-game. We used a few *Pandemic* elements to merge with our current game elements for concept A, such as the cooperative element in which each identical role player works together with others to fight a world threat. Hereafter we worked out the key elements and goals of the game to make it more suitable for ABB and her target group. We named this concept ABBlackout due to the outages in the world that ABB is going to solve. A detailed description of Concept A can be viewed below.

Concept A: ABBlackout

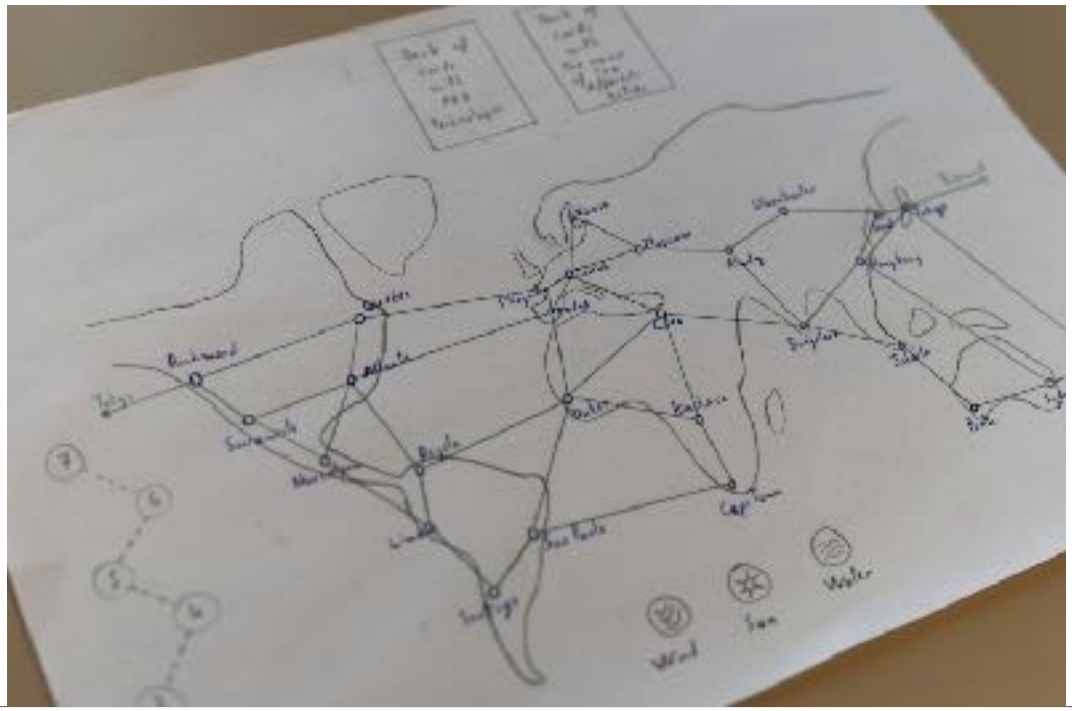
Mechanics

- All players are ABB specialists in different field with the same objective; save the world from an energy outage;
- There are four different energy sources that need fixing before the outages turn into blackouts (wind, solar, water, thermal for example);
- When all the sources in a city are gone, there's a blackout;
- On the board there's a blackout level. Every time a blackout occurs, the blackout level goes up. Once it reaches level 8, the players lose;
- Each turn a player can use up to four different actions to travel between cities, treat failures or discover solutions;
- ABB Engineering Labs are spread across the board, here you can find researchers than can offer you a solution for the outages if you play the right cards;
- Players must play strategically, using their individual roles to fight the outages together;
- All players start together in Zürich, there is no fixed ending point.

Hardware

- Role cards decide what roles, and therefore abilities, each player has and are given at the beginning of the game;
- Blackout cards are spread over the deck and accelerate the process of the global blackout;
- Normal cards control the 'normal' spread of the blackout by drawing cards with locations that will then suffer outages ;

Image 3.3



- The board shows all the locations and keeps track of the amount of outages in each of the cities.

As concept A was specified, it would leave us to concept B. We really appreciated a Travel and collect idea but also felt the need for a game in which the player has to develop his own project. Because concept A emerged into a travel and collect game, it would leave us to develop concept B into a build-your-own game. As specified in the formal B concept, the game has to be about developing your own machine, product, surrounding while collecting the appropriate material to realize it. This concept has a less cooperative focus but embraces the personal development of the player. Which is a key factor within ABB. Furthermore about the process of the concept, it was created without any further inspiration of other games. We were quite certain of the personal-developing focus within the game that we had to generate a concept which could target this element. The focus was set, which would only leave us to making the build-your-own game more concrete. This went in a process of discussing and writing down the key factors we needed for this concept to embrace the personal development in the game. Moreover we named the concept ABBuild It because it embraces the build factor while the focus is on ABB. A detailed description of the concept can be found below.

Concept B: ABBuild It

Mechanics

- Individually chosen, secret objectives;
- Can only use ABB resources to build your objective;
- Every location has its own branch with its own type of resources;
- If locations are connected, you can move from one to another every turn but get less resources or less variety in resources;
- If locations are not connected, it takes a X-amount of turns to get there but you get more and more rare resources. These resources are limited;
- The amount of turn is decided by different time zones shown on the board;
- If you reach a company, its resources are presented to the player and you can choose what to use;
- If other players are at a connected location, trading is allowed;
- Players take turns doing actions.

Hardware

- Cards decide whether you get a short cut through the board, gain resources or lose resources;
- The resources per location are shown on cards;
- The board shows where the players are and what their options are when it comes to locations.

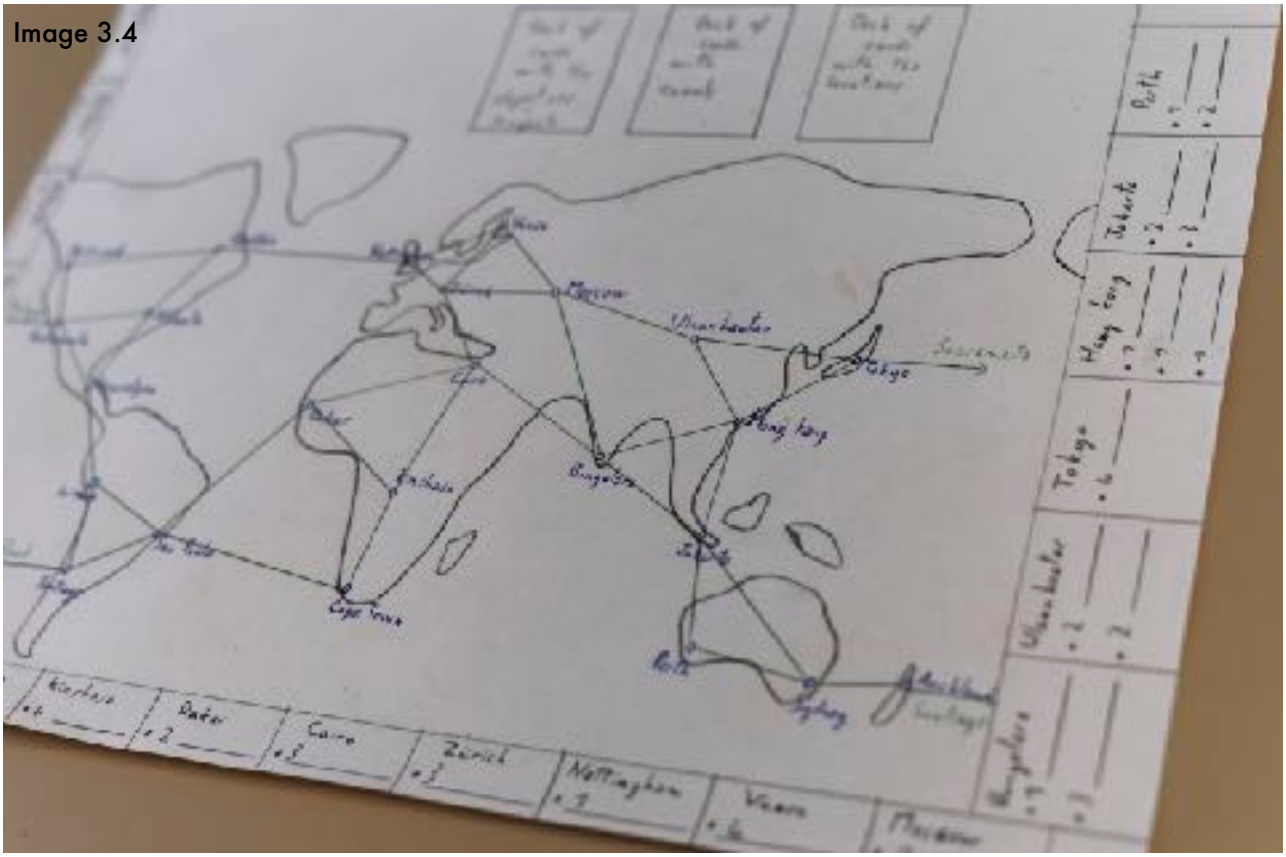


Image 3.4

As the concepts were finalized, the next focus would be preparing the ABB-meeting with Heidi and Johanna. The focus of the meeting is to elaborate on the process we have made so far and, most importantly, describe the final two concepts, as well as delivering any remarks regarding the concepts or project related subjects in general.

3.4 One concept

One of the challenging parts during the creative phase is deciding on the final idea that is going to form the foundation of the project, the concept to rule them all. In order to finalize the concept we organized a meeting with ABB to talk about the progress we have made, the concepts we generated, to ask questions and make any last remarks known. However, the most important part of the meeting was to involve our client into our project process. In addition to the meeting, we prepared a set of key-points for the presentation, building up to the most important subject: the concepts. The sheets of the presentation can be viewed on the next pages.

Agenda items

- Design Principles
- Research phase
- Creative phase
- Concepts
- Discussion
- Question time
- Additions

ABB

Design principles

Research phase

- Desk research
  - Game mechanics
  - Findings
- Interviews
  - Short questionnaire
  - Findings

ABB

Desk research findings

Gamification theory

In-game mechanics

Game design process

Winning mechanics

ABB

Interview findirgs

Opportunities for promotion and financial stability

Open mindedness and influence

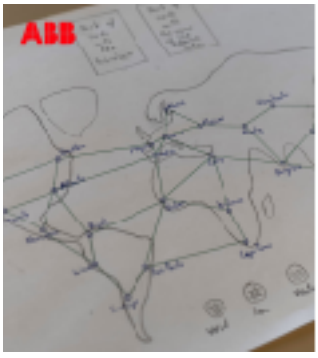
Importance and individuality

Colleagues and extra activities

ABB

Concept 1 - ABBuild it

- World map
- Individual win
- ABB-technologies
- Collect ABB-resources
- Chosen personal objective
- Trading
- Game duration: 30 - 60 min



Concept 2 - ABBlackout

- Word map
- Cooperative win
- Fight energy outages
- Individual abilities
- Use ABB techs to save the world
- Game duration: 30 - 60 min

ABB

ANY ADDITIONS?

At first we described our design principles which form the core foundation of our project. Design principles form the fundamental goals of the overall project on which decisions can be based on. We made the design principles based on the Look & Listen phase and the conclusion of the research results. These principles are our guiding lights throughout the project and keep every piece of work moving towards the end-product. Together they ensure a level of quality the employer demands. The following principles will be applied to the board game for ABB.

Engaging

The game needs to be attractive and pleasing so it can hold the player's attention. This will result in a more immersive gaming experience overall and will make the game interesting and engaging and therefore, make the information about ABB more memorable.

Simple

The game mechanics must be simplified to ensure that everyone understands the game in order to be able to win, but have to be hard enough so students won't get bored quickly. These is no need for too much complexness since this will make the game harder to learn and play. The rules have to be understandable for everyone and be pretty self-explanatory.

Educational

The game must contain educational value. Through interactive and informative gameplay, the students gain knowledge about ABB and her many specializations. Besides that, the educational part of the game should also be fun and challenging.

After the design principles, we elaborated on our research phase, our findings and how it benefited us in the creative phase. We finally arrived at the concepts part and described each of them and how they both contribute in in our goal achievement.

Furthermore about the process of the meeting, we moved onto the discussion part in order to discuss the concepts and decide which of the two are most suitable for ABB's preferences. The ABB-representatives asked a lot or questions regarding the game mechanics in both concepts and showed great interest in each of them. However, a concept had to be chosen so decisions had to be made. Before we go into that, the following list shows a brief summary of points the representatives were highly positive about regarding each concept.

Concept A: ABBlackout

- Cooperative gameplay
- Role playing

Concept B: ABBuild It

- Developing individual skills
- Personal achievements

However, despite their positiveness over both concepts, the representatives showed their preferences for concept A: ABBlackout. According to the representatives concept A has a more mutual overlap with their requirements mostly due to the cooperative gameplay within the concept. Furthermore, they believe this game mechanic brings players together and at the same time makes them feel useful in their own way because of their individual roles, an aspect in which personal development could be perfectly enrolled in. Other than that, they have an overall more positive feeling about concept A for unknown reasons.

At the end of the meeting we gave Johanna and Heidi a handout to take home with them, which existed out of the interview results and the concept overviews. This handout contained all the information from the interview and the conclusions we had drawn from them.

3.5 ABB Handout

This is the handout we gave to ABB after our meeting, the content largely overlaps with the research and interview analyzing outlined before.

Research questions & goals

Who is the average student in the target audience?

> Most of the target audience we've interviewed fit a specific profile. They were in their early to mid twenties and primarily male. Most of them are studying to become engineers in fields like electronics, automation and machine production.
> Those who have already done an internship, have done this with a company that offers projects or assignments that include subjects that are relevant in their field of study. The ones who hadn't yet done an internship are still unsure what company they want to do this with.

What do the students know about ABB?

> When we mentioned ABB, people showed a lot of signs of recognition. This is not strange, considering the size of the ABB branch in Vaasa. While they knew the company and knew some basic information, we noticed only a few students had

more knowledge about the company and knew how diverse ABB really is and the possibilities that this diversity brings along.

Still the vast majority of them would be interested in working at ABB and they all seemed interested to gain more knowledge about the company. This is a good foundation for the board game, because now we know the interest already exists. We just have to provide information and make sure that they don't lose their enthusiasm.

What do the students look for in a future employer?

The answers to this question were diverse and very useful. There were several answers that shared some similarity, which we'll discuss here.

Opportunities for promotion and financial stability

This is a very logical and understandable answer. Pretty much anyone who starts a new job wants to be able to grow within the company and get the promotions that this growth involves. They want to be able to get rewarded (in this case, financially) if they rise above the other employees and do excellent work.

Open mindedness and influence

The students seemed to find it very important that they could practice some form of influence over projects or solutions and wanted to work for a company that has an open mind about these things. Long story short; they want to be able to express themselves and be heard. This answer goes very nicely with the next answer we received.

Importance and individuality

They want to be treated as individuals and feel like the work that they do is important. No one wants to be a number in a big company, and it's quite natural to feel, in a company as big as ABB, intimidated by the amount of employees. In order to work around this, we have to emphasize the opportunity to express individuality that ABB offers.

Colleagues and extra activities

They want to work in an environment that offers the possibility for outside of work activities, or at least the possibility to organize these themselves. They want to be able to work closely together with their colleagues.

What are their favorite board games?

The first answer we got was usually the classic Monopoly. A lot of students didn't seem to have a favorite board game and didn't play board games often. We did notice that strategy-based games and card games were mentioned a lot.

How do we make students remember ABB even after the board game has finished?

It's hard to answer this question, since we're not sure what form the board game is going to take yet and we don't have time to properly research different methods and conclude on the best one before we start the concept phase. We can, of course, give our own opinions and share some of our knowledge, since we're a part of the target audience ourselves.

Interaction with information

We all agree that drily receiving information is not enough to make us remember it. If we're able to interact with the information, for example by having to apply it in a simulated situation, we're much more prone to remember information.

Visualizing

It's been proven endlessly that visualizing information makes it easier for us to interpret and remember. If we can see what is meant by something, or we get a visual that we can connect to a word of definition, we're more likely to absorb the information.

Interesting

It's quite obvious that we react more to, and remember more of the subjects we find interesting. If we can create such a subject (or even better; let the students create this themselves), we can assume that the students will remember more of the information given and the company over all.

In conclusion

Our target audience fits a specific profile; mostly men in their early to mid twenties. Most of them have done an internship at a company in a field that matches their field of study. The ones who haven't done an internship yet, don't know where to do this yet, but do have some demands of the future companies they want to work at. The most common ones were opportunities for promotions and financial stability, open mindedness and influence, importance and individuality and colleagues and extra activities.

They know what ABB is but have a little unclarity about what ABB does. They are interested in learning about what ABB can do for them and gaining some more general knowledge about the company.

Board game wise, they are not very familiar with a lot of diverse board games. The first board game that came to mind most of the time was Monopoly. They also seemed to like strategy-based games and card games.

In our own experience, we need to be focused on interaction with information, visualizing information and making it interesting to ensure that the players remember ABB even after the game is finished.

3.6 Conclusion and transfer create concepts phase

After the rather dry part of research the team plunged straight into the creative process and didn't want to limit themselves. In this process we came up with a huge amount of ideas, mechanics and gameplay-strategies we slowly boiled down to the core concepts we'd like to follow and implement into the board game. These culminated in our presentation of the final two conceptual game ideas to ABB representatives, who picked and gave valuable feedback on our ideas and progress. For us »imagine« was the keyword of this phase, to put out as much creative content as possible, which the team can now refine to a clearer concept.

4. Brainstorm two

Introduction

After our meeting with ABB, we selected the concept they found the most interesting, ABBlackout. We wanted to do a new brainstorming session in order to write down all our ideas about the game. We were inspired by the game *Pandemic* for the concept we choose, but we didn't look more into the game mechanics before the brainstorming because we didn't want to stay focused on this game. We also didn't focus on the match up we could possibly do with our ideas because we didn't want to be limited by something.

Process

We divided our ideas into 2 categories during the brainstorming, "How it works?" and "How it looks?", then we had a third category later with more general things we would like to include in our game. We came out with many different ideas, good or bad, then we looked at every idea we had for each category to see if we could add it to our game. The one who propose the idea developed his proposition and then we discussed what could be the advantages or disadvantages. With this method we were able to listen to everyone propositions and it makes us thinking about new ideas we can add.

At the end of the session we came up with a list for each category of the things we think could be good in our game.

How it works?

It corresponds to the mechanics and the gameplay we would like to include in our board game. We want our game to be playful, interesting and easy to understand.

- Time zones
- Travelling
- Fixed / hidden research centers
- Hints
- Random events
- Fast and slow solutions
- Cards
- Variety in roles
- Trading cards
- Limited number of action per turn
- Different energy outbreaks
- Realistic energy type in the cities

How it looks?

Here the team thought about what could be the aesthetic of our board game, we want our game to look like an ABB board game. It has to be attractive for the people who will play with.

- ABB style
- Cubes / Hemispheres
- Soft information on city cards
- Minimalistic
- World map with ABB locations
- Badges
- Industrial looking

General ideas

The general information and way of thinking we would like to include in the game.

- Cooperative gameplay
- Replace ability
- Finland / Vaasa / Helsinki
- ABB roles
- ABB technologies
- Small box

Conclusion

After a long session of brainstorming the team had many ideas we would like to include in our board game, all those ideas would make the game really interesting but we also have to make it playful, fast and easy to understand so we can't incorporate too many of those ideas in our board game. We will have to choose the most interesting ones and develop them in the way we want.

Image 4.

4.1 Concept details

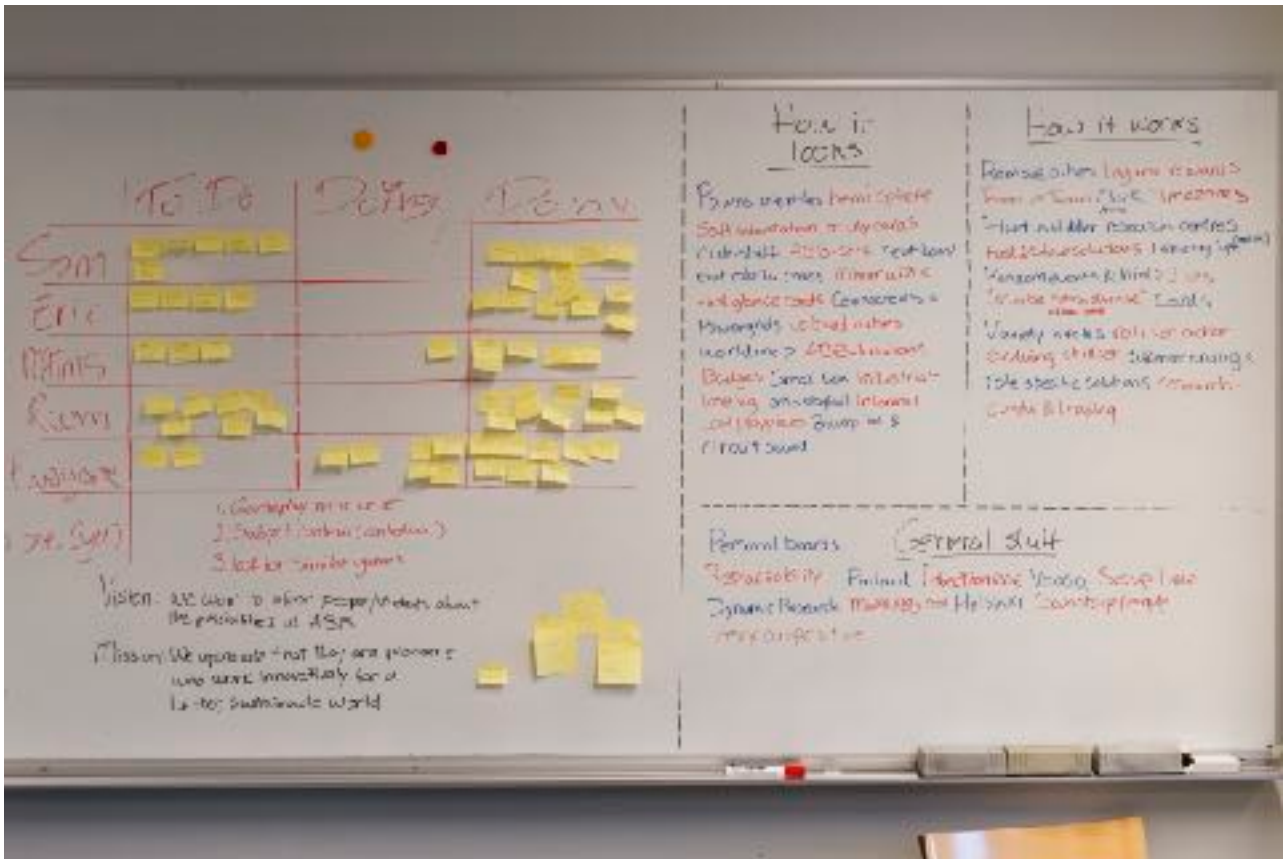
We are now developing our concept by adding more details. We had so many different possibilities after our brainstorming session so we started to detail the proceedings of one game. We did it a few times but there are endless possibilities so we decided to detail one game and to make it touchable and playable and then to add, remove or change some parts.
We have the proceeding of a game from the setup of the board to the end by losing or winning the game.

1. Setup the game
   a. Choose randomly which cities have the first outages and place the cubes on the board
   b. Pick a role randomly and put your pawn on the starting location
   c. Every player draws 4 cards
2. Define who starts first
3. Player's turn
   d. Draw a card
   e. Roll a dice to determine how many actions you will have
   f. Chose the actions you will do
      - Travel
      - Trade cards with other player
      - Provide energy for one city (it won't be definitive)
      - Do some researches
      - Find the solution against the outages
4. The outages spread to new cities
5. Repeat step 3 and 4 until the end of the game
   g. The team wins if:
      - You find a solution for the outages and you provide enough energy too every cities problem
   h. The team loses if:
      - There are too many blackouts (yet to be defined)
      - The team runs out of cards
      - The team runs out of time

After this we started defining the roles, every roles will have different abilities, making the game more cooperative. You will be able to end the game even if some roles are missing but cooperate with people with different abilities will make the game easier and more enjoyable. We would like to make those roles unique with a possibility of evolution, players could get new skills after a certain number of turns or after some actions, and it can show to the possibilities of promotion at ABB.

We want to use roles that illustrate the different professions at ABB like engineers, researchers, manager, businessman, workers… And give them abilities in relations with their work at ABB, to show that everyone in the ABB Company have an important role.

Image 4.1



4.2 Plan for testing

We intend to test our game once the prototype is finished through play-testing, one of the most crucial stages within our project. In this stage we get to see our game life in action and played by the project members but also by people who have no clue of the game whatsoever. This phase determines how well our game works and most importantly though, if it is engaging.

Personal testing

Once our prototype is build there will be a several amount of play rounds to test the game by our own project members, without bringing any new other players into the rounds. We chose this method because this allows us to work out any small bugs or failures we discover throughout the testing rounds. It also gives us a better understanding of how our own game works. This part will be a loop of testing, discover failures, bugs or other remarks and work out our test findings in a new prototype, this method will be repeated until desired results are achieved(in this case the desired results of our client). In a brief way this can be described as iteration and implementation of the board game. The amount of testing rounds will be decided upon achievement of desired results.
However, we have to keep in mind that regardless of the opinions and insights we gain from the game at this point, our opinion and insights are mostly affected by the time we spend developing this game. As result of that, we might try to unconsciously justify feelings and expectations that might not be there. Testing on our own is not harmful to the development of the game in any way, as long as we not forget to test the game on actual players as well.

Public testing

Once the game has been through an amount of iterations and implementations through personal testing, it is time to open the doors to public testing. In this part within the testing phase we aim on having our game tested by as much people as possible to gain different insights and test results. Testing a board game can be very similar to testing an online game. Before we begin testing, we have to make sure the environment is set. Secondly, to have the game set up ready, before we can invite anybody into the test environment. Lastly, we have to make sure an easy explanation of the game play is available to the players, desirable in the style of a pocketbook.
To determine if the rule book consists of an understandable explanation of the game the test phase must also contain several test rounds in which players figure the game out themselves. This shows how easy understandable the rules are and how well written the book is.

Keep record of the sessions

While thoroughly testing we have to keep record of everything that happens while the game is being played. Depending of the kind of testing role each of us will take, some of us have to stay low and take notes using a laptop to not miss on any crucial detail while the game takes place.
The notes will be as detailed as possible so we not miss on any contextual information or meaning in which the content of the note took place. Furthermore, we will record the duration of each test round and how long the game as a whole takes. If a game takes two hours but is supposed to last one hour, then we have to find out what holds up the game.
As the roles within the test team are decided, the test leader has to explain everything to the participants while the observers take notes of the whole testing phase. It is very important to note that nobody of the test team get's in the way of the participants. At the beginning the test leader makes known to participants to say any opinions or questions out loud, so the observants can take note of that. This prevents constantly interrupting the participants to ask if they have any remarks regarding the game.
During the ideal test phase we want to stimulate the participants as much as possible. We want to make sure they tell us which rules, aspects, mechanics within the game they don't understand and, most importantly, why they don't understand it and how they continued after. This helps us rewrite the rules more effectively and determine any flaws in the game and rule book.

Evaluation

Finally, every play round will be ended with a short questionnaire or discussion to attain opinions, tips, flaws from our participants and, most importantly, what they think of the game. In this part we aim for enhancing our greater understanding of the game and of everything that happened during the play rounds. As mentioned before we would like to set up a short questionnaire in the end, combined with the discussion to not miss on any kind of information.
The questionnaire will contain the following questions (which will be available for any modifications):

- What was your favorite part of the game?
- What was your least-favorite part of the game?
- Which part didn't you understand or found difficult?
- Which part did you find too easy?
- Is there a part of the game you would adjust?
    - If yes, which one and how?
- If you could describe the game in one word, what would that be?
- Was the game too long? Too short?

- Did you find the game fun and engaging?
- Did you learn anything from playing the game?
- Would you play the game again?

4.3 Benchmark

Introduction

We noticed we had some issues implementing new mechanics and decided we wanted to get some inspiration from existing games that already passed the playability test. We knew it was late in the process but we had already done some research on a certain genre of games to get inspired for ABBlackout. This time, while looking into the games, we focused on several things.

- Objectives
- Players and playtime
- Similarities between the game and the current version of ABBlackout
- Differences between the game and the current version of ABBlackout
- Mechanics we like and would consider implementing

The categories we focussed most on were of course the differences and mechanics we liked. Like most raw research material, it's written informally.

Ghost Stories

https://boardgamegeek.com/boardgame/37046/ghost-stories

Objective

> Ghost Stories is a cooperative game in which the players protect the village from incarnations of the lord of hell – Wu-Feng – and his legions of ghosts before they haunt a town and recover the ashes that will allow him to return to life. Each Player represents a Taoist monk working together with the others to fight off waves of ghosts.

60 min playtime
1-4 players

Similarities

- Cooperative gameplay and winning mechanic
- Every turn/round there's a new wave of ghosts (energy outage) that you have to fight
- You can go to a tile and get rid of a ghosts

- You lose when you don’t have enough cards left to draw and the problem isn’t solved yet

Differences

- All ghosts have different abilities instead of the monks
- You lose when there’s three ghosts on a certain city
- You can play so that ghosts go from one place to another
- To exorcise a ghost, the Taoist rolls three Tao dice with different colors: red, blue, green, yellow, black, and white. If the result of the roll matches the color(s) of the ghost or incarnation of Wu-Feng, the exorcism succeeds. The white result is a wild color that can be used as any color.
- Your character can die and be revived.

Mechanics we might want

- A ghost can make you roll a ‘cursed’ dice which gives you a random bad effect. Awesome.
- Different tiles (cities in our case) can have different effects or abilities as well, which might be sabotaged by the ghosts. For example, if you go to the cemetery you can revive dead monks.
- Special dices
- Tokens that help you get items or abilities you can’t roll yourself

Castle Panic

https://boardgamegeek.com/boardgame/43443/castle-panic

Objective

> The forest is filled with all sorts of monsters. They watched and waited as you built your castle and trained your soldiers, but now they've gathered their army and are marching out of the woods. Can you work with your friends to defend your castle against the horde, or will the monsters tear down your walls and destroy the precious castle towers? You will all win or lose together, but in the end only one player will be declared the Master Slayer!

60 min playtime
1-6 players

Similarities

- Monsters come in waves and your team has to defend your castle.
- You can trade cards.

- Requires strategic thinking.

Differences

- Cooperative play but an individual win (most victory points) so you gotta balance helping the group and winning by yourself.

Mechanics we might want

- Nothing new, really. Just basic tower defense.

Pandemic

https://boardgamegeek.com/boardgame/30549/pandemic

Objective

> In Pandemic, several virulent diseases have broken out simultaneously all over the world! The players are disease-fighting specialists whose mission is to treat disease hotspots while researching cures for each of four plagues before they get out of hand.

45 min
2-4 players

Similarities

- Cooperative gameplay and winning mechanic
- Every turn/round there's a new wave of disease
- Trading cards
- Curing cities to keep them from being infected
- Meter for spreading of diseases
- Crisis level
- Everyone has special abilities

Differences

- Lose by running out of cards
- Action cards
- No good event cards
- City cards
- Crisis level is random because you have to draw a card

Cool mechanics we might want

- This game is very similar to ABBlackout but a little too uneventful. We have definitely taken inspiration from Pandemic, but changed a lot of things. The objectives are very similar but the gameplay and player experience has changed a lot.

Space Alert

https://boardgamegeek.com/boardgame/38453/space-alert

Objective

> Space Alert is a cooperative team survival game. Players become crew members of a small spaceship scanning dangerous sectors of galaxy. The missions last just 10 real-time minutes (hyperspace jump, sector scan, hyperspace jump back) and the only task the players have is to protect their ship.
> During play, the central computer will announce the presence of various threats on one the supplied 10 minute soundtracks that also acts as a game timer. The threats vary from space battleships and interceptors to different interstellar monsters and abominations, asteroids or even intruders and malfunctions on the spaceship. Players have to agree who will take care of which task and coordinate their actions (moving around the ship, firing weapons, distributing energy, using battlebots to deal with intruders, launching guided missiles, etc.) in real time to defend the ship. Only a well-working team can survive 10 minutes and make the jump back to safety.

30 min playtime
1-5 players

Similarities

- Defend your things and fight enemies
- Cooperative survival game
- Discuss tasks and actions together for everyone, help each other.

Differences

- Missions lasts 10 mins, so 30 min playtime with setup and evaluation
- Pick your own roles within the team
- Soundtrack
- A central computer that narrates the game
- Different kind of threats
- In real time

Mechanics we might want

- All of the above. The time limitation is a good thing to think about, as well as the idea of picking your own roles and discussing tasks for everyone. Also there's a wide variety of actions you can do in real time.

Shadows over Camelot

https://boardgamegeek.com/boardgame/15062/shadows-over-camelot

Objective

Each player represents a knight of the Round Table and they must collaborate to overcome a number of quests, ranging from defeating the Black Knight to the search for the Holy Grail. Completed quests place white swords on the Round Table; failed quests add black swords and/or siege engines around Camelot. The knights are trying to build a majority of white swords on the Table before Camelot falls.

60-80 min playtime
3-7 players

Similarities

- Players do actions in every turn, with a good variety of options (including evil actions)
- Save the thing by doing the thing and stuff.

Differences

- I think the other players don't know what cards you draw? At least there's an option not to show.
- Players must also choose one of three evil actions, each of which will bring Camelot closer to defeat. Moreover, one of the knights may be a traitor, pretending to be a loyal member of the party but secretly hindering his fellow knights in subtle ways, biding his time, waiting to strike at the worst possible moment.

Cool stuff we might want

- The option for quiet sabotage; very cool. Maybe the players don't know each other tho and then it's weird and difficult to add.
- Also in all of these a recurring theme is like sub-missions within the big mission of protecting or saving something or fighting off baddies.

Arkham Horror

https://boardgamegeek.com/boardgame/15987/arkham-horror

Objective

Arkham Horror is a cooperative adventure game themed around H.P Lovecraft's Cthulhu Mythos. Players choose from 16 Investigators and take to the streets of Arkham. Before the game, one of the eight Ancient Ones is chosen and it's up to the Investigators to prevent it from breaking into our world. During the course of the game, players will upgrade their characters by acquiring skills, allies, items, weapons, and spells. It's up to the players to clean out the streets of Arkham by

fighting many different types of monsters, but their main goal is to close portals to other dimensions that are opening up around town. With too many portals open the Ancient One awakens and the players only have one last chance to save the world. Defeat the Ancient One in combat!

120-240 min playtime
1-8 players

Similarities

- Cooperative thing to defeat the thing
- Side missions to fight monsters (remove outages) but don't lose track of the big mission to make sure the enemy doesn't enter the world by closing portals (research centers?)

Differences

- Picking own roles out of super big pile of roles
- Random enemy – draw/pick 1 out of 8
- Upgrade your character with skills and allies

Cool mechanics we might want

- Looks pretty cool overall actually. Too long but the idea of picking a perfect team for a certain enemy is very awesome. Also they did implement the upgrading your character part, so that might work?

Red November

https://boardgamegeek.com/boardgame/36946/red-november

Objective

Red November is a cooperative game in a gnomish attack submarine where everything is going wrong. The sub is descending and the water pressure increasing, the nuclear reactor is overheating, the nuclear missile launchers are pre-igniting, fires and water leaks are everywhere, there's a giant Kraken looming nearby and there's very little oxygen and vodka left. While the storyline feels more and more like a disaster movie, the players must get organized to solve the problems, divide the tasks among themselves to minimize the risks, and sometimes accept to sacrifice themselves for the common cause.

60-120 min playtime
1-8 players

Similarities

- Has the same ‘panicky’ everything is filling up with water and we have no time oh god oh god oh god feel as ABBlackout.
- 3 different kinds of problems you need to fix, if one of them gets too bad you lose
- Random emergencies can occur, like epidemics
- Events will happen after every turn

Differences

- Time is a factor; if you spend more time on fixing something the results will be better – though when you spend more time on something, there will be more events (making the situation worse) after every turn.
- Instead of dividing your 4 actions the way you want, during a turn a player can only 1) move to a place and 2) do a thing there.

Cool mechanics we might want

- Nah it’s almost exactly like we have only their cards and actions are different. The time thing is pretty interesting though, you have to decide whether or not to aim for better results and risk getting screwed over in the end.

Last Night on Earth: The Zombie Game

https://boardgamegeek.com/boardgame/29368/last-night-earth-zombie-game

Objective

> Last Night on Earth, The Zombie Game is a survival horror board game that pits small-town Heroes head-to-head against a horde of Zombies. A team of four heroes is chosen by one set of players, and the Zombies are controlled by 1 or 2 players. Each hero has its own special abilities. The board is modular, which changes the layout of the town and start positions of each hero. The game comes with several scenarios, which include simple survival, rescue, or escape. Differing combinations of heroes, scenarios, and board configurations offer a lot of replayability.

90 min playtime
2-6 players

Similarities

- Similar yet different; 4 players cooperate to win, 2 players cooperate to destroy everything
- Everyone has special roles with abilities
- Both the zombie deck and the hero deck have lucky cards that give you advantages

Differences

- You can change the way the board looks! Very cool.
- Heroes have weapon cards

Cool mechanics we might want

- Having the enemy controlled by players is sick. How awesome would it be if there was a player in ABBlackout just wrecking all the power supplies?!
- Also, not having a fixed board is awesome.

Shadow Hunters

https://boardgamegeek.com/boardgame/24068/shadow-hunters

Objective

> Shadow Hunters is a survival board game set in a devil-filled forest in which three groups of characters – the Shadows, creatures of the night; the Hunters, humans who try to destroy supernatural creatures; and the Neutrals, civilians caught in the middle of this ancient battle – struggle against each other to survive.
> You belong to one of these groups and must conceal your identity from others since you don't know whom you can trust – at least not initially. Over time, though, someone might decipher who you are through your actions or through Hermit cards, or you might even reveal yourself to use your special ability.
> The key to victory is to identify your allies and enemies early because once your identity is revealed, your enemies will attack with impunity using their special abilities like Demolish, Teleport, and Suck Blood or their equipment cards such as the Rusty Broad Ax or Fortune Brooch. This ancient battle comes to a head and only one group will stand victorious – or a civilian, in the right circumstances, might claim victory.

45 min playtime
4-8 players

Similarities

- Special roles with special abilities

Differences

- 3 types of roles you can be
- Hidden identity
- Not really cooperative

Cool mechanics we might want

- I just like the idea of having a hidden identity and therefore having an element of not trusting each other as much – but might not be appropriate for ABBlackout

Forbidden Island

https://boardgamegeek.com/boardgame/65244/forbidden-island

Objective

Forbidden Island is a visually stunning cooperative board game. Instead of winning by competing with other players like most games, everyone must work together to win the game. Players take turns moving their pawns around the 'island', which is built by arranging the many beautifully screen-printed tiles before play begins. As the game progresses, more and more island tiles sink, becoming unavailable, and the pace increases. Players use strategies to keep the island from sinking, while trying to collect treasures and items. As the water level rises, it gets more difficult- sacrifices must be made.

30 min playtime
2-4 players

Similarities

- Cooperative play and win
- Players with different roles and abilities
- Do something because everything goes wrong

Differences

- Super pretty game
- During the playing some locations become unavailable

Cool mechanics we might want

- I think this is pretty similar but the idea that you can reach less and less locations is interesting.

Lord of the Rings

https://boardgamegeek.com/boardgame/823/lord-rings

Objective

Lord of the Rings is a cooperative game where the objective is to destroy the Ring while surviving the corrupting influence of Sauron. Each player plays one of the Hobbits in the fellowship, each of which has a unique power. The game is played on a number of boards: the Master board indicates both the physical progress of the fellowship across Middle Earth and the corrupting influence of Sauron on the hobbits, and a number of scenario boards which detail the events and adventures of particular locations. Progression across the boards is determined by playing cards (many of which represent the characters and items of Middle Earth), and the

effects of corruption are represented by a special die. The game is lost if the ring-bearer is overcome by Sauron, or won if the ring is destroyed by throwing it into the volcanic fires of Mount Doom

60 min playtime
2-5 players

Similarities

- Roles, abilities, cooperative play and wins
- Cards and stuff

Differences

- Multiple boards -> multiple locations
- A dice decides how badly corrupted everything is and in how much trouble you are

Cool stuff we might want

- Multiple boards sound amazing.

Conclusion

At the end of the benchmark, we had a lot of mechanics we really liked and we had a better overview of the mechanics we could cut from ABBlackout. I think what we were most influenced by was the fact that a lot of the games were narration based in a way and focussed strongly on storytelling. We really want to implement this in the game to make it a more complete and immersive experience.

Another thing we really liked was the idea of time and it made us reconsider the way we found new energy sources. For a while we changed this mechanic into waiting for a whole turn while researching, but during play-testing we found out that this was difficult to understand for people who only played the game once. In the end we decided that the moment you start researching, your turn ends.

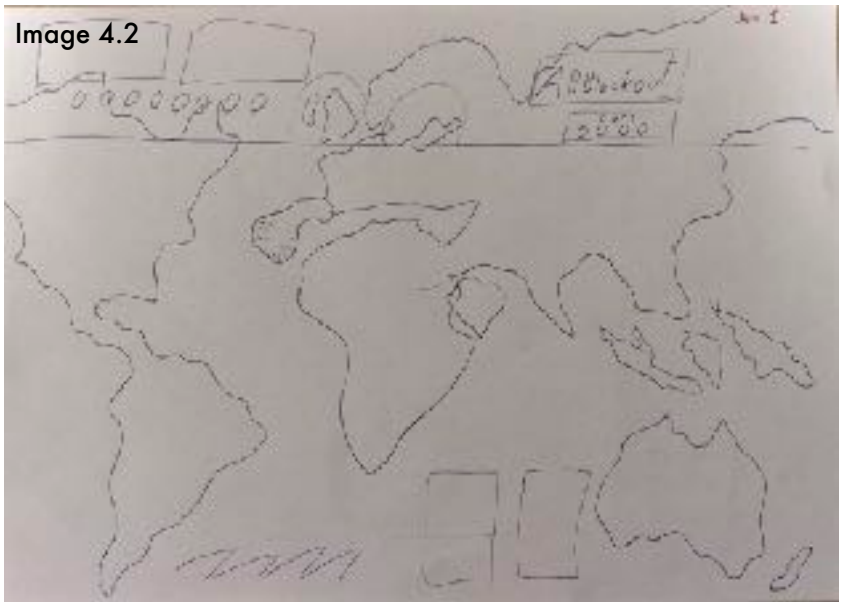
We based our current ‘bad events’ cards off the game *Ghost Stories*, which gave a new spin on the cards we had and gave us an opportunity to explore storytelling more.

4.4 Creating the board

We knew very quickly that we wanted to use a world map to show off the amount of locations ABB has. This was already implemented in all the concepts we visualized, but was not playable. Because the members of our team have a strong background in visual design and usability, we decided to draw several versions of our board. Some were very abstract and experimental, some were very detailed and concrete and showed some variation of locations for the mechanics. Below we will walk through the maps and explain what the idea behind the board was.

Board 1

Image 4.2



Above you can see the first board we drew based on the mechanics we wanted to add. We added room for the decks of cards, icons to show the new energy sources and the crisis level. It was very simple and the basis for all the designs we made after this.

Board 2

Above, in board two, you can see that we started to experiment with visual aspects of the game and started to slightly steer away from board one. First, we implemented the possible logo of the game and we changed the location of the mechanics.

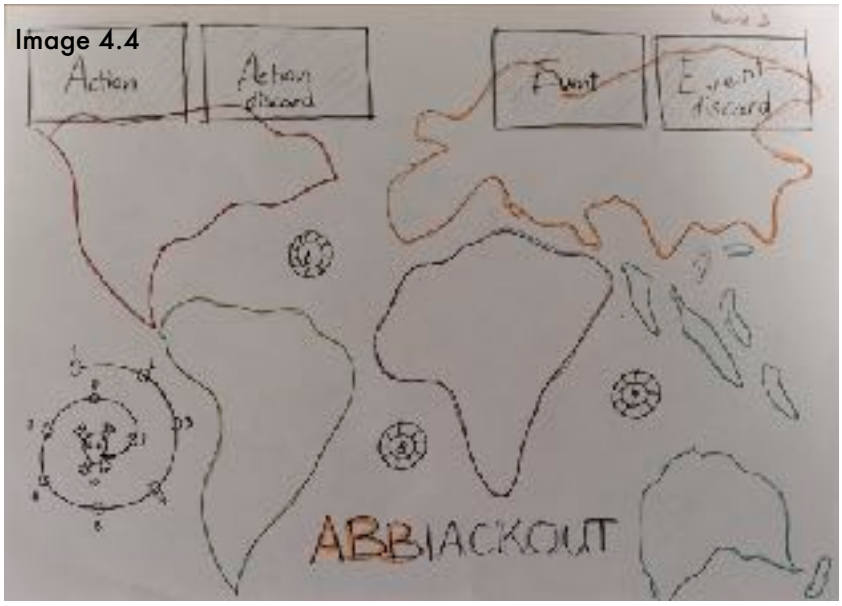
The looks of the blackout meter changed and we placed in on the bottom of the board. We also decided to implement only three new energy sources, since this would decrease the difficulty level and playtime. The sources are now spread across the board, close to the

areas where they should be implemented to make it clearer. Also in this version, the cards are off board so they can be put wherever the players want and we removed the crisis level.

Image 4.3

Board 3

Image 4.4



Board three is the same in gameplay but different in appearance. The cards are back on the board and the blackout meter has a new look. We decided the symbolism of a spiral would come across better in this case. This got us thinking about different ways to implement the blackout meter, and we got a wide variety of ideas.

Board 4

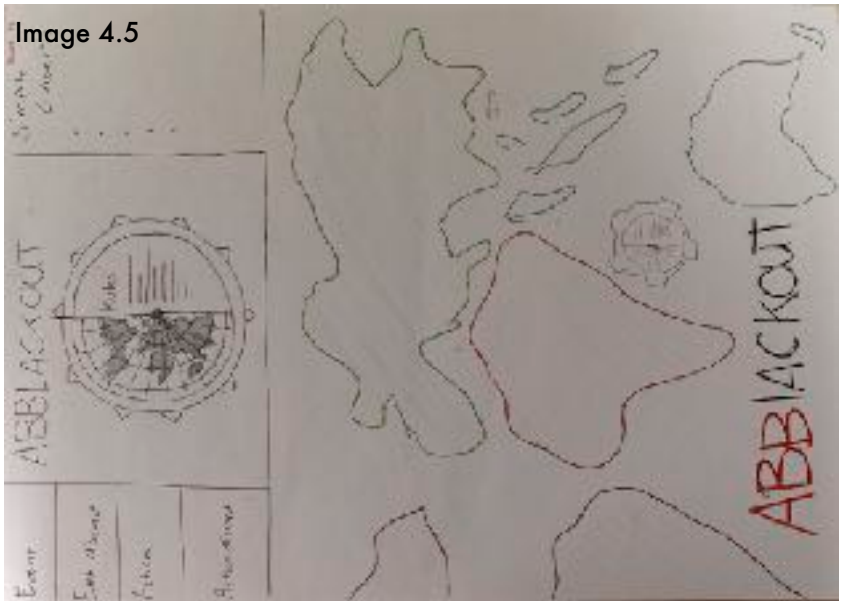


Image 4.5

This board is vastly different from the other versions, because it has all the mechanics in one place and leaves a lot of open room for the world map. At the top you can find the guidelines and the card piles. In the middle is a device we kept from this point, the new blackout meter. This is a turning mechanism in the shape of a circle. On the left we see a world map and on the right we see a few rules or other guidelines, this can be decided later. Whenever a blackout occurs, the players turn the mechanism one notch and a black layer of plastic appears. This covers a small part of the board, and as more and more blackouts appear, the world slowly turns darker. Until we reach 10 blackouts and the whole world is without energy. We felt this would translate the symbolism even better and even got some enthusiastic and positive feedback that it was ‘cool’ and made the experience more immersive.

Board 5

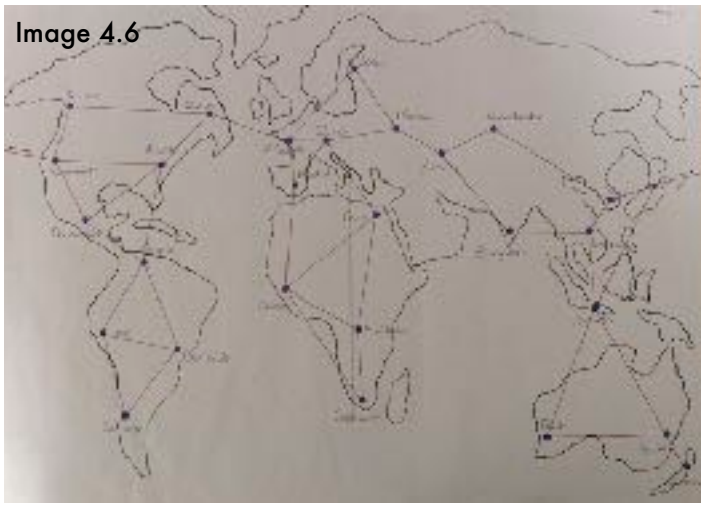


Image 4.6

In this board, we started to focus on the cities we wanted to use. To get to this point though, we had to do a lot of research on the locations ABB has and in which cities they can be found. We manually started to pin all the locations in google maps and that ended

Image 4.7

up being a lot more work than we thought. At the end, the map looked like this: Obviously, we had more than enough locations to choose from. We only had a few we absolutely had to implement, like Vaasa, Helsinki and Zürich. Other than this, we had to

Image 4.8

pick locations based on geographical advantages, to ensure the board remained playable. We picked some well known and some lesser known locations. This looked like this. From this point, we started drawing new boards that were actually playable.

Board 6

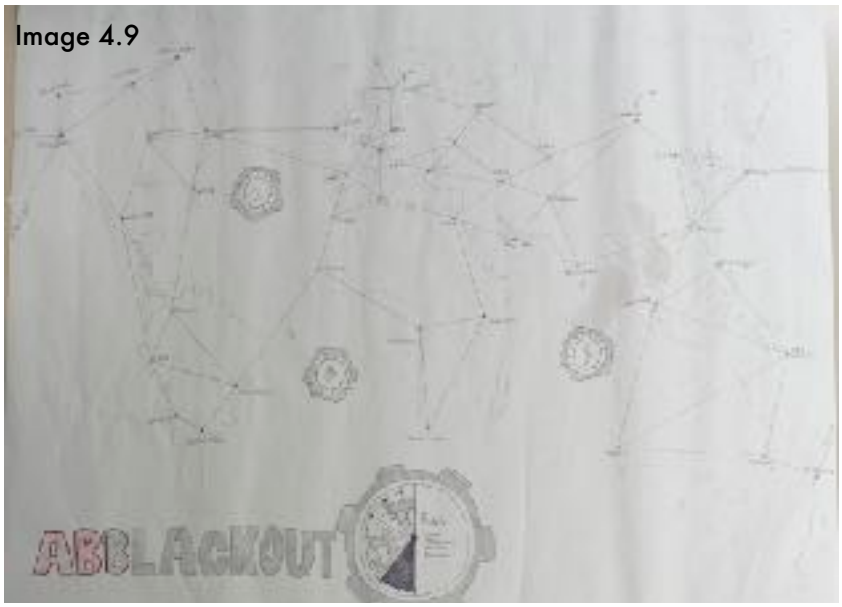


Image 4.9

This board was drawn on a bigger scale so it would be more like the size that the final board would be. This board doesn't have a place for the cards but has some open space to ensure that players can put them on there anyway. Below you see a drawing of the mechanism, which we made usable by placing a black half circle on top that you could move.

Spread across the map you also see the new energy sources. We quickly made tokens for this so we could start playing the game. The cards we used will be explained in the next chapter.

Board 7


Image 4.10

We drew another board like this, but this time we left some more space for the cards and we changed and removed some cities. We placed dots of color on every city to emphasize which new energy source belonged on which city and drew a line between continents so players could see which cities belonged where.

The most important change here is that North America was made a little smaller and Asia and Europe a little bigger, purely for playability and readability reasons. This board we used for the first few paper play-tests.

4.5 Cards

Cards were a big challenge for us and they have been through the most changes throughout the process, to the point where one card had four different notes on it in four different handwritings.

Role cards

The roles were the only cards that remained throughout the process. We changed some of the content on them, and we added and removed and changed quite a bit of narration, but these are the basics for our four role cards.

Worker

- You have five actions each turn instead of four
- You can prevent the loss of energy in the city you are in and all connected cities to it

This card is not very strategic in use but has very practical abilities. It's based on the idea that the worker has a lot of hands on experience and prevents problems before they even start, hence the ability to do work in the connected cities - nothing can go wrong when he's around.

Engineer

- You can remove all outages from a city in one action
- You can supply cities with renewable energy once the solution for the city is found just by walking through it

Again a very practical role, but this time with some more strategic possibility. The engineer is the first person you send abroad when a situation gets out of hand and he fixes all of your problems for you very quickly.

Scientist

- You need one part less to research a solution
- You can use one action to remove an outage in a connected city

This is a role than you can use very strategically. Because the scientist had so much experience researching, he can do it faster and with littler resources. It's always a good idea to leave it to the expert, so always try to research new energy sources through the scientist.

Manager

- You can use your actions to move another player's pawns
- You can use one action to move one pawn to the location of another pawn

The manager is a special role, because it comes with an extra responsibility. As a manager you lead the team and always steer them in the right direction, but in the end they have to do the work themselves. Hence the ability to move people but not use their abilities. The player should lead the strategic part of the game and take their role as manager seriously.

Object cards

The object cards need to be collected in a certain set to be able to do any research. When we decided on our three energy sources, hydro, wind and solar, we were able to make a first version of these cards.

Wind	Hydro	Solar
Rotor	Dam	Silicone wafers
Generator	Generator	Metalwork
Metalwork	Transformer	Transformer
Cables	Cables	Cables

Each source has a unique object that you can find at the top of the list, then two objects that you can find in two different sources and an object that is the same for every source. The unique object card can be found in the pile twice, the objects that can be used for two sources can be found three times each and the common object can be found four times. As you can see, the objects differ in their rarity.
Additionally we can find three 'jokers' in the pile, a *YuMi robot*, *AZIPOD* and *TOSA*, which can be used to complete any set for research.
When we play-tested this which ABB professionals, though, they had some advice about the objects we used and gave a few suggestions. With their help, we agreed on the following.

Wind Turbines	Hydropower	Solar Panels
Rotor	Protection Relay	Inverter
Switchgear	Ring Main Unit	Ring Main Unit
Generator	Generator	Switchgear
Transformer	Transformer	Transformer

4.6 Playing cards

Action cards

Action cards were a big part of the first few play-tests. Action cards are cards that had a specific positive action you could do during your turn. You collect these cards in your hand, together with object cards, up to a maximum of seven cards. If you have more than seven, you discard the excessive ones into the correct pile. Action cards take one action to execute and can only be played during your turn. They could also be given to other players for one action.

Event cards

Event cards have either good or bad events on them, often directly related to the amount of outages on the board. These cards are, when drawn, immediately executed.

Situation 1 – actions, bad events, good events, objects

This was the situation when we first play-tested the game. We had two decks of cards:

- Events - good and bad
- Actions and objects

Every turn, a player would pick 2 event cards. After this they took 2 cards of the second deck, which had either actions or objects. When we played this we noticed two things wrong with this.
First, the game was too easy. Because we sometimes had good events and sometimes had bad events, we were able to control the amount of outages very well and didn't face any serious blackout threats at all. The second thing we noticed was that we didn't use our action cards very much. We made some changes and came to our second situation.

Situation 2 – actions, bad events, good events, objects

In this situation we added a lot of bad event cards and changed the decks a bit:

- Bad events
- Good events, actions and objects

Every turn, a player would pick 2 bad event cards. After this they took 2 cards of the second deck, which had either good events, actions or objects. This way, there would be bad events every turn and the chances of drawing good events became smaller.
We noticed that this also meant that the chances of picking object were smaller because they were shuffled into a huge stack of cards. Also it was quite confusing to differentiate between stacking action cards in your hand or playing event cards immediately. Again, we noticed that we didn't use the action cards very much.

Image 4.11

Situation 3 – bad events, good events, objects

We decided to get rid of action cards altogether, which changed the decks a little to this:

- Bad events
- Good events and objects

We also added the crisis level which would determine the number of cards a player draws from a certain deck.
Every turn, a player would pick bad event cards according to the crisis level. After this they took two cards of the second deck, which had either good events or objects. There was no

confusion anymore whether or not to store the cards in your hand because all event cards have to be drawn immediately.
Of course there were some changes in the content of the cards, but eventually we decided to keep the third situation for the game.

Situation 4 – final

In the final version of the game, we removed and added a lot of cards. We tried to balance where the outages were put and tried to make the narrative as complete as possible. This looked almost the same as the third situation, so:

- Bad events
- Good events and objects

Every turn, a player would pick bad event cards according to the crisis level. For the difficulty level, the players now always only pick only one good card, which we've now named *ABB support* cards.

Situation 1 & 2

The full set of examples can be found in Attachment I. A small example list of the cards can be found below.

Bad Events
Put a cube on Sao Paulo and 2 connected cities
Put 3 cubes on south America
Fly to Moscow
Add 1 cube in every continent
Put a cube on Perth and every connected city
Fly to Perth
Add 3 cubes to one city

Action Cards
Use a discarded action card again. Remove it afterwards from the game.
Draw 2 cards, then discard 1 card from your hand
Move any pawn to any city
Use this card as a joker to complete a set for curing

Move to any city in the same continent
Use this card as a joker to complete a set for curing
Trade one card freely with any player

Good Events
For the rest of the game, you need one less card to solve a problem. This doesn't apply if you are the researcher/scientist.
You can hold 1 more card in your hand for the rest of the game
You can hold 1 more card in your hand for the rest of the game (this is really strong, I would only put one of these in)
Shuffle all discarded Player cards back into the deck
Remove a cube from your city and all connected cities
Breakthrough! Remove 2 cubes from America
Face the Crisis! Play with the top card of the Event-deck revealed. (could be too complicated)

Situation 3

The full set of examples can be found in Attachment I. A small example list of the cards can be found below:

Event Cards

+	-
Breakthrough! Thanks to research in Vaasa, remove 4 cubes in the yellow area	Put 6 cubes on the map, you can choose where to put them
You can remove one cube from a city if there is one player or more on it	Put 3 cubes on one colour, you can choose where to put them
You are promoted, you can keep one more card in your hands	You won't be able to move for one turn due to a big outage in the city you are in
You win 1 action for the next 2 turns	You lost 1 action for the next 2 turns
the outage-rate decreases	You've been careless! Put a cube in the city you're in and all surrounding cities.
remove one cube from the cities with 3 cubes	The research center in XXX is off the grid now!

Situation 4 – final

Here is a list of all final cards.

Bad Events	
Expert needed!	You fly to Perth.
Emergency Meeting!	You fly to Moscow.
Meeting at ABB Headquarters	Both the Engineer and the Manager fly to Zürich.
Trial at Testing Facility	Both the Engineer and the Worker fly to Bogota.
Energy Conference	Both the Manager and the Scientist fly to Cape Town.
Construction Delays	Put 2 outages in the city of Almaty and 1 in Baku.
Oil Rig on Fire	Put 1 outage on all cities connected to a city with 3 outages. (This card doesn't cause blackouts or chain reactions)
Forgetfulness	Put 6 outages to different cities in North and South America.
Failed Climate Agreement	Put 1 outage in 1 city of each continent. (Not every city.)
Gas Shortage	Put 1 outage in every city of Oceania.
Coal Shortage	Put 1 outage in every city in Asia.
Lack of Charging Stations	Put 1 outage in every city in Europe.
Drought	Put 1 outage in every city in Africa.
Fuel Shortage	Put 1 outage in every city in North America.
Burning Rainforest	Put 1 outage in every city in South America.
Energy wasted!	Put 1 outage in the city you're in and all connected cities. This overrides the Worker's ability.
Transformer failure	Put 1 outage in the city of São Paulo and all connected cities.
Nuclear Accident	Put 1 outage in the city of Zürich and all connected cities.
Generator explosion	Put 1 outage in the city of Perth and all connected cities.
Limit on Oil exports	Put 1 outage in the city of Abu Dhabi and all connected cities.
Overfilling of Landfills	Put 1 outage in the city of Kinshasa and all connected cities.

Smog in the City	Put 1 outage in the city of Hong Kong and all connected cities.
Evaporation of the Great Lakes	Put 1 outage in the cities of Winnipeg, Saint-Laurent and Washington D.C.
Corruption	Put 1 outage in the cities of Bogota, São Paulo and Buenos Aires.
Tsunami	Put 1 outage in the cities of Port Moresby, Parañaque, Hong Kong and Sydney.
Wrong Directive	Put 2 outages in the city you are in.
Onset of Winter	Put 2 outages in the city of Saint-Laurent.
Mass Tourism	Put 2 outages in the city of Istanbul.
Earthquake	Put 2 outages in the city of Tokyo.
Extreme Winter	Put 2 outages in the city of Vaasa.
Oil sand mining	Put 2 outages in the city of Winnipeg.
Desertification	Put 2 outages in the city of Dakar.
Hurricane	Put 2 outages in the city of Miami.
Coal plant smog	Put 2 outages in the city of Beijing.
Low fuel efficiency	Put 2 outages in the city of Sacramento.
El Niño	Put 2 outages in the city of Santiago.
Oil spill from tanker	Put 3 outages in the city of Cape Town.
North Sea pollution	Put 3 outages in the city of Kopenhagen.
Energy loss cut off the internet connection	Don't draw a ABB support card this turn.
Unorganized documentation!	Reshuffle all discarded bad events back into the deck.
Lousy Quality Control	Put all outages you removed this turn back on the board.
Panic	Move the marker 1 space on the Crisis Level forward.
Panic	Move the marker 1 space on the Crisis Level forward.
Panic	Move the marker 1 space on the Crisis Level forward.

ABB Support

Solar Impulse	You may fly to any city.
Knowledge transfer	Use a discarded ABB Support card again. Remove it afterwards from the game.

Worldwide Branches	You may move to any city in the same continent.
Master of the Intranet	You may give one of your components to any player. You don't have to be in the same city.
Stronger Together	You may move another teammate to your location.
ABB management training	You may move any player to any city.
Quick reactions	Remove 1 outage from every city a player is in.
Driving innovation	You have 2 extra actions right now.
Great Innovator	You may fly to any innovation center.
i-bus KNX	Remove all outages from one city.
Lucky Break!	Keep this card and use it anytime to ignore a bad event.
Electric vehicles infrastructures	Remove 1 outage from the city you are in and all connected cities.
Rapid response service	Move the marker 1 space on the Crisis Level backward.
Company Efforts	Remove 1 outage from 1 city in every continent.
Gold coast light rail	Remove 1 outage from Oceania
Factory of the Future	Remove 2 outages from Asia
Powering high-speed train	Remove 1 outage from Africa
Gotthard Tunnel	Remove 2 outages from Europe
Custom High voltage equipments	Remove 1 outage from South America
Smart grid implementation	Remove 2 outages from North America

Jokers can be used to complete any set for development. They are tradable like a normal component.

Components and Jokers		
Amount	Name	Renewable Energy Type
2	Protection Relay	Hydropower
2	Rotor	Wind Turbine
2	Inverter	Solar Panels
3	Switchgear	Solar + Wind
3	Generator	Hydro + Wind
3	Ring Main Units	Solar + Hydro

4	Transformer	All
1	YuMi Robot	Joker
1	AZIPOD Thruster	Joker
1	TOSA Charging System	Joker

4.7 Crisis level

The crisis level tells the players how many cards to pick after every turn and has been a topic of discussion all throughout the process. We had a hard time figuring out how to implement it, if we wanted to implement it at all and if we implemented it, how it should work.

Situation 1

After every turn, the players look at the crisis level to decide how many bad event cards they have to take. This rate increases by drawing a bad event card that says that this happens and can be decreased by drawing the opposite good event card. So a turn would look like this:

1. Do your actions
2. Take X bad card(s)
3. Take two good cards

This was a little too easy at the start of the game and too difficult at the end.

Situation 2

After every turn, the players look at the crisis level to decide how many bad event cards and good event cards they have to take. This rate increases by drawing a bad event card that says that this happens and can be decreased by drawing the opposite good event card. So a turn would look like this:

1. Do your actions
2. Take X bad card(s)
3. Take X good card(s)

We expected that this would balance out the difficulty level a little, but it didn't. It was now too easy throughout the game.

Situation 3

After every turn, the players look at the crisis level to decide how many bad event cards they have to take. This rate would increase after 30, 15 and another 15 minutes. The first 30 minutes of the game you would pick 1 card, the 15 minutes after that you would pick two and the last 15 minutes of the game you pick three. This would also ensure that the players stay within the right time frame. When we tested this, we found that players found it confusing to keep track of time themselves and they gave some suggestions. The results lead us to situation 4.

Situation 4


Image 4.12

We gave the board a border, divided into several sections. In these sections, there is a number, and this controls the crisis level. At first the number is always one, then it changes to two and eventually to three. After every turn, the player would pick bad cards according to the current crisis level, pick one ABB support card and then move the crisis level marker one step forward. This way, the game very gradually increases in difficulty and it becomes irrelevant how much time the team needs to get into the game, because it depends on turns. The players can also follow the advancement of the game.

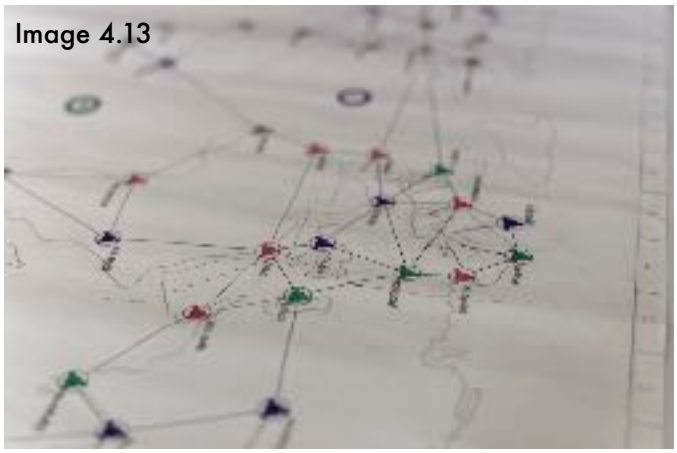


Image 4.13

4.8 Game introduction

Trying to keep the narrative nature of the game in mind, we decided we would explain the rules, roles and setup instruction in the form of an interactive story that is read out loud at the beginning of the game. The idea was that an ABB employee would read this to all the players and the players would pick roles and set up the game during the story.

You can find the first version of the narration in Attachment II.

When we introduced this to ABB during a meeting, their first response was negative. They felt it was way too long and they lost their concentration very quickly. They found the setup confusing and unnecessary, since they could just set up all the boards before the players came. They did really like the idea of the narrative story and suggested we make it a lot shorter and cut some aspects that would only make the game more confusing (not only in the narrative, but also in the gameplay).

Below you can find the second version, which is the shortened version we used during the ABB play-test.

Version 2

Welcome to *ABBlackout*, a game where you, as a team, have to work together to supply the world with renewable energy! In this introduction you will find the rules and instructions to play the game!

Story

Planet Earth is running out of fossil fuels. We saw this coming for a while, but the world is in trouble and needs to be fixed now. You and your team of ABB experts are trying to provide the world with clean, sustainable and reliable energy. Once you have supplied the world with these new energy sources, you win the game!

Outages spread all over the world due to the lacking resources and the loss of energy seems unstoppable. Still you and your team fight for a bright future and try to find the best way to build the solutions: powerful wind turbines, efficient solar cells and reliable hydro power.

But this quest won't be easy for you because – like in real life – there are always obstacles to overcome and hard times for a team. But don't worry too much: your team has the global power of ABB behind them and your company will help you with everything they have! So brace yourselves and let the game begin…

Most important rules

You can use 4 actions in your turn, how you split them is completely up to you:

- Move from a city to a connected city
- Remove one outage marker from the city you are in
- Use your special, role specific ability
- Either give or take a component card from another player if you are in the same city
- Move from a city with a research center to any other city that has a research center
- At any research center discard the right set of components to research a solution for the matching renewable energy.
- Add a renewable energy source to the cleared city you are in (if the team did the research)

When a city runs out of some of its fossil energy, put an outage marker on it, but if you have a city with no energy (3 outage markers) and have to put another marker on it… bad luck, you have a blackout! Put 1 marker on all cities connected to the affected city and turn the blackout-wheel one more space. Fight harder from now on, because you will lose when you reach 8 blackouts in total!

To stop this from happening you can install renewable energy in a city! Once you have researched your solution it will pay off and for one action you can build the renewable power in a matching city… and that city can never be affected by outages of fossil energy!

At the end of your turn, have a look at the crisis level and draw cards equal to that number first from the Bad Developments-stack, which contains random events that will slow down your efforts, and then always one card from the ABB supply that will yield positive effects on your game due to the continuing efforts of ABB to fight the crisis. Look at the cards afterwards and see how things turn out in the world. But look out, if you take too much time the crisis will get worse!
Good luck!

This version went better, but still wasn't satisfactory. We forgot a few key mechanics and the test group still had a lot of questions. We figured it was hard to understand because it wasn't visualized at all and it was just dry information.

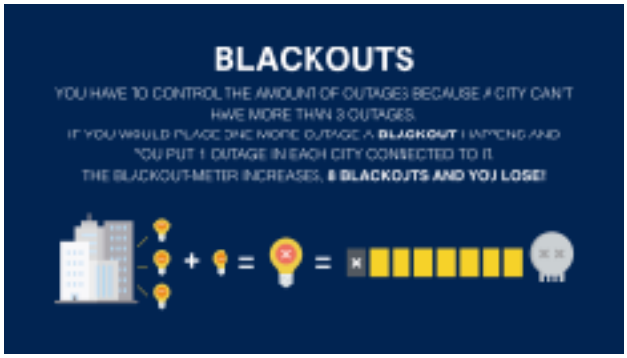
Version 3

Here you can see the powerpoint we made to combat this problem. Through visualization, the rules are understood and remembered better. We used this version to play-test with students, and it seemed to work well in combination with the manual.


ABBLACKOUT
CAN YOU SAVE THE WORLD?


NO FOSSIL FUEL LEFT
THE WORLD IS RUNNING OUT OF FOSSIL FUEL
DEVELOP RENEWABLE ENERGY TO SAVE THE WORLD


SAVE THE WORLD
WORK TOGETHER WITH YOUR TEAM AND TRAVEL ALL OVER THE WORLD TO PREVENT CITIES FROM OUTAGES WHILE COLLECTING COMPONENTS TO DEVELOP THESE THREE SOLUTIONS


BLACKOUTS
YOU HAVE TO CONTROL THE AMOUNT OF OUTAGES BECAUSE A CITY CAN'T HAVE MORE THAN 3 OUTAGES
IF YOU WOULD PLACE ONE MORE OUTAGE A BLACKOUT HAPPENS AND YOU PUT 1 OUTAGE IN EACH CITY CONNECTED TO IT.
THE BLACKOUT-METER INCREASES, 5 BLACKOUTS AND YOU LOSE!


YOU, THE PLAYER
YOU HAVE A SET OF BASIC ACTIONS TO SAVE THE WORLD
YOU MAY USE UP TO 4 OF THE FOLLOWING ACTIONS IN ANY COMBINATION IN YOUR TURN
– MOVE TO ANY CONNECTED CITY –
– FLY BETWEEN INNOVATION CENTERS –
– REMOVE AN OUTAGE FROM A CITY –
– GIVE OR RECEIVE A COMPONENT CARD –
– DEVELOP A SOLUTION –
– INSTALL RENEWABLE ENERGY IN A CITY –
USE YOUR SPECIAL ABILITY


MOVE TO ANY CONNECTED CITY
MOVE YOUR PAWN TO ANY CITY CONNECTED TO YOUR LOCATION ON THE MAP


FLY BETWEEN RESEARCH CENTERS
FLY YOUR PAWN FROM ONE RESEARCH CENTER TO ANOTHER WITHOUT GOING THROUGH CONNECTED CITIES


REMOVE AN OUTAGE FROM A CITY
USE THIS TO CONTROL THE AMOUNT OF OUTAGES IN THE WORLD.
YOU CAN ONLY REMOVE OUTAGES FROM THE CITY YOU ARE IN

GIVE OR RECEIVE A COMPONENT CARD

WORK TOGETHER WITH YOUR TEAM AND GIVE / RECEIVE COMPONENTS
YOU CAN ONLY GIVE / RECEIVE **WHEN BOTH PAWNS ARE IN THE SAME CITY**

DEVELOP A SOLUTION

COLLECT THE CORRECT 4 COMPONENTS TO DEVELOP A SOLUTION.
ONCE ALL SOLUTIONS HAVE BEEN FOUND YOU WIN THE GAME
DEVELOPMENT CAN ONLY BE DONE AT AN INNOVATION CENTER

INSTALL RENEWABLE ENERGY

ONCE AN ENERGY TYPE HAS BEEN DEVELOPED YOU CAN SECURE CITIES WITH THE SAME ENERGY TYPE. SECURED CITIES ARE NOT AFFECTED BY OUTAGES ANYMORE AND BY INSTALLING ALL OUTAGES ARE REMOVED FROM THE CITY.

USE YOUR SPECIAL ABILITY

EVERY ABB-SPECIALIST HAS SPECIAL ABILITIES
WORK TOGETHER AND USE EACH OTHERS ADVANTAGES

THE TEAM

TOGETHER WITH YOUR TEAM OF ABB-SPECIALISTS YOU ARE GOING TO SAVE THE WORLD FROM TOTALL DARKNESS

PROCEEDING OF YOUR TURN

I. USE ANY COMBINATION OF UP TO 4 ACTIONS

II. LOOK AT THE CRISIS LEVEL AND DRAW THAT MANY BAD EVENT CARDS

III. DRAW ONE ABB SUPPORT

IV. MOVE THE MARKER ON THE CRISIS LEVEL ONE POSITION FORWARD

GOOD LUCK ABB-TEAM

AND SAVE THE WORLD FROM TOTAL DARKNESS

IF YOU HAVE MORE QUESTIONS, REFER TO YOUR MANUAL

4.9 ABB play-testing

When we first met with ABB, one of their goals was that the board game should be realistic for engineering students and experts. To ensure we reach this goal, we decided to set up a play-test with ABB employees, so they could judge whether they found the game to be disturbingly unrealistic.

We talked about this play-test and the results earlier in this chapter. We met up with four employees, all experts in different fields. They had a variety of technical backgrounds, but also people from marketing and international communication were present. This was great because they had some insight to specific ABB locations that we didn't have prior to this play-test.

We had set up the board before the team arrived. We assigned a test master who explained the game and the rest of the group members would operate in the background and take notes of the progress being made. Also, it's worth mentioning that only two of the players knew each other before this day. When they started, we read the introduction to the game and divided the roles.

We immediately noticed a few things. First, they had a lot of questions. Because two members of the team remained at the table, they had the opportunity to ask questions at all times, which wasn't a very good thing. For the first two rounds, before every action they looked at us to find some sort of assurance that that move would be okay. Second, the manager took his role very seriously and began thinking very strategically from the beginning of the game. He really tried to steer the game and the team into the right direction and reminded everyone of the common goal; researching for solutions.

Negative things during the gameplay were that they took longer than we planned to finish. Because the game started off quite slow, due to the introduction and questions, and the amount of cards they had to take (at some point they drew 6 cards in one turn), they took 70 minutes, instead of the 60 we had hoped for.

They drew some cards that were unclear or confusing, which we took out of the game afterwards. About halfway through the game, they stopped reading the narrative of the game and just read the action they had to do.

Positive things were that they really seemed to enjoy themselves and really worked together to win, regardless of how familiar they were with each other before the game. They tried to play very strategically and made a lot of jokes during playing.

Feedback

Fortunately, they had a lot of feedback about the game. They gave us a lot of advice about the locations we used on the map. For example, Stockholm was on the map but a more realistic city would be Västerås, because there's more ABB activity. And, like we said before, they had some feedback about the components we used for the solutions.

They said that they were most excited about playing the game when they thought they had a real chance of losing, though they sometimes got a little nervous when they received very difficult cards.

They told us that the objective became clear during playing, but that it could be made more clear during the introduction.

Once they got a little more familiar with the game, they said it was easily understandable and they didn't even notice that they had been playing for a long time. They didn't mind the fact that it was a little unrealistic.

They all said they would play it again.

Transfer

For the next adjusted game board and assets we will take a look on each city on the board game and send ABB the list of cities we currently have on the board, so they can confirm whenever or not this city is important within their company. We can also take that into account regarding the components needed to research a solution. Luckily they provided us with a list of components that can be used for each type of energy source the ones ABB actually produces.

The objective of winning the game could be made more clear, this will be clear in the powerpoint we are going to create. The powerpoint will pinpoint all the rules of the game in a simple and visual way to the players.

The final adjustments will be made in the playing cards. Removing or editing a few cards that interrupt the game flow or change the outcome of the game in an unpleasant and non-challenging way.

4.10 Student play-testing

Within our testing phase we plan on doing public play-testing on students, the actual target group, as much as possible. Through play-testing we will find out if our board game meets the requirements or needs adjustments in order to do so. Each description of every test round will be included with a summary of the overall progress and feedback we received regarding our board game.

First test and feedbacks

The first play-test we did that included only students was with the other students in our EPS group. They had followed the progress of our game from a distance but weren't familiar with the way the game was played.
In advance we made a few changes to the game as result of the play-testing with ABB employees. We changed the following objects and parts of our board game. We tested with Game Introduction Situation 3, which you can find in the chapter game introduction, because remembering a whole narrative story and the rules is too difficult for the players. We also took into account that it is easier to remember the rules when visually presented. In addition to the changes we have made, we also tested with Crisis level. In this situation, the crisis level would be controlled by time. Furthermore, we tested with Play cards.

We set up the game beforehand, and everybody got around the table. We assigned a test master who explained the game and the rest of the group members would operate in the background and take notes of the progress being made.

At first the players had a few difficulties with understanding the rules. Knowing whenever or not something could be counted as an action. After the introduction of the rules there had been some questions and we had to go through some of the powerpoint slides again to point several rules out.

The players read through their abilities and roles and started focusing on reduction of outages in the world. Apparently, it wasn't quite clear to them that the main objective of the game is to research for solutions, which they started on pretty late. Throughout the duration of the game they asked several questions regarding the player cards. They did discussed a lot together, but most of the discussion was about whenever or not an action was right according to the rules. Anyhow, they also discussed strategies and the next best steps to take to ensure victory.

As mentioned before we started testing with new game situations. One of them is the new crisis level we designed that controlled the amount of player cards one has to draw. The first play test we did with ABB employees, we used random cards in the deck which determined the crisis level. In the new situation the amount of time decides the amount of

cards that had to be drawn. The first 30 minutes of the game you would pick 1 card, the 15 minutes after that you would pick two and the last 15 minutes of the game you pick three. This new way of controlling the crisis level didn't went as we expected because one of the players had to keep an eye on the amount of minutes that have passed in order to know when the rate goes up. If we didn't reminded them of the time, they would've played the whole game without changing the crisis level.

Feedback

One of the most important parts of testing is receiving feedback from your participants. We asked the players to think out loud so we could write down their opinions, tips and thoughts.

The first thing most players had feedback on was the introduction and explanation of the rules. It was too difficult to remember it all. A short pocket version of the rules could be very handy throughout the game play and the winning and losing objective have to be made more clear in the beginning. Same goes for the cards, some cards couldn't be understood according to the players. This had mostly to do with the way of writing and vocabulary. In addition to that, some of the cards were found useless or unnecessary, disturbing their gameplay.

Not everybody knows which city belong to which continent. It was quite difficult for players to put an amount of outages on a continent, if they were told to do so, if they weren't sure whenever or not a city belonged to the right continent. It is best to distinguish each continent with a border or a color to not cause any confusing among the players anymore.

The overall engaging experience of the game wasn't what we wanted to achieve since we sensed a bit boredom among the players during the play. According to them the game could be made more difficult, it was rather easy. The roles were unbalanced as well, for example the engineer who was too powerful.

Same goes for the educational part of the game. The players didn't felt like they learned anything from the game. We tried to educate our players by making the content of the cards more narrative, but as the game goes on, players started to ignore the story of the cards with each round even more than before and entirely skipped reading it in the end.

Transfer

For further adjustments of the game we will rework the introduction part. This means including a pocket version of the rules for every player to look into when necessary, but keep the powerpoint part in the game. Same goes for the cards, the cards need to be as

simple and understandable explained as possible or this won't turn out good for the game play if one doesn't know what to do, because it is poorly explained in the cards.

The continents will be distinguished with lines or colors. Furthermore, the cards will be made more difficult to create a real challenge for our players to succeed in the game. On top of that the roles will be made more balanced, giving that the engineer won't be made as powerful than his fellow colleagues.

Last but certainly not least, the education factor of the game needs a rework because the players need to learn what ABB can do and how they can benefit from the company as future employees or interns.


Image 4.14

The next tests

After our first play-test, we made some modifications based on the feedback we received. After we applied this feedback, we started playing the game with other students who had never played, or heard about, the game before. We played these games with the finalized board, the finalized cards and the finalized game rules. We expected that we only have to do small modifications after this.

We set up the board beforehand during all of these play-tests and the game master explained the game and the rules by using the powerpoint we made. After this, we gave them the manual and they were on their own. We didn't interfere with the gameplay and only observed the players, taking notes on the progress they made.

During the game, the players occasionally asked us questions anyway, which made it clear for us that there was still a little confusion about certain aspects of the game, which we them made the appropriate modifications for. While playing during the play-tests, they figured out how to play the game on their own. In every play-test by working together they managed to find how to play.

Feedback

Most of the time during these tests we received good feedback from the players, once they understood the rules perfectly, they found the game interesting. It still took them a few turns to become completely aware of all the rules but with the help of the manual, they found it easier.

Most of the feedback was about the difficulty of the game. At some point the game was a too easy and sometimes it suddenly became too hard, so we had to find a balance in the cards and the crisis level that would keep the game interesting and still make it possible to win. The huge difficulty here was the balancing of understandability, challenge, duration and winnability. These factors behaved in unexpected ways after changing and we had to be careful while changing the behavior of one.

The effects on the cards were clear enough to understand them, there wasn't too much information on it. Also the information about ABB was short and easy to read. They didn't read it every time because it isn't needed for the game but they remember more about ABB now than on the previous tests.

Transfer

During these test we only made small modifications on the game itself. We made it easier to understand and tried to determine a good way to make it more interesting once the players are all aware of the rules.

We also noticed that we can't force someone to learn something about ABB but the small information on the cards helps, allowing the player to learn about ABB activities and what ABB can possibly offer them.

The next step for us will be to make a final design for all the cards and the board, so we can provide ABB a finalized board game.

4.11 Conclusion and transfer design details phase

The design details phase was interesting, but also very complex for the team. We very much wanted to make our own game, and especially didn't want to give ABB a bad reputation for copying games, but were very unsure about how much and what we can change from the games we got inspired by. In the benchmark we showed the general direction of the game we would like to make and you can see where we got inspired from, but in the end we do feel like we've made an independent game.

At the end of the design details phase we were happy about the process and results. We have a well functioning game with simple and yet immersive gameplay, educational content and a lot of positive feedback. We will take all of this to the Realize phase, where we will make some visual designs for the game and where we will write a manual. In the next phase we finish all that we are able to do in the short time we have, and we will hand everything over to ABB.

5. Visual Design

Initially, we thought that this part of the project would be a lot bigger than it eventually turned out to be. At the start of the project, we were under the impression that we would be able to deliver the game in full, including all of the visual design. If we wouldn't be able to do this, we could hand this task off to a partner company of ABB that would do the designs for us. In one of our meetings, however, ABB announced that they won't need the final visual designs because they are changing their house style in 2017.

This didn't mean we couldn't do anything but it meant that we wouldn't deliver a whole game. We aimed for a version that could easily be adjusted according to these changes. Therefore we decided to make a playable 'template' for ABBlackout, in which the colors and details could be changed and added without problems. This template still has to be in line with our Design Principles, in that there has to be room for a lot of educational aspects and the design should be simple but engaging.
The design of the manual will be discussed in the next chapter.

Cards

As the cards form the major part of the game, they also need a good design of their own, even if it meant that it was going to be changed eventually after the upcoming ABB house style change in 2017. As mentioned before, the cards form a critical part since it mainly decides the progress of the game. The cards need to be designed in a certain way that they can be interpreted as simple and understandable, and most importantly are actually simple and understandable. In this case the right font, color and position form the three headlines in the design of the cards because these aspects, if handled well, make the cards simple and understandable in the end.

Fonts

As main fonts we embraced Helvetica Light and Helvetica Bold to make our text readable, supported by "side fonts" like Adobe Devanagari Italic. We chose Helvetica because it is a Sans Serif kind of letter-type and works very well for large and readable titles, but most importantly, for large amounts of readable texts as can be viewed below. Adobe Devanagari font type is used as an agile font for remaining sorts of information like facts on the cards, below you can view an example.

HELVETICA LIGHT

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HELVETICA BOLD

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ADOBE DEVANAGARI ITALIC

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Color

During the designing part of the cards we had to choose the right colors for the cards, since every kind of category card needed it's own color, we also noticed that each category rather has it's own different cards as well that needed to be separated by colors. Because the design is most likely going to be changed in the future, we chose to go for simple colors as bright yellow, blue, purple, pink and so on to make a clear distinction between various cards.

The colors play a major part as well in recognizability. For example, the background cards. Each one of these has it's own background color so the player can recognize by color which card to take: green goes for the ABB Support cards, orange belongs to Bad Event cards, white pairs with the role cards and dark blue fits the solution cards. Because most of these cards are laying face down, they need their own style of color on both sides; front and back.

Image 5.

Within the category of cards are different kind of cards, for example the solution cards. This category of cards owns the color yellow, but the icons on these cards need their own

colors as well to be recognizable as a certain type of solution cards. This example can be viewed below.

Position

Certain parts of a card need to be prioritized and should receive more attention over others, and thus, need the right position in order to do so. We designed the cards in a certain way that the title, name of the card and image are seen directly. The description comes right after the image and after that, any additional information may be added below

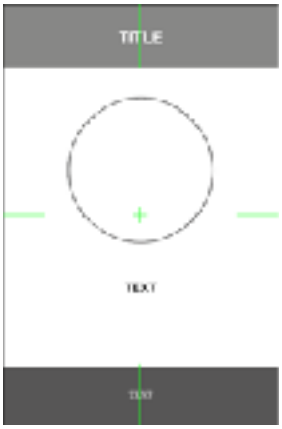


Image 5.1

in the cards, if needed. An example of a very simple design can be viewed below.
The image is supposed to receive the most attention since a card can be recognized by it. Every logo is supposed to be identical and at a certain part in the game, it also helps the player recognize what kind of card he has drawn before actually reading the text.

Solution Cards

The solution cards are designed in a bright yellow because these solutions provide energy to the world and yellow mostly represents the color of electricity. Each of these three cards

Image 5.2

have their own symbol representing the energy type in the game.

Role Cards

The role cards presents the certain type of jobs at ABB and each one of these job positions have their own set of abilities. Each role can have its own color to divide the job types in the game by color and thereby decide which colored pawn a player has to use throughout the game.

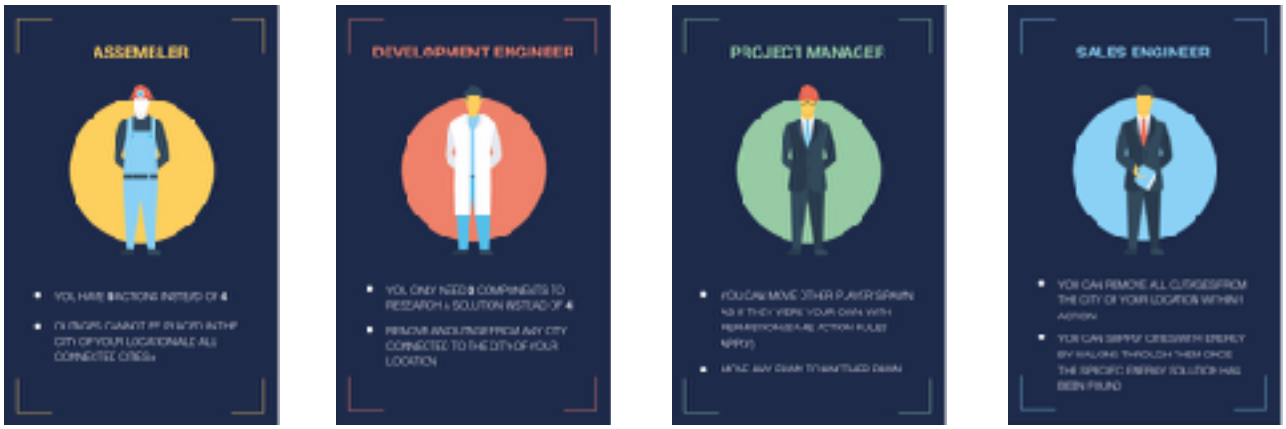


Image 5.3

Bad Event Cards

The bad event cards decide the progress of the game and are a disadvantage to the players. Because of that, we chose the color orange to represent the damaging effect of the cards to the progress of the players. We considered the color red because this color is perceived as dangerous and is mostly used in alarming situations. However, we eventually decided not to choose this color because the main design color of ABB is red and we didn't want the players to associate the bad events with ABB.

Image 5.4

ABB Support Cards

As the bad event cards embraces the color orange, we picked the color green for the ABB support cards. This color is associated with positivity and thus the reason why we chose this color to decorate our ABB support cards with. These cards consist of good events and positiveness and should have a color to fit the content as well.

Image 5.5

Image 5.7

Component Cards

The component cards are our most diverse set of cards since there are many different component cards within this category. Because each type of energy source needs their own four types of components, these components had to be designed individuality or at least needed to be separated by color for the players to be recognized. One of the component cards shown below has it's own type of image to visualize the type of component. The rest of the component cards have their own color, but in the future also need their own certain type of image to stand out from the rest. The joker cards have to stand out especially, but have to overall follow the same guidelines as the no marl

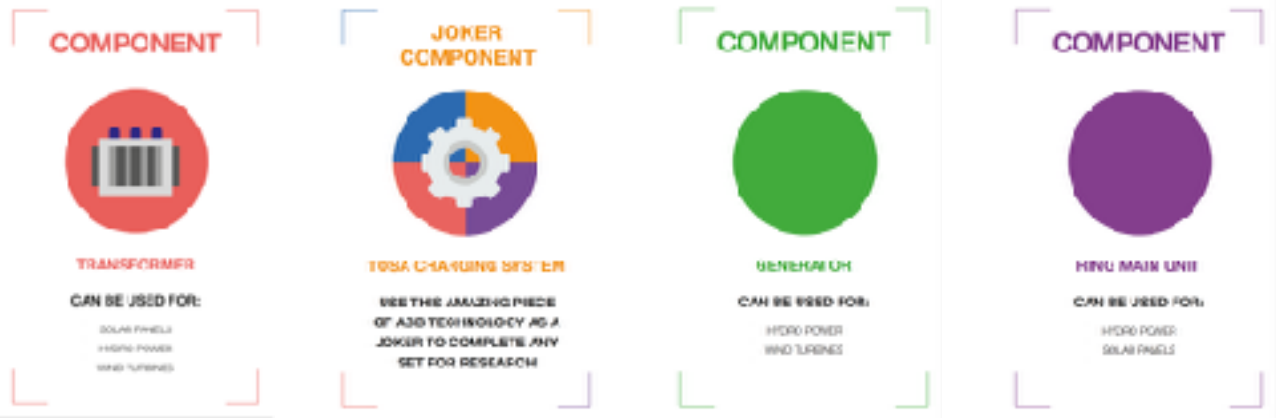
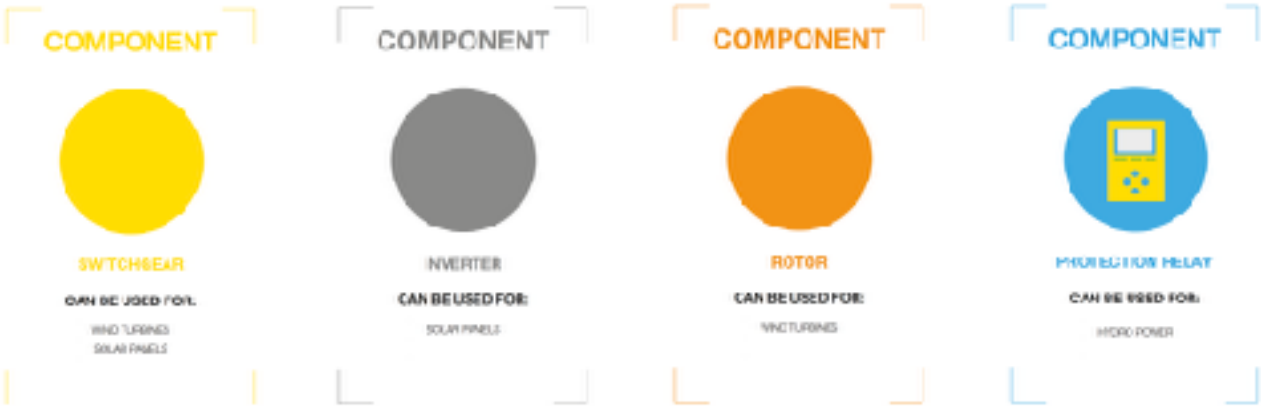


Image 5.6

components as they are treated the same gameplay-wise.



5.1 Manual ABBlackout

The team went to multiple iterations of the manual, an excerpt of one of the first being shown below:

ABBLACKOUT

Planet Earth is running out of fossil fuels. We saw this coming for a while, but the world is in trouble and needs to be fixed now. You and your team of ABB experts are trying to provide the world with clean, sustainable and reliable energy.

CONTENT

Role cards | Solution cards | Bad events | Good events | Objects | Solution pieces

Outages | Crisis level marker | Solution markers | Research centres | Player pawns | Board

OVERVIEW

In ABBlack-out, the players form a team of ABB employees. You must work together to research clean, sustainable and reliable energy sources before the world runs out of fossil energy.

ABBlackout is a cooperative game, that means the team works together, wins together and loses together.

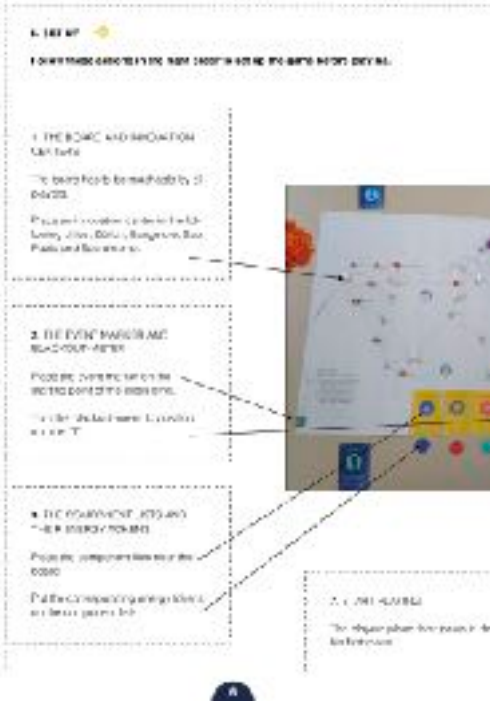
The goal is to research 3 renewable energy types: Solar Panels, Wind Turbines and Hydro Power. Once you have researched these types, you find a new energy source. If the team finds all three the of the energy sources, they win the game.

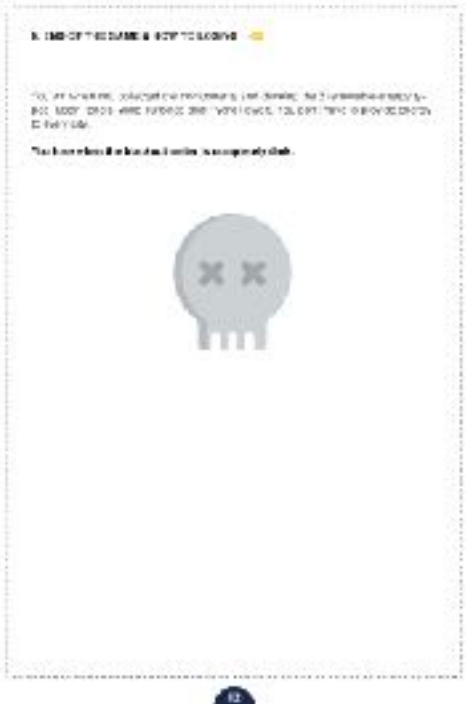
The figures that are on the board at the start of the game are **outages.** These represent a loss of fossil energy in a city. The more outages that are on a city, the more trouble the city is in.

If a city loses all energy, a Blackout occurs. If this happens 8 times, the world goes black and the team loses.

Each player has a specific role with special abilities to improve the team's chances.

We were quite satisfied with the content in the first version, but players found some phrasings confusing and in the late stages of the project, while pinning down the terminology of the single mechanics, we changed a lot of the words. Below you can find the finalized, rephrased version of the manual:





5.2 Conclusion and transfer Realize phase

The Realize phase was a very intensive phase for us, since we had limited time to finish the project and all team members held themselves to high standards of quality. We were very busy producing visual designs and did a lot of research on how other games produce and present their manuals.

At the end of the Realize phase, we have a finished product that we can show to ABB. We have first versions of the visual designs and the manual. These can be used as templates for ABB to build further upon our game and complete it when they receive their new house style. Now that the Realize phase is complete, we can continue to work on our final presentation and the hand over to ABB.

6. ABB feedback

After the end of our report and after we had finalized the game, we organized a last meeting with ABB. During this meeting, we invited our contact person, Heidi and her colleague Roosa. We also invited our teacher and supervisor, Mikael. We let them play the game themselves for the first time, to really transfer the knowledge of how the game works and to ensure that they are able to see the final version in an optimal way.

When the game started, they started strategizing immediately and instead of just jumping into playing, they carefully read each other's role cards and tried to get the objective of the game clear for themselves. They did take a lot of time to start playing, but they felt prepared when they started. Mikael immediately played the assembler's first turn exactly the way we imagined would be perfect, by using your extra move to locate yourself in a strategic spot using travel between innovation centers. This gave us a good idea about the amount of strategy they would try to implement into the game.

We completely moved away from the table and didn't respond to questions, so they looked some details up in the manual quite often, which it good because that means we've given them the toolkit to figure out the game by themselves. It became clear quickly that they had a clear understanding of the game and they were thinking ahead a lot, placing new energy sources almost everywhere. After 50 minutes, we were afraid the team would take too much time but they finished the game in 1:00.41. All and all, from our point of view at least, the game went exceptionally well.

When they were finished, they looked very pleased with themselves and when we asked for their opinion, they let us know that they felt very happy about the game. On ABB's side

they were very happy that the game was finished, at least to our best abilities to finish it, and they were very enthusiastic about the result. Roosa told us that she was a little nervous to play it at first but got into the game very quickly and was able to play without too much problems. Mikael told us that he was very happy to successfully play this game and happy to play it with this company.

Heidi said that the game was nothing like envisioned at the start of the project, but she felt that this version was even better.

Image 6.

6.1 Reflection on team process

Now, after the project is finished, we would like to look back on our process. What went well and what could we have done better?

Team

At the beginning of the project, we introduced the team using our Belbin test results. These results gave us an indication of the kind of person we could potentially be in this project and in our collaboration. Looking back, we think this indication was quite accurate. Our team existed out of two shapers, one resource investigator and a team worker. We noticed that the tension could get a little high with this team, including the two shapers and that caused some miscommunication, discussion and frustration. These problems occurred mostly in the design details phase and the realize phase, where we had to make strict decisions about a lot of the details in both gameplay and design.

We think that if we agreed to listen to each other and be respectful of each other's ideas, we could have avoided a lot of the problems that we had. Because there was some tension, people quickly reacted angrily instead of patience and understanding.

In a private atmosphere, our communication was always amicable. Professionally, we all still have to learn a little about dealing with frustration and compromise-making.

Employer

The collaboration with ABB was very good. It became very clear from the start that we had a very similar understanding about the game, which caused little to no problems throughout the project. Our communication was informal and we experienced this to be very pleasant. During the meeting we were very open about our process and they were very open about their wishes and feedback. We felt like we were taken seriously throughout the experience and they really treated us like equals and as regular employees. They were very cooperative and really tried to get involved in the process while still giving us creative freedom. All and all we experienced the collaboration between ourselves and the employer as very positive and successful.

Process

The process went roughly the same as we imagined it would go at the beginning of the project. We had a clear understanding of the phases and when we would move from one phase to another, which went very well. When we reached the design detail phase, we had a lot of discussion and we took a lot of time here. Fortunately, we had foreseen this so we didn’t lose a lot of time for the realize phase.

Final deliverable

We're very happy about the final version of the game. We have made a functioning, immersive, simple and educational board game that is fun to play and encourages strategic thinking and teamwork. We feel this project was a realistic representation of a project we would work on in our professional fields. We learned a lot about working together in a multidisciplinary team, and all the knowledge we've gained on this will definitely taken with us into our future projects.

Conclusion

The first few phases went down very well. We noticed that we worked together well creatively and that we really knew how to progress, regardless of our different backgrounds. We had the same ideas of how we wanted the game to work and were open to each others ideas.

When we entered the design details and realize phases, we encountered a lot of communication problems and started to be less open to each others opinions and ideas. Our views on the game started to diverge and we didn't handle this in the best way. Because of a lack of time and unexpected changes, we became quite frustrated with the project and each other and it was challenging at times to regain our concentration. In the final weeks, we really had a lot of work left and were forced to set our different views aside and make some hard decisions, which worked very well. When we finally decided on all the details, we regained our enthusiasm for the game and we could see this in the positive feedback we received during play-testing.

Looking back on the whole process, we feel like we had some difficult times on the way, but we've always kept focus on the goal and are happy now that we've reached this.

ATTACHMENTS

Attachment I – Cards

First Version:

All Cards we came up with so far

List of all Cards, sorted under each other, with numbers where they apply.

On some cards I have made some slight alterations, to clear things up or to make it more understandable.

	BAD EVENTS
27	Put a Card on Sao Paulo and 2 connected cities
14	Put 3 cubes on south America
23	Fly to Moscow
38	Add 1 cube in every continent
19	Put a cube on Perth and every connected city
18	Fly to Perth
17	Add 3 cubes to one city
37	Out 3 cubes on Asia, but only on cities that already have a cube
36	Put 2 cubes on Saint-Laurant
16	Fly to Bogota
22	Put 3 cubes on Buenos Aires
46	Add 3 cubes in Oceania
26	Put a cube on Agadir
24	Fly to Zürich
8	Tornado! Lose all energy in XXX and put 3 cubes on it
47	Something went wrong, put all the cubes removed this turn back on the board
1	Out a cube on Tokyo and all connected cities
36	Mobile network is down, the team can't talk to each other until the end of next turn
42	Something went wrong, put all the cubes removed this turn back on the board
10	Put a cube in the city you're in and all connected cities (this ovverrides the Engineers ability!)
45	The research center in bangalore is off the grid now
41	Choose (dice roll - 3) cards in your hand. Discard them.
15	Add 1 cube to all cities in North America
29	Put 2 cubes on Singapore
4	Put 3 cubes on Africa
21	Check which player has the least amount of cards in hand. Every player discards cards from their hands until they have the same number of cards.
40	Put 6 cubes on cities in Europe, that already have a cube on them
2	You can't use your role's ability or Action Cards for the next turn (maybe the next player would also be cool, just to fuck up planning)
34	All cities connected to a 3 cube-city get 1 more cube. (Doesn't count for cities that already have 3 cubes.)
9	Draw no new cards from the Player-deck this turn
12	Put a cube on Hong Kong and two connected cities
11	Put 2 cubes on Kinshasa
5	Something happened in Sacramento, put 2 cubes there (Sacramento is a research city, isn't it?)
25	fly your ass to Cape Town, bitch.
30	You can't move next turn, but still use Abilities and Action Cards
3	Flood! Lose all energy in XXX and put 3 cubes on it.
39	Put 3 cubes on Asia
28	The city you are in gets 3 cubes
20	HQ flaw! Put cubes on all cities connected to Zürich
32	You got electrocuted! You are in intensive care, skip your next turn
43	Earthquake! Lose all energy in XXX and put 3 cubes on it.
7	Roll a dice. Out as many cubes on America as the result of the dice roll
44	You have 1 action less next turn.
3	You have 1 action more next turn (good event)
33	Mix up! Reshuffle the discarded Event cards into the deck.
6	The outage-rate increases
13	Add 2 cubes in Europe

Now all Player cards, but I split them into Action Cards and Good Events

	ACTION CARDS
10	Use a discarded action card again. Remove it afterwards from the game.
24	Draw 2 cards, then discard 1 card from your hand
27	Move any pawn to any city
26	Use this card as a joker to complete a set for curing
6	Move to any city in the same continent
17	Use this card as a joker to complete a set for curing
4	Trade one card freely with any player
2	Move another pawn to your location. This doesn't have added value for the manager
23	Use this card as a joker to complete a set for curing
25	Take any action card from another player
28	Remove 1 cube in every city a player is in
7	Move to any city with 3 cubes in it.
22	Move and use the abilities of another player for this turn.
8	You can fly to any city.
16	Quarantine a city. Don't remove the cubes, but don't place more in the future (I like it, but not sure if we should implement that)
15	Move to any research center
19	Draw 3 cards and discard 2 from your hand afterwards
12	You and another player draw a card
1	Supply 2 cities with a reliable power grid. This only works once the solution has been found.
5	Play a Event card from the discarded one's. Remove it from the game afterwards.
3	Rearrange the top 6 cards of the Event-deck
17X	Supply 2 cities with wind energy. This only works once the solution has been found. (was sorted as event)
14	Repair a research center
29	Supply 2 cities with water energy. This only works once the solution has been found.
30	Remove all cubes from any city.
11	Remove an Event card from the discard-pile for the rest of the game.
9	Use another player's ability for one time instead of your own.
21	Play as another player's role this turn.
13	SPECIAL: Use this card to ignore an event anytime in the game. Afterwards remove this card from the game.
20	Look at the top 3 cards of the Event-deck, pick one. Shuffle the 2 other cards in the pile, put your picked card on top of the deck.

	GOOD EVENTS
13	For the rest of the game, you need one less card to solve a problem. This doesn't apply if you are the researcher/scientist.
48	You can hold 1 more card in your hand for the rest of the game
5	You can hold 1 more card in your hand for the rest of the game (this is really strong, I would only put one of these in)
18	Shuffle all discarded Player cards back into the deck
21	Remove a cube from your city and all connected cities
26	Breaktrough! Remove 2 cubes from America
31	Face the Crisis! Play with the top card of the Event-deck revealed. (could be too complicated)
19	Remove one cube from all the cities with pawn on them.
1	Skip the next event. (Perfect Management! The player after you draws one Event card less)
23	Remove as many cubes from any location on the map, as you already have removed this turn.
20	Skip the next event. (Perfect Management! The player after you draws one Event card less)
6	You can remove one cube from a city if there are one or more players on it.
25	Breakthrough! Remove 4 cubes from Asia
24	Breakthrough! Thanks to research in Vaasa, remove 4 cubes from Europe

<u>on</u> a city / <u>in</u> a city

Stuff we thought up, but are on no card at the moment
Asia, but only on cities that already have a cube.(if no cities have cubes, foresee random cities in Asia with the cubes)

	BAD DEVELOPMENTS
	Oh no, a transformer station went down! Put one outage marker in the city of São Paulo and all connected cities.
	By burning the rainforest the resources will only go quicker! Put three outage markers in South America.
	Emergency meeting for the Northern Hemisphere! Fly to Moscow for further planning of the crisis.
	Some countries closed their borders to stop sharing energy with others! Add one outage marker in every continent.
	A faulty generator in a coal plant went down! Put a cube in the city of Perth and every connected city.
	For better management of the crisis in Oceania an ABB expert is needed! You fly to Perth.
	A very harsh winter hit Finland hard, lose energy in the city of Vaasa and put two outage markers on it.
	Covering long distances with a power grid can be really hard and time consuming. Put two outage markers in the city of Ulaanbaatar and one in Almaty.
	Winter came early and harder than expected, put two outage markers in the city of Saint-Laurent.
	The engineer and the factory worker are needed for testing new, experimental technology. Fly both players to Bogota now.
	A big drought in Nairobi causes the power plant to run out of cooling water, put two outage markers in the city.
	Major miscommunication in a gas power plant. Add one outage marker to all cities in Oceania.
	It's hard to proof energy production against the forces of the desert. Put two outage markers in the city of Dakar.

	Important meeting at the headquarter in Zürich! The engineer and the manager are needed and have to immediately fly there.
	Oh no, a huge Hurricane! Lose energy in Miami and put two outage markers on the city.
	Making sure you did the job right the first time is essential for success! Put all the outage markers you removed this turn back on the board.
	You can't see anything due to all that smog! Put one outage marker in the city of Hong Kong and all connected cities.
	You used too much energy for a project! Put one outage marker in the city you're in and all connected cities. (This overrides the Worker's ability!)
	Fracking was never a good idea! Add one outage marker to all cities in North America.
	Smog from all the coal plants takes over the city, put two outage markers in the city of Beijing.
	The Congo just closed it's borders, put one outage marker in Kinshasa and all connected cities.
	Problems tend to get worse when no one cares about them. Put six outage markers on cities in Europe, that already have a marker on them. (If no city has a marker chose the cities yourself)
	Work tends to get harder when you neglect it. Put one outage marker in all cities connected to a city with three outage markers. (Don't put markers on cities already having three outages)
	Energy loss cut your internet connection, don't draw from the ABB supplies this turn.
	Abu Dhabi rations their oil exports, put one outage marker in all cities connected to it.
	Too much trash from developed countries cause riots in West Africa. Put two outage markers in the city of Kinshasa.
	Loose environmental laws make the consumption of fuel in Sacramento explode, put two outage markers in the city.
	A conference in Cape Town requires the engineer and the scientist, move both pawns of each role there!
	Huge flood in Chile due to El Niño! Lose energy in the city of Santiago and put two outage markers on it.
	There is a problem with oil refineries in North America. Put three outage markers in North America!
	Miscommunication in the team caused a mix up! The city you are in loses energy,

3	Remove a cube in the city you're in and all connected cities
9	Move any number of cubes from one city to another.
8	Remove 1 cube from all cities with 3 cube on them (waaaaay too strong)
7	For the rest of the game you have one more action per turn
15	Permanently save a city from outages
10	You can do 1 more action for the next 3 turns (I think we should redo that abit, counting turns can get confusing)
2	For every player in your zone you can remove a cube from that zone
12	Make a whole continent immune to XXX outages for the next turn.
22	Breakthrough! Remove 4 cubes from Oceania and Asia

Second Version:

	XXX
remove a cube in the city you're in and all connected cities	Draw no new cards this turn
rearrange the top X cards of the outbreak deck	Mobile Network is down! For the next turn, the team cannot talk to each other.
skip the next spread of outages	Transformer Station Failure, add a cube to every city in zone XXX
move any pawn to any city - with permission	Every player discards their hand to the amount the player with least cards has
remove 1 cube in every city a player is in	Problems in the supply chain, don't draw cards this turn
draw 2 cards	
get 2 additional actions this turn	
repair a research center	
International Staff Meeting, this turn trade cards freely with other players	
remove as many cubes as you've already removed this turn	

Event Cards

These cards work as a replacement for the infection cards in Pandemic and will introduce a more random, surprising and narrative Element to the game.

+	-
Breakthrough! Thanks to research in Vaasa, remove 4 cubes in the yellow area	Put 6 cubes on the map, you can choose where to put them
You can remove one cube from a city if there is one player or more on it	Put 3 cubes on one colour, you can choose where to put them
You are promoted, you can keep one more card in your hands	You won't be able to move for one turn due to a big outage in the city you are in
You win 1 action for the next 2 turns	You lost 1 action for the next 2 turns
the outage-rate decreases	You've been careless! Put a cube in the city you're in and all surrounding cities.
remove one cube from the cities with 3 cubes	The research center in XXX is off the grid now!
You can move cubes from one city to another	the outage-rate increases!
New innovation! Use this card/piece of technology as joker to complete curing	Mixup! Reshuffle all the events into the Event-deck
Containment! Permanently save a city from further problems	Roll a dice, it will decide how many cubes you have to add on the map
Company Training! For the rest of the game you have 1 more action per turn	Bad luck, add 1 cube in all the (colour) cities without any cubes yet
Teamwork, you and another Player can both draw an additional card	Add 3 cubes on one city
Teamwork II, for every player in your zone, remove 1 cube from that zone	all cities connected to a 3 cubes city get one more cube if there is less than 3 cubes (it doesn't cause an outbreak)
Anytime. You can use this card to use someone else's ability instead of yours	Choose (dice roll-3) cards you have to remove from your hands
You draw 1 more card this turn but you will have to remove 1 from the cards you drawed	You can't use your abilities for 1 turn
Touch the skies! For the rest of the game play with the top card of the event-deck revealed	The city you are in get 3 cubes
fly to another city	Flood!/tornado/earthquake Lose all energy in

<u>All</u> Cards we came up with so far

STUFF TO ASK ABB:

- **What have Hydro and Solar in common?**
- **Which roles in the company do they want to be represented in our little stories? What are the actual names of our roles?**
- **More cool tech to include? (Solar Impulse…)**
- **facts about ABB they would like us to include**

REWORDING EVERYTHING, CLEAR DESCRIPTIONS FOR EVERYTHING, ALL SAME STYLE

male/female roles (pictures/wording)?

	ROLES
Manager	You are the master of planning and strategy, gather the team around you and don't lead it into chaos! - Your advanced planning techniques let you move another player's pawn like it was your own. (It still costs you actions) - You always keep the big picture in mind and can use one action to move one pawn to the location of another pawn to keep the team together.
Industrial Scientist (R&D)	You are the brains of the group, the team will rely on your knowledge and scientific skills! - Research is your nature and no one can match your skills in that: You need one component less to research a renewable energy source. - Your vast knowledge helps you to better understand the reason of the outages, which enables you to remove outage markers from cities connected to your location.
Engineer	As the link between science and application you are the most creative - and best - in fixing the problems at hand. - Due to your great training finding the reason for an outage is just too easy for you: remove all outage markers from a city for only one action. - Fast application of solutions is what you're best at: Once an energy source has been researched, by walking through matching cities
	you automatically install them there.
Factory Worker	The hard working with a practical attitude are always the most important ones and come on: where would the others be without you! - Hard, honest work pays off! You have 5 actions per turn. - Your down-to-earth attitude let's you identify problems better where they are actually happening. Prevent the loss of energy in the city you are in and all connected cities.

Here we have to put on more educational shit, and small infos about the stuff (Flavour text)

Proposal: Every single component-card gets a unique picture and a small fact/story what's in the picture

(Shitty, made-up examples: "The Xyslfkajsd-offshore wind park is one of the biggest and most powerful in the word, thanks to ABB tech" / "ABB transformers are typically built in the country they are needed to reduce the impact on the environment")

COMPONENTS		
AMOUNT	**POWER TYPE**	**NAME**
2	HYDRO POWER	Protection Relay
2	WIND TURBINES	Rotor
2	SOLAR ENERGY	Inverter
3	SOLAR + WIND	Switchgear
3	HYDRO + WIND	Generator
3	SOLAR + HYDRO	
4	ALL	Transformer

	put two outage markers in it. Don't forget to plan together with your teammates!
	The management of a worldwide crisis really takes it's toll sometimes! Put one outage marker in Zürich and all cities connected.
	Earthquake! Lose energy in Naucalpan and put two outage markers in it.
	You should be organized in your documentation! Reshuffle all discarded Bad Developments back into the deck.
	A decision of the European Parliament stops the use of fossil fuels, add one outage marker in all European cities.

Do we need more of the ABB supplies?

"You get training from ABB…"

	ABB SUPPLIES
	YuMi Robot - Use this amazing piece of ABB technology as a joker to complete any set for research
	AZIPOD - Use this amazing piece of ABB technology as a joker to complete any set for research
	TOSA - Use this amazing piece of ABB technology as a joker to complete any set for research
	Build your actions on the wisdom of those who came before you. Use a discarded ABB supply card again. Remove it afterwards from the game.
	It is nice to have good company infrastructure! Move to any city in the same continent.
	You make good use of ABB's intranet and found how to help best! You may give one of your components to any player. (You don't have to be in the same city.)
	You are always stronger together, move another teammate to your location! (This doesn't have added value for the manager.)
	You get ABB management training and it instantly pays off! Move any pawn to any city.

	You can't solve everything alone, take any one card from another player if they are okay with it.
	Great teamwork in getting these circuit breakers online again! Remove one outage marker from every city a player is in.
	ABB employees quickly react to new challenges: You can move to any city with three outage markers in it.
	Sometimes you can't solve a problem without the skills of others: You may use the abilities of another player next turn.
	The solar-powered engines of the Solar Impulse plane are still going strong, take it for a ride and fly to any city.
	Take control of the power network and quarantine a city. Don't remove the cubes, but don't place more in the future (I like it, but not sure if we should implement that)
	You are at the edge of innovation, ABB chartered a plane for you and you can fly to any research center.
	Supply two cities with efficient ABB solar cells. (This only works once the solution has been researched.)
	You've done a great job so far and get a raise! Play a ABB supply card from the discarded one's. Remove it from the game afterwards.
	You are doing great research and it pays off! Look at the top four cards of the Bad Development-deck and rearrange them how you like.
	Supply two cities with powerful ABB wind turbines. (This only works once the solution has been researched.)
	Supply two cities with reliable ABB hydro power. (This only works once the solution has been researched.)
	You and your team achieved great operational efficiency! Remove all outage markers from any single city.
	Well, no one does efficient decommissioning like ABB: Remove one discarded Bad Development card from the game.
	Lucky Break! Keep this card and use it to ignore a Bad Development anytime in the game.
	You're a master of maintenance! Remove an outage from the city you're in and all connected cities.
	Sometimes you have to make hard decisions

Attachment II – Narration (First Draft)

Version 1

Welcome to ABBlackout, a game where you, as a team, have to work together to supply the world with renewable energy! In this introduction you will find the rules and instructions to play the game!

Story

Planet Earth is running out of fossil fuels. We saw this coming for a while, but the world is in trouble and needs to be fixed now. You and your team of ABB experts are trying to provide the world with clean, sustainable and reliable energy. Once you have supplied the world with these new energy sources, you win the game!

Outages spread all over the world due to the lacking resources and the loss of energy seems unstoppable. Still you and your team fight for a bright future and try to find the best way to build the solutions: powerful wind turbines, efficient solar cells and reliable hydro power.

But this quest won't be easy for you because - like in real life - there are always obstacles to overcome and hard times for a team. But don't worry too much: your team has the global power of ABB behind them and your company will help you with everything they have! So brace yourselves and let the game begin…

Turns

The players play one after the other, each turn will have the same proceedings. When it's your turn:

- You can do up to four actions. These actions may include;
- Moving from one city to a connected city
- Removing/adding energy sources from the city you are in
- Using your special, role specific ability
- Use your whole turn to find the solution if you are in a research center and have a complete set of card

Once you have taken your four turns, you draw the number of cards determined by the the crisis level of the bad developments cards. Those cards will lead to bad events happening in the world.
The first one you draw are the event cards; in this stack you'll find bad things happening around the world; whether it's a loss of energy in a city or an emergency call that tells you to fly to another location, these cards are bad news and have to be executed immediately.

The second pile of cards you draw from is the action stack and you will take two of those cards at the end of your turn. Here you'll find actions that will help you in the game, but have to be stay in your hand at the end of the round. These cards require an action to execute.

You will also find other cards in this stack. First, there are good events in here that help you face the consequences of the bad events. These events can also be executed immediately.

Second there are object cards; these cards also stay in your hand and you need to collect a set of these to research a new energy source. We will come back to that later, but it is important to tell you that, since you're only human and have limited knowledge and abilities, you can only hold 7 cards in your hands at all times, unless you are told differently.

If you and another expert are in the same city, you can use actions to give or take cards from each other (with permission of course).

Outage rate

The situation around us is not improving; therefore we have an outage rate which tells you how many bad event cards a player has to draw at the end of the turn. The game starts of with this rate at 1, but this can increase and decrease throughout the game.

Roles

Now that we have a general introduction to the turns, let's look at our team. At the beginning of the game, you all pick a role by shuffling them and dividing them blindly. Each role, as it says on the card, has a special ability that will help you win the game and work together better. Don't forget to talk about your actions, because good teamwork will be required to win the game!

Unfortunately, good abilities come hand in hand with bad abilities. If you use your good ability, you must also use your bad ability, which is listed on the role card.

You can now pick your roles.

Cure

We are working together to find new energy resources all around the world, but how does that work? You will see that there are certain ABB research centers spread out on the board. These are located in Sacramento, Sao Paulo, Zürich and Bangalore. These

research centers have the ability to keep working on limited energy sources, but if there is no power in the city, this research centre will stop working, even if it's still available for traveling through. If there is a limited amount of energy restored, it will work again.

Because of ABB's excellent progress in research about this subject, they are giving a grand that allows you, as experts, to travel from one research centre to another by taking just one action.

Remember talking about the object cards? Well, this is where they come in handy. If you collect the right set of objects, you go to a research centre and hand in your cards. The turn after this you will stay on the centre and research for the entire turn. When you are finished with this in the next turn, you can put a token of the right colour on the new energy source that you provided. This means that you can use your actions to start clearing all that fossil fuel and replace this with your new source. To see which city needs which source, you can look at the colors; they correspond. Once a city is provided with this new source, it can no longer be affected by outages or bad events in the game.

Blackouts

This is a good thing, because the game has a twist. At the bottom of the board, you will find a blackout meter. This meter has 8 settings and can be adjusted by turning.

Every time a city runs out of energy and gets affected by an action again; there's a complete blackout. This means that all the connected cities of this location lose one energy cube and the blackout meter goes up a notch. You can do this 8 times until the whole world is black, and the game is lost.

Set up

So, let's set up the board. The two stacks of cards go on either side of the board and next to them there should be room for a discard pile, where you put down the cards you've used.

The lack of energy started badly in a few central cities and slowly started spreading; Naucalpan lost two energy sources and people started taking energy from connected cities, both Bartlesville and Lima lose an energy source as well. The same goes for Cairo, where two sources are lost, and Abu Dhabi and Nairobi, both of which lost one source. Hong Kong was affected as well; two sources were lost here and this spread to Beijing and Paranaque.

Because of an error in Perth, this city lost all of it's energy; put three cubes in Perth. Because of a communication error from Perth, a few more cities lost one energy source; Helsinki, Buenos Aires, Madrid and Almaty, add one cube on them.

You can match your role with the corresponding pawn and move this to Vaasa, since that is where you are located.

Now that the board is at a starting point; let's do a test run. The oldest experts have the most experience; so the oldest player starts. Try to use your actions to move to Helsinki and help restore an energy cube. So 1) move and 2) remove/add an energy cube. The other actions you can use as you please, but we suggest you use your research centres well and try to get spread out across the board in case something happens.

Don't forget; at the end of each turn you take the amount of event cards that the infection rate reads and execute these immediately. After, you take two action cards and either use the good events immediately or store the action and object cards in your hand.

Good luck, team!

Attachment III – Timestatements

Timestatements EPS

Sept. - Dec. 2016

Eric Fürstmann

Date	Time	Hours	Description
8/9/16	12:00 - 16:00	4h	ABB Meeting
9/9/16	12:30 - 15:00	2h 30m	Debriefing
10/9/16	11:00 - 15:00	4h	Homework in English, EnAw
12/9/16	10:00 - 18:00	8h	Project Management, English, Swedish, Projectwork
13/9/16	10:00 - 15:00	5h	Projectwork, EnAw, Homework in English
14/9/16	10:00 - 18:00	8h	English, Projectwork, Swedish
16/9/16	12:00 - 15:30	3h 30m	Projectwork
17/9/16	11:00 - 14:00	3h	Homework in EnAw
19/9/16	10:00 - 18:00	8h	English, Projectwork, Swedish
20/9/16	12:30 - 16:30	4h	EnAw, Projectwork
21/9/16	9:00 - 14:00 / 16:15 - 18:00	6h 45m	English, Projectwork, Swedish
22/9/16	10:00 - 16:00	6h	Projectwork
23/9/16	10:00 - 17:30	7h 30m	Projectwork, Homework in EnAw
25/9/16	12:00 - 14:00	2h	Homework in EnAw
26/9/16	10:00 - 18:00	8h	Projectwork, PM, Swedish, homework
27/9/16	10:00 - 17:30	7h 30m	Projectwork, EnAw, homework
28/9/16	10:00 - 18:00	8h	Projectwork, meeting with Roger, Swedish
29/9/16	10:00 - 17:00	7h	Projectwork, meeting with Mikael
30/9/16	10:00 - 16:00	6h	Projectwork, meeting/presentation with ABB
3/10/16	10:00 - 18:00	8h	English, PM, Swedish
4/10/16	10:00 - 16:00	6h	English, EnAw, Projectwork
5/10/16	10:00 - 18:00	8h	English, Projectwork, Swedish
6/10/16	10:00 - 15:00 / 18:00 - 20:00	7h	English, Projectwork
7/10/16	10:00 - 16:00	6h	English, Projectwork
10/10/16	10:00 - 18:00	8h	Projectwork, PM, Swedish
11/10/16	11:00 - 14:00 / 16:00 - 22:00	9h	Projectwork, EnAw, Swedish
12/10/16	10:00 - 18:00	8h	Swedish
13/10/16	12:00 - 17:00	5h	Projectwork, meeting with Mikael
14/10/16	11:00 - 17:30	6h 30m	Projectwork
15/10/16	12:00 - 16:00	4h	Projectwork
16/10/16	12:30 - 15:00 / 20:30 - 22:00	4h	Projectwork
21/10/16	20:30 - 22:00	1h 30m	Projectwork
22/10/16	12:30 - 18:00	5h 30m	Projectwork
23/10/16	16:00 - 20:00	4h	Projectwork
24/10/16	10:00 - 16:00	6h	Midterm Presentation, PM
25/10/16	11:00 - 19:00	8h	Projectwork
26/10/16	12:00 - 16:00	4h	Projectwork
27/10/16	11:00 - 16:30	5h 30m	Projectwork
29/10/16	13:00 - 16:00	3h	Projectwork
31/10/16	10:00 - 18:00	8h	EnAw Presentation, Projectwork
01/11/16	10:00 - 18:00	8h	Projectwork
02/11/16	10:00 - 17:00	7h	Projectwork, Energy Day
03/11/16	10:00 - 17:00	7h	Projectwork, Playtesting
06/11/16	9:00 - 11:30 / 14:30 - 18:30	6h 30m	Projectwork, Playtesting
07/11/16	9:30 -17:00	7h 30m	Projectwork, Meeting with ABB
08/11/16	10:00 -		Projectwork, Playtesting
09/11/16	8:00 - 18:00	10h	EnAw, Projectwork, Playtesting
10/11/16	10:30 - 17:00	6h 30m	Projectwork
11/11/16	10:00 - 17:00	7h	ABB meeting /w playtesting
13/11/16	12:30 - 16:00	3h 30m	EnAw Essay
14/11/16	12:00 - 15:00 / 21:00 - 00:30	6h 30m	Projectwork, EnAw Essay
15/11/16	10:30 - 16:00	5h 30m	Projectwork, EnAw Essay
16/11/16	10:00 - 16:30	6h 30m	Projectwork, EnAw Essay
23/11/16	10:00 - 16:30	6h 30m	Projectwork
24/11/16	12:00 - 17:30	5h 30m	Projectwork
25/11/16	9:30 - 16:30	7h	Projectwork
26/11/16	10:00 - 16:00	6h	EnAw, Projectwork
29/11/16	12:00 - 18:30 / 21:00 - 23:00	8h 30m	Projectwork, external playtesting
30/11/16	10:00 - 16:00	6h	Projectwork
02/12/16	13:00 - 17:00	4h	Projectwork
05/12/16	10:00 - 16:00	6h	EnAw, Projectwork
06/12/16	12:00 - 17:00	5h	Projectwork
07/12/16	11:00 - 22:00	11h	Projectwork
08/12/16	8:00 - 18:00	10h	Final meeting /w ABB, Projectwork

Timestatements EPS
Sept. - Dec. 2016
Delrue Mathis

Date	Time start	Time end	Hours	Description
30/08/2016	08:00	16:30	08:30	Orientation day
01/09/2016	09:00	16:00	07:00	Team building + introduction to the projects
02/09/2016	10:30	14:30	04:00	Team building
05/09/2016	14:30	16:00	01:30	Project management
06/09/2016	08:00	09:30	01:30	English
	12:30	14:30	02:00	Environmental Awareness
	18:00	19:00	01:00	English
07/09/2016	12:30	14:30	02:00	English
	16:15	18:15	02:00	Swedish
08/09/2016	12:00	16:00	04:00	ABB meeting
09/09/2016	12:30	15:00	02:30	Debriefing about the meeting
10/08/2016	10:00	13:00	03:00	Environmental Awareness - English
	14:00	16:00	02:00	Project Management
	16:00	18:00	02:00	Project work
11/09/2016	15:00	18:30	03:30	Project work + homework
12/09/2016	10:00	11:30	01:30	English
	12:30	14:15	01:45	Schedule
	14:30	17:45	03:15	Project management + Swedish
13/09/2016	10:00	11:30	01:30	Scrum + schedule
	12:30	14:00	01:30	Environmental awareness
	18:00	20:00	02:00	Basics of 3D printing
	20:30	22:00	01:30	English - Swedish
14/09/2016	10:00	12:00	02:00	Work on the project
	12:30	14:00	01:30	English
	14:00	16:00	02:00	Work on the project
	16:15	17:45	01:30	Swedish
16/09/2016	12:00	15:00	03:00	Researches - interviews - game mechanics
	18:00	21:00	03:00	Homework
17/09/2016	14:00	16:30	02:30	Project Work
18/09/2016	15:00	19:30	04:30	Homework
19/09/2016	10:00	11:30	01:30	English
	12:30	16:00	03:30	Researches - look for games
	16:15	17:45	01:30	Swedish
20/092016	12:30	14:00	01:30	Environmental awareness
	14:00	16:30	02:30	Rapport -preparing brainstorming
21/09/2016	09:00	12:00	03:00	Brainstroming
	12:30	14:00	01:30	English
	16:15	17:45	01:30	Swedish
22/09/2016	10:00	16:00	06:00	Brainstroming - selecting ideas
23/09/2016	10:00	15:00	05:00	Matchup our ideas - working on concept
24/09/2016	14:00	16:30	02:30	Homework
25/09/2016	17:00	19:30	02:30	Homework
26/09/2016	09:30	11:30	02:00	Individual concepts
	12:00	14:30	02:30	Mutualise our concept
	14:30	17:45	03:15	Project management + Swedish
27/09/2016	10:00	12:00	02:00	Work on the project

Timestatements EPS

Sept. - Dec. 2016

Romy Koch

Date	Time	Hours	Description
08/09/2016	12:00-18:00	6h	ABB-team meeting and homework
09/09/2016	12:00-17:00	5h	ABB project and Environmental Awareness homework
12/09/2016	10:00-14.00	4h	ABB project
12/09/2016	14.30-18.00	3,5h	Project management and Swedish class
13/09/2016	8:00-11:00	3h	English and English homework
13/09/2016	12:30-15:30	3h	Environmental Awereness and ABB project
14/09/2016	12:00-16:00	4h	English and Swedish
14/09/2016	19:00-21:00	2h	Homework
16/09/2016	12:00-16:00	4h	ABB Project
17/09/2016	14:00-19:00	5h	Homework and ABB project
18/09/2016	10:00-12:00	2h	Environmental Awareness
19/09/2016	10:00-14.00	2h	English class and homework
19/09/2016	14:00-18:00	4h	Project management and Swedish class
19/09/2016	19:00-21:00	2h	Homework
20/09/2016	12:00-16:00	4h	Environmental Awereness and ABB project
20/09/2016	19:00-21:00	2h	Homework
21/09/2016	10:00-18:00	8h	English and Swedish and brainstorm + results
22/09/2016	12:00-17:00	5h	ABB project
23/09/2016	12:00-18:00	6h	ABB project and Environmental Awareness homework
24/09/2016	16:00-18:00	2h	Homework and ABB project
26/09/2016	12:00-14:00	2h	ABB project
26/09/2016	14:00-18:00	4h	Project management and Swedish class
26/09/2016	19:00-21:00	2h	Homework
27/09/2016	10:00-12:00	2h	ABB project
27/09/2016	12:00-14:00	2h	Environmental Awareness
27/09/2016	14:00-18:00	4h	Environmental Awereness and ABB project
28/09/2016	11-13.30	2,5h	ABB project
28/09/2016	13.30-14.30	1h	Meeting Roger
28/09/2016	14.30-18.00	3,5h	ABB project and Swedish
28/09/2016	19:00-21:00	2h	Swedish homework
29/09/2016	10:00-14.00	4h	ABB project
29/09/2016	14:00-15:00	1h	Presentation teachers and meeting
29/09/2016	15:00-18:00	3h	ABB project
29/09/2016	19:00-21:00	2h	ABB project
30/09/2016	10:00-13:00	3h	preparing presentation
30/09/2016	13:00-15:00	2h	Presentation and meeting ABB
30/09/2016	15:00-17:00	2h	ABB after presentation talk and scheduling
01/10/2016	20:00-23:00	3h	Prepare Swedish oral exam and study
02/10/2016	12:00-14:00	2h	Enviromental awareness homework
03/10/2016	10:00-18:00	8h	Guest lecture, Project Management and Swedish
03/10/2016	19:00-21:00	2h	Homework
04/10/2016	10:00-14.00	4h	English and Environmental Awareness
04/10/2016	14:00-17:00	3h	ABB project and homework
04/10/2016	20:00-21:00	1h	Homework
05/10/2016	10:00-18:00	8h	English, ABB project, homework, Swedish

Timestatements EPS
Sept. - Dec. 2016
Samira El Messaoudi

Date	Time start	Time end	Hours	Description
30/08/2016	08:00	16:30	08:30	Orientation day
01/09/2016	09:00	16:00	07:00	Team building + introduction to the projects
02/09/2016	10:30	14:30	04:00	Team building
05/09/2016	14:30	16:00	01:30	Project management class
06/09/2016	08:00	09:30	01:30	English class
	12:30	14:30	02:00	Environmental Awareness class
07/09/2016	12:30	14:30	02:00	English class
	16:15	18:15	02:00	Swedish class
08/09/2016	12:00	16:00	04:00	ABB meeting
09/09/2016	12:30	15:00	02:30	Debriefing about the meeting
10/08/2016	10:30	16:00	05:30	Environmental Awareness - English class
	17:00	19:00	02:00	Project Management class
11/09/2016	16:00	17:15	01:15	Defining the project
12/09/2016	10:00	11:30	01:30	English class
	12:00	14:30	02:30	Making Schedule
	14:30	17:45	03:15	Project management + Swedish class
13/09/2016	10:00	11:30	01:30	Scrum + schedule
	12:30	14:00	01:30	Environmental awareness class
	17:00	20:00	03:00	English homework
	20:30	22:00	01:30	Swedish homework
14/09/2016	10:00	12:00	02:00	Project work
	12:30	14:00	01:30	English class
	14:00	16:00	02:00	Project work
	16:15	17:45	01:30	Swedish class
16/09/2016	10:00	15:00	05:00	Researches - interviews - game mechanics
17/09/2016	10:00	16:30	06:30	Project work
18/09/2016	15:00	19:30	04:30	Environmental Awareness homework
19/09/2016	10:00	11:30	01:30	English class
	12:30	16:00	03:30	Project work
	16:15	17:45	01:30	Swedish class
20/09/2016	10:00	12:00	02:00	Project work
	12:30	14:00	02:00	Environmental awareness class
	14:00	16:30	02:30	Rapport - preparing brainstorming
21/09/2016	09:00	12:00	03:00	Brainstorming
	12:30	14:00	01:30	English class
	16:15	17:45	01:30	Swedish class
22/09/2016	10:00	16:00	06:00	Brainstroming
23/09/2016	10:00	15:00	05:00	Diverging ideas
24/09/2016	14:00	16:30	02:30	Project homework
25/09/2016	17:00	22:00	05:00	Environmental Awareness homework
26/09/2016	09:30	11:30	02:00	Project homework
	12:00	14:30	02:30	Merging our concepts
	14:30	17:45	03:15	Project management + Swedish homework
27/09/2016	10:00	12:00	02:00	Project work
	12:30	14:00	01:30	Environmental awareness class
	14:00	16:30	02:30	Project work