DIGI EDU HACK 2024

10.11.2024

Virtual Escape Room – Escape to Sustainability

Maritime Mindbreakers

Jade University

DigiEduHack 2024 Blue Anew Network

European Commission

DigiEduHack is an initiative under the Digital Education Action Plan (2021-2027) of the European Commission

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01 Maritime Mindbreakers

Members & Background

Jupp Allenstein

Studying at the Jade University of Applied Sciences in Elsfleth, Germany.

Bachelor's program in International Logistics Management in the 4th semester.

First participation in a Hackathon.

Little experience with administrating a local escape rooms.

Christiane Drechsel

Studying at the Jade University of Applied Sciences in Elsfleth, Germany.

Bachelor's program in Nautical Science in the 5th semester.

First participation in a Hackathon.

No experience with escape rooms.

Hanna Wohlers

Studying at the Jade University of Applied Sciences in Elsfleth, Germany.

Bachelor's program in Maritime Transport and Port Management in the 5th semester.

First participation in a Hackathon.

No experience with escape rooms.

Julia Swiergiel

Studying at the Jade University of Applied Sciences in Elsfleth, Germany.

Master's program in Maritime Management in the 2nd semester.

First participation in a Hackathon.

Little experience with playing escape rooms.

02 Storyline
1/4

In our digital escape room adventure Escape to Sustainability the players become crew members on board the containership Green Voyager, sailing across the Baltic Sea e.g. from Rostock to Tallinn. Their mission: to deliver the cargo safely, while following strict environmental rules regarding marine pollution from ships. But there is a twist: there are several occasions where the vessel's sustainable voyage is in danger.

The players are confronted with different challenges during their team voyage such as sudden waste system breakdowns and equipment malfunctions, forcing them to make careful decisions to address each issue without violating environmental rules. Any mistakes made on the journey alert the authorities in the port of discharge and bring serious trouble for the vessel and the crew.

01 Storyline
2/4

To guide their decisions, an Ecometer tracks the environmental impact of the actions and shows if the vessel and the crew are following environmental rules. If the Ecometer stays green the players are on the right track. But if it drops into the red, it signals that the ship is causing harm to the sea, and the risk of inspection increases.

Time is running out! Can the players reach the port of discharge safely, deliver the cargo and avoid unwanted inspections? The actions and decisions of the players will determine whether they complete their mission while protecting the sea.

„Ecometer“

01 Storyline
3/4

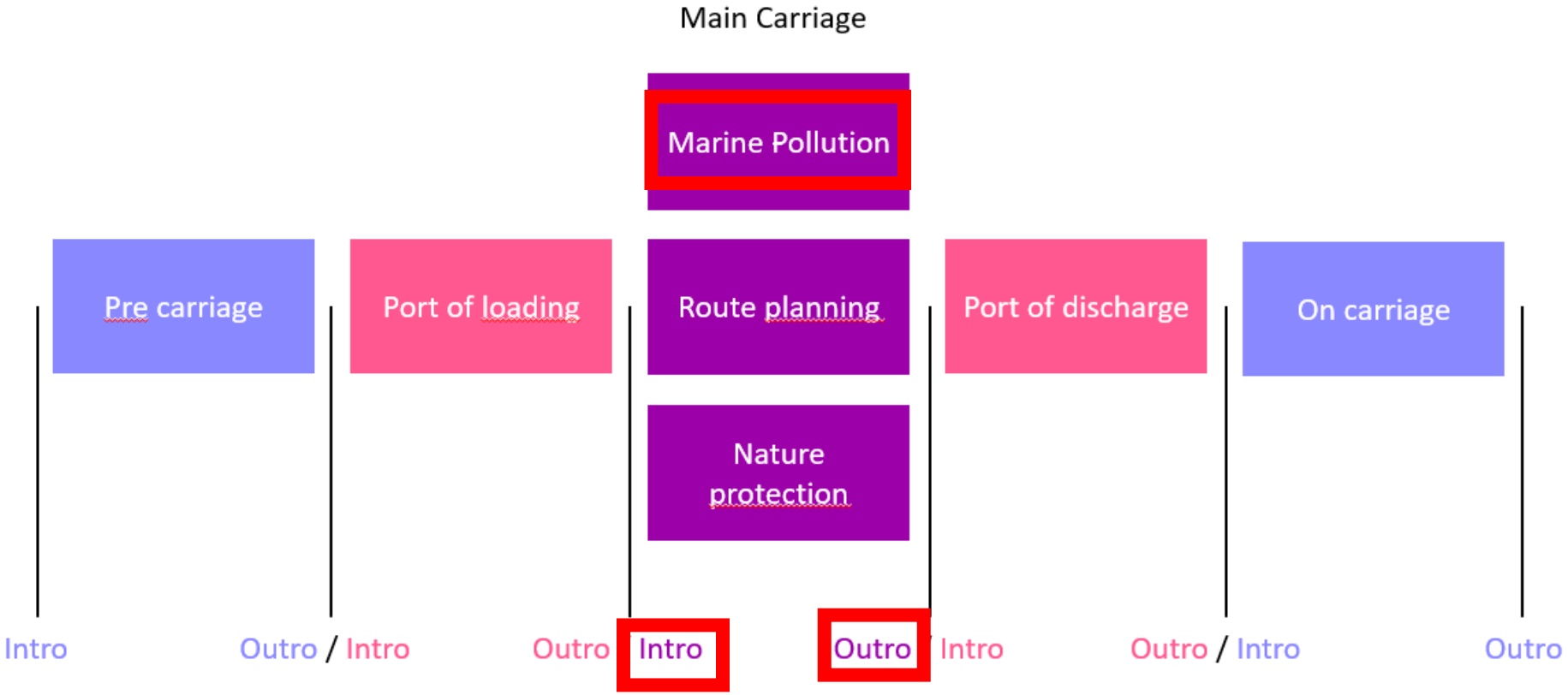
At the end of the escape room game, participants not only experience the relief of having brought the ship sustainably into the port to deliver the cargo duly - they also feel like protectors of the oceans and understand the importance of their own actions for environmental protection.

Through the playful exploration of topics such as waste separation, noise protection for marine animals, the prevention of chemical pollution and compliance with international environmental guidelines, the players have gained a deeper understanding of the challenges of the maritime environment. They realise that every action on board, whether small or large, has an impact on marine life and the entire ecosystem.

At the end of the game, the participants receive an Eco-Baltic-Hero award as a symbol of their commitment to protecting the environment. A short reflection invites the group to think about how they can implement what they have learnt in their everyday lifes - for example by using less plastics, travelling responsibly or reducing their carbon footprint.

01 Storyline
4/4

Modular set-up of story telling and puzzles



= Developed for this concept

03 DIGIEDUHACK SOLUTION CANVAS

Solution description

We have drawn a concept for a digital learning escape room (ER) to draw participants' awareness to aspects of marine pollution. Participants are expected to be on their jump towards professional education in university or training at a maritime related company/organisation. The authors' desired objectives to be achieved range from an exciting gaming event in a maritime setting, a teamwork challenge, insight into various forms of marine pollution and how to prevent them and finally reaching a certain level of achievement or a title, as for instance a "Eco-Baltic-Hero" .

The final product is a digital ER of some 15-20 min duration. Participants are put in a role of a crew member on a cargo ship preventing various cases of marine pollution in order to deliver a cargo on-time to the final destination. It has a modular design and can be easily extended by a further ER in the future embedded in the same storyline addressing, for instance sustainable voyage planning in shipping. The concept of this ER adopts the suggested tools 'Scenario VR' by ELB Learning and 'we are learning' for an introduction.

The quizzes require a set of competencies such as observation, combination, selection and decision making, simple research in external media. The quizzes have different options of choice and the unique scoring tool is an 'Ecometer' delivering the sustainability points achieved. The solution can be easily made accessible to schools in various countries and also cross-country for more international teambuilding. This is possible as it is online and digital where participants can even meet at a distance.

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Context

Players are put in the role of a ship's crew to comply with rules and regulation for preventing marine pollutions of various kinds. The success is being measured in an Ecometer scoring tool.
The storyline involves life onboard a cargo ship in particular to attract young people for jobs in a maritime context, such as ports, shipping companies, navigation, maritime organisations and administration or others.

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Target Group

The ER is designed for teenagers / young adults in schools or vocational training aged 16/17-19. In general, the ER can be played by any individual or group of persons who are interested in playing Escape Rooms in a maritime and sustainability context.

The solution will at first affect the players in their role but may also indirectly impact organisations and companies in the maritime industry, such as ship owners, port terminals, navigation and technical crews of ships.
Core benefit is an increased awareness and promoting sustainable practices beyond the classroom. A side effect arises for the ER developers for increased awareness when adopting further ideas or new tasks.

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Impact

Some general benefits/impact can be seen from our solution, either from the ER or the storyline around it.

- Engagement and Motivation: the storyline is designed to catch the player and being integrated into the storyline as well as the objective.
- Critical Thinking and Problem-Solving Skills: The puzzles motivate to think critically and solve problems, skills that are vital for understanding sustainability challenges.
- Developing Empathy and Responsibility: The ER requires and develops a sense of empathy and responsibility regarding sustainability issues.
- Collaboration and Teamwork: Trainers and participants work in teams to either solve or design escape room puzzles, which encourages collaboration and communication.

There are different ways of monitoring impact. On the one hand there are interactive elements in the ER by which the ER owner can see participants involvement. From a pedagogical point of view the type of answers are being rated by an Ecometer as a scoring tool. In case of a class competition with more than one team the score measures the impact. The highest score group get the certificate "Eco-Baltic-Heroes".

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Innovativeness

Our solution is unique in the way that it integrates a specific industry (maritime) and region (Baltic). The developers have a maritime university background being intrinsically motivated by their field of education. It recognises UNCTAD's 7 Ocean Principles Literacy within the different quizzes.

Another aspect of uniqueness is the modularity of the storyline and further extension of the ERs. Further sustainability aspects can be addressed in a second consecutive ER within the same storyline onboard the ship, for instance involving sustainable voyage planning or technical aspects where applicable.

A first web research on similar products reveals that there are interactive web games at save the planet (https://www.readyforpeople.com/en/experiencias/save-the-planet/) or tackle the UN's 17 Sustainable Development Goals solving challenges around overproduction and consumption (https://design.amaze360.nl/sustainability-game/).

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Transferability

The storyline may appear quite narrow in a maritime transportation context but the embedded puzzle module can be easily adjusted by other quizzes in a different context or a different competency level, for example:

- Workshops and Seminars: Adapt the escape room for use in workshops or seminars at universities or vocational colleges.
- Corporate Training: Companies in the shipping industry or with significant logistics operations might be interested in using the escape room as part of their employee training programs on sustainability.
- Language and Cultural Adaptation: Translate and adapt the content to suit different languages and cultural contexts, expanding its reach to an international audience.
- Educational Competitions: Incorporate the escape room into larger educational competitions or challenges that focus on sustainability issues, engaging students around the Baltic.
- Teacher Workshops: Host workshops for teachers to learn how to facilitate your escape room, equipping them to run it in their own classrooms.

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Sustainability and Team work

Sustainability:

No particular plan for implementation in the short- or mid-term exists so far, but it looks promising to the authors to develop the concept further in the faculty context.

Teamwork:

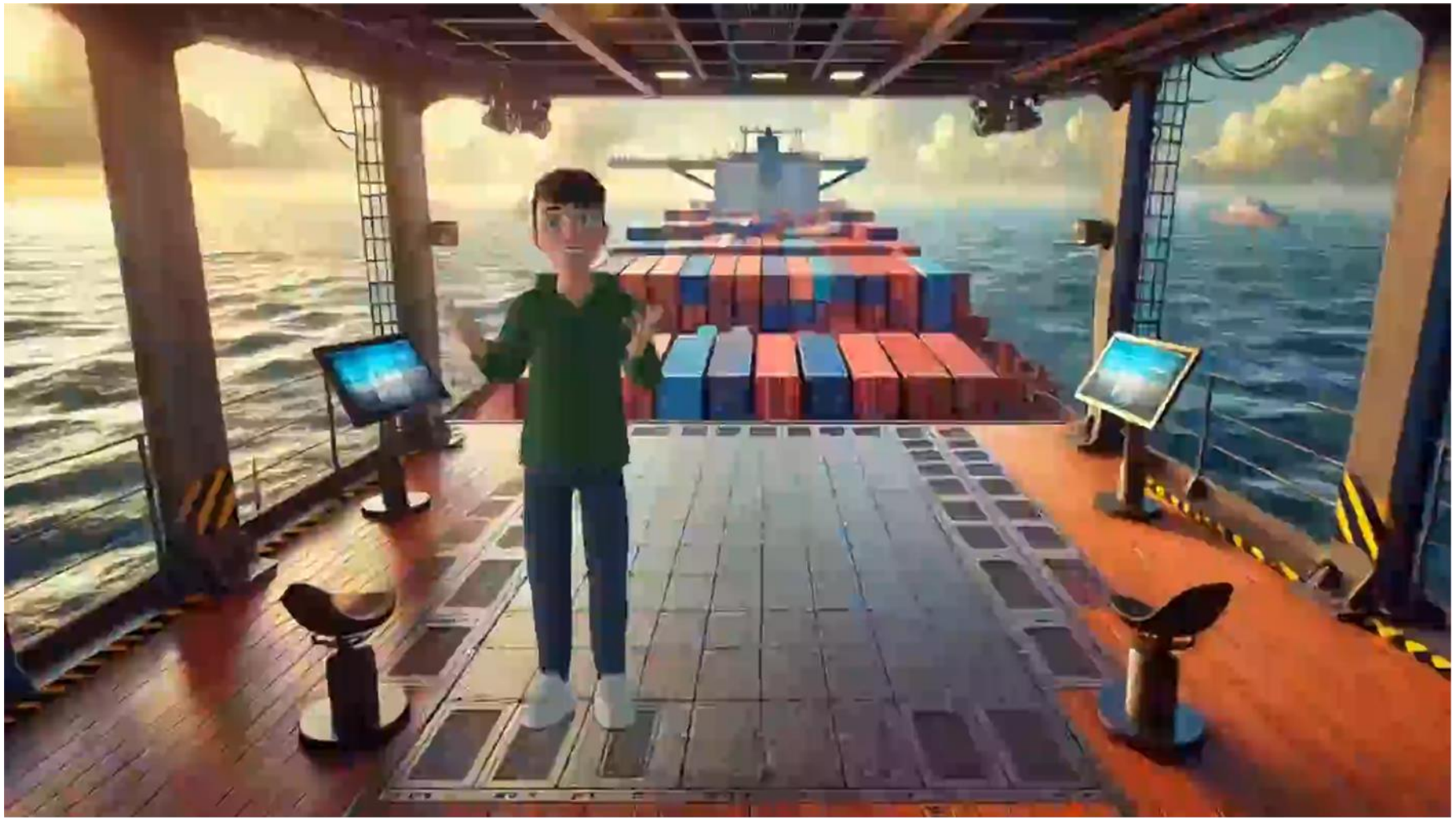
The authors' team was set up by students from different study levels and programs incl. nautical studies, logistics management as well as shipping and port business.

The storyline was quickly agreed upon and the puzzle developed.

Teamwork was excellent and trials of the different digital tools worked well. Continuation of this work in future is limited as the students are facing their exam period at the end of the year. It probably needs to be handed over to a successor group of students.

04 Virtual Escape Room

Intro



Watch separate video file Eduhack In.mp4

04 Virtual Escape Room

Intro – Storyboard 1/2

Action: Pictures of the Baltic Sea, gentle waves. A cargo ship appears on the horizon and heads towards the camera.

Text: "The Green Voyager, a container cargo ship on an important mission in the Baltic Sea, awaits your arrival. However, before this vessel can reach its destination and unload its cargo, you will be required to complete a specific task."

Action: Animation of the ship travelling through the Baltic Sea with images of rubbish in the water

Text: "The Baltic Sea represents a distinctive yet vulnerable ecosystem that is significantly impacted by environmental contamination. The presence of sewage, chemicals and plastic debris represents a significant threat to the biodiversity of these aquatic ecosystems. It is evident that a considerable number of ships are not adhering to the established guidelines, thereby contributing to the pollution of marine environments.
Your task? As the Green Voyager team, you must raise awareness of sustainability by preventing offences on board and thus gaining the right to enter port safely."

Action: Players who solve puzzles, use interactive elements and communicate with each other

Text: "As a team comprising three to five individuals with expertise in environmental matters, your objective is to provide assistance to the ship's crew members. You will encounter challenging puzzles that will assess your proficiency in sustainability, teamwork, and problem-solving."

04 Virtual Escape Room

Intro – Storyboard 2/2

Action: Depiction of positive environmental influences, such as clean waters and healthy marine life

Text: "The success of the Green Voyager in reaching its destination as an exemplar of sustainable transport is contingent upon the decisions made along the way. If the necessary decisions are not made, the vessel may find itself unable to reach its intended destination due to the closure of the harbour gates. It is imperative that preparations are made without delay, as the future of the Baltic Sea is dependent on the decisions that are made in the present."

Action: The Escape Room logo appears with a slogan underneath: 'Protect the Baltic Sea - your mission begins now!'

Text: "Get ready for the adventure of a lifetime. The Green Voyager is waiting for you. Let's secure the future of our oceans together."

04 Virtual Escape Room

Puzzle – Challenge 1 'The pollution detectives'

Your first task is to identify different types of pollution in the picture and understand the impact of these pollutants on marine life.

Learning objective: 5th Ocean Literacy Principle, The ocean supports a great diversity of life and ecosystems

Task: The players have to identify different types of pollution (e.g. plastic waste, oil pollution) in a picture.

Additional information:
To further inform players and raise awareness, short videos or animations can be included to illustrate the effects of different types of pollution:

- Plastic waste: a clip shows how marine animals ingest plastic and the health consequences of this.
- Oil pollution: An animation shows the process of oil pollution and its effects on birds and other animals.

Completion of the challenge: After all stations have been successfully completed:
The players see the level of their Ecometer on the screen. The better they have done, the higher the score.

04 Virtual Escape Room

Puzzle – Challenge 1 'The pollution detectives'

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Questions to identify pollution:

1) What type of waste is most commonly found in the oceans?
   A) Glass bottles
   B) Plastic waste
   C) Paper waste
   D) Metal packaging
   Correct answer: B) Plastic waste

2) What is called 'microplastic'?
   A) Plastic objects that are larger than 5 cm
   B) Small plastic particles that are smaller than 5 mm
   C) Biodegradable plastics
   D) Plastic bottles that float in the sea
   Correct answer: B) Small plastic particles smaller than 5 mm

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Puzzle – Challenge 1 'The pollution detectives'

<u>Questions about the effects of pollution:</u>

3) how does plastic waste affect marine life?

A) It improves their living conditions.
B) It has no effect on them.
C) It can be eaten by animals and cause injury or death.
D) It helps with reproduction.
Correct answer: C) It can be eaten by animals and cause injury or death.

4) What is a possible effect of chemical waste in the ocean?

A) Promoting the growth of coral reefs.
B) Damage to the food web and biodiversity.
C) Improving the habitat for marine animals.
D) Increasing the clarity of the water.
Correct answer: B) Damage to the food web and biodiversity.

04 Virtual Escape Room

Puzzle – Challenge 1 ‘The pollution detectives’

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Questions about pollution prevention:

5) What is an effective method to prevent oil pollution from ships?

A) Regular maintenance and inspection of tankers.
B) Using cheaper materials in the construction of ships.
C) Ignoring existing regulations on oil disposal.
D) Increasing the number of journeys with empty ships.
Correct answer: A) Regular maintenance and inspection of tankers.

6) Which behaviour can help to reduce pollution on beaches?

A) Leaving rubbish lying around because it doesn't bother you.
B) Taking part in beach clean-ups and litter collection campaigns.
C) Using more disposable products when visiting the beach.
D) Ignoring warnings about pollution on the beach.
Correct answer: B) Taking part in beach clean-ups and litter picks.

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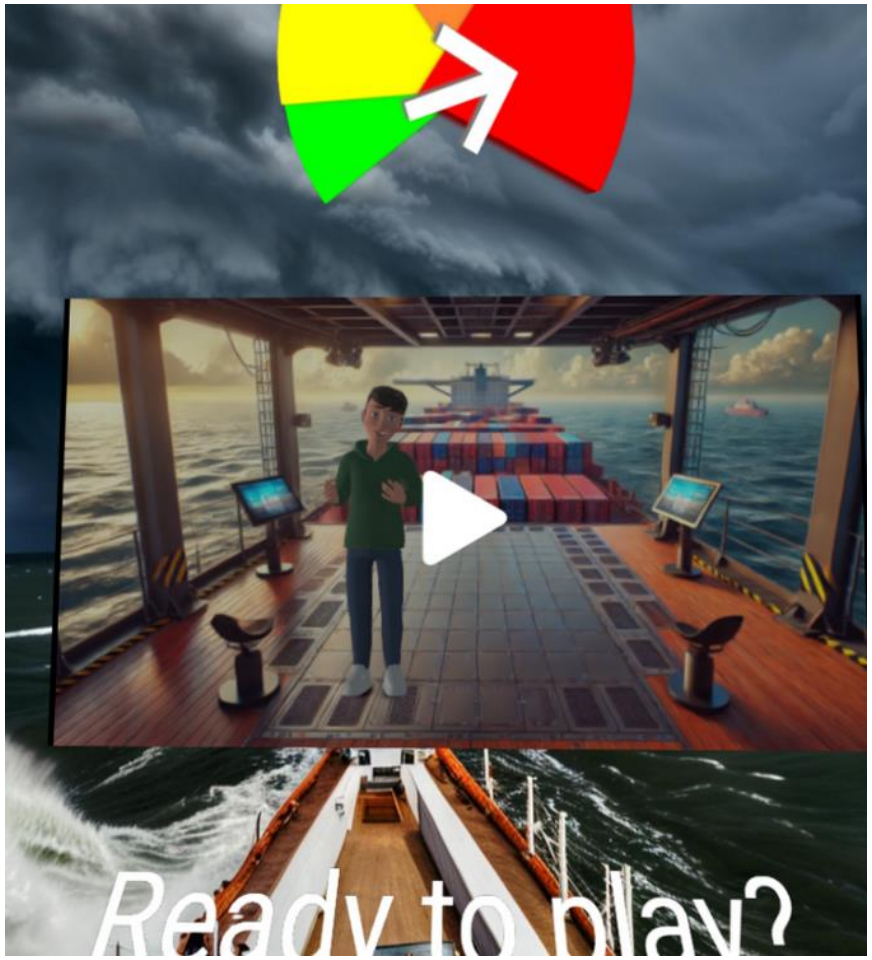
Puzzle 1



04 Virtual Escape Room

Puzzle – Challenge 2: Emergency in the engine room

The players are on board when an important component of the exhaust filter system suddenly fails. If the system is not repaired quickly, the ship threatens to exceed the permitted emission limits, which leads to an alarm on the Ecometer. In addition, a sudden increase in speed has increased emissions. The players must act quickly to reduce the emissions and adjust the speed of the ship.

Learning objective: Awareness of the connection between ship speed and emissions. Promotion of sustainable decisions in the maritime sector.

Task: Identify the problem with the exhaust filter system.
Carry out repair measures.
Adjust the speed of the ship to reduce emissions.

Completion of the challenge: After all stations have been successfully completed: The players see the level of their Ecometer on the screen. The better they have done, the higher the score. ‘Your quick decisions have helped to control emissions and bring the ship safely into harbour!’

04 Virtual Escape Room

Puzzle – Challenge 2 Emergency in the engine room

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Problem identification:

Players see a graphical representation of the exhaust filter system with the following components: Catalytic converter, particulate filter, sensor. A red warning symbol indicates that a part has failed.

Challenge: The players must identify the defective component from several options (e.g. catalytic converter, particle filter, sensor).

Interaction: Players can click or tap on the individual parts (catalytic converter, particle filter, sensor) to get more information.

Question: Please name the specific component that is responsible for reducing nitrogen oxides.

Correct answer: Catalytic converter

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04 Virtual Escape Room

Puzzle – Challenge 2 Emergency in the engine room

Speed adjustment:

A speed regulator is displayed. The players must adjust the speed of the ship to reduce emissions.
The players have to decide how much they should reduce their speed. They receive information about the relationship between speed and emissions.

- Step 1: Graphical representation: players see a visual speed controller with a pointer standing on the ship's current speed (e.g. 25 knots). There is a colored scale (red for high emissions, yellow for moderate emissions, green for low emissions).
- Step 2: Information on the relationship between speed and emissions. Information board: An information box is displayed in which the players are informed about the relationship between speed and emissions:

  ‘A 10% reduction can reduce emissions by 20%.’
  ‘A 20% reduction can reduce emissions by 35%.’

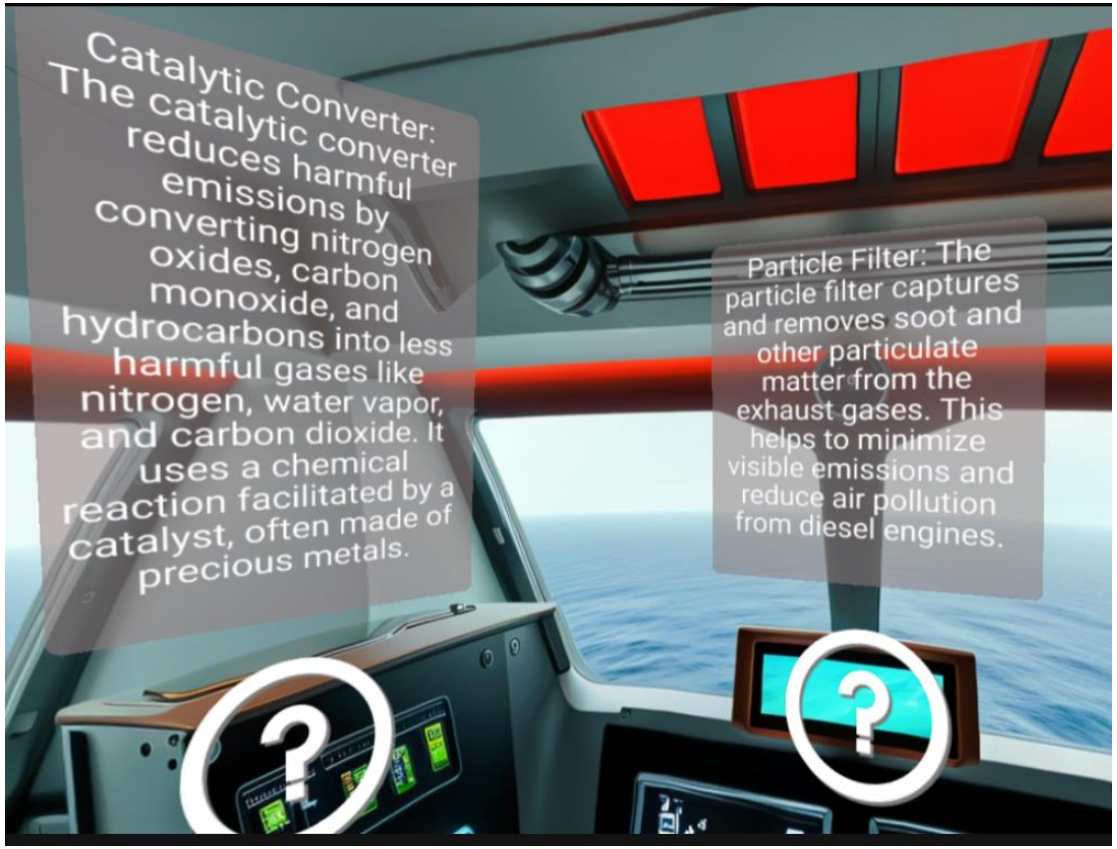
04 Virtual Escape Room

Puzzle – Challenge 2 Emergency in the engine room

- Step 3: Decision-making:
  Decision options: The players have to decide by how much they want to reduce speed.
  They have the following options: Reduce by 10%, Reduce by 15%, Reduce by 20%.
  Interactive elements: Players click a button or drag a slider to make their decision.
  Wrong decision: If the players only choose a reduction of 10%: The Ecometer remains in the yellow or red area.
  Negative feedback: ‘The reduction was not sufficient. Please try again with a higher reduction!’
- Step 4: Feedback and impact:
  Right decision: If players choose a reduction of at least 15%: The Ecometer shows an improvement and changes to the green zone.
  Positive feedback: ‘Well done! Your decision has helped to successfully reduce emissions!’

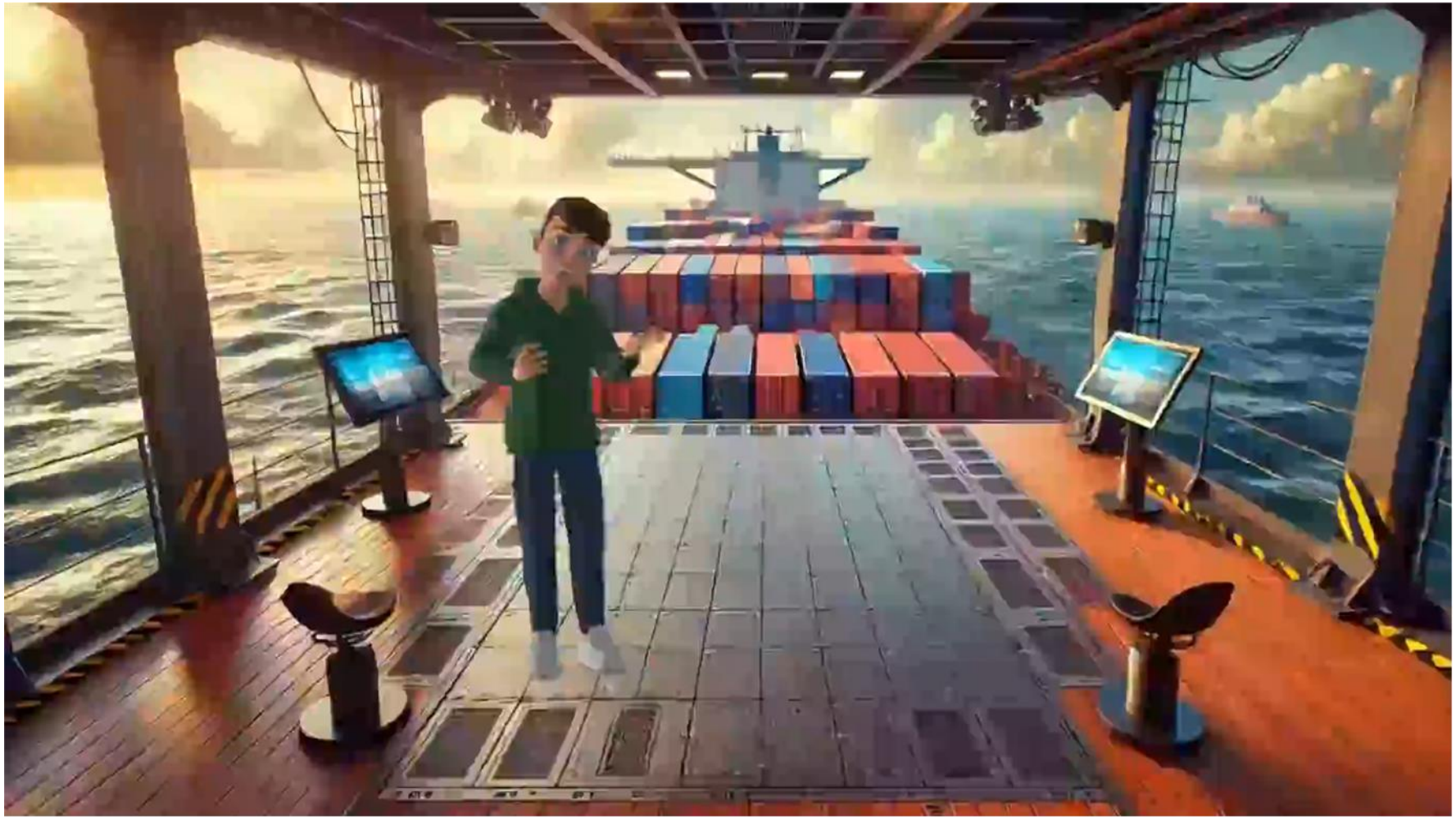
04 Virtual Escape Room

Puzzle 2



04 Virtual Escape Room

Outro



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04 Virtual Escape Room

Outro – Storyboard 1/2

Action: The cargo ship approaches the safe harbour in calm waters as the horizon lights up. The logo of the 'Mission Baltic Sea' escape room appears.

Text: "Congratulations! Together you mastered the challenge and brought the Green Voyager safely into harbour. Through your decisions and commitment, you prevented the Baltic Sea from being exposed to further pollution."

Action: Short reviews of the completed tasks. Each scene shows a completed challenge, such as sorting waste, sealing a leak or recognising hazardous substances.

Text: "As a team, you were challenged to solve difficult puzzles and pay careful attention to the environment. You separated waste properly, discovered and eliminated oil leaks and disposed of hazardous substances safely. Your commitment has made the Green Voyager an example of sustainable transport."

Action: Ein sanfter Zoom auf das Deck des Schiffes, wo die Spieler, symbolisch dargestellt, zusammenstehen.

Text: "Every step of this journey has contributed to keeping the oceans cleaner and raising awareness of compliance with international environmental standards."

04 Virtual Escape Room

Outro – Storyboard 2/2

Action: A digital ‘Ecometer’ appears, showing the players' environmental awareness score. The bar moves into green areas depending on the player's performance.

Text: “Based on your decisions, the Ecometer shows your environmental balance. This measuring instrument illustrates how much you have contributed to the preservation of the Baltic Sea's fragile ecosystem. The higher the value, the more sustainably and conscientiously you have achieved the goal.”

Action: The Ecometer reaches the final point, which indicates how well the players have taken care of the environment.

Text: With your successful completion, you have proven that the ship fulfils environmental standards and that the cargo can be handed over safely

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Action: A symbol for a certificate appears with the note ‘Download’. On it is a logo and the name of the escape room as well as the individual Ecometer value.

Text: You can download a personalised certificate in recognition of your efforts. It shows your Ecometer score and confirms your contribution to protecting the Baltic Sea. Take it with you as a sign of your commitment to a more sustainable future.

Action: The camera zooms out, the ship is safely in harbour, the sea is calm and the screen shows a ‘Download’ button.Text on the screen:’Thank you for being part of the mission. Together for a clean Baltic Sea!’

04 Virtual Escape Room

Certificate

ECO-BALTIC-HERO

Congratulations on the successful „Escape to Sustainability"

Your dedication to environmental protection and your commitment to protecting the oceans have made you a true protector of our seas!

Through your knowledge, teamwork and decisions, you have minimized our ship's environmental footprint and preserved the health of the ocean. With your success, you help to increase awareness of the sustainable use of our earth's resources.

MARITIME MINDBREAKERS
ESCAPE TO SUSTAINABILITY
MARITIME MINDBREAKERS

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05 Challenges

Overview of further possible challenges

Emergency in the engine room

Medium puzzle

Incorrect chemical labeling

Medium puzzle

Repair recycling system

Hard puzzle

Course correction to avoid a protected area

Easy puzzle

Reduce emissions by adjusting speed

Medium puzzle

Sound of the deep sea

Medium puzzle

Optimize energy consumption

Easy puzzle

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05 Challenges

Overview of further possible challenges

Medium puzzle: Incorrect chemical labeling

Background: The villain has mixed up chemical labels, and players must figure out which chemical must be handled and stored how to avoid environmental pollution.

Goal: By carefully analyzing the safety data and clues on the labels, players must identify the correct chemicals and restore correct storage.

Puzzle type: Logic puzzle and matching task

Clues: Safety data sheets that contain rules for storage and disposal, as well as clues on the correct color assignment of the labels.

Learning effect: Players learn that chemicals on board pose a potential threat to the environment and that their correct labeling and storage is important.

05 Challenges

Overview of further possible challenges

Hard puzzle: Repair recycling system

Background: The recycling system on board has been sabotaged and no longer separates waste correctly, which leads to increased environmental pollution. The players must reset the system so that all materials are recycled correctly.

Goal: The players must adjust the recycling system using a combination of switches and buttons so that plastic, metal, paper and organic waste are separated correctly.

Puzzle type: Technical puzzle

Clues: Diagrams or drawings of the system, with explanations of the settings for each type of waste.

Learning effect: Players learn the importance of recycling and how complex it can be to correctly separate and process waste.

05 Challenges

Overview of further possible challenges

Easy puzzle: Course correction to avoid a protected area

Background: The "Green Voyager" accidentally came close to a marine protected area. The players must correct the course so as not to disturb sensitive marine ecosystems.

Objective: They must reset the course on a map, taking into account the outlines of the protected areas, so that they navigate out of the danger zone with a minimal angle of deviation.

Puzzle type: Geography and navigation task

Clues: A map with marked protected areas and a ruler or compass for measuring angles.

Learning effect: Players learn that certain zones at sea enjoy special protection and that ships must adjust their course to respect them.

05 Challenges

Overview of further possible challenges

Medium difficulty puzzle: Reduce emissions by adjusting speed

Background: A sudden increase in speed has led to increased emissions. Players must calculate the optimal course and speed to reduce CO_2 emissions and still arrive at port on time.

Objective: Players must use a map and fuel consumption data to optimize speed to minimize emissions.

Puzzle type: Calculation and decision puzzle

Clues: Clues about the speeds and their impact on fuel consumption and emissions.

Learning effect: Players learn the direct impact of speed on emissions and the importance of efficient timetables.

05 Challenges

Overview of further possible challenges

Medium puzzle: Sound of the deep sea

Background: Acoustic pollution and soundproofing in the sea. Players listen to a series of audio files with various ship sounds, whale songs and alarm signals. The saboteur has tampered with the alarm system and the crew must figure out which alarm signals are real and which sea sounds were used as a distraction.

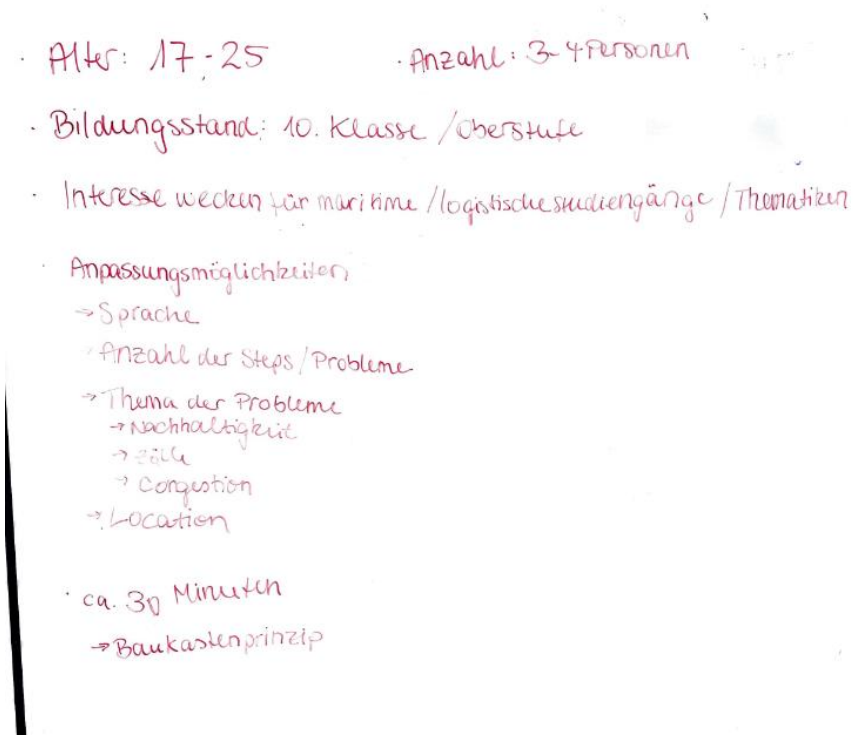
Objective: Players identify and sort various sounds to distinguish real alarm signals from noise. They must also recognize when which sounds are disturbed by human activities and how this affects sea creatures.

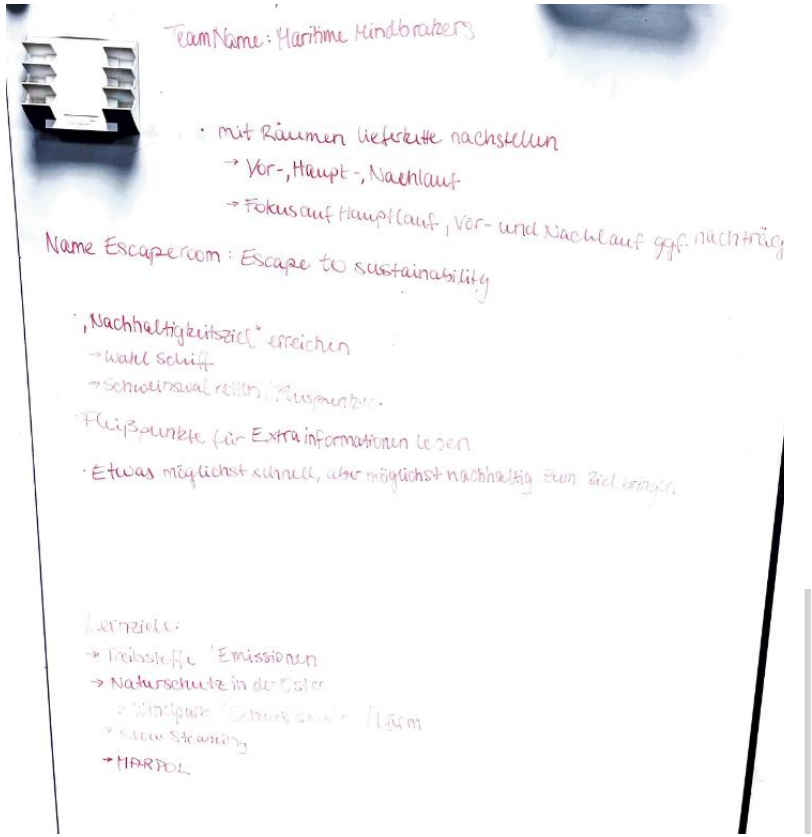
Puzzle type: Audio clips of whale songs and ship sounds

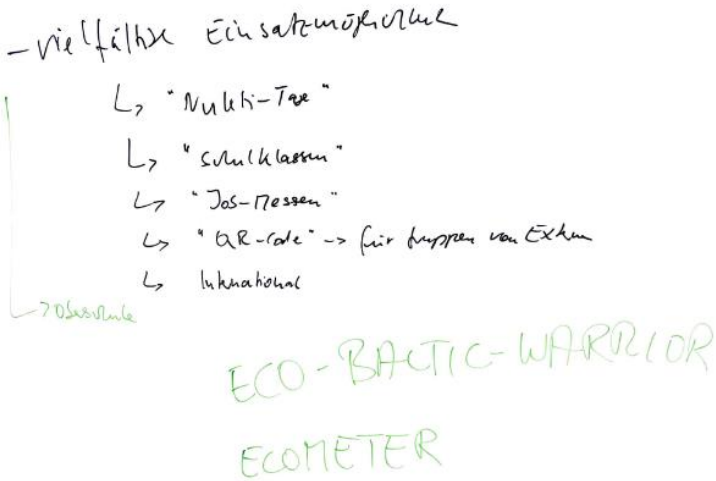
Clues: Background information on noise pollution in the sea caused by shipping traffic

06 Working Method / Workflow

Idea board:







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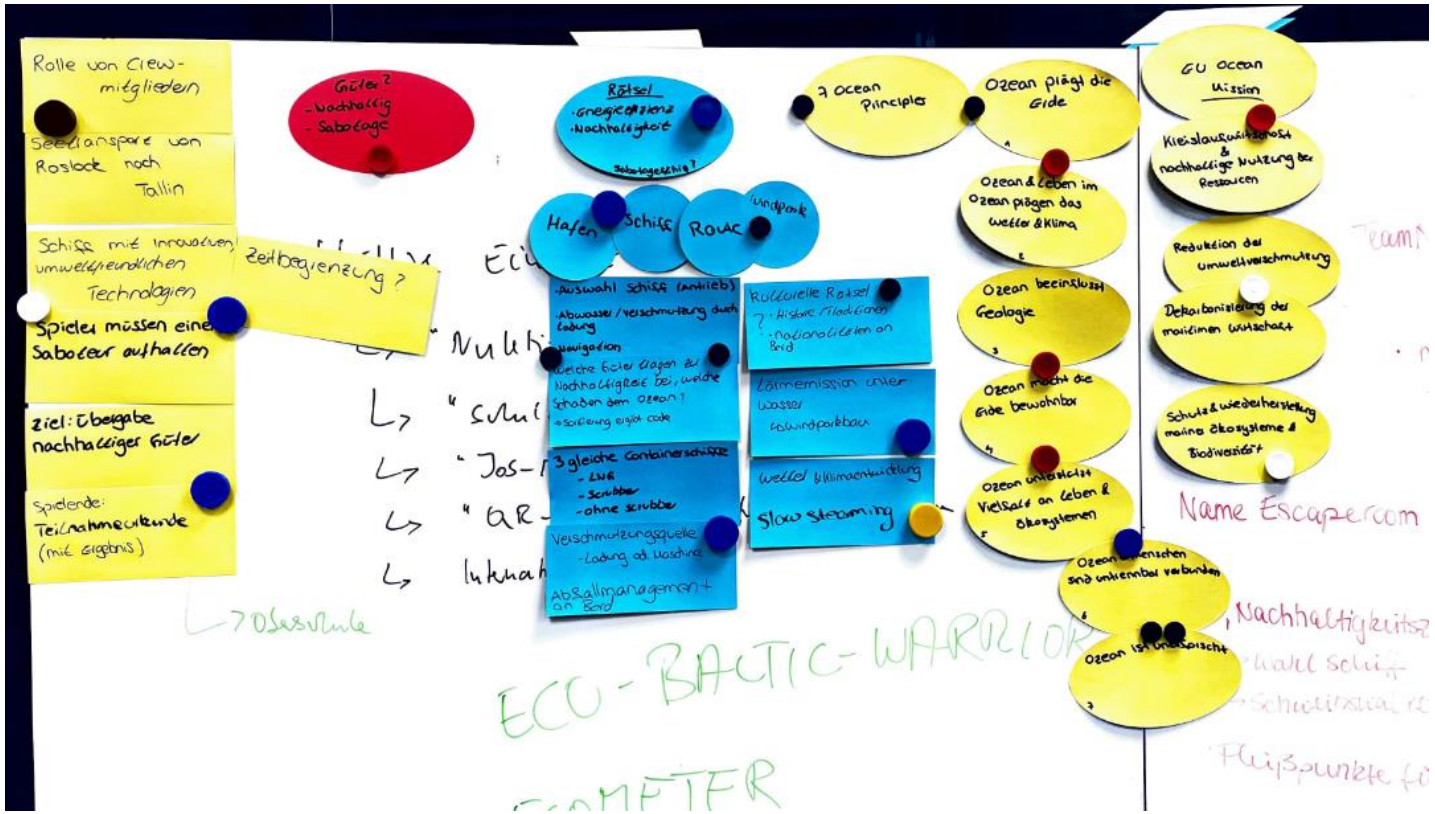
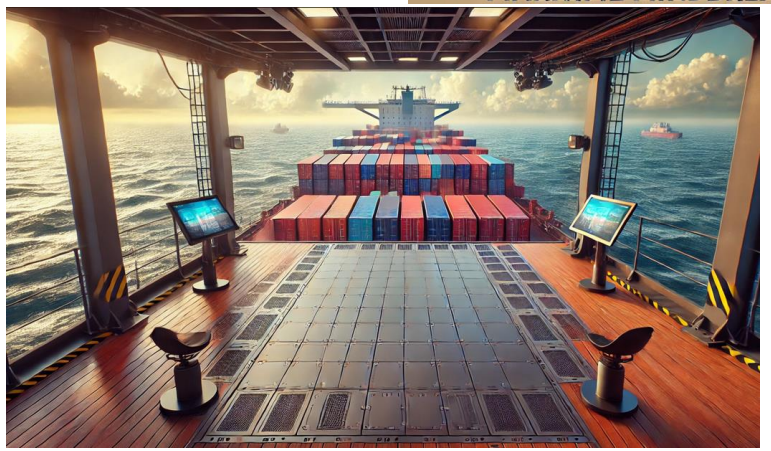
06 Working Method / Workflow

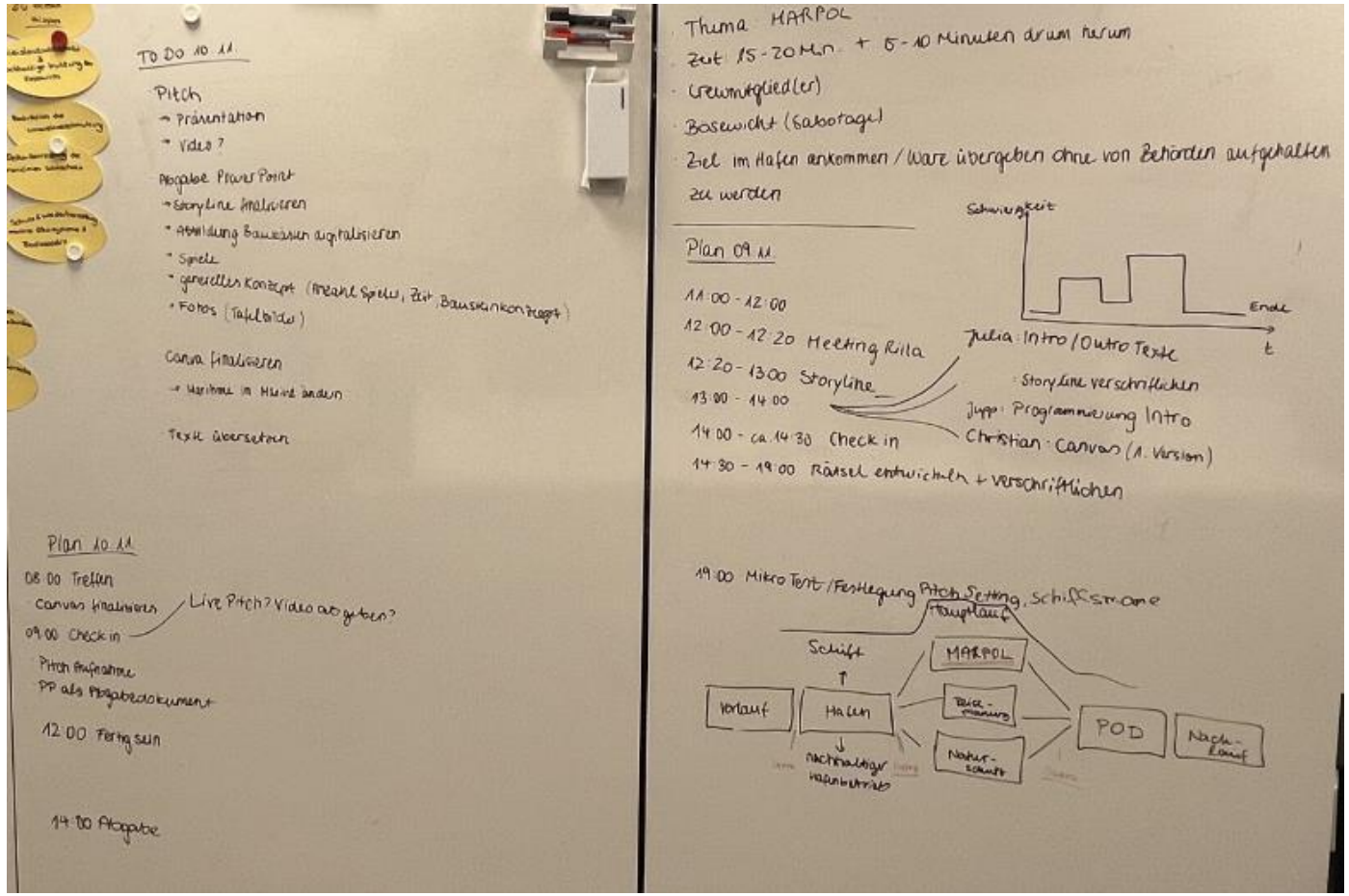
Storytelling:





06 Working Method / Workflow

Organisation:



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06 Working Method / Workflow

Pitch Preparation:

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THANK YOU!

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