TECHERA

"A new technology era in the Adriatic Sea – Big data sharing and analytics for a circular sea economy"

D 2.3.3 Digital gaming for communicating sustainability in the blue sector

15/06/2023

Deliverable Number D.2.2.3

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Work Package Number	2
Work Package Title	Communication activities
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Activity Title	Digital and web-based activities
Partner in Charge	PP4-OGS
Partners involved	Rita Blanos, Davide Agnetta, Nicole Beneventi, Igor Celic, Caterina Fanara, Giulia Massolino, Diego Panzeri, Simone Libralato (OGS) White Cocal Press di Diego Manna; external service Divulgando SrL, Trieste
Status	Final
Distribution	Public

Partnership:

Summary

List of abbreviations and terms

FAIRSEA	Fisheries in the Adriatic Region - a Shared Ecosystem Approach
SME	Small Medium Enterprise
OGS	National Institute of Oceanography and Applied Geophysics – OGS
TECHERA	A new technology era in the Adriatic Sea – Big data sharing and analytics for a circular sea economy
GSRC	Game Science Research Center

1. Introduction

It is well known that marine ecosystems are threatened by overfishing, pollution, habitat modification and climate change, but it is less clear how human activities can be managed to ensure sustainable and diverse use of the seas. Science is providing increasing evidence of the consequences and impacts of human activities. Scientific tools also provide a basis to support management. However, this information is difficult to translate into action due to the natural inertia of economic activities, uncertainty about the impacts and potential benefits of actions and, most importantly, a general lack of knowledge about the impacts of human activities and their consequences. For example, it may not be obvious to the general public that marine ecosystem degradation from various anthropogenic activities poses significant risks to human health and ecosystem services: some may be immediately apparent, others not, and many will only be apparent in the long term.

Ocean literacy on marine sustainable approaches are therefore key elements to reduce vulnerability of our seas and contribute to developing resilient communities understanding that sustainable exploitation of the sea can only be achieved through effective and equitable adaptation and mitigation actions that must be taken globally, starting from the local communities. In order to contribute to the accomplishment of the United Nations Sustainable Development Goals, including the need for quality education to achieve sustainable development, it's necessary to carry out joint actions involving the scientific community and civil society to raise awareness for the conservation, restoration, and sustainable use of seas and oceans, in agreement with the UN Decade of Ocean Science for Sustainable Development. To be effective, science communication cannot follow preconceived models, but must adapt to the different needs of the public to be reached. Therefore, it's necessary to rethink marine science communication using a new communication framework.

Sustainable blue economy sectors need innovative approaches to increase capacity and disseminate knowledge to facilitate participatory decision-making and collective sustainable action. Game approaches can be developed for a) improving information dissemination, b) improving discussion, and c) improving quantitative assessment of decision impacts on complex systems. All serious gaming approaches represent an essence of scientific concepts in the Adriatic fisheries sector and use entertainment, digital approaches and visualisation to address different communication objectives. Games and serious gaming are strongly science-based approaches that can help deliver relevant key messages to different audiences (depending on age, experience, role in the blue sector) that are useful for a holistic approach to blue sector management.

Figure 1: Role of different kind of gaming approaches to transfer information and knowledge.

Fishing in particular represents a direct anthropic activity on marine life that can adversely affect ecosystems through use of impacting fishing gears, through illegal and unreported catches, and through unregulated exploitation. One of the United Nations Sustainable Development Goals is to effectively regulate the use of marine resources and to put an end to overfishing, illegal, unreported and unregulated fishing, and destructive fishing practices. In order to do that it is required to implement science-based management plans to restore fish stocks as quickly as possible to levels that can produce at least maximum sustainable yield according to their biological characteristics. These plans involve scientists and governmental bodies, and receive the suggestions from stakeholders. Nevertheless, the process of developing such plans is difficult because often they are compromising scientific advice, political willingness and stakeholder resistance. Thus making information more widely available and increasing awareness might help reach a far more sustainable objective. The gaming approaches can also be used also for collecting data to be used in scientific analyses.

1.1. The Fish N' Ships card game

Raising the awareness of citizens can support the achievement of the goal of sustainable fisheries: increase awareness especially for the future generation, through educational activities and the use of teaching tools that effectively communicate key concepts and promote sustainable behaviours.
Fish n' Ships is a card game developed within the Interreg Italy-Croatia FAIRSEA project to provide participants with knowledge about the marine ecosystem and the sustainable management of its resources. The game is developed considering the marine food web and fisheries in the Adriatic Sea. Using cards representing species, fisheries, actions or global issues the players grasp in a simple and intuitive way the key concepts useful to socio-ecological sustainability such as trophic levels, ecological pyramid, fisheries discards and management of socio-ecological systems. The game is made of a total of 120 species cards representing 36 different species belonging to 16 groups of ecologically similar species (functional groups), and each species is briefly described with its main ecological, biological or trophic characteristics. Fishery cards represent the eight fishing methods in the Adriatic Sea, and each card includes a brief description to increase knowledge of the complexity of fishing and the extent of the damage it can cause to the ecosystem.
The game card was previously developed and printed in several copies. A preliminary online version was developed at the website : https://fishnships.it/.

Figure 2: The Fish N' Ships logo (copyright OGS).

2. Digital gaming for communicating sustainability in the blue sector

2.1. Objective of the activity

The Fish N' Ships digital web-based game on sustainable fisheries (in Italian and English) will be further implemented to include additional cross-cutting circular economy concepts and social aspects. To overcome cross-border communication barriers, the web game will be translated into Croatian. All networks related to the partnership and other related programmes (ADRION, ITA-SLO, CEI) will be used to broaden civil society participation.

In order to achieve the objectives, a number of actions and activities have been carried out, involving also collaboration with an external SME.

1. Addition of the version of the online game in other languages (Croatian);
The online game was developed in Italian and English. The activity includes the implementation of new features that require translation into English, as well as the introduction of the full translation of the online game into Croatian.

2. Simplified and/or accelerated online game modes that use existing structures and rules to increase playability;
In order to immediately engage the user in the main part of the game, it was considered that the initial phase be redesigned by excluding parts where the player has little control over decisions and that randomly drawn cards be placed already on the board to speed up the first part of the game. It was also considered that the single-player version of the game be developed to encourage single-player participation as well.

3. Changes should be made to allow players to recognise the social (e.g., the role of the players) and economic aspects (e.g., the value of the catch or the cost of catching fish);
It is necessary to provide an evaluation of the strategy used by the player that allows him to take into account the nature of the relationship with the marine environment (degree of responsibility, speed in catching resources in the sea, haste in fishing); it is also necessary to provide game phases in which the player is involved in the evaluation of different aspects of fishing that allow him to make decisions that can relate to the economic and social part of the interaction between humans and the environment.

4. Storage of online game information for later processing by OGS staff;
Automatic storage of game statistics with information about players and games played is required. The system must provide for anonymization of any information, while it is essential to maintain basic data for categorization of users. The main characteristics of the game activity must be stored in such a way that they are brief and concise, but of great importance for describing the game strategy. The data stored in consultation with the OGS staff will be processed by them to evaluate the strategies used and the educational functionality of the game itself, while fully respecting privacy.

5. Creation of a promotional video for the game and an explanatory video on some of the game rules to attract players;

Two video tutorials are developed to promote and accelerate the learning phase of the game. A first short video should be developed to promote the use of the game and attract new players. It is aimed particularly at young people. A second short video should be developed to illustrate some of the rules of the game to promote understanding of the key concepts behind Fish N' Ships and to accelerate learning of the game.

6. Contribute to dissemination campaigns for the game to increase the number of players via social media (Twitter, Facebook, YouTube, etc.) and also physical events and festivals;

Actions include dissemination of the game through social media and online events. Sharing news about the game on social channels was considered also a priority in order to increase dissemination of the game. Expert players will present at various events to promote the game and spread the basic concepts and rules of Fish N' Ships.

3. Modifications and improvements of the digital game

A redesign of the Fish n' Ships logo was carried out in order to distinguish the online version of the game, characterised by its own rules, from the card version and any future local editions. For this purpose, a lifebuoy element has been added that will contain the name of the game version.

Figure 3: The new Fish N' Ships logo for the online version of the game (copyright OGS).

Moreover, a series of activities were conducted in order to improve the game.

The initial phase of the game has been simplified, excluding the first phases in which the player's choices were mandatory and did not allow for a personalised game experience. All players start with 2 phytoplankton cards already present in their sea, making it possible to take a trophic-level 2 organism already in the first move.

The single player version of the game has been developed in order to optimise the players' opportunities to use the platform without waiting for opponents, by playing with a random card generator.

In order to allow players to appreciate the social aspects of the game, the choice of **the role to play has been introduced**, among four profiles:

A: fisherman - focused more on sustainable fishing;
B: conservationist - focused more on nature conservation;
C: researcher - focused more on the resilience of the marine environment;
D: generic - a role free from guidelines. (point 3 of the specification)

In order to **introduce social, ecological, and economic concepts** throughout the entire gaming experience, achievements have been added to be earned during the game based on good practices in line with one's profile.

Specifically, these are:
Great Predator achievement- If the player catches tuna and swordfish.
Seahorse achievement - If the player has 3 seagrasses, the ideal habitat for seahorses.
Biodiversity achievement - If the player has 18 different species in the sea.
Selective Fishing achievement - If the player has used the 3 most sustainable fishing tools to reduce bycatch.
Diversified Fishing achievement - If the player has fished from 3 different trophic levels.
Protected Species achievement - If the player has both dolphins and turtles in the sea.
Happy Sea achievement - If the player has at least 30 organisms in the sea.
Sustainable Fishing achievement - If the player has fished without causing any secondary effects.
Resilient Sea achievement - If the malus has not caused any chain effects.

The achievements are visible on the player's board, who can access information on how to obtain them at any time during the game, thus adjusting their strategy to achieve them. Once earned, the achievements, initially grey, will take on their final colours. Achievements can be lost if the player's behaviour during the game becomes less virtuous.

For each role, **a personalised score has been developed** to encourage behaviours in line with the chosen profile. Playtests were carried out to balance the scores that can be obtained by playing with the different roles, in order to avoid any favoured profiles in the final evaluation. This is the matrix of scores assigned to the different achievements, based on the role played.

A final evaluation of the player's performance has been introduced, based on their behaviour during the game and its correspondence with the chosen role, so that the player can reconsider their choices at the end of the game, based on their impact on the score, and evaluate how they could improve their management of marine environment resources.

The Croatian version of the online game has been added by translating the texts of the website pages for a total of 10 folders and inserting the Croatian cards into its graphics.

The English version of the website has been updated by implementing all the texts regarding the new game features for a total of 4 folders.

13 new illustrations have been created; 4 related to the roles and 9 related to the achievements.

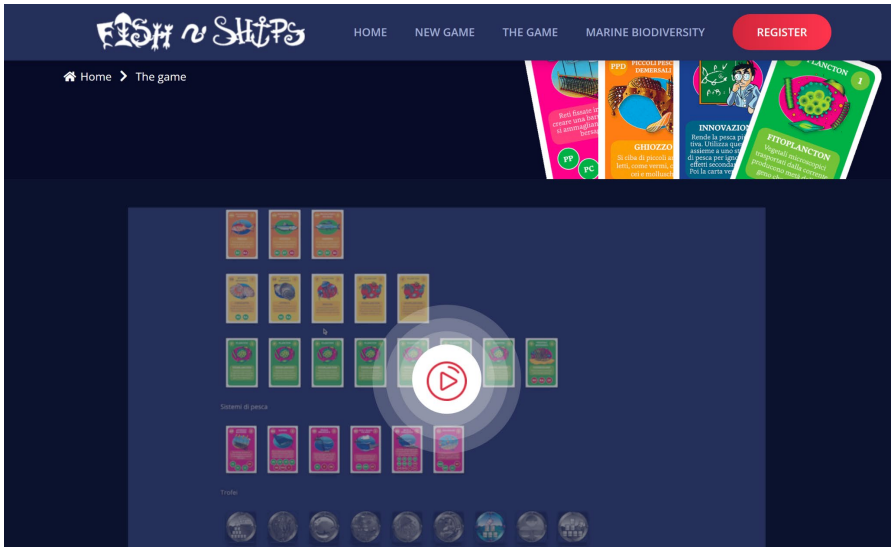
Figure X: new illustrations of roles and prizes developed for Fish N Ships.

A system has been implemented to save the collected data (roles chosen, achievements acquired, scores, trophic levels affected by fishing pressure, population, and biodiversity of the sea) in order to evaluate the behaviour and choices of the players, all while fully respecting privacy. **Currently, the game has a total of 146 players who have played 424 matches**

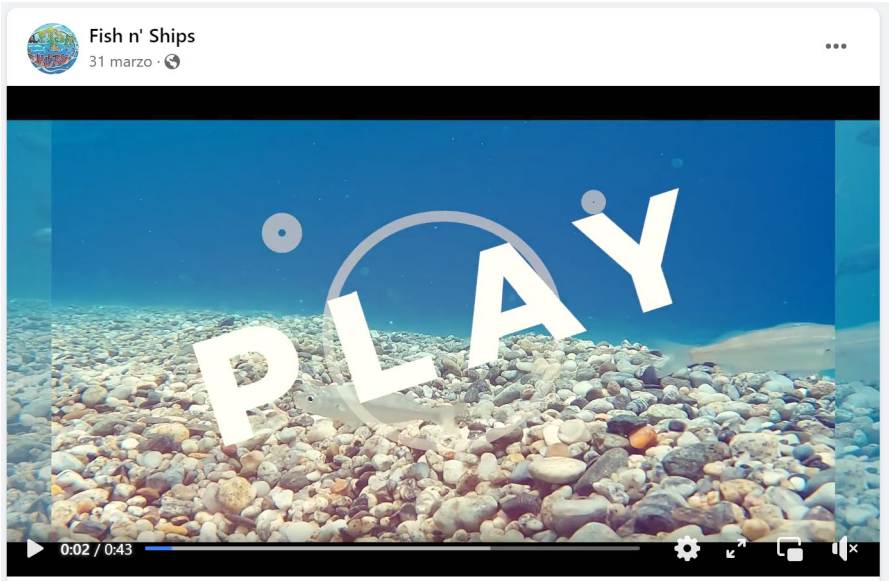
4. Videos and tutorials developed

A video tutorial has been produced and added to the website, created in Italian, English, and Croatian, in order to make learning the gameplay easier. In order to promote the game, two promotional videos have been created in Italian and English.

https://youtu.be/4gEXc6xlnUc Fish n' Ships video tutorial



https://fb.watch/l9WuCOhtNa/ promotional video in English on Facebook Fish n' Ships page



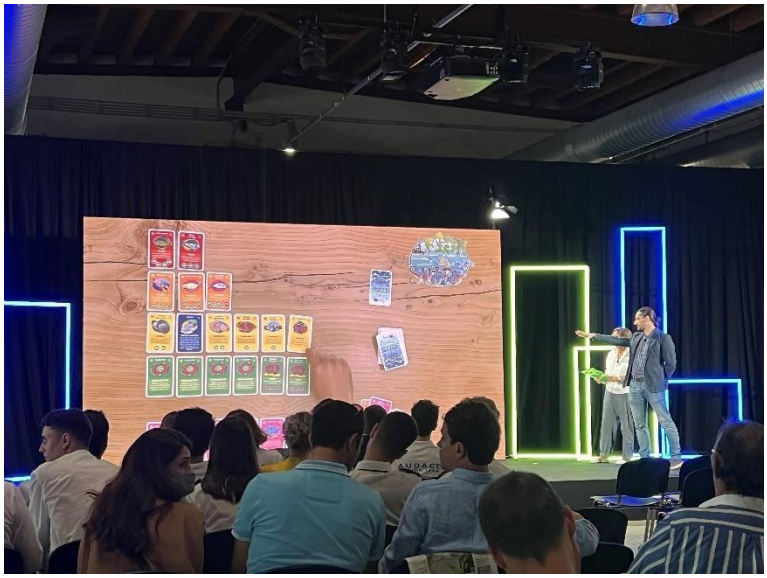
5. Social activity

In addition, the Facebook page Fishnshipscardgame was set up, which is kept active and updated with information about the game (https://www.facebook.com/fishnshipscardgame) and currently has 72 followers.
A game page has also been created on boardgamegeek.com, the world's leading portal for games. Currently, the game has an average rating of 7/10 (https://boardgamegeek.com/boardgame/318535/fish-n-ships) Additionally, the game's website can be accessed through a direct link on the wwf 's one plane school page.

6. Events

Several events have involved Fish N' Ships experts to promote the game by organising gaming sessions with the public.

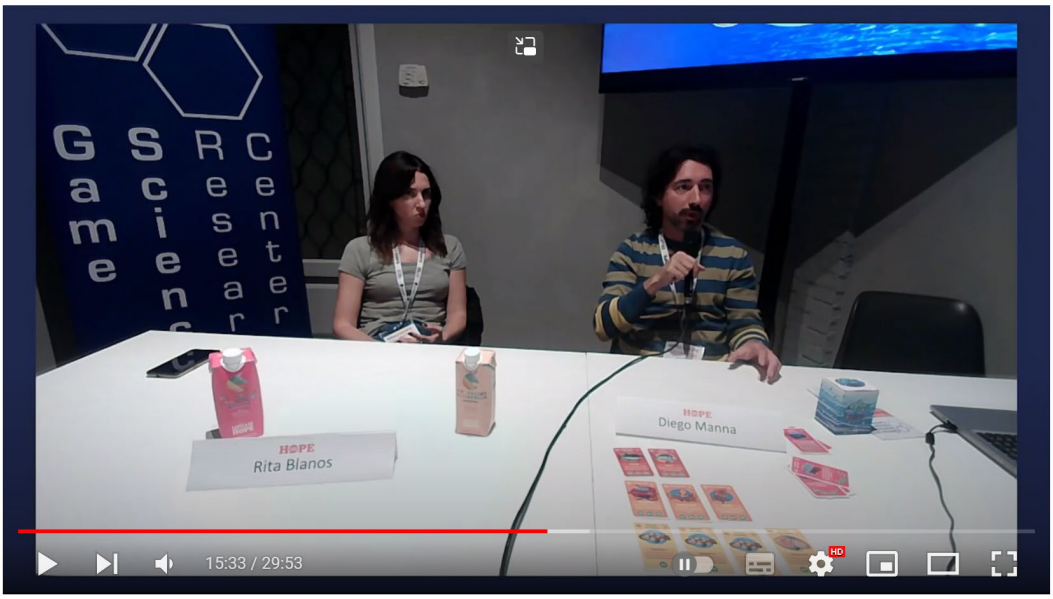
L'alfabeto del futuro - Science and Technology TV Show 23rd June 2022, 12.816 views



Trieste Next Science Festival, Trieste 23rd September 2022, 23 students

Festival for Sustainable Development, Modena 6th October 2022, 125 students

Lucca Comics&Games workshop on games for sustainability, 31st October 2022, 27 views



Fish n' Ships: ricercatori per gioco con OGS

GAME Science Research Center
314 iscritti

Iscriviti | 2 | Condividi | Scarica

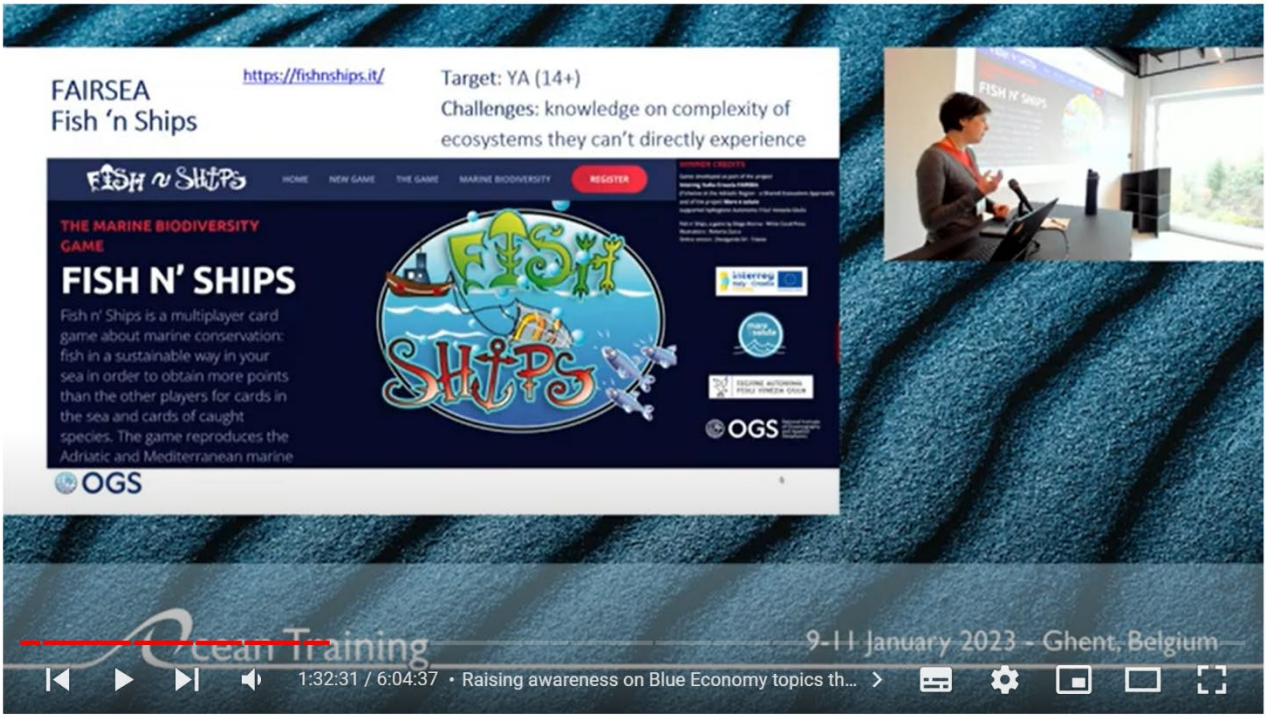
27 visualizzazioni 27 dic 2022

Nell'ambito del Lucca Comics and Games Festival, l'istituto nazionale di Oceanografia e di Geofisica Sperimentale - OGS, propone un'attività ludico-formativa in linea con gli obiettivi dell'Agenda 2030 e nello specifico sull'utilizzo delle risorse marine per uno sviluppo sostenibile. I ricercatori dell'OGS in collaborazione con Diego Manna, scrittore, divulgatore e game designer, presenteranno i propri progetti sulla sostenibilità ambientale e i giochi sviluppati sul tema come strumento educativo.

Incontro realizzato in collaborazione con l'OGS-Istituto Nazionale di Oceanografia e di Geofisica Sperimentale.

University of Trieste, teachers training course, 2nd December 2022, 9 participants

Ghent University, Ocean training conference, 10th January 2023, 84 participants, 208 views in streaming



10th of January - Oceantraining Conference

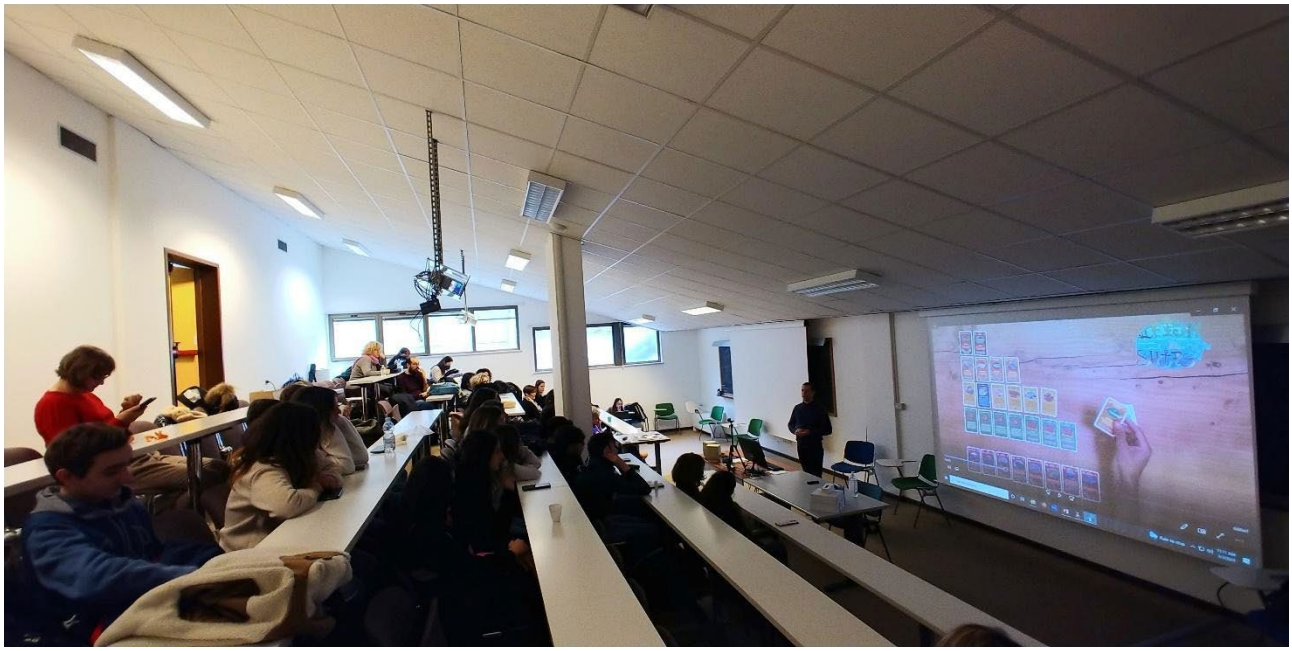
Marine Training
213 iscritti
Iscriviti
1 Condividi Scarica

208 visualizzazioni Trasmesso in streaming 4 settimane fa
info and programme: http://conference.oceantraining.eu/

00:00 - N/A Mostra altro


FAIRSEA
Palydecide – a
discussion game
(EN, IT, HR)
OGS

Workshop Blueschools, Trieste 3rd March 2023, 58 participants



Bergamo Ludends, Games for Sustainabilty, 15th April 2023, 26 participants


FISH N' SHIPS
IL GIOCO
SULLA BIODIVERSITÀ MARINA
FISH N' SHIPS
Fish n' Ships è un gioco di carte che nasce allo scopo di educare i partecipanti alla conoscenza dell'ecosistema marino e alla gestione sostenibile delle sue risorse. Il gioco tratta in maniera intuitiva ed immediata concetti chiave quali
SONY
GIOCA A FISH 'N SHIPS ANCHE ONLINE!
INQUADRA IL QR CODE E SFIDA GLI ALTRI GIOCATORI!
OGS

Modena Play, 19th - 21st May 2023, 62 participants

Conclusions

Game-based learning is an educational approach that uses games and game-like experiences to increase engagement with scientific topics. This approach, using games and gaming tools (board games, video games, role-playing games, and so on), has gained popularity in recent years as it offers numerous advantages over traditional teaching methods.

Games and gaming are very powerful learning and educational tools: they increase intrinsic motivation and help people to better focus on a topic, often through problem solving. Specifically, sustainability education has employed games as a learning tool for several reasons, among which their compatibility with effective instructional design practices, their integration of hands-on learning via real-world problems and situations, and their ability to function as intricate systems that enable the comprehension of environmental systems and the effects of diverse behaviours on the ecosystem.

Furthermore, digital gaming can be an approach for collecting information on the behaviour of players, on their strategy, learning curve and solutions adopted.

The online version of the Fish n Ships game, developed under the FAIRSEA project and perfected under the TECHERA project, has proven to be an excellent educational tool to raise awareness among citizens, especially the younger generations, about sustainable fisheries and marine resource protection, thus promoting sustainable behaviour