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Sustainable Sea: a board game for engaging students in sustainable fisheries management

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ABSTRACT

Sustainable Sea is a strategy game developed for educational purposes in which players assume the role of fishermen while learning concepts related to the sustainable management of fishing resources. Players earn points as they apply sustainable policies. The game was tested on high-school students and students pursuing bachelor's and master's degrees in Asturias (Spain). Pre- and post-tests were performed to evaluate the knowledge acquired from playing the game. The game was also evaluated as an educational tool using a satisfaction survey. A general increase in the understanding of fisheries sustainable management concepts was observed (significant in the bachelor's degree group), and the students exhibited a significant preference for this alternative teaching tool.

KEYWORDS

small-scale fisheries; marine resources; sustainable management; game-based learning; education; educational games; teaching methods

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1. Introduction

Marine fisheries resources have been overexploited for decades (Coll, Libralato, Tudela, Palomera, & Pranovi, 2008; Jackson et al., 2001; Tsikliras, Dinouli, Tsiros, & Tsalkou, 2015), and the proportion of fish stocks within biologically sustainable catch levels has exhibited a stepwise downward trend (FAO, 2018). The problem has global dimensions. Measures to encourage the sustainable management of fisheries resources are needed if we are to meet the food requirements of the world's increasing population while addressing the effects of climate change and environmental degradation (FAO, 2018). Artisanal fisheries provide employment for 90% of those engaged in extractive fishing (FAO, 2018). However, information on catches is scarce, occasionally inaccessible, and difficult to interpret (Battaglia, Romeo, Consoli, Scotti, & Andaloro, 2010; García-de-la Fuente, González-Álvarez, García-Flórez, Fernández-Rueda, & Alcázar-Álvarez, 2013; Guyader et al., 2013). The enhancement of artisanal fishing is a key to generating a more sustainable use of marine resources and has been noted as a crucial step for such fishing's continuity (Holling, 2001).

In the South Bay of Biscay, anchovy (*Engraulis encrasicolus*), blue-whiting (*Micromesistius poutassou*), mackerel (*Scomber scombrus*), horse mackerel (*Trachurus trachurus*) and sardine (*Sardina pilchardus*) are the most common pelagic fish. The bay is also visited by migratory species, such as tunids (*Thunnus alalunga* and *Thunnus thynnus*), whereas the demersal community is dominated by European hake (*Merluccius merluccius*). Additionally, cephalopods are abundant and highly exploited by a large artisanal fleet from northern Spain, with concomitant social relevance (ICES, 2019).

Asturias is located in the South Bay of Biscay, and it possesses more than 300 km of coastline and 226 fishing grounds whose diversity and wealth have favored settlements in which fishing is a main economic driver (Álvarez-Fernández, 2011; García-de-la Fuente et al., 2013). Artisanal fishing employs 71% of the Asturian fleet. However, artisanal fishermen face difficulties due to traditional management policies, low profitability, declines in fishing resources and habitat degradation (García-de-la Fuente et al., 2013). These circumstances have important social, economic, and environmental consequences. In addition, Asturias has an extensive gastronomic tradition of consuming marine invertebrates, such as sea urchin *Paracentrotus lividus* (de la Uz, Carrasco, & Rodríguez, 2018; Haya de la Sierra, 1989; Ouréns-Chans, 2013), octopus *Octopus vulgaris* (Fernández-Rueda & García-Flórez, 2007; Mauvisseau et al., 2017), spider crab *Maja brachydactyla* (García-Flórez & Fernández-Rueda, 2000) and stalked barnacle *Pollicipes pollicipes* (Rivera, Gelcich, García-Flórez, & Acuña, 2017). All these invertebrates have led the catches in their respective categories over the years, and generally, most of them exhibit a recent population decline (Dirección General de Pesca Marítima del Gobierno del Principado de Asturias, 2019). Therefore, improving sustainable management represents an urgent need with respect to preserving fisheries. However, the management of these natural resources is complex. Increasing the level of awareness is key to easing the implementation of environmental and conservation measures and their acceptance by stakeholders (Barreteau, Le Page, & Perez, 2007).

Learning how to better manage fisheries as natural resources can be taught using educational games designed to promote cognitive development as well as the acquisition and retention of learned material (Madani, Pierce, & Mirchi, 2017). In the last decade, such games have increased their presence as an important tool in citizen environmental awareness projects aimed at maintaining the motivation and participation of citizens in environmental conservation tasks (Eveleigh, Jennett, Lynn, & Cox, 2013; Iacovides, Jennett, Cornish-Trestrail, & Cox, 2013; Skukan, Borrell, Ordás, & Miralles, 2020). Educational games enable players to confront environmental sustainability challenges in a practical way, address problems, practice different approaches, and examine the consequences of their acts in a controlled environment Madani et al. (2017); Sharp (2012). The use of games as tools for improving the acquisition of complex knowledge has long been studied (Berson, 1996). Games are a powerful tool for learning, becoming involved, and tackling complicated tasks (Hoffman & Nadelson, 2010). The knowledge obtained while playing an educational game seems to be more effective because it is gained through practical learning (Sharp, 2012). Additionally, the use of games as educational tools has been found to be an enhancing service with motivational affordances that invoke game-like experiences and further behavioral outcomes (Huotari & Hamari, 2012). Diverse educational programs have been enriched through the implementation of instructional games and, at the same time, have been a tool for learning (Bochennek, Wittekindt, Zimmermann, & Klingebiel, 2007; Hofstein & Rosenfeld, 1996). This is the case, for example, with the computer simulation game Fish Banks Ltd. (Meadows, Fiddaman, & Shannon, 1989).

Here, the game Sustainable Sea was developed to increase fishing knowledge and awareness regarding the sustainable exploitation of marine resources. The game's goals include learning how to sustainably manage fisheries resources and how to solve problems that may occur due to natural events or human behavior. The development of this game represents a response to the international call for a more sustainable development noted by Holling (2001). The game's practical aspects and its educational framework were analyzed to determine its teaching potential at three different educational levels (EQF3, EQF6, and EQF7).

2. Material and Methods

2.1. Ethics statement

This study adheres to the European Code of Conduct for Research Integrity. The research procedures (Project No. 100/16) were approved by the Principality of Asturias's Ethics Committee. Informed consent was obtained from all participants. All surveys were anonymous. All participants were informed regarding the data collection and its purpose in this research, and all of them agreed to participate. This scientific game was specifically designed and developed for educational purposes.

The game has been registered in Spain under the number SAL2019014231. The cost of printing the game does not exceed 20€. The game and its manual are available in the form of a free download: `https://github.com/Lab12GeneticaUniovi/Sustainable-Sea`.

2.2. Game development

Sustainable Sea was developed in Spanish and English. It consists of the following:

- **A board of 48 tiles,** with 47 tiles representing the seabed and 1 tile representing a port. All tiles are placed so as to form a square, which is divided into three shades of blue that reproduce the bathymetry of the seabed: from light blue (shallow waters) to an intermediate blue (mid-depth waters) to dark blue (deeper waters) (Figure 1). The tiles are randomly distributed within each bathymetry category, which enables the players to position them differently each time the board is set up. Each sea tile has different fishing resources, and each of these resources has an assigned economic value, which can be obtained when the players finish their movement within that tile (Table 1).

- **One 6-sided die.**
- **Fishing vessels:** Each player/team is represented by a small boat token that is moved around the board. Each boat is painted a different color, and the players/teams can purchase boats whenever they pass through the port tile. Two types of vessel can be employed during the game:
  - Green-sail boats represent artisan vessels. This type of boat can take resources from a tile once per visit.
  - Red-sail boats represent trawlers. These boats can take resources from a tile five times per visit. However, this practice causes overexploitation, resulting in the subsequent unavailability of tile resources.
- **Poacher boat:** Each time someone rolls a 1, the poachers go to a tile. As long as the poachers are in a resource tile, players/teams cannot take this tile resources (because the poachers have already taken it). Additionally, if someone obtains or uses the Poachers Card, that individual can move the poacher boat to any tile on the board.
- **Money:** with values of 100, 500, 1000, 5000, and 10000 credits.
- **Sustainable management points** (SMPs, PGSs in Spanish) are earned by good practices with respect to the sustainable use of marine resources. However, points can also be lost during the game.
- **Action cards** are drawn when a 6 is rolled. The player drawing such a card moves and applies the card to the tile he or she moves to. Additionally, cards can be purchased and used at the team's convenience to make the game more dynamic. Cards can be used for one's own benefit or to the detriment of other

teams. Only one action card can be played per turn, and the possession of such a card is kept secret until used. There are two types of action card: single-use cards (which are applied and then removed from the board) and permanent cards (which remain on the board after being used; only another card would remove them). The specific action cards are as follows:

- Fines for illegal fishing: The administration finds you fishing with illegal gear. Pay a fine of 200 credits and lose 1 SMP.
- Explosive Cyclogenesis: A storm forces the ships to take refuge in the port. 0 SMP.
- Commercial Emporium: Create a commercial emporium in this tile. The economic benefit of the resources marked in the tile is doubled (x2), but you lose 1 SMP.
- Engine failure: You have an engine failure. You lose your next turn. 0 SMP.
- Poachers: Resources cannot be taken. 0 SMP.
- Genetic study: You commission a population genetics study. You earn 2 SMP. Then, you roll the die. Even: there is genetic variability; therefore, continue playing. Odd: there is no genetic variability, and this resource is overexploited. Therefore, this resource is no longer available.
- Marine protected area: Once this card is used, resources cannot be extracted from the tile. However, twice as many resources (x2) can be obtained in the adjacent tiles. You earn 1 SMP.
- Upwelling: In this tile, an upwelling of nutrients from the seabed provides twice as many resources (x2) as available elsewhere. 0 SMP.
- Fishing ban: Fishing within this tile has been banned to encourage stock recovery. It is impossible to fish. Earn 1 SMP.
- Oil spill: A fuel spill makes it impossible to extract resources within this tile and the adjacent ones. Lose 1 SMP.
- Environmental Volunteering: Eliminate an Oil spill card of your choice. Earn 2 SMP.

[Figure 1 about here.]

[Table 1 about here.]

2.3. Gameplay

Participants can play individually or in teams (from two to four players per team). Players/teams are differentiated by boat colors. Each player/team takes on the role of a guild that starts with one artisanal boat, 2 action cards, 5000 credits and 5 SMPs.

Each team places its artisanal boat in the port tile and starts by rolling the die. Every turn, each player/team performs the following acts:

(1) Roll the 6-sided die:
   - If a 1 appears, the poacher boat moves to the tile and blocks the resource. There are no benefits. The poachers remain in that tile and prevent resource collection until another 1 is rolled or a poacher card appears.
   - If a 6 appears, a card is drawn from the deck. The card is applied immediately to the tile the player's boat is in. Only after the card has been applied may the player reap the benefits it stipulates.
   - If any other number appears, the vessel moves, and the value of the tile is obtained from the bank.

(2) Players can purchase cards and/or SMPs and/or apply cards to their rivals or themselves during their turn.

(3) Pass turn.

Each time a player/team passes through the port tile, new boats can be purchased. If a marine resource is overexploited (due to the effect of certain cards and ships), the tile is placed upside down, and that resource cannot be used for the rest of the game.

The first team to obtain 15 SMPs wins. Thus, the winning team is the one that most effectively harmonizes both production and environmental protection. If resources were overexploited, everybody loses.

2.4. Concepts learned and knowledge test

During the game, eight concepts connected with fisheries sustainable management can be learned: 1) population bottleneck, 2) genetic variation, 3) marine protected areas, 4) sustainable management, 5) fishing bans, 6) bathymetry, 7) overexploitation and 8) artisanal and industrial fishing methods.

Understanding these concepts is key to the correct development of the game and relevant to understanding the functioning of fisheries. Players learn the concepts through using them in the course of the game. Thus, during a match, players can internalize the meaning of a concept and its importance for resources management.

The game was evaluated with two different approaches:

(i) the knowledge of the different topics acquired while playing (tests before and after playing the game).

(ii) the students' satisfaction level regarding this teaching method (satisfaction survey at the end of the academic year).

A questionnaire with eight items regarding the eight previously mentioned concepts (Appendix A) was developed to evaluate the players' knowledge. This questionnaire was given as a pre-test (before playing the game) and as a post-test (after finishing the game). When the game was finished, a brief discussion was held between the students and the professors. At this time, questions arose, and the main ideas and concepts were further clarified. Additionally, the relationship of the game to real life and the shared knowledge that was gained were addressed, as suggested by Lederman (1992) and Ryan (2000).

2.5. Pilot study

Prior to performing the study, both the knowledge pre- and post-tests and the satisfaction survey were evaluated with control groups of adults to assess whether the game was easy to understand and to verify the clarity of the proposed objectives. This first game trial was performed during the *Scientific Thinking Classroom* of the Extension Course (University of Oviedo). Subsequently, modifications were made to obtain the final versions of the game and the questionnaires used in the case study.

2.6. Case study

The game was played and tests were performed three times at three different educational levels. All the students attending class were selected to participate in the study.

(1) Secondary, EQF3: Subjects: Biology and Education for Citizenship (10 May 2018, n=18; age range: 14-15 years), IES Isla de Deva High School, Castrillón.
(2) Bachelor, EQF6: Subject: Conservation Genetics and Breeding for the Degree in Biology (15 February 2018; n=11; age range: 20-23 years), University of Oviedo.
(3) Master, EQF7: Subject: Aquaculture in the Erasmus Mundus Master in Marine Biological Resources (14 March 2018; n=6; age range: 23-27 years), University of Oviedo.

In the case of the bachelor's degree group, an anonymous and voluntary satisfaction questionnaire with seven entries regarding the level of satisfaction with the course was administered at the end of the academic year to evaluate the value of implementing this activity with future cohorts (Appendix B).

2.7. Statistical analysis

The participants' quantitative pre- and post-test scores were compared using parametric (Student's t-tests and F tests) and nonparametric (Wilcoxon signed-rank tests) statistics for paired samples and Monte Carlo approximation with permutations to detect significant differences. The satisfaction test results were adapted using a Likert-type questionnaire ranging from 0 (not important) to 10 (very important) to facilitate analysis with a sample mean comparison. All statistical calculations were performed using PAST 3.16 and IBM SPSS Statistics 24.0 statistical software.

3. Results

In all groups, there was an increase in the number of correct answers after playing the game (a strong increase at the bachelor's degree level). There was a clear increase in the number of matches at all educational levels (Table 2). Furthermore, there was a greater increase in the acquisition of knowledge regarding fishing bans and bathymetry (items 5 and 6).

[Table 2 about here.]

Previous levels of knowledge regarding the eight concepts related to the sustainability of fishery resources substantially differed between educational levels (pre-test correct answers: µSecondary = 2.28, µBachelor = 5.28, µMaster = 5.50; $F = 28.04$; $p < 0.001$). A general increase in the correct understanding of these concepts could be observed in the total number of players of all educational levels tested (post-test correct answers: µSecondary = 2.78, µBachelor = 7.09, µMaster = 5.67; $W = 263$, $p < 0.05$). This improvement was not equitable between levels ($F = 35.15$, $p < 0.001$) and was exclusively very significant at the bachelor's degree level ($W = 53.5$, $p < 0.01$). There were significant differences in the previous and subsequent understanding of the concepts included in the game when comparing the secondary education group (µSecondary before = 2.28, µSecondary after = 2.78) with the higher levels (e.g., the bachelor's and master's degree groups) ($p < 0.05$) (Figure 2).

[Figure 2 about here.]

The satisfaction survey on the teaching strategy revealed a clear global preference for alternative teaching activities (such as games and simulations = items 2, 3, 4 and 7) in contrast with conventional teaching methods, such as final exams and grades (items 1, 5 and 6) (µTraditional = 6.33, µAlternative = 7.88, $t = 3.21$ $p < 0.01$) (Figure 3 and Appendix B). The number of students who recommended retaining the activity in the curriculum for future student was 100%.

[Figure 3 about here.]

4. Discussion

Even with its small sample size, this study provides insights that can be useful for teaching fisheries management. Based on the results of the pre- and post-tests, regardless of educational level, all groups had enhanced their knowledge of specific topics after the game session. This outcome indicates the teaching potential of the game. Additionally, the participating students exhibited a high preference for active lessons, such as game-based lessons, in contrast to regular theory classes. Thus, the game could be used as a point of departure to improve the teaching of various topics. Previous studies (Mendler de Suarez et al., 2012; Squire, 2006) state that the use of this type of educational game provides experiences in which apprentice-level knowledge can be obtained though an activity rather than traditional lectures. Such educational activities entail emotion, attention, and concentration and facilitate the construction of long-term memories, which are involved in knowledge construction (Antunes, Pacheco, & Giovanela, 2012), are better than traditional methods (García Molina, 2011). Sustainable Sea game enables students to be active participants rather than passive observers. Such activities enable student to learn through problem-solving, making decisions and reacting to the results of their actions (Franklin, Peat, & Lewis, 2003). The game Sustainable Sea enables students to observe, explore, and manipulate a wide range of variables as well as receive immediate feedback regarding their actions, as recommended for those designing game-based learning environments for science education (Lester et al., 2014). In addition, all the surveyed students recommended retaining this activity in the future course curriculum. This finding validates the recommendations of several authors, who believe that future research should focus on whether the use of games can lead to observable long-term changes in behavior regarding environmental awareness (Wu & Lee, 2015).

Educational games are good tools for problem-based learning (Hmelo-Silver & Barrows, 2006) and helpful for teaching difficult concepts or mechanisms (Miralles, Moran, Dopico, & Garcia-Vazquez, 2013). The significant differences found in the comprehension of the concepts before and after playing the game with the bachelor's degree students are relevant. There was a higher increase in the effectiveness of the game with this group than with the other groups. This outcome reveals there is an optimal age or level of knowledge for the game. In the case of the secondary-school student, there is a lack of specific education on topics related to marine conservation and sustainable resource management, as noted by Viña (2019). In our study, these concepts were new and could not be clearly understood by the secondary-school students. In contrast, the topics were well known among the master's degree students. Considering these results, the game's effectiveness as an educational tool is clear for the bachelor's level, and it can most likely be easily adapted with only slight modifications for any other educational level, country or circumstances.

In addition to the acquisition of specific knowledge regarding fisheries management, the type of team game described here has other advantages. Students on the same team get to know one another through playing, interacting, making decisions and assuming roles together. These interactions while playing could help in the understanding of critical situations and improve problem-solving through empathy and relationship-building (Eisenack, 2013; Gee, 2007; Shaffer, 2006). If we consider all the advantages of learning through playing, this type of game seems to be a highly useful means to engage stakeholders and even citizens in a merged interdisciplinary approach (Eisenack, 2013).

Here, a new teaching-learning method based on a strategic board game is developed. This game not only makes learning more attractive and motivating for students but also teaches and consolidates concepts relevant to the conservation and sustainable management of marine resources. In addition, the game's low cost (less than 20€) makes it an affordable tool for teachers of all educational levels as well as for anyone else who may be interested. Currently, our natural marine legacy is declining rapidly (McCauley et al., 2015), and raising awareness regarding overexploitation and sustainable fishing can positively contribute to achieving conservation objectives (Jefferson et al., 2015).

5. Conclusions

This study shows that the Sustainable Sea game can increase the understanding of concepts related to fishing and raise awareness regarding the sustainable exploitation of marine resources. This board game can be used to increase engagement in learning complicated or less-interesting concepts connected with marine conservation, fisheries and the sustainable management of marine resources as an alternative to conventional methods. Future research on the adaptation of the game to other fishing scenarios, educational levels, different countries, and different marine resources would help confirm the results presented here.

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Disclosure statement

Authors declare not having conflicts of interest to disclose.

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Table 1. Exploited species showed in the game according to its bathymetry appearance and its relative prize.

Shallow waters		**Medium depth waters**		**Offshore waters**	
Species	**Prize**	**Species**	**Prize**	**Species**	**Prize**
Sea urchins	500	Algae	1000	Hake	300
Octopus	600	Hake	300	Albacore	400
Stalked barnacles	2700	Octopus	600	Algae	1000

Table 2. Descriptive statistics of the correct answers given to knowledge questionnaire (pre and post tests) by educational levels.

			Item 1	**Item 2**	**Item 3**	**Item 4**	**Item 5**	**Item 6**	**Item 7**	**Item 8**
High School	**Pre-test**	**Average**	0.8333	0.2727	0.4444	0.6667	0.0000	0.3333	0.6250	0.3571
		SD	0.4082	0.4671	0.5113	0.5000	0.0000	0.4924	0.5000	0.4972
	Post-test	**Average**	0.2941	0.0667	0.2500	0.6429	0.1538	0.6875	0.4375	0.3529
		SD	0.4851	0.2500	0.4372	0.4880	0.3755	0.4697	0.5145	0.5016
Bachelor	**Pre-test**	**Average**	0.7273	0.7273	0.8000	1.0000	0.6250	0.1667	0.8000	1.0000
		SD	0.4671	0.4671	0.4216	0.0000	0.5175	0.4082	0.4216	0.0000
	Post-test	**Average**	0.9091	1.0000	0.8182	1.0000	0.5455	1.0000	1.0000	0.8182
		SD	0.3015	0.0000	0.4045	0.0000	0.5222	0.0000	0.0000	0.4045
Master	**Pre-test**	**Average**	0.6667	0.1667	0.6667	1.0000	0.6667	0.5000	1.0000	1.0000
		SD	0.5164	0.4082	0.5164	0.0000	0.5164	0.5477	0.0000	0.0000
	Post-test	**Average**	0.5000	0.1667	0.4000	1.0000	1.0000	0.6667	1.0000	1.0000
		SD	0.5477	0.4082	0.5477	0.0000	0.0000	0.5164	0.0000	0.0000

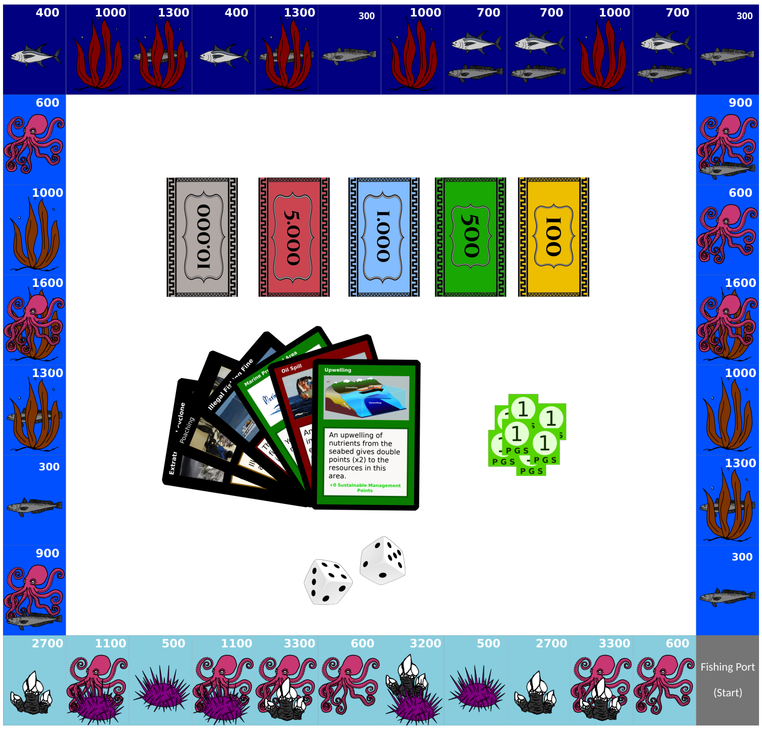

Figure 1. Game set-up. The disposition of the fishing resources can be appreciated according to the bathymetry. The starting tile represents the port, from where the players' boats (blue, pink, yellow and white) leave to fish. In the middle of the square, the (black) boat of the poachers, the cards, money and the sustainable management points. All players start with five sustainable management points, money, action cards and a cheatsheet.

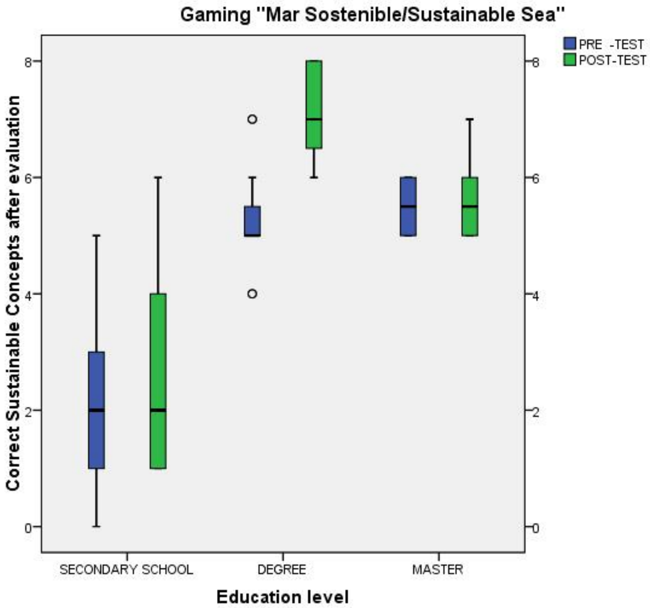

Figure 2. Results by educational levels in the Pre- and Post-test by defining and correctly understanding eight concepts associated with the sustainable management of fisheries resources in the game "Sustainable Sea".

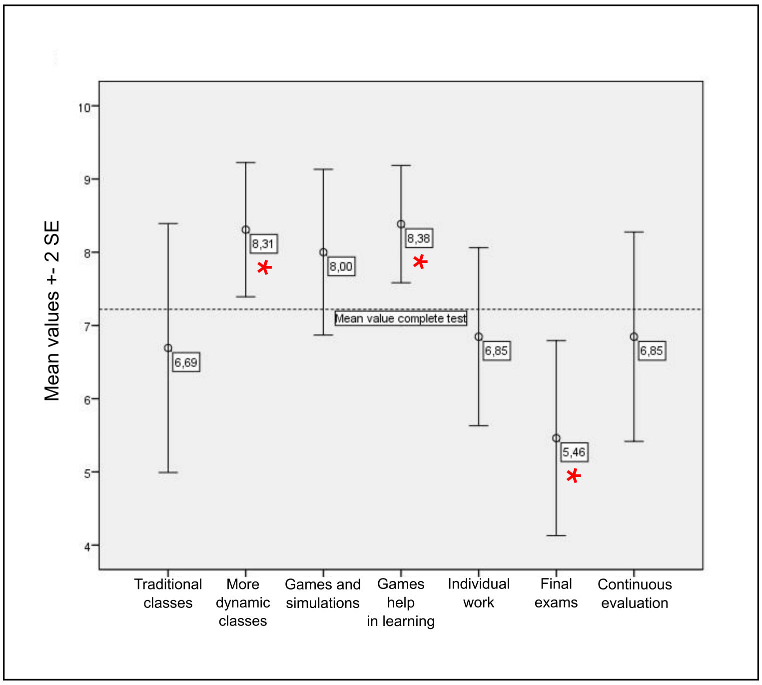

Figure 3. Results of motivation survey about the game Sustainable Sea in the course COMGE at the University of Oviedo. Average and standard deviation (SD) by items in the qualitative survey on preferences in teaching methods regarding this project. The red asterisks indicate significant differences with the average value of the survey (μ=7.21).

Appendix A. Survey 1. Quantitative pre- and post-test deployed to gamers.

When does a population bottleneck occur?

a) When there is a drastic decrease in the number of individuals
b) When a new territory is colonized by a single phenotype
c) The two previous ones are correct
d) Neither a nor b are correct
e) Do not know/ Do not answer

Genetic variation of populations occurs when:

a) Allelic frequencies change over several generations randomly
b) Differences in genetic material are generated
c) A strand of DNA is cut and attached to a molecule of different genetic material
d) Identical copies of an organism are obtained asexually
e) Do not know/ Do not answer

Marine protected areas...

a) Are sections of sea where there is no fishing
b) Are spaces designed to protect marine ecosystems
c) Are created to protect rare, exclusive and/or unique ecosystems
d) b and c are correct
e) Do not know/ Do not answer

Sustainable management and use of natural resources...

a) Is essential for the long-term survival of fishing exploitations
b) Is not indispensable for the long-term survival of fishing exploitations
c) Should only apply in particular situations
d) None of the above are correct
e) Do not know/ Do not answer

The fishing bans...

a) Are essential for the regeneration of fish stocks

b) Should be complemented with population studies to increase its effectiveness

c) Allows certain selected species to be fished, respecting, in any case, the established minimum sizes

d) None of the above are correct

e) Do not know/ Do not answer

Bathymetry is. . .

a) The study of waves and tides

b) The instrument used to exploit the seabed

c) The study of depth

d) The instrument to measure the movement of waters in the oceans

e) Do not know/ Do not answer

Overexploitation is...

a) The continued exploitation of a population

b) The exploitation of populations in the upper zone of the water column

c) Exploitation above maximum sustainable exploitation

d) None of the above

e) Do not know/ Do not answer

Traditional fishing compared to industrial fishing...

a) Has received much more research effort

b) Uses very few fishing gears

c) Always fish on the same species

d) Is a source of employment, income and food for people living in coastal areas

e) Do not know/ Do not answer

Appendix B. Survey 2. Qualitative post test deployed to gamers to measure their satisfaction about the activity.

(1) I understand the contents better when the teacher explains them in class and takes notes.

(2) I prefer more dynamic and participatory classes.

(3) I better understand the contents when they are developed through games and simulations.

(4) Introducing games on learning contents helps me to put knowledge into new situations.

(5) I assume that I learn the contents better when I can show the learnings in individual tasks.

(6) I think that the lessons learned are best demonstrated by final objective tests.

(7) Learning achieved through continuous assessment tasks is better demonstrated.