

Dear reviewer,

I and the others authors are grateful for your comments and suggestions.

We tried to eliminate superfluous phrases and shorten, where possible, in the introductory part.

The on field experience of the authors in these nine years of outreach activity by using the playful approach are argued from line 540 to line 543, moreover the utility of this approach was explained between line 139 to 146 in paragraph 2.2.1 Great success of the laboratories, in detail of MAREOPOLI, make INGV invests on this issue, supporting the publication of an educational-game book: MAREOPOLI.

The VISUAL QUESTIONNAIRE is a work in progress. We developed it starting from the "standard paper questionnaire" for older students, in order to have the possibility to submit it also to pre-school children. It was conceived following the 5 blocks scheme of the standard questionnaire, but it needs a particular interpretation. The method of interpretation will be developed with the collaboration of psychologists and sociologists, and is currently being studied. In order to respond to the reviewer's requests, we have added some parts (from line 440 to line 448), but we cannot currently devote too much space to the description of this methodology, either because it is not yet completed or because it is outside the objectives of this work.

Followed below the answer to the specific comments.

Best regards,

Marina Locritani

Specific comments gc-2020-6

17-18 Use the legitimate original names of the Institutions – I did it.

21 replace *didactic* with educational – I did it.

22 remove *some* – I did it.

34 the year is missing in the reference – I added it.

36 *In our opinion* better at the beginning of the sentence – I corrected this.

36-37 rewrite the sentence in a more legible way – I corrected with: However, in our opinion, the "physicality" of the experience is important, and, even more in a technological era, it is necessary to invest resources to create stimuli that involve students in real activities.

39-40 6-14 years old students – I did it.

48 to make easier the text reading, put citations at the end of the sentence. if you cited in this way, the reader expects a citation in the references (that is not present) - I added it.

56- 58 – 122 -132- 145 to make easier the text reading, put citations at the end of the sentence – I did it.

92 to make easier the text reading, put citations at the end of the sentence. – I did it.

The citation is missing in the references – I added it.

94-96 rewrite the sentence in a more legible way – I rewrote: In particular, the large part of European (79%) and Italian (69%) people, are very interested and confident in new scientific discoveries and technological developments, however there is a part of respondents who do not feel as well informed (52% Italians, 50% Europeans).

117 the year is missing in the reference – I added it.

148 I didn't catch the relation between this example and the previous concept - I cut the example

157 replace *but* with However – I did it.

165 replace *didactic* with educational – I did it

176-177 remove parenthesis – I did it

181 for high school students – I did it

185-186- 187 remove the sentence after young children – I did it

195-196 remove the sentence – I did it
203 to 206 remove parenthesis and *by students* – I did it
209 workshops participants – I did it
215 remove parenthesis and *but* – I did it
218 remove parenthesis and *parties involved* – I did it
225 replace *but it is precisely here that* with . In this contest – I did it
228 remove parenthesis – I did it
230 remove sentence in parenthesis – I did it
239 citation of the figure at the end of the sentence – I did it
240 241 how? - thanks to the experience of the involved illustrators and researchers in this field
242 the sentence it not clear – I rewrote: The spaces have 3 possible colours: blue, green, and yellow, each one corresponding to a specific topic, intuitively linked to the respective colour: water column, life in the sea and coast and seabed.
243 remove *some* – I did it
255 remove parenthesis – I did it
258 remove *that is* – I did it
259 citation of the figure at the end of the sentence – I did it
265- 267 to do so the conductor should be very skilled on the topics and prepared on educational approach in contrast with what you say at line 268 – I dedde: , properly trained
269 - 274 too long sentence, not clear the meaning – I rewrote: The peer education has proved to be an efficient method to stimulate learning. The conductor students experiment an increase in self-esteem and self-confidence, which in turn conveys a greater retention of the concepts acquired during the experience. Moreover, the verbal and not verbal language of the conductor of the game is similar of that of participant, consequently more attractive
284 how and for whom it may be available? – I added: A game-kit is available by the INGVambiente website (<https://ingvambiente.com/2020/01/17/il-gioco-del-polpo/>).
289 48 40x40 cm cards – I did it
289 replace *covered* with game – I did it
292 Questions are already established in the game or is based on conductor knowledge? – I added: established by the game
301-302 not clear – I rewrote: In this case, however, what is represented in the different boxes has to do with the proposed topic, and sometimes it is also useful to suggest the answers of the questions.
307 which case? – I cut in this case
312 citation of the figure at the end of the sentence – I did it
335 INGV Laboratorio di Grafica e Immagini (in italian) – I did it
337 replace *Second Grade secondary* with High. Insert (Figure 7). After adults – I did it
337- 339 remove the sentence after adults – I did it
342- 352 – 504 INGV Laboratorio di Grafica e Immagini (in italian) – I did it
356 replace *eras* with age – I did it
364 primary and kindergarten school students – I did it
364-365 remove after students... to age – I did it
368 remove sentence in the parenthesis – I did it
393 The story's arguments you use are critical for children's visual questionnaire interpretations. How do you handle it? I added these sentences: The 5 blocks of the graphic questionnaire are the same of the "standard" paper questionnaire with multiple choice answers previously used (Ref Locritani et al). We started from this questionnaire with the idea of extending it also to pre-school children. The methods of interpretation are currently still under development, with the help of psychologists and sociologists, and are

based on the frequency with which some characters are used, depending on the "chosen kingdom", and which gadgets and dressing are used, as well as other parameters such as, for example, the preference of the "gender" of the character. These are, however, evaluations that will have to be chosen, among several possible, after having analysed the first "tests" performed on a small number of children, as we are currently trying to do through collaboration with some kindergartens and early elementary school. This part of the work is certainly very demanding and delicate, and would require a special treatment that goes beyond the scope of this exhibition.

402 This sentence it is not clear. The figure citation should be put at the end – I rewrote: and the citizens living in these 5 kingdoms (Figure 11) for a total of 67 characters (including avater) that will be photographed and analysed by researchers (Figure 11).

410- 411 Difficult to manage the analysis, in drawing children are free to represent and imagine, in this case the choice is necessarily limited to what you propose. it is not clear the block identification assessment.... – I added: The questionnaire has only administered to a small group of children for a test section. Interpretation of the questionnaire results will require collaboration with psychologists and sociologists. This part will be developed soon.

420 this is a critical point. Before stating that it will allow... you should test it – I don't understand

421-422 remove parenthesis and *and* – I did it

423 what do you mean for unconventional educators? – I cut it

423-424 replace *Guccinelli....Factory*) with the Steam-Factory Team – I did it

423- 425 too long and not clear sentence – I rewrote: In this phase, collaboration with an expert designer, such as Steam-Factory Team, was fundamental, in order to create the appropriate framework for the questionnaire addressed to very young generations.

427 how do you probed? I added these sentences: Some preliminary tests were done in some primary (first three years) and kindergarden classes. During these tests, the children involved were asked to make drawings that concerned science and scientists. From this they drew some considerations emerged, regarding the use of the main characterizations preferred by children in this age group.

436 remove *regulate....* 2019) – I did it

340 remove *planetary* – I did it

441 remove parenthesis – I did it

447- 454 figures citation at the end of the sentence – I did it

460 remove *during PCTO experiences* – I did it

461 remove figure citation and – I did it

471 in parenthesis replace with figure – I did it

476 not clear – I cut (as in this case)

477 replace *the concept(...)* with complex concepts – I did it

479 Add a conclusion paragraph expanding and arguing this final part. I added these sentences: The playful approach, that, in our opinion and for our experience is particularly useful for better conveying scientific content, lends itself very well to be combined with the use of images or other art forms. The synergy between these two "modes" is, in our opinion, an effective means to overcome potential barriers due, in many cases, to language, and promotes a greater diffusion of these tools.

Remove *We can assume that the* – I did it

Questionnaire result highlight the importance of... – I did it

480 replace *indicate* with indicating – I did it

489-490 not clear – I rewrote: In addition, through the young generation is simple to reach their families and with them different types of stakeholders.

493 replace *didactic* with educational – I did it

497 remove *We easy understand how* – I did it

Through games and image we can more easily arise... – I did it

498 replace *other ages* with users remove *of course* – I did it

replace *to choose* with in choosing – I did it

405 Francesca Di Laura is a co-author of the paper, so other acknowledgement are not necessary – I rewrote: Daniela Riposati (Laboratorio di Grafica e ImmagineINGV, Graphic Office)

506 -509 replace with

Moreover, a special thanks to the Capellini-Sauro High School that participated in PCTO, and to Paolo Stefanelli (INGV) and Claudio Lopresti (GAD - Gruppo Astronomia Digitale, that organized with us the PCTO activities. Finally, authors thank the Historical Oceanography Society for the support in the interpretation of historical topics then explained in MAREOPOLI – I did it