

Education and attitudes towards marine conservation using whale-watching platforms in Peru

ABSTRACT Since the ban of whaling in the 70s, whale-watching became an economically important activity worldwide. In addition to the economic benefits that whale-watching represent for coastal communities, the activity is promoted as a platform for education and conservation awareness of marine biodiversity. However, just a small handful of studies have evaluated this role on people taken this type of tourism. In countries such as Peru where cetaceans species are still in jeopardy, whale-watching may play an important role promoting the protection of these mammalian species. Herein, we present the results of a study that aimed (1) to determine the degree of knowledge regarding cetaceans ecology and conservation status and (2) to evaluate if whale-watching tours serve as platforms for education and conservation awareness in people. We interviewed people taking whale-watching tours during humpback whales breeding season (winter-spring 2014) in northern Peru. A total of 323 persons were surveyed using closed-ended questionnaires and open-ended interviews before and after whale-watching tours. The results revealed an overall lack of knowledge concerning the presence of species of cetaceans in Peruvian waters, particularly those Peruvian participants. However, 98.4% of the persons indicated that they have learned about humpback whales conservation and marine biodiversity treats after tours. Participants were more willing to change their behavioral intentions towards cetaceans conservation and environment protection after whale-watching experience. Our results suggest that whale-watching platforms, when implemented with adequate interpreters, can serve as alternative source of environmental education and conservation awareness. This important to consider in countries such as Peru where by-catch and direct hunting have considerably decimated cetaceans populations.

INTRODUCTION



Despite the negative effects that whale-watching originates on cetacean species social behavior and reproductive aspects [1, 2], the activity still promoted worldwide as a tool to create awareness of iconic cetacean's conservation [3, 4]. In Peru, around ca. 3000 cetaceans per year are directly and indirectly hunted for human consumption or used as bait in shark fisheries [5]. People education may play an important role in helping the conservation of these species. Whale-watching may be an alternative platform to educate people about conservation issues of marine biodiversity. This study aims to (1) determine the degree of whale-watching users knowledge regarding cetacean's ecology and conservation status and (2) evaluate where whale-watching tours serve as platforms for education and conservation awareness in Peru.

METHODS

323 questionnaires were distributed of a total of 2894 persons before and after whale-watching tours at Los Organos (4°10'38.23"S, 81°8.27'4.83"W) northern Peru, during humpback whale breeding season encompassed between the 1st of August and the 30th September 2014.

Surveys included pre- and post-tour closed-ended questionnaires answered before and after whale-watching tour and open-ended personal interviews after tour.



RESULTS

Pre-tour questionnaire

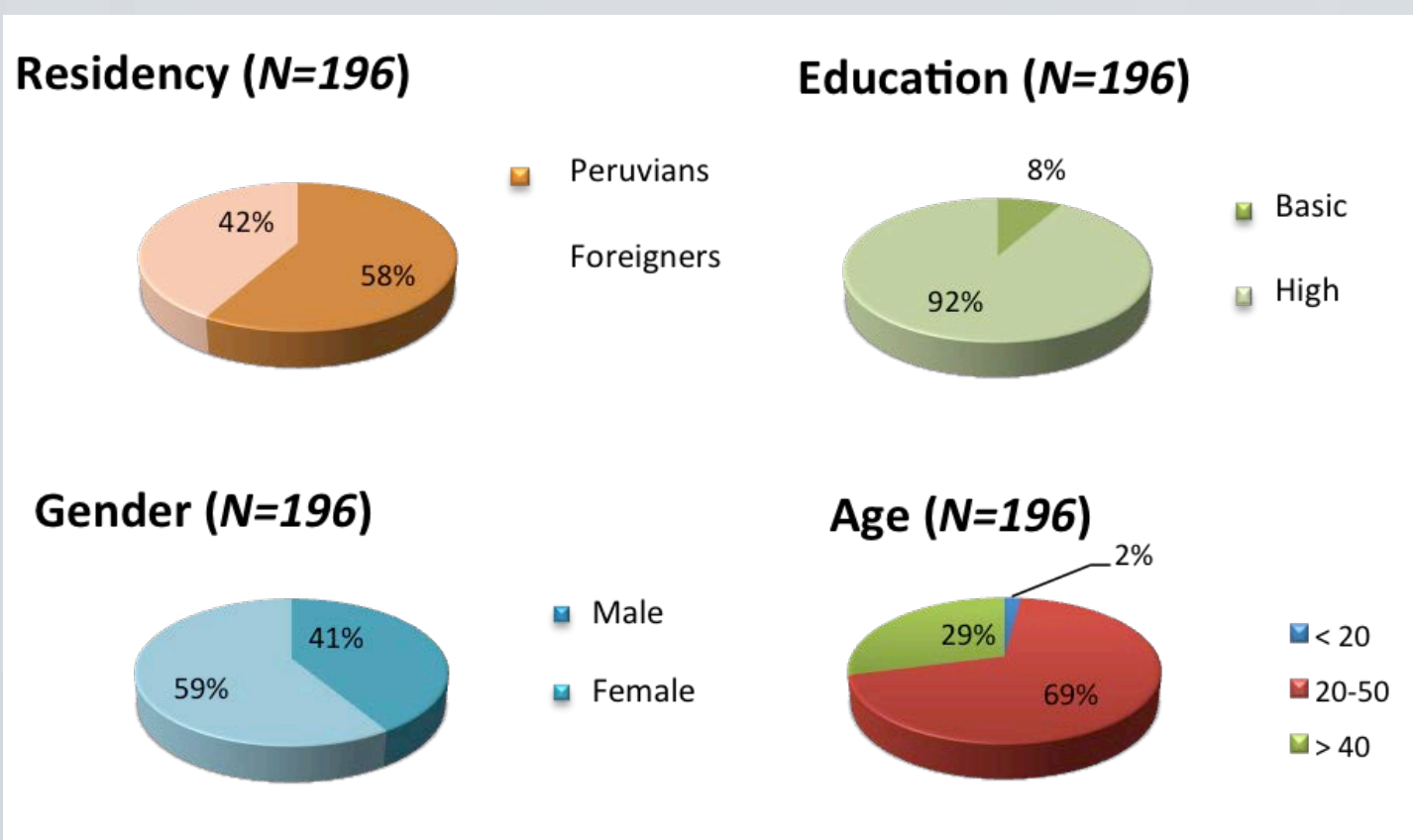


Figure 1 Socio-demographics. 61,68% (N = 196) of 323 participants completed the questionnaires.

	All participants (N=196)			Peruvians (N=114)			Foreigners (N=82)			Model χ^2 (df)	Pearson χ^2 value
	Yes (%)	No (%)	Not sure (%)	Yes (%)	No (%)	Not sure (%)	Yes (%)	No (%)	Not sure (%)		
Have you seen whales before?	33.16	66.84	0	30.7	69.3	0	36.59	63.41	0	0,745 (1)	n.s.
Can you recognize any specie?	43.88	56.12	0	41.23	58.77	0	47.56	52.44	0	0,777 (1)	n.s.
Did you know that whales inhabit Peruvian waters?	18.37	14.29	67.35	14.91	2.63	82.46	23.17	30.49	46.34	36,914 (2)	****

Table 1 Previous whale-watching tour participant's knowledge regarding whale biology and ecology.

	Not important at all (%)	Less important (%)	Important (%)	Very important (%)	Mean	SD	Residency
							Kruskal-Wallis P value
Knowing that the boat is following guidelines	0.5	5.6	38.8	55.1	3.4847	0.6282	F < P****
Learning about whale biology	0	2.04	48.98	48.98	3.4745	0.54946	F < P****
Learning what I can do to help support marine conservation	0	5.6	43.4	51.02	3.4541	0.60165	F < P****
Having the boat maintain a safe distance from the whales	1	4.6	45.4	48.98	3.4235	0.63186	n.s.
Learning about marine environment	0	6.1	47.96	45.92	3.398	0.60324	F < P**
Seeing other wildlife (sea turtles, sea lions, sea birds...)	0	6.1	54.08	39.8	3.3367	0.58955	F < P*
Learning about whale conservation	0	10.2	52.04	37.76	3.2806	0.64675	F < P*
Being as close to the whales as possible	7.1	23.5	43.9	25.5	2.8	0.87431	n.s.

Table 2 Analyses of Likert-type scale items regarding visitor's expentacies and interests toward whale encounters before whale-watching trip. Kruskal-Wallis test showed that generally Peruvians were more interested than foreigners on whale watch experience.

CONCLUSIONS

- Whale-watching can serve as an alternative platform for learning about marine species and its environment, especially for local communities where formal environmental education in schools and universities seem to provide scarce information on the issue.
- Closeness and proximity to whales and marine environment promote users to realize about the well/bad performance of whale-watching activity, as they became more concerned regarding whale-watching impacts on whales behavior. Thus, whale-watching in Peru must be performed under whale-watching regulations and legislation.
- Whale-watching interpretation must to highlight human behavior consequences on whales and its environment, in order to promote conservation awareness.
- Long term studies should be performed in order to assess if behavioral intentions changes towards a pro-environmental attitude are behavioral changes or just an intention to act.

Post-tour questionnaire

	All participants (N=196)			Peruvians (N=114)			Foreigners (N=82)			Model χ^2 (df)	Pearson P value
	Yes (%)	No (%)	Not sure (%)	Yes (%)	No (%)	Not sure (%)	Yes (%)	No (%)	Not sure (%)		
Do you feel you have learned something after the trip?	98.47	1.53	0.88	99.12	0.88	0	97.56	2.44	0	0,772 (1)	n.s.
Do you consider you had a successful sighting?	96.43	3.57	94.74	5.26	98.78	1.22	2,264 (1)	n.s.			
Do you think whale-watching contributes to marine mammals conservation?	95.41	4.59	97.37	2.63	92.68	7.32	2,390 (1)	n.s.			
Do you think that money, time and effort should be invested in their conservation?	98.98	1.02	100	0	97.56	2.44	2,089 (1)	n.s.			

Table 3 Descriptive analysis on satisfaction, education and conservation attitudes of Peruvian and foreigners participants.

	Educational level (N=196)				Residency (N=196)				All participants (N=196)			
	Basic (%)	Superior (%)	Model χ^2 (df)	Pearson P value	Peruvians (%)	Foreigners (%)	Model χ^2 (df)	Pearson P value	Pre-tour (%)	Post-tour (%)	Model χ^2 (df)	Pearson P value
Others	16	90.56	1,655 (1)	n.s.	88.6	95.12	2,564 (1)	n.s.	91.33	82.14	7,184 (1)	0,007*
Mammalian-cetacean	0	9.44	11.4	4.88	11.4	4.88			8.67	17.86		

Table 4 Descriptive analysis to evaluate whale-watching participants' knowledge regarding whale's biology.

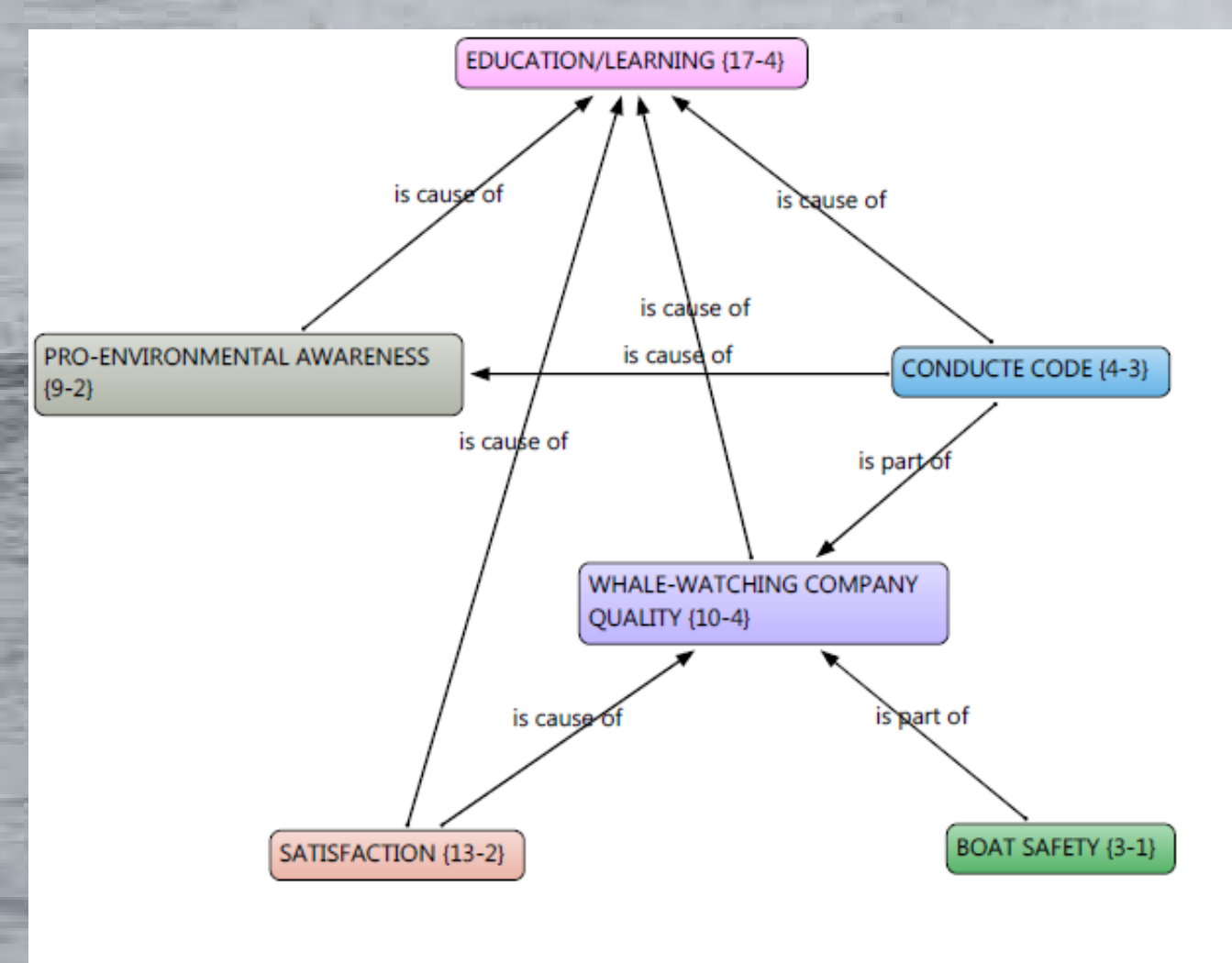


Figure 2 Semantic network analysis after open-ended personal interviews. Pink colors represent more frequent statements uses in oral interviews. Numbers indicate times that one statement was saying and the times of co-occurrence with others statements. N = 20. Atlas Ti.5 software.

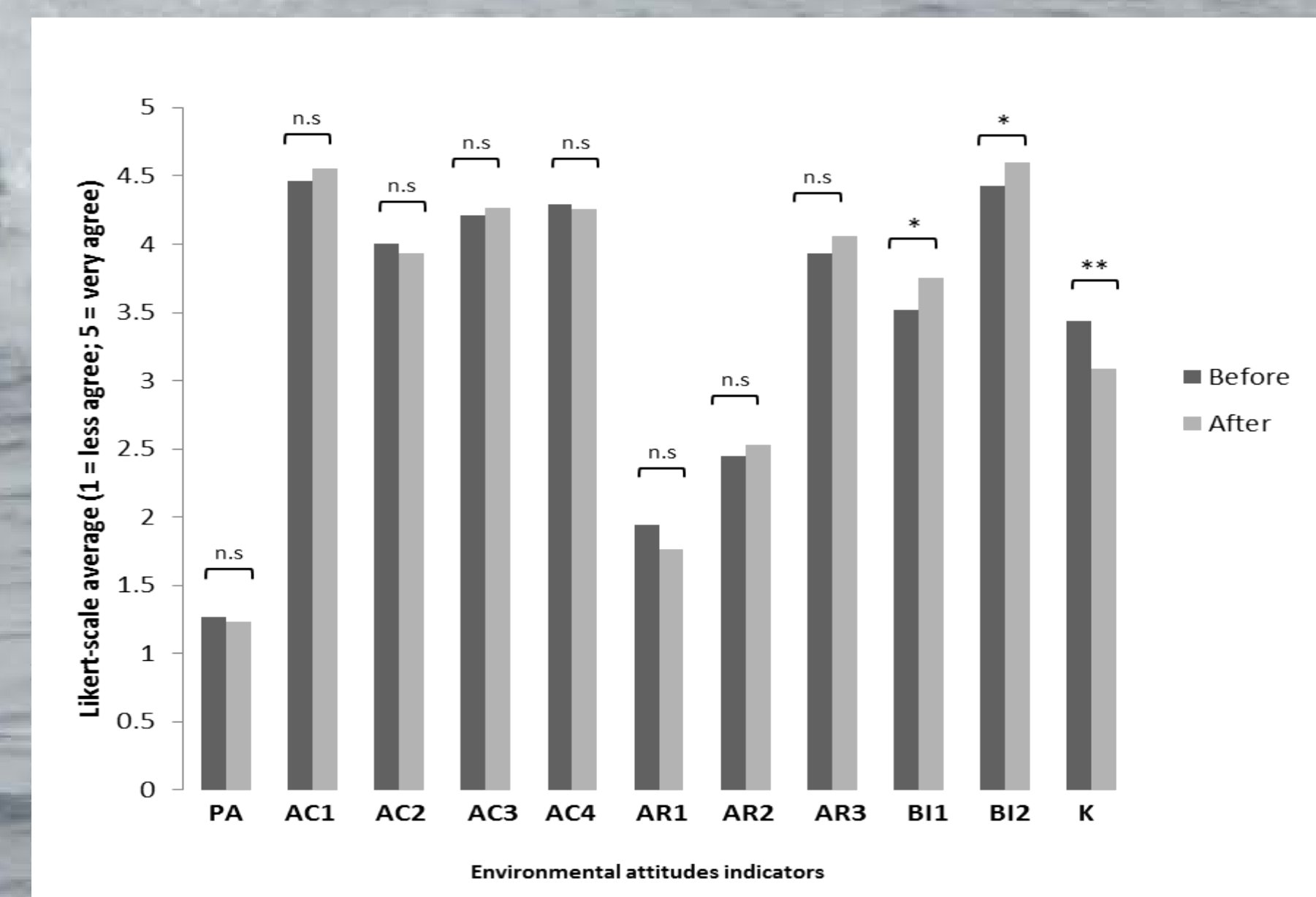


Figure 3 Attitudes towards marine conservation pre and post-tour. Opinions of participants on eleven statements: PA Problem awareness; AR Attribution of responsibility; AC 1 Awareness of consequence; BI Behavioral intentions; K Knowledge. Significance levels (Kruskal-Wallis test) are indicated, n.s = not significant; * P < 0,05; ** P < 0,01; *** P < 0,005; **** P < 0,001.

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