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Encouraging Drawing in Research with Children on Marine Environments: Methodological and Epistemological Considerations

Elodie Fache¹ · Catherine Sabinot^{2,3} · Simonne Pauwels⁴ · Léa Riera^{1,5} · Annette Breckwoldt⁵ · Gilbert David² · Ulamila Matairakula⁶ · Stéphanie M. Carrière¹

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Abstract

As part of an interdisciplinary research project on South Pacific fisheries, we recognized children as one of the relevant categories of stakeholders whose perspectives on fishing and fisheries management need to be considered. We used drawings to explore how, in Fiji and New Caledonia, children perceive their marine environment, including the fishing practices and the connections between these and local ways of ‘being-in-the-world.’ Our methodology involved drawing workshops in local schools, followed by short interviews with the participants. This methodological paper aims to identify the advantages and limitations of this drawing-based approach to research with children compared to conventional ethnographic and ethnoecological methods. Therefore, it focuses primarily on how this approach was designed and implemented and on the epistemological discussions it generated, especially concerning children’s involvement in the study and the use of drawing as a research tool.

Keywords Fiji · New Caledonia · Local knowledge · Children’s perceptions · Marine environment · Fisheries

Introduction

Social scientists are increasingly using drawings, which they make themselves or which are the result of collaborations with artists, as a fieldwork method and/or as a tool for disseminating their results, both within and beyond

the academia (Roussel & Guitard, 2021). Some also invite research participants, adults or children, to make a drawing, for instance in order to explore local representations of specific features of their surroundings (e.g., an underwater volcano: Calandra, 2013), places (e.g., “the place where you live”: Duarte Olson, 2013), spatial relationships (e.g., a radial frame of reference: Bennardo, 2002a), or connections between the latter and social relationships (e.g., among an above/below axis and hierarchical relations: Toren, 1990). Such drawing activities not only “provide a window into people’s mind” (Bennardo, 2002b, 174), but can also be seen as a vector capable of “connecting lives otherwise separated by time and space” (Mizen & Ofosu-Kusi, 2010, 256). In particular, children’s drawings made in the context of ethnoecological research open up a general interaction space between science and society, both in the countries where the drawings are made and in those of the researchers, should these be different. In addition, three concrete spaces are created for dialogue (Sabinot & Carrière, 2015): (1) between researchers working in various disciplinary fields; (2) between researchers, children and their families, school principals and teachers, and possibly other local stakeholders; and (3) between researchers and citizens invested with an official role of teaching, mediation, or decision.

✉ Elodie Fache Ph.D.
elodie.fache@ird.fr

¹ SENS, IRD, CIRAD, Univ Paul Valéry Montpellier 3, Univ Montpellier, Montpellier, France

² ESPACE-DEV, Univ Montpellier, IRD, Univ Antilles, Univ Guyane, Univ Réunion, Univ Nouvelle-Calédonie, Montpellier, France

³ ESPACE-DEV, Institut de Recherche pour le Développement (IRD), Centre IRD de Nouméa, Nouméa, Nouvelle-Calédonie

⁴ Aix-Marseille Université, CNRS, EHESS - CREDO UMR 7308, Labex Corail, Marseille, France

⁵ Leibniz Centre for Tropical Marine Research (ZMT), Working Group ‘Social-Ecological Systems Analysis’, Bremen, Germany

⁶ Pacific Blue Foundation, Suva, Fiji

Building on these studies and following the approach proposed by Carrière et al. (2017), we used children's drawings to explore how, in Fiji and in New Caledonia, children aged nine to 15 perceive their marine environment, including the fishing practices that take place therein, and the connections between these and local ways of 'being-in-the-world' (Heidegger, 1962; Ingold, 2000). This work was part of a broader research project that aimed to examine the webs of socio-cultural, policy and geopolitical connections within which fishing practices and fisheries management efforts occur in Oceania (Fache & Breckwoldt, 2019). In this project, we considered children as one of the relevant categories of stakeholders whose views and practices need to be taken into account for understanding the multidimensional context of fisheries. In large parts of the South Pacific indeed, children are users of marine territories and resources from a very young age, making a significant contribution to local fishing effort in shallow waters as well as to gleaning activities on reef flats (e.g., Kronen, 2004; Sabinot et al., 2021). We therefore argue that their ecological knowledge is as valuable as that of adult fishers, and should not be dismissed or overlooked (Johannes et al., 2000). The study aimed to test the following four main hypotheses: (i) when asked to draw the sea and what they and others do in the sea, most children will draw fishing activities that they practice and/or have already observed, and their drawings will therefore reflect the main local fishing techniques; (ii) children will not only associate the sea with fishing activities, but also with other kinds of activities, thus reflecting various human uses of marine territories; (iii) most children have a good ecological knowledge of marine life, and this knowledge is even deeper when they are themselves involved in regular fishing activities; (iv) there are differences between children's experiences and representations of fishing in Fiji and in New Caledonia, as well as within these study areas, especially between urban and rural contexts, and among the latter between those with and those without a formal marine protected area nearby.

This article deliberately focuses on methodological and epistemological considerations related to this approach, which enables the involvement of children in the research process and the creation of various spaces for dialogue, but which – despite valuable exceptions (e.g., Pagezy et al., 2010) – remains little used. First, after a brief presentation of our study sites, we describe how this approach was designed and implemented. Then, we provide an overview of our main results, which will be presented and discussed in more detail in a forthcoming article. Finally, we share the epistemological discussions this endeavor generated, especially with regard to children's involvement in the study and the use of drawing as a research tool. These considerations also revolve around the following question: what are the

advantages and limitations of drawing, compared to more conventional ethnographic and ethnoecological methods, in research with children?

Study Sites

In both Fiji and New Caledonia, we organized drawing workshops in three different contexts: (1) in an urban setting; (2) in a rural setting; (3) in another rural setting, this one adjacent to a formal marine protected area (MPA). All workshops were carried out in 2019 by a multidisciplinary team (anthropology, geography, ethnoecology, marine science), including two to five French, German and/or Fijian researchers.

Fiji

With a total land area of about 18,000 km² but an Exclusive Economic Zone (EEZ) covering about 1.3 million km², Fiji (or the Republic of the Fiji Islands) is a large ocean island state (Quirk & Hanich, 2016). The archipelago includes more than 300 islands, about one third of which are inhabited. Fiji's total (mainly coastal) population stands just below 900,000. While the urban population of this country is continuously increasing (from 37.2% in 1976 to 55.9% in 2017), its rural population is continuously decreasing (from 62.8% in 1976 to 44.1% in 2017) (Fiji Bureau of Statistics, 2018a). The latter spreads across 14 provinces and lives mainly from farming and fishing. In 2019–2020, it was estimated that 62% all Fijians were *iTaukei* (i.e., Indigenous), 34.2% Fijians of Indian descent (i.e., descendants of the Indians displaced to Fiji as indentured laborers under British colonial rule), and 3.8% 'Others' (Fiji Bureau of Statistics, 2021).

In Fiji (Fig. 1), we carried out drawing workshops: (1) in Lami Town, located in the outskirts of the country's capital, Suva, and therefore considered part of the greater Suva area; (2) on Cicia, a small organic island (about 35 km²) located in the Lau Province in the Eastern Division, with five villages that gather a total of about 1,000 inhabitants (Fiji Bureau of Statistics, 2018b; Fig. 2); (3) in Nakasaleka district on Kadavu Island, that gathers about 2,500 inhabitants and where the Naiqoro Passage Spawning Aggregation Marine Reserve was established in 2018 (Fiji Bureau of Statistics, 2018b; Fig. 3). Like Cicia Island, this third site is located in the Eastern Division, but much closer to – and with much more regular ferry transport to/from – Suva.

Fig. 1 Map of Fiji highlighting our three study sites. (Source: CartoGIS Services, College of Asia and the Pacific, The Australian National University, <http://asiapacific.anu.edu.au/mapson-line/base-maps/fiji-main-islands>, modified by the authors)

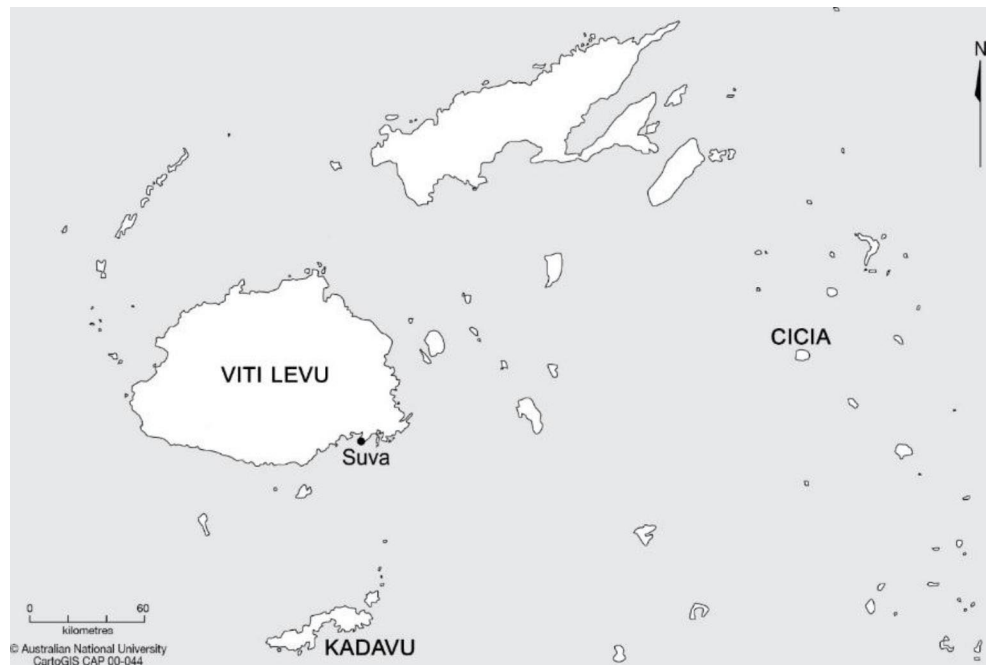


Fig. 2 Board located at the entrance of Tarukua village, Cicia Island, Fiji. (Photo by E. Fache, October 2019)



New Caledonia

New Caledonia is a French overseas territory engaged in a process of negotiated decolonization. Its surfaces are comparable to those of Fiji, with a total land area of about 18,500 km², and an EEZ covering about 1.4 million km². However, its population is far less numerous, with 271,407 inhabitants in 2019: 203,144 in the South Province; 49,910 in the North Province; 18,353 in the Loyalty Islands Province (ISEE, 2019). About 40% of its population is *Kanak*, about 25% is European, and other inhabitants include in

particular Oceanians (e.g., from Wallis, French Polynesia, Vanuatu), Indonesians, and Vietnamese (ISEE, 2019). About one third of New Caledonia's population lives in the capital city, Nouméa, in the South Province, and this figure rises to two thirds if we consider the entire urban agglomeration (*Grand Nouméa* including Nouméa, Dumbéa, Le Mont-Dore, and Païta) (Insee, 2020). Industrial, artisanal, recreational, and subsistence fishing activities co-exist in this area. The North and Loyalty Islands Provinces are mainly inhabited by *Kanak* people who are highly dependent on

Fig. 3 Board located at the entrance of Matasawalevu village, Kadavu Island, Fiji. (Photo by E. Fache, October 2019)



Fig. 4 Map of New Caledonia highlighting our three study sites. (Source: CartoGIS Services, College of Asia and the Pacific, The Australian National University, <http://asiapacific.anu.edu.au/maponline/base-maps/new-caledonia>, modified by the authors)



agriculture and fisheries, much of their catch being for self-consumption and gifting.

In New Caledonia (Fig. 4), we carried out drawing workshops: (1) in Nouméa; (2) in Yaté, about 50 km away from Nouméa; (3) in Hienghène, more than 350 km away from Nouméa, within one of the six noncontiguous marine clusters highlighted by UNESCO: the *Zone Côtière Nord-Est* (ZCNE; North-Eastern Coastal Zone).

Materials and Methods

Preliminary Steps

Prior to the drawing workshops, three main preliminary steps were used to anchor our approach, directly adapted from Carrière et al. (2017): defining the drawing instruction

Table 1 Interview guide

Drawing	Family context
Naming/description of all items on the drawing and, for people and marine creatures, of what they are doing.	Current and previous residence? With whom do you live?
Depicted place? Time context? Why did you draw this, and why did you draw it in this way?	Family's livelihoods? (+ If enough time, family's fishing activities and fish consumption?)
What title would you like to give to your drawing?	
Is there anything else you would like to share about your drawing or yourself?	

to be given to the children; preparing the interview guide for our semi-structured interviews; and seeking prior, free, and informed consent at various levels.

Drawing Instruction

Several criteria were involved in the choice of the drawing instruction to be given to the children. In particular, it had to be easy to understand for all children of our target age group. In addition, we did not want this instruction to exclude the possibility of drawing offshore areas (hence the avoidance of terms related to inshore areas such as lagoon or reef). Finally, in order to explore children's experiences and representations of fishing, the instruction had to focus on sea-related activities (rather than, for instance, on marine life), and make children feel personally involved while also allowing them to draw activities performed by others.

Fig. 5 Photos of the drawing workshops in Fiji



We thus defined this simple instruction: “Draw the sea and what you and others do in the sea”¹. The first part of this instruction (“draw the sea...”) aims to explore the children's perception and knowledge of the sea. The second part (“... and what you and others do in the sea”) aims to assess the importance that children spontaneously give to fishing compared to other activities that may occur in marine territories. Hence the choice to omit any direct reference to fishing in this instruction despite our research focus on fisheries.

Interview Guides

Our approach also involved face-to-face interviews, unrecorded and lasting up to about 10 min, to allow children to briefly describe their drawing as well as their family context. In preparation of these semi-structured interviews, we designed the following interview guide to be used by all interviewers (Table 1).² Yet we agreed that this interview guide would remain flexible and would, in particular, be adjusted: (i) for each drawing workshop, depending on its specificities (e.g., unexpected constraints of time and space), and (ii) for each child, on the basis of her/his respective interactions with the interviewer.

We also conducted semi-structured interviews with the educational team of each school (principal and/or teachers)

¹ Translated into French in New Caledonia and *iTaukei* Fijian in Fiji.

² A set of specific questions seemed preferable to a single open-ended question, such as the one used by Duarte Olson (2013): “Tell me about what you drew”, in particular to ensure that the children's description of their drawings would be as complete as possible despite the short duration of the interview, to limit differences from one interviewer to another, and to facilitate the exercise for the children.



Fig. 6 Photos of the drawing workshops in New Caledonia

in order to explore the features of this school and the profiles of its students, the curriculum and school activities related to the sea and/or fishing, and whether a recent event, internal or external to the school, may have influenced the children's drawings (e.g., an awareness-raising workshop organized by a conservation organization).

Prior, Free, And Informed Consent (PFIC)

In Fiji, we first approached the Ministry of Education, Heritage and Arts to get the permission to carry out this study in both urban and rural primary schools (with Year 4 to Year 8 students). The Ministry's support was preconditioned by our application, for each team member, for an 'approval for limited authority to teach' from the Fiji Teacher's Registration Authority. Before going to Cicia and Kadavu, we also requested permission from the Permanent Secretary for iTaukei Affairs to conduct research in these rural areas, and had preparatory meetings with, respectively, the Lau Provincial Office and Kadavu Provincial Office. Upon our arrival on these islands, we asked for customary PFIC through a *sevusevu*, a ceremony of introduction with presentation of kava (*Piper methysticum*) to customary authorities, without which a stranger is not allowed to enter the village area and community.

Once these institutional and customary consents were obtained, we arranged a meeting with the principals of the pre-identified schools to introduce our study and discuss our approach, get their consent as well as the consent of the teachers to be involved, and organize with them the drawing workshops (date and time, place, number of participants, protocol, etc.). We also requested their assistance in obtaining the PFIC from the parents or guardians of all children prior to any participation.

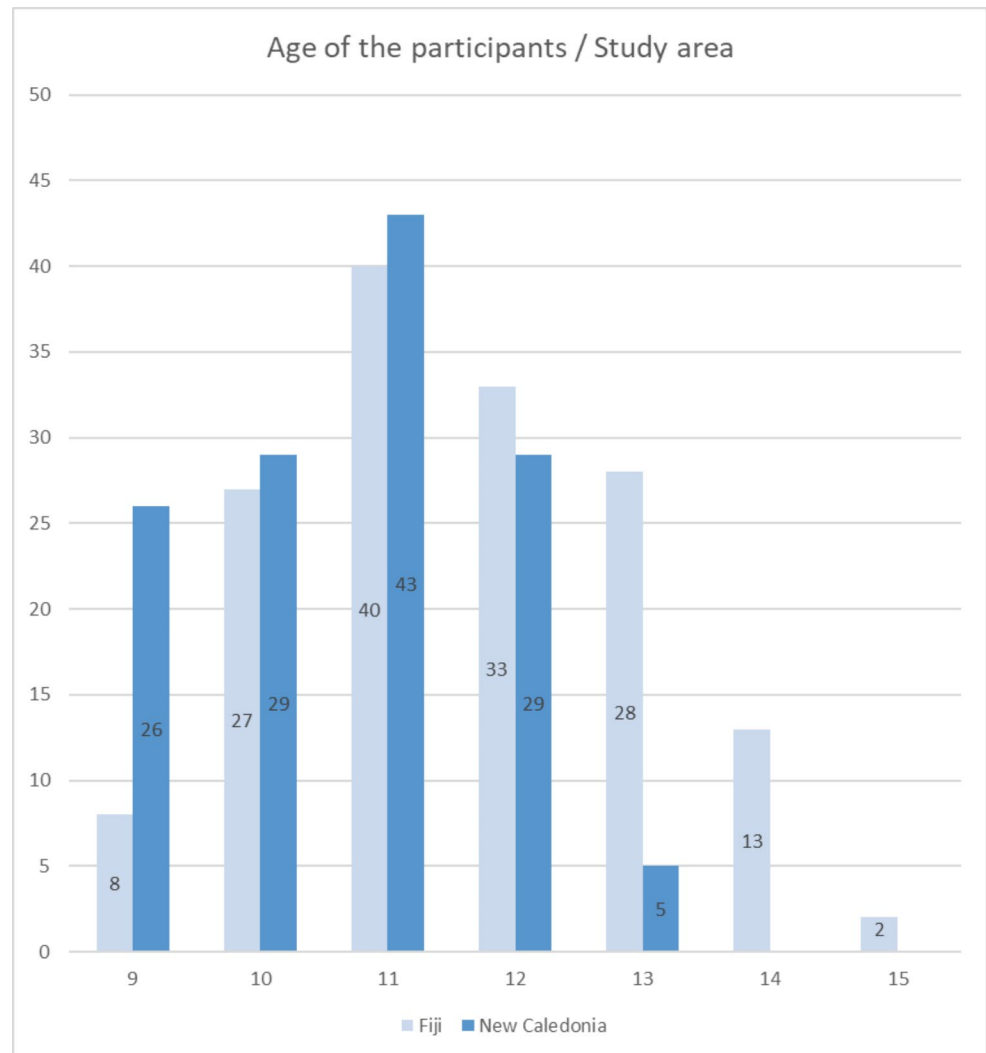
In New Caledonia, it is mandatory to obtain approval from the Education Department (*Direction de l'Enseignement de la Nouvelle-Calédonie* or DENC) for any involvement in primary schools, and from the Vice-Rectorate for middle schools (*collèges* in French). The primary and middle schools matching with our aim to focus on three different sites, and potentially interested in our approach, were identified in dialogue with these institutions. Once the interest of the principals and teachers of these schools was confirmed, we submitted an official application and received the approval from the DENC and Vice-Rectorate in early October 2019.

In New Caledonia, at the beginning of each school year, the educational team asks parents or guardians whether or not they authorize their children to participate in school-related activities and to be photographed during those, as well as whether or not these photos may be used by third parties or the media. The terms of this consent are then valid for the entire school year. As these terms also applied to our case, we complied with them and therefore did not make any additional request for consent.

Drawing Workshops

The drawing workshops were carried out between September and November 2019 in Fiji (Fig. 5), and over a three-week period in November 2019 in New Caledonia (Fig. 6). A total of 290 children participated in these workshops, 153 in Fiji and 137 in New Caledonia, with an equal participation of boys and girls targeted in all workshops. While our target group consisted of children aged nine to 15, in Fiji most of the children (85%) were aged 10 to 13, while in New Caledonia most of the children (96%) were aged nine to 12 (Fig. 7).

In order to make the conditions and course of the drawing workshops as homogeneous and transparent as possible, we followed the same predefined protocol in each school, however with some adjustments on a case-by-case basis according to the recommendations of the educational team and context-specific constraints. All workshops were carried out in a classroom during school hours. Before each workshop, the principal and teachers involved were reminded not to influence the children's drawings by giving them ideas or advice. We started each workshop by providing each participant with the same drawing material (which they could keep after the workshop): sheets of drawing paper (A4 format), a pencil, a set of 12 colored pencils, a pencil sharpener, and an eraser. Then we asked the participants to write their name, gender, age, and class on the backside of the sheet on which they would then draw, and gave them the drawing instruction. While they were drawing, we answered their questions and took photos of the classroom, of the group of drawers,

Fig. 7 Distribution of children by age

and of each child with their respective drawing (being careful that the participants whose parents or guardians did not authorize it would not appear on these photos). In parallel, we interviewed the educational team (principal and/or teachers) as described above.

Interviews with children were conducted either in the classroom itself or in another room (e.g., in the school library). In some schools, it was agreed with the principal and/or teachers that the children would draw until recess, after which we would start the interviews, while in others we started these interviews as soon as the first participants had finished their drawing. We aimed to interview all participants, but this was not possible in one school in New Caledonia due to an unforeseen event in the school that disrupted our schedule and limited our time with the children: only 16 out of the 32 participants were interviewed. At the end of each interview, we asked the children if we could keep their drawing(s), and all agreed.

Immediately following the drawing session and interviews or a few days later, we presented to the participants some preliminary results from this work and/or from a related project focusing on emblematic marine species in New Caledonia. A few months later, we sent a ‘souvenir booklet’ to the participating schools, gathering all the drawings made in the respective country, in both paper and digital formats.

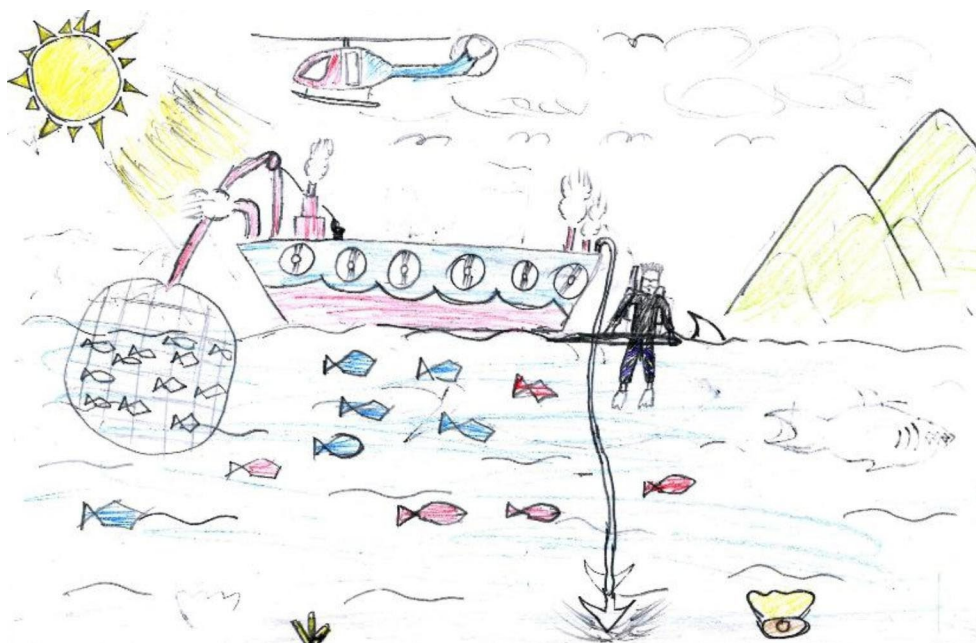
Data Processing and Analysis

A total of 164 drawings were collected in Fiji and 145 in New Caledonia, with a relative homogeneity in the number of drawings between the different sites (Table 2). Indeed, 17 children out of 290 (i.e., 5.9% of the participants) did produce more than one drawing. This situation indicates that some children needed much more time than others to complete their drawing, and that some among the faster children appreciated the opportunity to continue drawing in the time

Table 2 Number of drawings for each site

	Fiji, Urban (Suva's outskirts)	Fiji, Rural with MPA (Kadavu)	Fiji, Rural without MPA (Cicia)	NC, Urban (Nouméa)	NC, Rural with MPA (Hienghène)	NC, Rural without MPA (Yaté)
Total number of drawings	63	50	51	52	38	55
Drawings kept for the processing and analysis	59	50	44	49	38	50

Fig. 8 “Going for gillnet fishing”.
(Drawing made by a 12-year old
girl in the outskirts of Suva, Fiji,
September 2019)



left. In these cases, only the first drawing has been kept for the processing and analysis, yet the others might be used to discuss specific questions.

In addition to these children's drawings, our dataset includes: (1) a photo of each child with her/his drawing (except in the rare cases where the parents or guardians did not authorize this); (2) photos taken during each drawing workshop; (3) notes taken during the interviews with the children; (4) notes taken during the interviews with the educational teams; and in some cases (5) copies of the materials used or produced by the latter as part of their teaching (text books, posters, etc.). For the processing and analysis of this dataset, we created two Excel spreadsheets, one summarizing general information about each drawing workshop, and the other coding the data related to the content of each drawing (e.g., type of activities, fishing techniques, identity of the fishers, targeted or caught species, presence/absence of an underwater view and of marine life, presence/absence of marine management issues or measures).

Results

The results reflect the composition and content of the children's drawings, as well as the description and interpretation these children shared with us in interviews. First, we address the specificities of children's engagement with the sea and fishing in each study site. Then, we give an overview of the main results for each of our four main hypotheses.

Children's Engagement with the Sea and Fishing

In Fiji, the urban site is located on the inshore coastline of Suva Harbour, where industrial fishing boats are always anchored (Fig. 8). Children attending this school do not live directly by the sea, and the members of their household who fish usually do so on Saturday to 'prepare for' their Sunday meal; a central moment of the week in a country where the overall importance of Christianity for *iTaukei* Fijians has been well documented (e.g., Ryle 2010). Our interviews revealed that these children have a first-hand experience of the sea mainly through public parks located on Lami's and Suva's waterfront, and visits in the home village of their parents and grandparents, for holidays or longer periods of

Fig. 9 “Organic island”. (Drawing made by a 12-year old boy on Cicia Island, Fiji, September 2019)



Fig. 10 “Spearfishing day”. (Drawing made by a 14-year old boy on Kadavu Island, Fiji, November 2019)



time, during which they get an understanding of what living with and from coral reefs means.

For the children living on Cicia, known as “the organic island” (Fig. 9), the reef is usually both a playground and fishing ground. Only a few parents have a regular income, for instance as civil servants, as managers of a small grocery store, or through the sale of copra (dried coconut) or virgin coconut oil. Most adults define themselves as farmers and/or fishers, and fish is indeed an important part of the daily diet.

Like on Cicia, the children of Nakasaleka district on Kadavu Island usually engage in fishing activities and/or accompany family members during their fishing trips (Fig. 10). In our interviews, these children also appeared to be deeply aware that many families depend on fishing as their main source of food and income, thanks to the market’s proximity and accessibility.

In New Caledonia, children living in Nouméa sometimes go to its urban beaches (e.g., Baie des Citrons and Anse Vata; Fig. 11) and/or in the mangroves, and many immerse themselves in rural marine territories at weekends or during

Fig. 11 “En eaux troubles” (“In troubled waters”). (Drawing made by a 10-year old boy in Nouméa, New Caledonia, November 2019)



Fig. 12 “La pêche à la mer” (“Fishing at sea”). (Drawing made by a 12-year old boy in Yaté, New Caledonia, November 2019)



school holidays. The fish they eat from time to time is mainly bought (rather than caught), and only some of them have already fished. In contrast, in Yaté’s lagoon, many children have already accompanied members of their family on fishing trips (Fig. 12). In Hienghène, while the participating school faces the lagoon with its emblematic rocks in the shape of a hen and a sphinx (Fig. 13), a large part of its students come from social units that are based in the hinterland. While these children usually fish in rivers with family members, their connection with the sea has mainly

developed through school-related activities, such as environmental awareness-raising programs or sailing schemes.

Fishing Activities and Techniques

70% of the children’s drawings made in Fiji represented fishing activities, and 29% of those made in New Caledonia. In both Fiji and New Caledonia, most of the children who included small-scale fisheries in their drawing represented one or two fishing techniques, in particular: line-fishing from a watercraft (76 drawings; e.g., Fig. 14), line-fishing

Fig. 13 Untitled drawing. (Drawing made by a 10-year old girl in Hienghène, New Caledonia, November 2019)

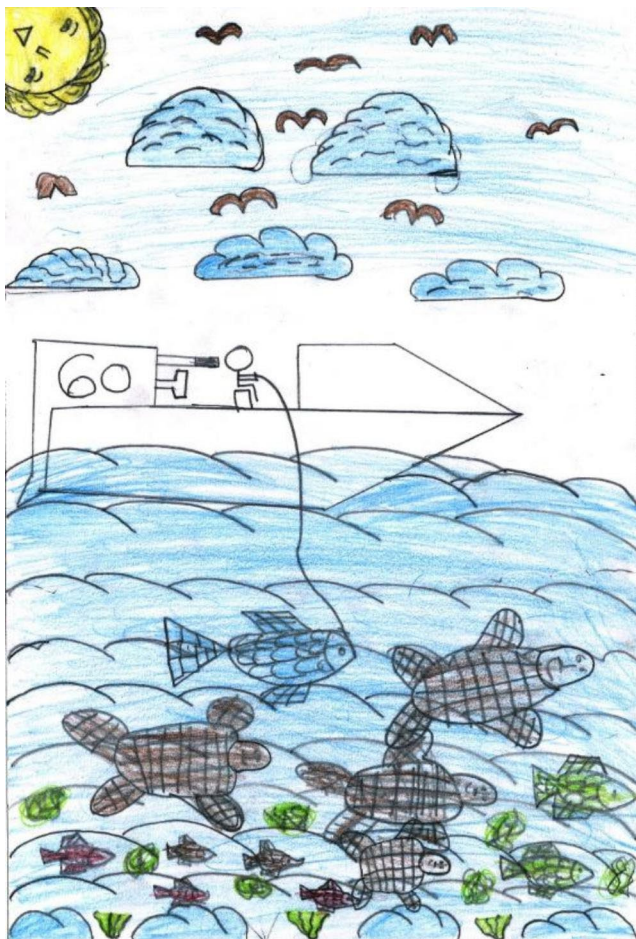


Fig. 14 “Different kinds of fish”. (Drawing made by a 12-year old girl on Kadavu Island, Fiji, November 2019)

from the shore (42 drawings; e.g., Fig. 15), using a speargun while free diving (40 drawings; e.g., Fig. 16). These techniques are very common in Fiji and New Caledonia, where the latter is used only by boys and men as in these children’s drawings.

Various Human Uses of Marine Territories

50% of the children’s drawings made in Fiji represented other sea-related activities (sometimes combined with fishing), and 58% of those made in New Caledonia. These sea-related activities included picnicking and relaxing on the beach, beach games (e.g., volleyball, soccer, playing with sand), bathing/swimming, water sports (e.g., recreational diving, sailing, surfing), sea transport of people or goods (e.g., ferry included in Fig. 9 above). Except for the latter, these activities mainly reflect recreational uses of the land-sea interface (e.g., Fig. 17), which also appears as a space for socialization.

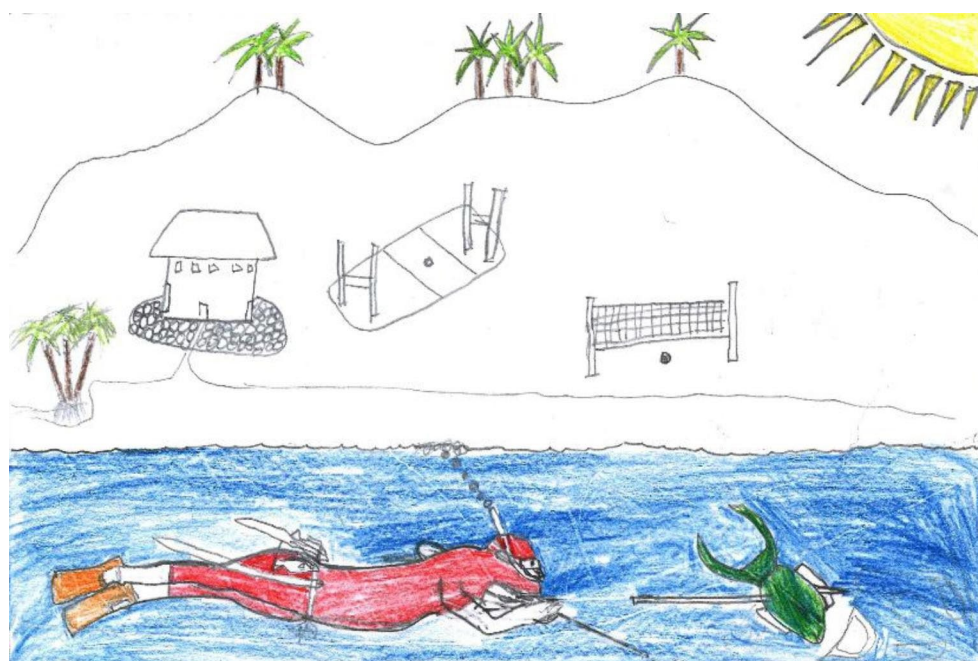
Ecological Knowledge of Marine Life

Most of the children’s drawings depicted marine life forms: fishes, marine mammals, sharks and rays, sea turtles and snakes, cephalopods and crustaceans, corals and seagrasses or seaweeds (e.g., Fig. 18). Some drawings also represented interactions within and/or between species (e.g., Fig. 19). These elements illustrate that, overall, the participating children had some degree of knowledge about marine environments and their various non-human dwellers. The interviews

Fig. 15 “Une femme et un monsieur qui pêchent” (“A woman and a man who are fishing”). (Drawing made by a 12-year old girl in Hienghène, New Caledonia, November 2019)



Fig. 16 “Saturday in Mabula”. (Drawing made by a 13-year old boy on Cicia Island, Fiji, October 2019)



also suggested that, for (at least some) children, this knowledge was acquired through fishing, as both a mode of active engagement with the constituents of their surroundings and a mode of intra- and/or inter-generational learning.

Comparative Perspectives

As noted above, the percentage of children who represented fishing activities was higher in Fiji than in New Caledonia where, in contrast, children more often focused their

drawing on recreational uses of the land-sea interface. This is partly related to the above-mentioned specificities of the study sites chosen in New Caledonia: the children living in Nouméa (urban site) often had a limited experience of fishing but regular experience of beaches, and many of those attending the school in Hienghène (urban site with MPA) belonged to social units from the hinterland. In Fiji too, children's experience of fishing was more limited in the coastal urban site than in coastal villages.

Fig. 17 “La plage de Bourail” (“The beach in Bourail”). (Drawing made by a 10-year old girl in Nouméa, New Caledonia, November 2019)



Fig. 18 “Fishing trip”. (Drawing made by a 13-year old boy in the outskirts of Suva, Fiji, September 2019)



In addition, in both Fiji and New Caledonia, a notable difference between the drawings made in the two rural contexts was observed: while asked to “draw the sea...”, children represented a land-sea continuum (rather than the sea only; e.g., Figs. 14, 18 and 19 above) more often in the rural site located further away from the capital city (84% in Hienghène and 91% on Cicia Island) than in the rural site closer to the capital city (68% in Yaté and 54% on Kadavu Island). This might reflect the greater importance of commercial fishing (versus subsistence fishing) as well as the

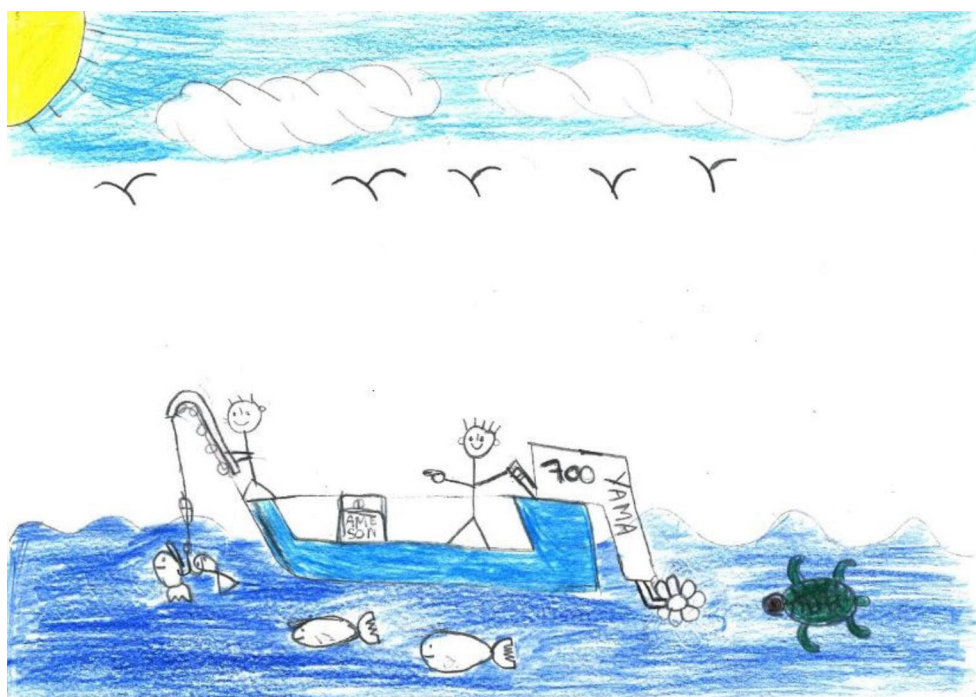
greater access to motorized fishing boats near the capital city’s markets. Both in Yaté and on Kadavu Island indeed, the children’s drawings often included such boats, with the horsepower noted on the engine (e.g., Figs. 14 and 20).

However, our analysis has not revealed any influence of the formal MPAs (Naiqoro Passage Spawning Aggregation Marine Reserve in Fiji and *Zone Côtière Nord-Est* in New Caledonia) on what the children chose to depict.

Fig. 19 “La meilleure pêche” (“The best fishery”). (Drawing made by a 12-year old boy in Nouméa, New Caledonia, November 2019)



Fig. 20 “La pêche à la canne à pêche c’est mieux” (“Fishing with a rod is better”). (Drawing made by a 10-year old boy in Yaté, New Caledonia, November 2019)



Discussion

This methodological and epistemological discussion purposely addresses, from different angles, the advantages and limitations of drawing in research with children, compared to more conventional ethnographic and ethnoecological methods (namely unstructured or semi-structured interviews and participant observation).

A Way to Enter the Worlds of Children

Drawing represents a task-based method that “can enable children to feel more comfortable with an adult researcher” and “[facilitate] their ability to communicate their view of the world”, while giving them “more control over their form of expression” compared to an interview situation (Punch, 2002, 330, 337, 331). A clear strength of this approach is

therefore that it allows adult researchers to explore the view and knowledge children have of their marine environment in a way that allows the latter to remain in a comfort and control zone, as illustrated by the desire of some children to make several drawings, confidently and whole-heartedly. Yet, as Mizen & Ofosu-Kusi (2010) note in relation to photographs taken by children in Ghana, a drawing made by a child “is incapable of speaking for itself in unequivocal tones” (Mizen & Ofosu-Kusi, 2010, 257). Hence our idea to combine this task-based method with short semi-structured interviews, through which “children can be treated in the same way as adults and display their competencies” (Punch, 2002, 330), i.e. their ability to verbalize the content and context of their drawing. The children’s reaction to this interview situation formed a continuum from extreme shyness to easy conversation, with some cases of enthusiastic talkativeness. Overall, the challenges related to having the children’s views voiced and heard were mitigated, on the one hand, by the positive interaction established between the workshop facilitators, school staff and participants and, on the other hand, by the workshop facilitators’ prior knowledge of the archipelagos and their respective contexts, including an understanding of local ontologies and practices. In Fiji, the presence of an *iTaukei* team member for each workshop also ensured that the children felt confident to openly ask questions throughout the process, and that the shyer children felt more comfortable than if interviewed by foreign researchers. Last but not least, as a medium between the children and researchers, the drawings – in their very materiality – played a primordial role in facilitating reciprocal trust and verbal exchange during the interviews.

Applied to study areas of which one has sufficient prior knowledge (Calandra, 2013), this image-centered approach generates data that would be more problematic to access using classical ethnographic and ethnoecological methods. As researchers and adults, most of whom are not Oceanians, we anticipated that, practically, our participant observation of the worlds of children might to some extent transform them while, ethically, this would raise questions about the (in)appropriateness of not complying with local norms and expectations related to adult roles and adult-child interactions (Knupfer, 1996). Moreover, a threefold pitfall might be encountered when only or mainly using interviews in research with children. First, “ask[ing] questions which [...] adults would not ordinarily ask might be confusing, or construed as culturally inappropriate,” for children (Knupfer, 1996, 143). Second, while “we often insist on oral or written responses to our questions,” children are often more adept at presenting information through an action, a symbolic play, or a drawing (Knupfer, 1996, 143). Third, in Pacific Island countries and territories, children are generally encouraged

to be quiet in the company of adults (e.g., Godin 1998; Nabobo-Baba, 2006, 101-2; Toren 1990, 175).

We assume that a situation we encountered during the PFIC procedure in two Fijian schools was related to this last point. A few days before the drawing workshops in these schools, we requested the assistance of the educational team in obtaining the PFIC from the parents or guardians of all participants. When checking the PFIC forms with the educational team before starting these workshops, it appeared that some children had filled out and signed the forms themselves, stating that their participation was not authorized. In the first school, we understood that the handing over of the PFIC form could not have been accompanied by adequate explanations from the educational team. So, in agreement with the latter, we gathered the respective children, explained to them what their participation in a drawing workshop would consist of, and gave them a second opportunity to have a parent or guardian fill out and sign the form in the village nearby, which a number of them wished to do. These children thus made a drawing, and all agreed to be interviewed. This was not possible in the second school, where many students are boarders. In this case, there was a stark contrast between the children from the village where we were based, all boarders in this school, and the children from other villages. The former (12 children) were all authorized by their parents or guardians to participate in the drawing workshop, after our intention and activity were explained by the village headman (*turaga ni koro*) and by ourselves, while only nine children from other villages participated in this workshop. We assume that these situations were related to the children’s apprehension about speaking to/in front of adults, the PFIC form stating that participants would be invited to present and explain their drawing to us.

As is also common in New Caledonia (Godin, 1998; Lebègue, 2018), verbalized communication in Fiji is subject to rules related to gender, age and birth order, status, rank and function, as well as kinship between the people involved (Nabobo-Baba, 2006). Hence some people speak at every gathering (e.g., the chief’s spokesperson),³ whereas the voice of others is rarely heard (e.g., a young and low-status cadet). Also, “the younger a person is, the greater the expectation that they will be quiet and listen more” (Nabobo-Baba, 2006, 101), and when children are invited to speak by an adult, they usually speak in a low, almost inaudible voice, as both an acknowledgement and a manifestation of *madua* (shyness compounded by fear) in their relationships with those who are senior to them (Toren, 1990). In primary schools, some teachers strive to create a space where children’s eloquence is valued but, there too, silence remains

³ The chief very rarely expresses himself, his word being sacred and therefore considered dangerous. His spokesperson mitigates this sacredness and this danger.

‘culturally desirable’ and is considered a pivotal way of knowing (Nabobo-Baba, 2006).

Time was the main limitation we experienced in this approach. More time would indeed allow a more flexible timeframe for the drawing phase, as well as a more in-depth dialogue during the interview phase. If lasting longer, the latter would increase the capture of information, as a broader and more targeted set of questions could be addressed with each child. These questions could, for example, aim to explore in greater detail the practices, norms and values that children see as paramount in their family and community, how and by whom these are enacted on a daily basis, and how they have shaped these children’s understanding of the marine environment they depicted.

Drawing Instruction and Information Elicitation

The instruction given to the children – such as the one we chose: “draw the sea and what you and others do in the sea” – undeniably influences the content of their drawing, and therefore circumscribes the information that is elicited. It enables the generation of data related to specific topics, while *de facto* shifting other aspects out of sight, even though these could be just as scientifically relevant. For instance, our instruction allowed us to explore children’s experiences and representations of fishing in different contexts in Fiji and New Caledonia, as well as other activities they associate with the sea. However, because of its very general focus on ‘the sea’ and related activities, this instruction did not allow us to explicitly explore children’s contribution to fisheries through gleaning: the gathering of marine resources such as shells, sea cucumbers, urchins, seaweeds, and fish in shallow waters or in habitats exposed during low tide. During the interviews, some children mentioned this contribution to fisheries, which our ethnography also confirmed, but they rarely illustrated it. Since gleaning takes mostly place on reef flats, how much more frequently the children would have drawn this activity if the instruction emphasized reef flats instead of ‘the sea’? Or if the instruction focused on, for instance, food collection and harvesting in and around the lagoon?

This spotlight on specific topics at the expense of others is to some extent comparable to how the focus and spatial-temporal context of participant observation circumscribes the interactions in which ethnographers are involved, the data they produce, and thus their descriptions and analysis. The drawing instruction is also, to some extent, comparable to the question given to the interviewee at the beginning of an unstructured interview, usually designed to set the central theme of this interview while being as open as possible. Yet, whereas researchers usually ask other questions during the course of an unstructured interview, based on

the interviewees’ responses and aiming to encourage them to further develop their thoughts, in our work the drawing instruction was not complemented by follow-up instructions. In other words, we conceived this drawing instruction as a single and overarching question, allowing children to choose what they wanted to include in their drawing and decide when this drawing was finished. This was intended to give children more control over what they would share with the research team (i.e., what matters to them, not to us), while minimizing some forms of bias that might emerge in interviews as well as in participant observation (e.g., non-neutral probes and encouragements, adult-centric perspectives, etc.).

Moreover, like an unstructured interview, a drawing is not “a means of getting the ‘right answers’” (Olivier de Sardan 2015, 34), but rather a means of formulating new questions or reformulating old ones. In an interview situation, researchers can immediately integrate these new or reformulated questions into the exchange in progress. As part of our approach, these new or reformulated questions would require a second series of drawing workshops, either focused once again on a single and overarching drawing instruction (defined on the basis of the results of the first series of workshops), or inviting each child to successively make several drawings in response to a set of drawing instructions. These instructions may, for instance, aim to investigate several interrelated themes, or to explore the same theme but through an increasingly narrow prism (funnel effect) as suggested by Carrière et al. (2017).

Drawings as Labile and Porous Documents

Children’s drawings are highly influenced by the spatial-temporal and interactional context in which they are produced (Carrière et al., 2017). Indeed, in response to an identical drawing instruction, each child would have potentially made a different drawing in another place, at another time of the year, week or day, if they were sitting next to other children or alone, if they were in company of other researchers, and so on. Our experience in this and previous studies reveals that children’s drawings often reflect what they have recently seen, done, learned, etc. in the different spheres in which they engage (at school, in the village or neighborhood, in the family circle, etc.).

For example, in the outskirts of Suva in Fiji, four drawings referred to “gillnet fishing” (in the words of the respective children), with one child describing such fishing in terms of “human activities that destroy sea creatures” and stating that “we learn about it” at school. The teacher indeed explained to us that she tried to raise her students’ awareness of various environmental issues, including “gillnet fishing”, shortly before the drawing workshop (e.g., Figs. 8 and 21).

Fig. 21 “Don’t use gillnet fishing”. (Drawing made by a 12-year old boy in the outskirts of Suva, Fiji, September 2019)

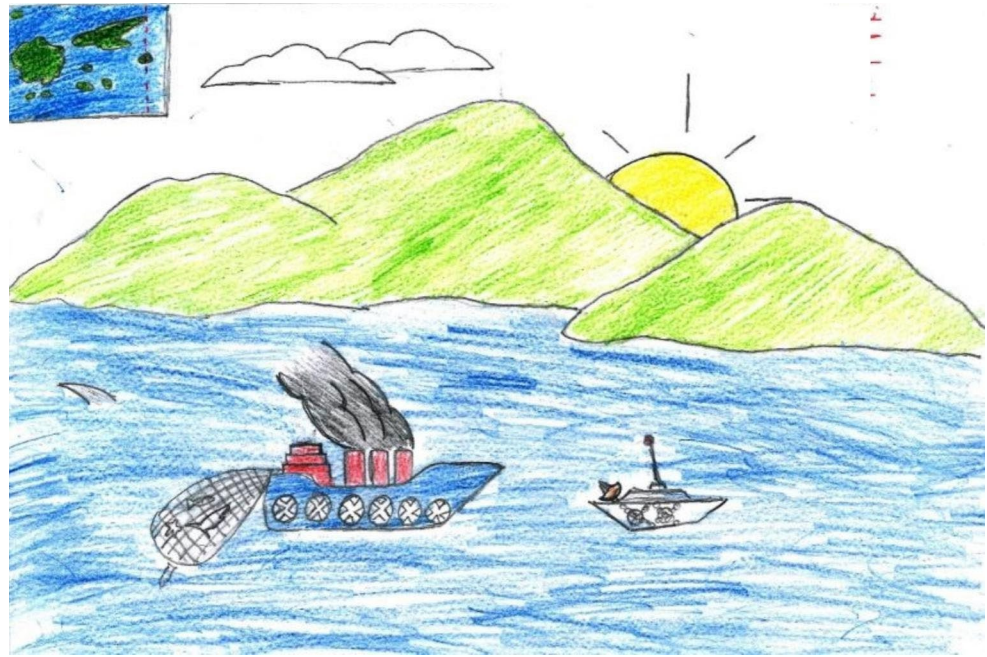


Fig. 22 “Island of Cicia”. (Drawing made by a 12-year old girl on Cicia Island, Fiji, September 2019)



In addition, at school, children are expected to comply with specific ways of being and behaving, as well as to engage in specific adult-child interactions (between teachers and students), which crystallized in the pictures they produced in response to our drawing instruction. This is particularly obvious in the (rare) drawings that include annotations or a legend (e.g., Figs. 22 and 23). Furthermore, the drawing workshops we organized confirmed that “children drawing together [...] collaborate and share ideas” (Rose & Jolley, 2019, 2). For instance, on Kadavu Island in Fiji, five out of 21 drawings included the words “the ocean” or “our

ocean” written in large colored letters at the top or center of the drawing sheet (e.g., Fig. 24). We also noticed that our very presence and our interactions with children influenced some of their drawings. This is well illustrated in the case of one of the schools in Fiji, where a few children asked us what the French flag looks like and incorporated it into their drawing (e.g., Fig. 25).

In both unstructured and semi-structured interviews, the responses of the interviewees – adults or children – may also vary according to, for example, the spatial-temporal context, the identity of the interviewers (e.g., nationality, gender, age)

Fig. 23 “Le mauvais temps” (“The bad weather”). (Drawing made by a girl (of unknown age) in Yaté, New Caledonia, November 2019)



Fig. 24 “The living animals in the sea”. (Drawing made by a 12-year old girl on Kadavu Island, Fiji, November 2019)



and the degree of trust placed in them, or recent and upcoming events (as brilliantly illustrated in the landmark study by Favret-Saada, 1977; see also Olivier de Sardan, 2015). Similarly, participant observation enables the production of knowledge that is always contextualized in place and time, but also reflects the relations between the people who are present, as well as between them and the researchers, and the status and role(s) assigned to the latter in the local arena (e.g., Nayral & Nicolas, 2016). Drawings are thus, similar

to interview or participant observation situations, both the result of interactions and “a medium” (Calandra, 2013, 183; Sabinot & Carrière 2015) between a complex social-ecological milieu, people living in and shaping this milieu, and researchers. Equally, drawings have the “capacity to tell us something of children’s lives independent of our means to know them” (Mizen & Ofofu-Kusi, 2010, 255) despite their lability and porosity. Drawings therefore provide: “(a) information on the world (on the reference reality); and (b)

Fig. 25 “Fishing”. (Drawing made by a 10-year old girl in the outskirts of Suva, Fiji, September 2019)



information on the point of view of the interlocutor concerning the reality in question” (Olivier de Sardan 2015, 32). In summary, these (children’s) drawings are not necessarily more labile or porous than data collected through conventional ethnographic and ethnoecological methods.

Drawing as a Qualitative-Quantitative Research Tool

This work conducted in the South Pacific showcases that a major interest of mobilizing drawing in research on children’s knowledge of the sea and fishing rests in its both qualitative and quantitative potential.

The sensitive dimension of drawing makes a valuable contribution to the qualitative understanding of children’s intimate views of, and relations with, the sea as well as the land-sea continuum. Each drawing indeed materializes a child’s attempt to make visible her/his individual thoughts and emotions, which gives us a contextual insight into her/his reality. A close attention to the overall composition and various elements of a drawing (e.g., underwater or above-water view, human and non-human beings represented, interactions between them) provides relevant information on the child’s ecological knowledge (e.g., understanding of marine social-ecological dynamics) as well as on how this child imagines, sees or contributes to what takes place within the land-sea continuum.

Furthermore, through their gathering of numerous participants and their replicability, drawing workshops allow for the collection of a dataset that is large enough to make a statistical analysis possible (see also Chabanet et al., 2018). It is however important to ensure that the deployment of

descriptive statistics, based for example on a census of the different items drawn by children, do not deprive the analysis from the informational and conceptual richness embedded in drawings. This requires a solid research experience in, and thorough knowledge of, the respective societies. This work can therefore only be carried out as a complement to in-depth fieldwork.

Based on this qualitative and quantitative potential, drawing appears as a tool that can be used to highlight constants and variations at several levels, and thus facilitate the development of a comparative approach at these different levels: (1) between individuals or groups within a specific site (e.g., boys and girls in a same school), (2) between different sites within a same country (e.g., an urban setting and a rural setting), (3) between different countries (e.g., Fiji and New Caledonia). This tool indeed enables a research team to collect data in various socio-geographic contexts, using a relatively standardized protocol, in a limited timeframe. This produces a solid dataset that can be explored using both qualitative and quantitative lenses, in response to both initial and new hypotheses, with regard to each individual research site as well as at the crossroads of all of them. Such work allows to identify relevant comparison avenues,⁴ to be further examined through more in-depth methods such as participant observation and unstructured or semi-structured interviews.

⁴ See also, for instance, Duarte Olson (2013)’s exploration of cognitive differences between *favela* and *asfalto* residents in Rio de Janeiro, and Chabanet et al. (2018)’s analysis of differences in coral reef representations before and after the use of a teaching toolbox.

Next Steps and Other Perspectives

Even though we have observed and experienced that drawing is a relatively universal activity, as Pagezy et al. have demonstrated (2010), we wonder: to what extent is this approach free of “constructions and definitions of childhood [...] guided and supported by western models”, in particular of “western notions of children’s innocence, freedom, creativity, and independence” (Knupfer, 1996, 139)? In addition, to what extent did we really manage to prevent a situation in which “researchers impose their own meanings on the data they collect from children rather than illuminate other possibilities for interpretation” (Spyrou, 2011, 158)? And how could we present such data and interpretations in ways that dismiss the boundaries between our academic text and children’s drawings (Knupfer, 1996)? A next step we are now considering is therefore the organization of co-analysis and co-writing workshops in the participating schools. The co-analysis workshops will invite children to interpret the contrasts between the drawings made in their school and other schools within the same archipelago, as well as to identify similarities and differences between the drawings made in Fiji and in New Caledonia. The co-writing workshops will aim to explore alternatives to the separation between our academic text and the children’s drawings; alternatives in which the latter take precedence.

In addition, a single drawing can showcase various dimensions of fisheries, such as: social (fishing as an activity bringing families and friends together), cultural (fishing as a means of intergenerational transmission of knowledge and skills), economic (fishing as a crucial source of food and/or income), environmental (fishing as an activity threatened by marine pollution). As such, and because children are outsiders to the fisher-manager relations and their drawings can therefore be deemed ideologically neutral, children’s drawings could be used as a starting point for developing a serene dialogue on fisheries issues that can inform co-management decisions and strategies.

The approach we propose here is also timely in terms of the global realization of how important it is to implement initiatives that raise ecological awareness among the future generations to ensure environmentally friendly habits. This method gives a fairly accurate picture of what children already know, think and do, on which awareness programs (whether they are designed and implemented by NGOs, community leaders or school staff) could be built to ensure that these are best adapted to each specific context and group, while empowering children by making them actors (rather than mere recipients) of such educational efforts. Drawing could also be part of the reflection on how to rethink schooling in contexts where ways of knowing and learning were/are not those promoted by current curricula,

in which Indigenous epistemology and pedagogy remain to a great extent excluded (Nabobo-Baba, 2006; Wadrawane, 2017).

Conclusions

Drawing appears to be a particularly relevant tool to involve children in research projects within contexts and societies of which one has a solid prior knowledge. This tool is a valuable complement to conventional ethnographic and ethno-ecological approaches, since it ensures that children remain in a comfort and control zone, while (1) allowing researchers to produce both qualitative and quantitative data, and (2) generating new or reformulated research questions as well as comparison avenues. These data, questions and comparison avenues can then be further explored through other series of drawing workshops and/or participant observation and in-depth interviews. We also draw attention to some of the limitations of this tool (i.e. lack of time during the workshops, circumscription effect of the drawing instruction, lability and porosity of the drawings). However, we argue that these limitations are similar to those encountered when using participant observation and unstructured or semi-structured interviews, and easily rectifiable.

Children’s drawings therefore represent an unconventional but promising way for more inter- and transdisciplinary approaches to marine social-ecological studies. The above-described procedure facilitates the involvement of numerous researchers, who have various scientific backgrounds and experiences, yet are all able to contribute in specific ways, either at different stages or throughout the process. In fact, this paper was also conceived as a medium for sharing individual and collective experiences within our team, as a basis for both our immediate next steps and future projects. Finally, the procedure allows the (direct and indirect) involvement of various categories of stakeholders, while remaining articulated around what children know, think and do, and therefore contributing to children’s empowerment.

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Compliance with Ethical Standard

Conflict of Interest The authors have no conflicts of interest to declare that are relevant to the content of this article.

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