Fostering Ocean Literacy through Formal Education in Quebec, Canada: A Case Study of Saving a Coastal School

By

Noémie Roy

Submitted in partial fulfillment of the requirements for the degree

of
Master of Marine Management

at

Dalhousie University

Halifax, Nova Scotia

December 2020

Table of Contents

List of Tables

List of Figures

Figure 6. Enablers of the implementation and sustainability of the program *Le Saint-Laurent dans ma classe*. The numbers in the bubbles indicate the total number of interview participants that identified this factor as an enabler to the implementation and sustainability of the program added to the number of survey participants that indicated this factor as "always an enabler", "sometimes an enabler" or identified the factor as an enabler in the comment section of the survey. If a participant identified a factor as an enabler in both the survey and the interview, it was only counted once.

Abstract

Roy, N. (2020). Fostering Ocean Literacy through Formal Education in Quebec, Canada: A Case Study of Saving a Coastal School [graduate project]. Halifax, NS: Dalhousie University.

Protecting coastal ecosystems, livelihoods, and identities require the active engagement of ocean literate citizens. Ocean literacy, or the understanding of the ocean's influence on us and our influence on the ocean, can be fostered through marine education. Yet, in Canada, marine education falls in a jurisdictional gap, with ocean conservation largely under federal jurisdiction and education under provincial jurisdiction. With little to no ocean literacy in curricula, teachers lack the time and resources to include the ocean in their classroom. Along the St. Lawrence Estuary, a rural community mobilized to save its middle school by developing an innovative program connecting the existing curriculum to the ocean. For instance, students practise physical education by learning scuba diving. My research project explores the rationale, barriers, and enablers to the inclusion of ocean literacy in schools through a case study of this program. I completed interviews and a survey with school community members and found that the program faces considerable barriers that threaten its sustainability, including the lack of an educational framework, educational resources and funding. Support from school community members and access to a program coordinator were the greatest enablers of the program. Students and adults involved in the program gained knowledge about the ocean and took actions to care for the ocean, showing the influence of the program on their ocean literacy. This case study acts as an example of how ocean literacy initiatives, although challenging to implement in schools, can support citizen engagement in coastal management.

Keywords: ocean literacy, coastal communities, formal education, whole-school approach, marine citizenship, case study, Quebec

Acknowledgment

First, I would like to thank my supervisors Julia Ostertag and Jerry Bannister for their support throughout this project. Learning and applying interview and survey methods in the midst of a pandemic was not easy, but they helped me feel more confident and comfortable with this perspective. I would like to thank Julia for her continuous encouragement, ideas and support during our many calls and emails over the last year. I am grateful that she welcomed me as an intern with the Canadian Ocean Literacy Coalition (COLC). I would like to thank Jerry for his guidance and help in navigating the blurry interface between education and marine management.

Second, I would like to express my gratitude to my participants. Their insights, energy, interest and support meant a lot to me. What they have accomplished at this school is amazing and I hope that my research will support their work.

I would also like to thank my internship hosts, COLC and Ocean Wise. Working with the amazing women leading COLC has been inspiring. My experience with COLC shaped my vision of ocean literacy and influenced the way I approached this research. I would like to thank Danika Strecko from Ocean Wise. Working with her provided me with a deeper understanding of the world of ocean education and of the relationships between ocean education actors in Quebec and the rest of Canada.

I am grateful to Diane Roy, Sarah MacNeil, Laurence Poulin, as well as Émilie Dumas and her colleagues for pre-testing my survey. Their comments made it more accessible to participants. I would also like to thank Laurie Laplanche for helping me make my survey more inclusive of diversity.

I would like to extend my gratitude to the organizations that provided financial support for my master's. The *Fond de recherche du Québec en nature et technologie* and the Sobey Fund for Oceans funded my research, and MEOPAR funded my internship with COLC.

I would like to thank the Marine Affairs Faculty and my classmates. I have learned so much in the past 16 months through our discussions and work together.

Finally, I would like to thank my family and my friends. I am grateful for the time they spent brainstorming ideas with me, proofreading my chapters, and attending my presentations, as well as for their emotional support.

Positionality statement

I am a Master of Marine Management student at Dalhousie University, in Halifax, Nova Scotia, but I grew up in Gatineau, Quebec, on the unceded and traditional territory of the Anishinaabeg First Nation. Growing up, I was surprised to realize how disconnected to the ocean many people were given that I always felt drawn and connected to it. I feel most connected to the ocean when I am by Washipekuk, the St. Lawrence River in Wolastoqey, the language of the Malécite First Nation, camping on the beach and being woken up in the middle of the night by the sound of the waves crashing by my tent. I also feel connected to the ocean when I share my passion for whales with friends and family or hiking for days along the glacier-sculpted edges of the Saki-nip, or Saguenay Fjord in Innu-aimun, the language of the Innu First Nations.

I decided to conduct research on the program *Le Saint-Laurent dans ma classe* out of curiosity and a desire to support ocean literacy programs. Although I have visited the small town on the south shore of the Saint Lawrence where this school is located, I have never been inside the school. Therefore, I recognize that, as an outsider, my view of the program may differ from the reality of the people experiencing and being involved in the program. I intend to conduct my research for the benefit of the program, of the community around this school, and of other communities that wish to start similar programs. I hope that my background in ocean literacy and marine management will allow me to provide insight to these groups.

Chapter 1: Introduction

As coastal ecosystems are influenced by both inland and marine human activities, their management requires in-depth understanding of human influences on the ocean and of the ocean's influence on us (Crain, Halpern, Beck, & Kappel, 2009). This understanding is required of coastal managers, of ocean stakeholders and rights holders, as well as of the general public (Santoro, Santin, Scowcroft, Fauville, & Tuddenham, 2017). Co-management (Aheto et al., 2016; Tiakiwai, Kilgour, & Whetu, 2017) and stakeholder engagement (Mason, Lim-Camacho, Scheepers, & Parr, 2015; Pomeroy & Douvere, 2008) are often praised as best practices in marine management. Such approaches necessitate the engagement of a public that understands, values and cares for the ocean, which reflects the goals of the ocean literacy movement increasingly emerging nationally and internationally (Glithero, 2020). Ocean literacy is most often defined as an understanding of "the ocean's influence on us and our influence on the ocean" (Santoro, Santin, Scowcroft, Fauville, & Tuddenham, 2017, p. 5). Ocean literate citizens are empowered with the ability to make responsible decisions regarding ocean resources and the tools to develop sustainable approaches to ocean governance (Santoro et al., 2017).

This project explores the connection between ocean literacy and marine management by taking an in-depth look at one coastal community's efforts to integrate the ocean in all aspects of the curriculum at their local middle school, the St. Lawrence middle school[1]. As such, a case study of this school allows for a nuanced exploration of the role of education (more specifically, ocean literacy) in marine governance. Many proponents of

[1] The school and the town are not identified to protect the privacy of the project participants.

both ocean literacy and marine management are quick to call on education as playing a pivotal role in transforming human-ocean relationships (Schoedinger, Cava, & Jewell, 2006; McKinley & Fletcher, 2012; Gough, 2017). The realities in this small coastal community suggest that undertaking such an endeavour comes with many challenges but can lead to collaboration among community members and support coastal community resilience.

In this chapter, I outline how the emerging movement for ocean literacy aims to both increase ocean knowledge(s) and contribute to marine citizenship and marine governance. I then describe the school community behind my case study. Finally, I present the management problem and research questions that guided my work.

1.1 Ocean literacy

Many international and national initiatives call for a more ocean literate public. The Galway Statement for Atlantic Cooperation was signed in 2013 by Canada, the United States, and the European Union to support the sustainable development of the Atlantic Ocean (EU-CANADA-US. Research Alliance, 2013). Since then, UNESCO launched the Ocean Literacy For All initiative (Santoro, Santin, et al., 2017). This initiative aims to increase worldwide awareness around ocean conservation. The project ResponSEAble by the European Commission (European Commission, n.d.) connects Europeans with the ocean through education. In Canada, the Canadian Ocean Literacy Coalition (COLC) conducted a baseline study on the *seascape* of ocean literacy called *Understanding ocean literacy in Canada* (Glithero, 2020). This study looked at Canadians' relationship with the ocean at the national level and across five different regions (Pacific, Inuit Nunangat, Inland,

St. Lawrence, and Atlantic). COLC is now developing a National Ocean Literacy Strategy to be released in February 2021.

People's relationship with the ocean varies across regions, cultures, languages, and socioeconomic contexts. There is no "one" version of ocean literacy in Canada. Mirjam Held, a researcher on the interactions of Western and Indigenous knowledge systems, describes ocean literacy as "always culturally and socially mediated as contexts and priorities differ among peoples and regions" (Held, 2018). For instance, having lived by (and on) the Arctic Ocean for about four thousand years (Carter et al., 2018), Inuit people deeply relate to the ocean through their culture, way of life and food (Hoover, 2020). Furthermore, in Quebec and other francophone communities across Canada, people have developed rich expressions reflecting their connection with the ocean that are not reflected in the English language (Ostertag & Ammendolia, 2020). Words typically used in maritime contexts (e.g., *embarquer*, meaning "to get in a boat") are often used in day-to-day terrestrial lives (e.g., *embarquer dans la voiture*, meaning "to get in the car"). To better understand the influence of cultural and social contexts on ocean literacy, the use of a case study methodology is relevant. Indeed, case studies allow to take an in-depth look at the particularities of a contained topic within its circumstances (Stake, 1995).

One way to foster ocean literacy is through marine education, as marine education can develop ocean citizenship (McKinley & Fletcher, 2012). Fletcher & Potts (2007) describe ocean citizenship as our common and individual responsibility towards ocean health. In 2005, the guide "Ocean Literacy Essential Principles of Ocean Sciences" was published in the United States by the National Oceanic and Atmospheric Administration, the National Marine Educators Association and others (National Oceanic and Atmospheric

Administration, 2020). This guide defined ocean literacy around seven Western ocean science principles: (1) The Earth has one big ocean; (2) The ocean shapes the Earth; (3) The ocean influences weather and climate; (4) The ocean makes Earth habitable; (5) The ocean supports biodiversity; (6) The ocean and humans are interconnected; and (7) The ocean is largely unexplored (adapted from National Oceanic and Atmospheric Administration, 2020). Although many knowledge systems contribute to ocean knowledge, there has been a large uptake of these Western science principles in the field of marine education (e.g., Ocean Wise, 2018; Mokos et al., 2020). However, since 2005, multiple organizations have broadened their definition of ocean literacy to be more inclusive of fields beyond natural sciences (e.g., social sciences, arts, etc.) and of other knowledge systems (e.g., Indigenous and local knowledge systems). Examples of such organizations include the Canadian Ocean Literacy Coalition (Glithero, 2020), the Canadian Network for Ocean Education (CaNOE, 2018), and the Portuguese Blue Schools Program (Escola Azul, 2020). Moreover, the UNESCO Ocean Literacy Toolkit goes beyond these seven principles and addresses linkages between ocean literacy, sustainable development, and governance (Santoro et al., 2017). Santoro et al. (2017) explain that "developing and sustaining innovative approaches to ocean governance will require improvements in global ocean literacy [by] promoting not only the understanding of ocean knowledge but also the understanding of how to govern marine ecosystems in a sustainable manner" (p. 65).

Marine education can take place in both non-formal education settings (e.g., in museums, or aquariums) and formal education settings (in schools through institutionalized education, as defined by the UNESCO Institute for Statistics, 2012). The jurisdictional context for formal education in Canada is complex. While calls for more ocean literacy

often originate at the international or national level, education is managed at the provincial and local level. Since the ocean is under federal jurisdiction and education is under provincial jurisdiction, ocean education falls in a jurisdictional gap. In fact, the dynamic and interconnected nature of the ocean continuum (land, water, coasts, ocean, sea ice, atmosphere, etc., as defined by Glithero, 2020) itself defies jurisdictional boundaries and zones, much like ocean education. This project aims to explore how calls for more ocean literacy can be addressed through formal education. To achieve this purpose, I chose to conduct a case study. This methodology has the potential to provide in-depth analyses and concrete examples of how calls for more ocean education can be implemented in this complex jurisdictional context.

1.2 The St. Lawrence middle school case study

This project examines a small, rural coastal community situated on the St. Lawrence Estuary, in Quebec, Canada and its connection to the ocean. This community is deeply attached to their school and to the sea, which can be seen, heard, and smelled from almost everywhere in the community. For instance, their attachment to the sea can be noticed through the ocean-themed street names and the exhibition of ocean-themed sculptures across the community (Figure 1).

Figure 1. A wooden sculpture of a pirate in front of the St. Lawrence middle school, the local middle school.

Like many small coastal communities, however, the future of this town of about 3,900 people (Statistics Canada, 2016) is increasingly uncertain. From 2011 to 2016, the population declined by 2.6 % (Statistics Canada, 2016). In 2016, the school board threatened to close this community's middle school, the St. Lawrence middle school (pseudonym), due to its small population (25-30 students). To save their school, community members decided to give the school something special. They created the program *Le Saint-Laurent dans ma classe* (pseudonym), a program initiated by a committee of parents and developed in partnership with a marine consulting firm. From scuba diving in their physical education class to reading about shipwrecks in their French class, the students in this program learn about the ocean in every subject. Through this program, teachers use the

regular middle school curriculum, but apply it to the ocean. Many themes are addressed throughout the year, including storms, marine mammals, and marine careers.

The St. Lawrence middle school has the St. Lawrence Estuary in its backyard and many marine researchers, fishers and storytellers in its community. In this context, *Le Saint-Laurent dans ma classe* becomes an opportunity for intergenerational connections and place-based education within the community. Place-based education roots the learning process in the local context (Sobel, 2004). For instance, students learn from local experts on topics that directly affect their community, such as coastal erosion. As the students interact with community members, they develop ocean citizenship and become ambassadors of the sea in their community.

The approach used at the St. Lawrence middle school is very similar to the whole-school approach to Education for Sustainable Development developed by the UNESCO following the adoption of the Sustainable Development Goals (Santoro et al., 2017). Although criticized for being Western-focused (Sauvé, Asselin, Marcoux, & Robitaille, 2018), this framework aims to contribute to the development of responsible citizens with the knowledge, skills, values and behaviours necessary to create a fair, diverse and sustainable world (Santoro et al., 2017). In the whole-school approach, sustainable development is addressed in the classroom through all school subjects, and beyond the classroom, namely through interactions with the community (Kennelly, Taylor, & Serrow, 2011). The St. Lawrence middle school takes a similar approach by teaching marine education in all school subjects and through interactions with local community members.

According to Billé (2008), a community is defined by "the object of collective action around which individuals decide to rally" (p. 7). In my project, I am interested in the

community of people rallying around the program *Le Saint-Laurent dans ma classe*. I refer to this community as the "school community", which includes grade seven and eight students (ages 12-14), parents, all the school personnel, and other people who interacted with the school (for instance, by supporting the program *Le Saint-Laurent dans ma classe* or by participating in a public event at the school). When referring to the people living in the municipalities surrounding the school, I use the term "local community".

Following the initial success of the program, the school board decided not to close the school. However, the school is still in a precarious situation. It currently has only 29 students registered for the 2020/21 school year. The principal is managing two elementary schools in addition to the St. Lawrence middle school without the help of a vice-principal. The school only has three full-time teachers. The other teachers are dividing their time between this school and other schools in the region. Additionally, high staff turnover and low funding availability make managing a long-term program as *Le Saint-Laurent dans ma classe* difficult. Unfortunately, like many school change initiatives (Askell-Williams & Koh, 2020), the program created a lot of enthusiasm at its start, but rapidly lost momentum over the years. In the first year of the program, a consultant specializing in marine education and marine sciences was hired to help create and implement the program. This consultant brought a lot of ideas and energy into the program. However, a lack of funding prevented the school from rehiring this consultant the following years. Then, changing teachers and a new principal made it difficult to keep the program going. Finally, the COVID-19 pandemic stopped the school from doing any ocean-themed activities in the last three and a half months of the 2019-2020 school year.

Challenges such as lack of funding and staff turnover are common in rural schools in Quebec (Arena, Riopel, & Des Ruisseaux, 2009). As Arena et al. (2009) explain, in Quebec's remote regions, the population tends to decrease, leading to a decrease of students in schools. As schools are funded based on their size, schools with fewer students get less funding. Therefore, these schools have to teach with less equipment, supplies, and staff resources (Arena et al., 2009).

1.3 Management problem and research questions

Ocean governance influences environmental health, economic prosperity, and human well-being (Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services, 2019). Therefore, the engagement of coastal communities in ocean decision-making is critical (Pomeroy & Douvere, 2008). Local and Indigenous stakeholders often have a different perspective on the state of natural resources than government officials (Denny & Fanning, 2016) and are the stakeholders most affected by resource management decisions (Kearney, Berkes, Charles, Pinkerton, & Wiber, 2007). Their inputs are essential to effective, equitable, and just resource management (Bennett, Blythe, White, & Campero, 2020). In fact, lack of stakeholder engagement and participation is thought to have been one of the main factors leading to the cod collapse in Atlantic Canada in the 1990s (Finlayson & McCay, 1998). This event deeply affected the livelihood of coastal communities (Binkley, 2002) and continues to generate conflicts among community groups and between communities and the government today (Mullowney & Baker, 2020). Stakeholder engagement allows deepening of mutual understanding and fosters collaboration between the public and governing bodies as well

as between stakeholder groups (e.g., industry, academia, non-governmental organizations) (Miller, Marsh, Benham, & Hamann, 2020). These collaborations allow for stability in the face of changing and uncertain ocean conditions (Metcalfe et al., 2017).

Including ocean literacy in formal education would reach a large proportion of the population and provide both youth and adults with the tools to meaningfully engage in marine management processes and to find innovative solutions to marine issues (Santoro, Scowcroft, et al., 2017). Formal education is accessible to all in Canada (Hopkins, 2012) and influences both the decision makers of today (adults, including parents, guardians, and teachers), and the decision makers of tomorrow (the students) (Manitoba Education, 2010). However, the integration of ocean literacy in formal education comes with challenges. As mentioned above, in Canada, the ocean falls under federal jurisdiction, while education falls under provincial jurisdiction. On one hand, ocean management is primarily the responsibility of the Department of Fisheries and Oceans Canada (DFO). DFO acknowledges the educational potential of the marine protected areas it manages (Fisheries and Oceans Canada, 2017). Yet, beyond some small-scale education programs (e.g., Fisheries and Oceans Canada, 2016), and some resources for teachers (Fisheries and Oceans Canada, 2020), DFO has neither an educational mandate nor extensive funds for education. On the other hand, the Quebec Ministry of Education affirms that environmental issues do not concern its sector (Sauvé et al., 2018), and there are currently little to no ocean-related concepts in the Quebec kindergarten to grade twelve curriculum (Quebec Ministry of Education, 2006; Quebec Ministry of Education, n.d.). Teachers across Canada struggle to include ocean concepts in their classroom as they face barriers such as lack of time and resources (McPherson, Wright, & Tyedmers, 2018). This is especially true of

teachers in rural regions, where financial, human and material resources are even scarcer (Arena et al., 2009).

The difficulty of including ocean literacy in educational programs can hinder the development of school community members as marine citizens and their engagement in ocean issues. Programs like *Le Saint-Laurent dans ma classe* present an opportunity for school communities to develop the knowledge and critical thinking skills they need to become active stewards of the ocean and to participate in management processes regarding ocean issues. The management problem addressed in this project relates to the complexity of integrating the coastal environment, the local community, and the education system in a context of siloed relationships and jurisdictional gaps. To address this problem, I aim to answer the following research question: "How can formal education foster ocean literacy in coastal school communities?" I answer this question by exploring the program *Le Saint-Laurent dans ma classe* as a case study through the following sub-questions: "What are the barriers associated with the implementation and sustainability of this program?" and "What are the enablers associated with the implementation and sustainability of this program?"

The purpose of this case study is to gain a more granular understanding of the complexity of implementing ocean literacy in the formal school system, and to inform educators and policy-makers seeking to implement such initiatives. Ocean literacy initiatives such as this one create opportunities for conversations, meaningful dialogues, and knowledge exchange among local community members by bringing together people from different knowledge systems and backgrounds. By creating connections between the education system, community members, and place, such ocean literacy initiatives bridge silos, build trust, and work towards conflict resolution. In other words, these initiatives set

the stage to develop the meaningful collaborations needed for sustainable ocean governance (Santoro et al., 2017).

Chapter 2: Methodology

This research is a case study of the program *Le Saint-Laurent dans ma classe*. To complete this case study, I used a mixed-method approach, combining semi-structured interviews and a survey. In this chapter, I present these methods, justify their use, and address their limitations.

2.1 Case study

As my project focuses on a specific program within a specific school, I relied on the case study literature in order to develop my methods. A case study can be defined as "the study of the particularity and complexity of a single case, coming to understand its activity within important circumstances" (Stake, 1995, p. xi). The important circumstances in this case study are the possibility of the school closing and the implementation of the program *Le Saint-Laurent dans ma classe*. These events set the boundaries of my project, which is focused on a coastal school community involved in the program from its implementation, in 2017, to the data collection period for this project, from May to July 2020 at the end of the 2019/2020 school year. Boundaries are an important feature of a case study, as they define its limits (Erickson, n.d.). Setting boundaries allows me to provide detailed findings about this program, and establish the transferability of the research, understood as the degree to which the findings can be applied to another context (Leininger, 1994). By providing detailed descriptions of this case study, I provide the reader with the information they need to make decisions regarding the application of these findings to another situation (Stake, 1995).

2.2 Mixed-methods

This research was originally planned to be conducted only qualitatively through semi-structured interviews. However, the COVID-19 pandemic prevented me from going to the school and meeting participants in person. Because many members of the studied population are teachers and parents that had to adapt to homeschooling because of the pandemic, many of them were likely not to have enough time for an interview. While searching for a way to complement my qualitative data in a way that would not be too demanding of my participants, I was recommended to take a mixed-method approach. Mixed methods have the advantage of combining strengths from both quantitative and qualitative methodologies (Greene, Caracelli, & Graham, 1989). It is recommended to use a mixed-method approach when the research question can be better answered when addressed from multiple perspectives (Andrew & Halcomb, 2012; Simons & Lathlean, 2010).

A mixed methodology was useful to explore the perceptions of participants regarding the influence of the program on the ocean literacy of the school community. The survey allowed participants to use likert-like scales to express whether they thought the program had an influence on the ocean literacy of the school community. By using a scale, it was easier for participants to rate this influence. It made comparison between participants' answers easier than by comparing qualitative answers that covered a much wider range of possible responses. Qualitative answers from the semi-structured interviews, allowed me to gather detailed examples of how the program does or does not have an influence on the ocean literacy of the school community.

My two sub questions, “What are the barriers associated with the implementation and sustainability of this program?” and “What are the enablers associated with the implementation and sustainability of this program?”, also required multiple perspectives in order to be answered. The survey allowed me to ask participants whether they thought factors that had been identified in the literature were barriers or enablers to the delivery of the program. In the interviews, participants were asked to name barriers and enablers without being provided with a list of factors. Therefore, the survey allowed me to test if the barriers and enablers described in the literature are the same within this program, while the interviews allowed participants to come up with new barriers and enablers without being influenced by a list of pre-selected factors.

This mixed methodology was conducted in a convergent parallel design (Figure 2), meaning that the analysis of the results from the survey was done independently from the analysis of the results from the interview (Halcomb & Hickman, 2015). I used this design as the purpose of using mixed-methods was to obtain two complementary datasets for each of research question, and the convergent parallel design allowed to give equal priority to both research methods (Halcomb & Hickman, 2015). This methodology was approved by the Marine Affairs Program Ethics Review Standing Committee in April 2020 (MAPERSC #: MAP2020-01).

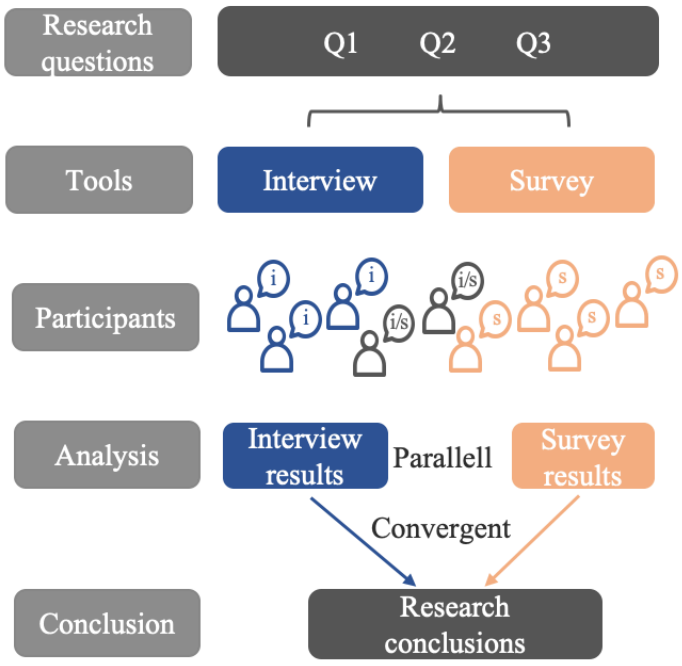

Figure 2. Conceptual representation of the research design. Q1, Q2, Q3 refer to my three research questions. This figure shows that I answered all three questions using both interviews and a survey. Participant icons identified by an "i" represent participants to interviews only (n=3). Participant icons identified by an "s" represent participants to the survey only (n=4). Participant icons identified by "i/s" represent participants in both methods (n=2). Icons adapted from Flaticon (2020).

2.3 Participants

The population studied included all adults who are or have been involved in the program *Le Saint-Laurent dans ma classe*. This included parents of current or past students in the program, all current or past members of the school staff since 2017, all current or past members of the governing board since 2017 and any community member that is or was involved in the program. The total number of potential participants for this project is

estimated to be about 80 people (parents, teachers, community members, school administrators, consultants, etc.).

To contact participants, I wrote an email presenting my project and asked the school's principal to distribute this email to people who corresponded to the population studied. However, since the principal had only started working at this school in 2019, she did not have the contact information for most of the teachers or parents of students that had left before 2019. In order to reach these people, I wrote an individual email to every person the principal had put me in contact with, reiterating my interest in having them as a participant in my project. In this email, I asked them to share this project with other people that they know have been involved with this project in the past. People were given the link to the survey in the email. When participants expressed interest to complete an interview, I contacted them either by phone or by email in order to plan the interview. At the end of most interviews, I attempted snowball sampling by asking the participants if they could think of someone else that I should contact to participate in the project. No additional participants were found using the snowball sampling technique.

2.4 Interviews

The purpose of the interviews was to collect participant insights and experiences regarding my research questions. To do so, I used semi-structured interviews, as they allow researchers to obtain elaborate answers and ask probing questions when necessary (Adams, 2004). The interview guide can be found in English in Appendix A1 or in French, the language in which the interviews were conducted, in Appendix A2. I had five interview participants: one current teacher, one past teacher, two members of the governing board of

the school, and one involved community member. I interviewed these participants through three individual interviews over the phone and one interview with two participants over Zoom. The interviews were conducted between May 29 and July 2, 2020, and lasted from 30 minutes to an hour, the maximum length recommended by Adams (2004) in order to avoid interviewer and interviewee fatigue.

All the interviews were audio recorded using the application QuickTime. I transcribed the interviews and conducted a thematic analysis in French in NVivo12. A first list of themes was identified from the research questions. Those were: “change in ocean literacy”, “barriers to the delivery of the program”, “enablers of the delivery of the program”, and “community”. Some themes were divided into multiple sub-themes. For instance, “change in ocean literacy” was divided into “change in ocean literacy of the students”, “change in ocean literacy of the participant”, and “change in ocean literacy of the school community”. The themes ‘‘barriers to the delivery of the program’’ and ‘‘enablers to the delivery of the program’’ were divided into individual barriers (e.g. “staff turnover”) and enablers (e.g. “access to specialists”). Sub-themes to “community” also emerged, such as “school precariousness” and “language”.

2.5 Surveys

The interview process was complemented by an online survey. Survey questions were built from the research questions, from the Canadian Ocean Literacy Survey (Glithero & Zandvliet, 2020), and from feedback from supervisors. The survey was built in Opinio, a survey platform recommended by Dalhousie University’s Research Ethics Board for its

confidentiality. The survey was administered in French but is available in both English and French in Appendix B1 and B2, respectively.

The French survey was pre-tested three times. The first time, a quantitative social science researcher gave feedback on the form of the survey. The second time, two ocean literacy researchers gave feedback on its wording and content. Finally, a grade 5 teacher and a retired middle school principal gave their opinion on the clarity of the questions. The people who pre-tested the survey for the first two rounds were selected for their expertise in quantitative research and ocean literacy. The two people who did the last round of pretest were selected because they have a background in education, as does most of the population targeted by the survey. Between each pretest, the survey was adapted according to the comments from the previous round.

The final survey contained 20 questions consisting of demographic questions, likert-like scales and a space to share comments on the program. The scales were namely about (1) barriers and enablers to the delivery of the program and (2) the participant perceptions of the influence of the program on the ocean literacy of diverse actors in the program (students, teachers, parents, and community members). To address the barriers and enablers to the delivery of the program, the survey provided the participant with a list of factors (e.g., students' interest, support from the parents, etc.). The participant indicated whether they thought the factor was more of an enabler, a barrier, both or neither. Factors were selected from the literature (Glithero & Zandvliet, 2020; Gough, 2017; Lambert & Sunburg, 2006; McPherson et al., 2018; Stewart, 2019) and from feedback from the two ocean literacy researchers. Participants were also given the opportunity to add factors and to indicate whether they thought these factors were enablers or barriers. To address the

influence of the program on the ocean literacy of actors involved in the program, the survey provided the participants with a statement (e.g. "The program *Le Saint-Laurent dans ma classe* increases the ocean literacy of the teachers at the St. Lawrence middle school") and they had to indicate on a scale whether they agreed with the statement or not.

The survey was available from May 24 to June 8, 2020. In total, five people completed the survey, including two participants from the interviews. A sixth person completed all of the survey but left one question blank. Two additional people opened the survey and completed the demographic section but did not answer the other questions. I did not include the responses of these two people. As only a small number of participants responded, survey results were analyzed descriptively, not statistically.

2.6 Language

This project is about ocean literacy, but this term has no widely accepted translation in French. The English term was established in the United States in 2003 (Cava, Schoedinger, Strang, & Tuddenham, 2005) and more recently accepted internationally (Santoro, et al., 2017) and in Canada (Glithero, 2020). In French, the Intergovernmental Oceanographic Commission (IOC) directly translates the term to *alphabétisation océanique* (Intergovernmental Oceanographic Commission, n.d.). In Canada, *connaissance de l'océan* (translating to "ocean knowledge") is used by the Canadian Ocean Literacy Coalition (COLC, Glithero, 2020), and by the federal government (Fisheries and Oceans Canada, 2018). Yet, COLC recognizes that it is an imperfect term, as it is unknown to and not used by the francophone practitioners in ocean literacy. In my interviews and my survey, I chose to use *connaissance de l'océan*, as it is the term used by COLC and Fisheries

and Oceans Canada. I provided both interview and survey participants with a definition of the term. In the interviews, when I realized that participants had difficulties relating to the term, I often switched to *connexion à l'océan* or "connection to the ocean", in English. *Connexion à l'océan* is close to the meaning of ocean literacy and was more accessible to participants.

2.7 Limitations and other option

Due to the COVID-19 pandemic, no in-person data was collected for this project. Being in person would have allowed me to see the school and the environment where the program takes place, meet more people in the school community, recruit additional participants, and possibly have short interactions with people who did not have time to answer a survey or for a full interview. I would also have been able to see how students engage with the program, for instance, through artwork or other projects displayed at the school. This project is a small case study, as it only focuses on one program at one school. Ideally, this project would have generated a greater response from participants and have had a longer time frame to allow for more in depth and longitudinal research on the program *Le Saint-Laurent dans ma classe*.

Also due to the short time frame of this project (January to November 2020), I did not include students as study participants. Involving youth would have required a different research approach to build relationships with the students and engage them ethically in the research. The new sociology of childhood recognizes children as active agents who shape the world around them and recommends the engagement of children in every step of the research process (Greene & Hill, 2005). Properly undertaking such an approach takes time,

especially in order to address the ethical concerns in research with children such as power relations, informed consent and confidentiality (Kirk, 2007). Therefore, I chose not to engage with students, rather than engaging in a superficial and possibly unethical way. Still, this is a gap in my research as students are a central part of the school community.

Researchers have developed a standardized test to measure ocean literacy across the world (Fauville, Strang, Cannady, & Chen, 2019). These allow to measure ocean literacy levels across countries, languages, and time. The use of such tests would have allowed me to get a standardized measure of the influence of the program on the ocean science literacy of the school community, particularly of the students. However, these tests tend to only measure levels of natural science knowledge about the ocean. In my project, ocean literacy is defined as broader than knowledge. Ocean literacy also involves ocean values and ocean action. Additionally, it is broader than natural sciences as our relationship with the ocean can be approached through social sciences, health, economics, culture, governance and many more fields (Glithero, 2020; Santoro et al., 2017). Therefore, I chose not to use this approach.

Chapter 3: Results

Through interviews and surveys, I collected qualitative and quantitative information to answer my research questions. The interview data were analyzed separately from the survey data. In this chapter, I present what the interviews taught me about the context of the program, its objectives, and the language used to talk about the program. Then, I address the barriers and enablers of the program, its influence on the ocean literacy of the school community, and its inclusivity first by exploring the interview results, second by exploring the survey results, and third by combining the results of both methods. By combining the results, I provide an overarching view of how the data answer the research questions.

3.1 Context

From the interviews, I learned about the history of the town where the St. Lawrence middle school is located. This small town has two sectors that used to be two separate municipalities. One sector is located inland, and most of its inhabitants work in agriculture. The other sector is located on the coast where people work in marine industries such as fishing, marine research and tourism. The St. Lawrence middle school is located on the coast, in the second sector. The school is on one of the main streets of the village, right by the church and the St. Lawrence Estuary. As a participant phrased it, the school is "in the heart of the village"[2].

[2] Original quote: "dans le cœur du village"

In 2016, the school board announced that it would close the school. The school board wanted to send the students to another, bigger school in the area, but the school community was against this decision. Parents and local community members formed a committee prevent the school from closing. The committee sought legal advice and researched ways of keeping the school open. As an interview participant shared, one day a member of the school board informed the committee that if the school could be made unique in some way, it would make it more difficult for the school board to close it.

To make the school more unique, a committee member thought of a program that would capitalize on the location of the school, the presence of marine experts in the local community, and the connection to the sea of the local community. This member happened to have as a neighbour a marine consultant specialized in marine education. The committee approached the consultant, who accepted to develop the program. From the start, the program obtained strong support from the school, local community, and school board, because it gave a "local colour"[3] to the school by making the material learned in class locally relevant. Overall, the attachment of the local community to the school and to the sea, combined with the strong support from local community members, allowed the program to be launched in the fall of 2017.

3.2 Program objectives

When asked about the objectives of the program, interview participants' answers differed. The main objective is to save the school, followed by increasing student interest

[3] Original quote: "couleur locale"

and knowledge about the ocean and ocean-related careers. Other participants also mentioned as an objective for the school to become a space for local community learning.

Making the school unique to prevent it from closing was mentioned as the fundamental objective of the program by three interview participants. Many participants expressed a desire for students from other municipalities to eventually choose to go to the St. Lawrence middle school instead of their neighbourhood school in order to participate in the program. This would increase the number of students in the school and make it even more difficult to close. Yet, for that to happen, school buses or parents transporting their children transport from other municipalities would be necessary.

Another objective of the program is to increase student interest and knowledge about the ocean. Four out of five interview participants agreed that the aim of doing so was for students to become more "conscious [or aware] of the ocean"[4]. Some participants expressed additional reasons for increasing student interest and knowledge about the ocean. One participant put emphasis on increasing scientific knowledge. They explained that students often get to learn about sports or arts in specialized school programs, but rarely about science, and that the program was a great opportunity to foster interest in ocean science. A second participant said that having a common theme for all school subjects was likely to increase student motivation.

A third participant shared a hope for the program to foster ocean citizenship among the students. They explained that by learning about the ocean in all aspects of school life, students may better understand how it applies to all aspects of life itself. They added that if

[4] Original quote: "conscientisés par rapport à la mer"

students become ocean citizens, it will influence their decisions throughout their life. For example, "the next CEO of a large multinational company may be in this class. If this person has well-anchored, strong values towards the ocean, well, in their management decisions, even if they are not an expert of the sea or a scientist, they will always have a will to protect [the ocean]"[5]. Similarly, schools using the whole-school approach to Education for Sustainable Development often aim to develop students' citizenship (Henderson & Tilbury, 2004). They do so, for instance, by encouraging student engagement in the local community. Such engagement has been promoted at the St. Lawrence middle school namely by a science and art fair as well as a beach clean-up, two activities that will be described later.

An additional objective for the program was to increase students' career literacy. The school aims to increase students' awareness of employment in the local maritime sector. During their two years at the school, students spend two full months learning about ocean careers. They do so namely by visiting a local marine industry college and marine research centre. The school also hosts presentations from members of the coast guard. The school is located in the Bas-Saint-Laurent region, a region where the population is declining and the median age, 50 years old in 2018, is one of the highest in the province (Institut de la statistique du Québec, 2019). Youth of ages 15-24 is the main group to leave the region (Arena et al., 2009). Some return to the region later in life, but not all (Arena et al., 2009).

[5] Original quote: "Le prochain PDG d'une grande compagnie multinationale est peut-être dans cette classe. Si cette personne-là qui devient PDG a des valeurs ancrées, très fortes envers les océans, bien dans ses décisions de gestionnaire, même s'il ne devient pas un expert de la mer ou un scientifique, il va toujours avoir dans sa tête, par défaut, cette volonté de protection la qui va rester."

By increasing students' career literacy, the school hopes that students will stay in the region.

Finally, two participants shared a hope for the school to become a space for knowledge sharing across the local community. They felt that the actual creation of the program resulted in people from the local community coming together, creating connections and exchanging knowledge. This way, "the school becomes a central platform where everybody can learn about the ocean."[6] Individual community members have collaborated with the school (e.g., by giving a presentation in class), but only one event has been opened to the full community: a science and art fair. These two participants hope that more events will be open to the public in the future.

At the science and art fair, students got to present some of their work to the local community. For the science part of the fair, students worked in teams and selected a marine animal on which to do research. For instance, a team selected the sea cucumber. Other species that were selected are presented in Figure 3. Each team presented their animal at the school fair. Then, two teams were selected to attend *Expo-mer Hydro-Québec*, the regional fair organized by the marine education non-governmental organization (NGO) Exploramer, where a team from the St. Lawrence middle school won first place. The art section of the school fair was about marine plastics. In their art class, students reflected on plastic pollution through videos, texts, and images. Then, they collected plastic on the beach by the school and from their home and created a sculpture with it. The sculptures included seahorses made of soap bottles and plastic bags and fish made of plastic bottles.

[6] Original quote: "L'école devient une plateforme centrale où tout le monde peut apprendre au sujet de l'océan."

Figure 3. A poster presented by the St. Lawrence middle school at the *Expo-mer Hydro-Québec* marine science fair. The poster presents three marine species: the edible periwinkle (*bigorneau comestible*), the lumpfish (*grosse poule de mer*), and the waved whelk (*buccin commun*).

3.3 Language

As mentioned earlier, there is no direct equivalent in French to ocean literacy. My participants did not use *connaissance de l'océan*, as I did. Instead of speaking about ocean literacy, participants spoke about knowledge, consciousness or interest in the ocean.

Participants did not identify the program as being part of the field of ocean education. In Canada, this field is mostly known in English-speaking populations through the Canadian Network for Ocean Education (CaNOE). One interview participant was aware of the field of environmental education and saw this program as part of this field. Environmental education is known in Quebec, namely because of the Centr'ERE or *Centre de recherche en éducation et formation relatives à l'environnement et à l'écocitoyenneté*

(translating to “Research center in environmental and eco-citizenship education and training”) who recently led a strategy on environmental and eco-citizenship education (Sauvé et al., 2018). Yet, most interview participants were not aware of the terms “ocean education” and “environmental education”. Rather, they spoke about the program as a way to give “a local colour”[7] to the school or to “tint the school with a blue colour.”[8]

3.4 Barriers to the program

The program was implemented in 2017, but it soon met many barriers. This section explores those barriers.

3.4.1 Results from the interviews

In the interviews, participants were asked to identify the main barriers to the implementation and sustainability of the program. Lack of support for the program, turnover in staff, and work overload were the three barriers that were mentioned the most often.

[7] Original quote: “couleur locale”
[8] Original quote: “teinter l’école de bleu”

i. Lack of support

When participants were talking about the lack of support for the program, they mentioned three different themes: lack of funding, lack of easily accessible resources and lack of a framework for the program. Themes related to lack of support were mentioned a total of 24 times and all interview participants addressed one of these themes at least once.

After the completion of the first year of the program (2017/2018), the consultant that had been hired to implement the program was not rehired. The school lacked the funds to pay this consultant and believed that they could now run the program without the consultant's help. Yet, not having a consultant meant that teachers were asked to create all activities and to coordinate the program. Teachers that were present in the first year of the program compiled the activities they had done in a folder so that the activities could be re-used by future teachers. However, such a folder does not replace a consultant. The consultant, through their network, had the ability to constantly invite new presenters to the school and plan diverse activities.

Another difficulty associated with losing the consultant was that the program now lacked coordination. As there was no clear framework for the program, some new teachers had difficulties understanding what the program is and what is expected of them. As one teacher put it, "everybody thinks that someone else will do it [organizing activities] and in the end no one does it."[9] Because of this dynamic, in the second and third year of the program, significantly fewer activities were organized than in the first year (Figure 4).

[9] Original quote: "Tout le monde se dit que quelqu'un d'autre va le faire, et ça finit que personne ne le fait."

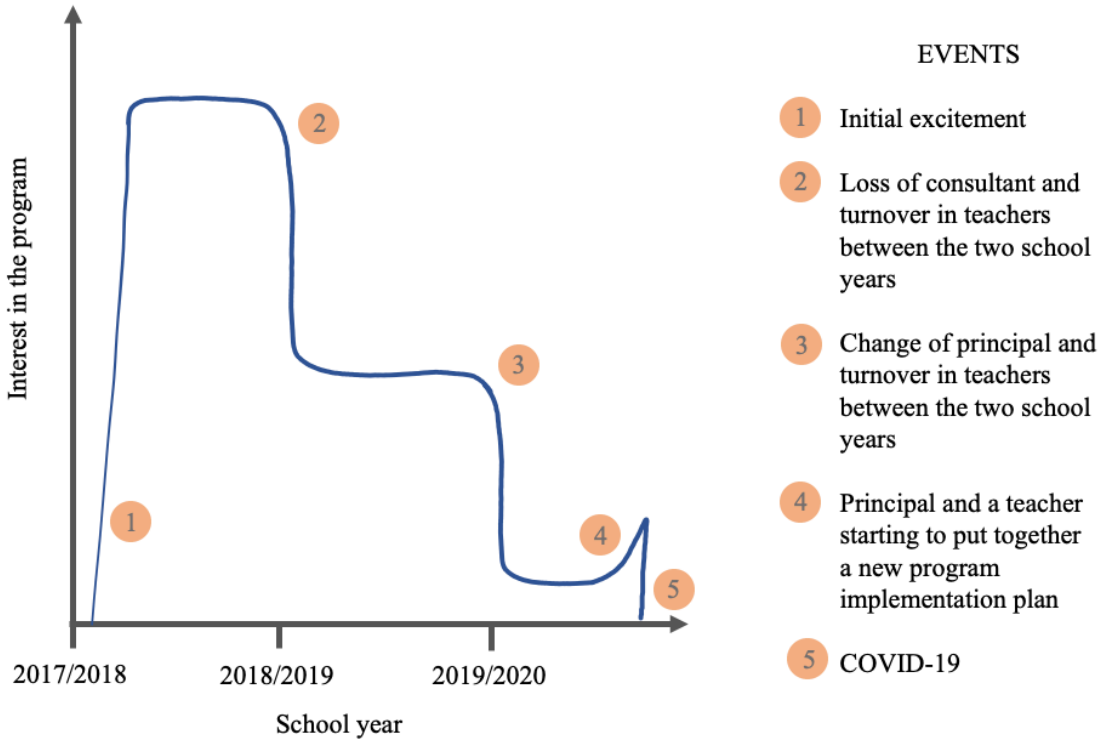

Figure 4. Schematic representation of the variation in the interest in the program *Le Saint-Laurent dans ma classe* over the first three years of the program.

ii. High turnover in staff

The second-biggest barrier according to the interviews was the turnover in school staff. The program was implemented in 2017/2018 with a team of seven teachers and one principal. All teachers but one were replaced for the 2018/2019 school year. Before the start of the 2019/2020 school year, the principal retired and four teachers were replaced, including the only teacher left that had experienced the first year of the program. For the 2020/2021 school year, four new teachers arrived at the school. This extreme turnover in staff was identified as a barrier by three interview participants.

Turnover in teachers makes the program discontinuous. A successful activity is difficult to repeat without the teacher who initiated it, as its delivery often depends on the teacher's interests and relationships. For instance, the science teacher present at the beginning of the program participated in the regional marine science fair with the students. This teacher now works at another school and has been replaced by someone who chose not to participate in this fair. Turnover in teachers also makes it difficult to plan ahead for the following school year. Elementary, middle and high school teachers in Québec only learn in July whether they will be teaching at the same school the following year. As one participant explained, "There is so much movement in the personnel that no one plans the following school year [in advance] because all will have to be redone in August without the same team necessarily."[10]

The appointment of a new principal slowed down the delivery of the program (Figure 4). This finding is not in isolation as Miller (2013) observed declines in school performance following turnover in principals in public schools and Soini, Pietarinen, & Pyhältö (2016) acknowledge the important role of the principal in leading school change. As mentioned previously, in addition to the St. Lawrence middle school, this principal is responsible for two elementary schools. From August to December 2019, as the new principal was getting accustomed with the three new schools, the *Saint-Laurent dans ma classe* Program was not a priority. The new teachers were left without support and did not engage in the program. Only teachers that were present in previous years managed to organize some activities, such as a visit from the Coast Guard and documentary film

[10] Original quote: "Il y a tellement de mouvement niveau du personnel qui se font qu' il n'y a personne qui planifie la rentrée scolaire qui va suivre [en avance] parce que tout est à recommencer au cours du mois d'août avec pas nécessairement la même équipe."

screenings. At the beginning of 2020, the principal sat with a teacher to put in place a plan for the program, but the COVID-19 pandemic delayed the implementation of this plan.

iii. Work overload

Participants expressed the view that teachers and the school principal were already overloaded with work before the implementation of the program. Therefore, they lacked energy and enthusiasm to invest in the program. Four out of the five interview participants mentioned work overload as a barrier. Teachers struggled with the addition of program responsibilities to their regular responsibilities and the difficulty of finding ocean education resources. As many teachers at this school teach in multiple schools, they already have a lot to manage. The barrier of work overload is related to the barrier of a lack of support. In fact, the teachers I interviewed felt that the lack of a framework and the lack of help to find resources, two sub-themes under the barrier lack of support, contribute to why they feel overwhelmed.

iv. Other barriers

Other barriers were also mentioned by participants, but less frequently than the ones above. For instance, three participants mentioned a lack of interest from teachers as a barrier, leading to fewer activities and a decrease in student interest. This dependency of student interest on teacher interest was also noticed by Lam, Chen, & Ma (2009) in their study on motivation in a high school in China. They found that teacher motivation influenced student motivation. A participant in my project mentioned that having a consultant with a lot of energy and passion for organizing the program helped to secure

teacher engagement. The teachers felt more supported and perceived the program as more exciting. However, most of the teachers that benefitted from the support and passion of the consultant have now left the school and new teachers sometimes find it difficult to get interested in the program. The uncertainty regarding the future of the school was also mentioned as a barrier by two participants.

Three participants mentioned the COVID-19 pandemic as a barrier. From March 2020 to the end of the school year in June, the school was closed and students were learning from home. Because of the challenges of remote teaching and the general context of uncertainty, no activities related to the program were completed during this period. In the fall 2020, the school reopened. The school had planned to start the year with a whale-watching expedition. However, as field trips are currently prohibited, they pushed this expedition to the end of the 2020/21 school year. Moreover, catching up on material that was not covered in the spring and the possibility of a new school closure in the event of an in-school virus outbreak probably put additional pressure on teachers. Teachers may not have as much time and energy to put on the program this fall as they would without the pandemic.

3.4.2 Results from the survey

In the survey, participants were given a list of factors and had to indicate on a scale whether they thought each factor was more of a barrier or of an enabler. Six participants answered this question, including two of the interview participants. In the survey results, two factors stood out as barriers. For the factor of “funding”, four participants indicated that it was “always a barrier” or “sometimes a barrier". The two other participants evaluated

it as “sometimes an enabler” and one indicated “neither a barrier nor an enabler”. Another factor that stood out was the lack of overlap between ocean concepts and the provincial curriculum. Three participants indicated that this factor was sometimes a barrier. The three other participants indicated that it was “sometimes an enabler”, “neither a barrier nor an enabler”, or that they preferred not to answer.

The survey included a limited number of factors selected based on the literature. The factor of turnover in teachers was not offered in this list of factors but was suggested as an additional factor by a survey participant[11]. This participant indicated that turnover in teachers was “always a barrier”.

Figure 5 combines the results from the interviews and surveys on the barriers to the program. As shown in the figure, lack of support was the greatest barrier to the program. Lack of funding, which falls under lack of support, was particularly important as a barrier because it prevented the consultant from being rehired.

[11] Original quote from the survey participant: “roulement du personnel enseignant”

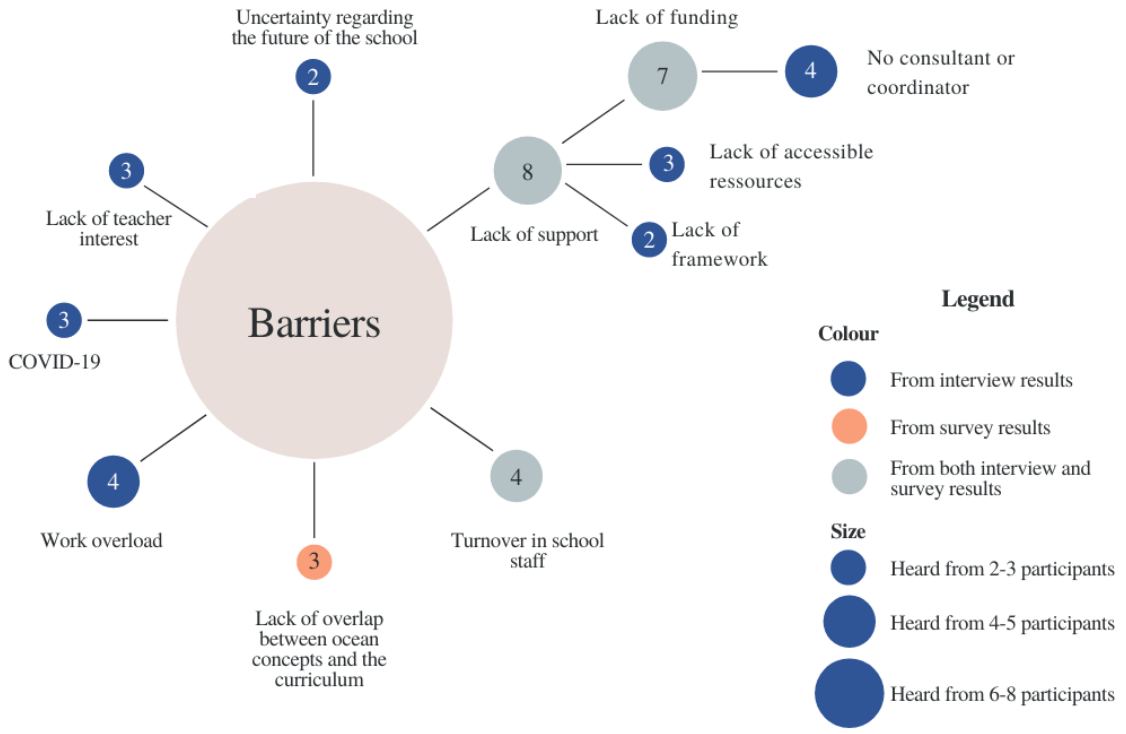

Figure 5. Barriers to the implementation and sustainability of the program *Le Saint-Laurent dans ma classe*. The numbers in the bubbles indicate the total number of interview participants that identified this factor as a barrier to the implementation and sustainability of the program added to the number of survey participants that indicated this factor as "always a barrier", "sometimes a barrier" or identified the factor as a barrier in the comment section of the survey. If a participant identified a factor as a barrier in both the survey and the interview, it was only counted once.

3.5 Enablers of the program

Even though the program faced many barriers, it also benefitted from enablers (Figure 6). Both interview and survey participants identified enablers to the implantation and sustainability of the program.

3.5.1 Results from the interviews

When participants discussed the enablers of the implementation and sustainability of the program, they discussed what enablers were important in the past, important in the present, or could be important in the future. In the past, having the help of a consultant enabled the school to implement the program. In the present, having the support of a motivated team of parents and school community members, having many specialists and marine institutions close by, and having interested teachers were the main enablers of the delivery of the program. In the future, many participants expressed that the school is planning to implement a two-year plan with fixed activities and themes to support the long-term sustainability of the program. They hope that this plan will enable more stability in the delivery of the program.

i. Past enablers

Having access to a consultant was identified as an enabler by four interview participants and was mentioned a total of seven times during the interviews. According to Henderson and Tilbury (2004), partnerships with organizations outside the school, such as consulting firms, are a factor of success for schools using the whole-school approach to Education for Sustainable Development, namely because partnerships can provide

technical support and expertise. The consultant had already prepared in the past a program made to fit within the Quebec school curriculum. Having access to the educational resources developed for this past program avoided a lot of work for the school. Additionally, this consultant has an established network in the marine field in Quebec. They established connections between marine practitioners and the school, invited specialists to the school and organized multiple field trips. A participant gave some examples of the presentations and activities that were possible through this consultant: "It was always passionate people. […] We had at one point a writer, who told us his story. The children did scuba diving. It never stop[ped]."[12] As mentioned before, this consultant was not rehired after the first year of the program. Interviewed teachers believe that the decline in interest in the program after the first year (Figure 4) was directly linked to the loss of this consultant.

For the 2020/2021 school year, the school hired a part-time recreational technician. I contacted the school in September 2020 and was informed that this new support staff is responsible for organizing extracurricular activities both related to the program or not. This employee is not involved in in-class activities, but can help organize field trips, such as a whale-watching boat tour, for instance. Therefore, they can, although only partially, fill the role of the consultant.

ii. Present enablers

Having the support of motivated parents and school community members appeared as an enabler of the program seven times during the interviews and was mentioned

[12] Original quote: "C'était toujours des passionnés. […] On a eu un moment donné un écrivain qui nous a conté son histoire. Les enfants ont fait de la plongée sous-marine. Ça ne s'arrête pas."

by three different participants. Parents and school community members first initiated the program and have been continuously supporting the program. Since the beginning of the program, most teachers and the principal have changed, but the school community members involved remained the same. As one participant said, parents and school community members allowed the program "to stay on course so that transitions happen with great motivation."[13] Some of them are part of the school governing board, to which the school has to periodically report on the state of the program. Moreover, many school community members offered to come to the school and share their knowledge and passion voluntarily. As many of these people are marine researchers, storytellers, fishers, or members of the coast guard, this is an "invaluable resource"[14] for the school.

The region around the school is home to many marine research institutions and marine industries. This was identified as an enabler of the program by two participants, for a total of nine times. As a participant said, "one of our greatest strengths is that the community has resources that we rarely find in villages."[15] These resources are not financial. They are resources in terms of knowledge, skills, and infrastructure. The proximity of these resources creates opportunities for the school to invite presenters from marine institutions and go visit these institutions with low travel costs. These low costs increase the likelihood of having access to these activities in the long-term and allows the school to build these activities into a two-year plan.

[13] Original quote: "Garder le cap pour que les transitions se fasse avec une grande motivation"
[14] Original quote : "Une ressource inestimable"
[15] Original quote: "Une des plus grandes forces qu'on a c'est la communauté autour qui a des ressources qu'on retrouve rarement dans les villages"

Another enabler was the interest of teachers in the program. Participants said that interested teachers were more likely to organize activities. They also said that teacher interest was influenced by the amount of support they received in their role. Therefore, providing teachers with funding and time to organize activities may actually get them to be more interested in the program.

iii. Possible enablers in the future

The idea of a two-year plan was developed by the principal and a teacher in early 2020 (Figure 4). This enabler was mentioned 21 times during interviews and by three participants. Some participants expressed hope that this plan would relaunch the program and gave me detailed explanations on how and why this plan was developed. They decided to establish a two-year plan with four themes per year and fixed activities. As students are at the school for two years, they complete eight themes during their time at the school. The program originally had nine themes, developed in collaboration with the consultant: (1) fishing, (2) plankton, (3) storms, (4) legends, (5) diving, (6) shipwrecks, (7) plastics, (8) Vikings and pirates, and (9) whales. In the new two-year plan, the themes for the first year are (1) plastic, (2) marine careers, (3) diving and shipwrecks, and (4) whales and biodiversity. For the second year, the themes are: (1) storms and climate change, (2) legends, (3) fishing, and (4) Vikings and pirates. Having only four themes per year added simplicity to the program, which teachers hope will make it more sustainable. Moreover, teachers would like to find a specialist for each theme who would come to the school every two years to give a presentation. Inviting specialists from organizations outside the school is an opportunity for non-formal education. According to Sauvé et al. (2018), schools

highly benefit from having access to non-formal resources, as these resources allow to explore new themes in depth, without asking the teachers to become specialists in each of these themes.

iv. Other enablers

Other enablers were identified by interview participants, although less often than the enablers described above. Some of these enablers were the direct opposite of what participants had identified as barriers, such as enhanced funding (opposite to lack of funding), and more time for teachers to work on the program (opposite to work overload). Location was expected to be an obvious enabler of the program, as the school is situated right by the St. Lawrence Estuary. Only one interview participant, a teacher, mentioned the advantage of having access to the sea. However, this participant mentioned it four times. This person talked about how the beach is in the backyard of the school and how they can go from the classroom to the seashore in minutes. Beach clean-ups and collecting marine invertebrates were mentioned as examples of activities that were undertaken. Maybe other participants are not used to the idea of outdoor class activities and therefore did not think of the possibility of doing activities near the coast as an enabler. Castle, Fletcher, & McKinley (2010) studied factors influencing the inclusion of marine education in school in England. They found that proximity to the coast was not an important factor as marine education was mainly carried out in the classroom. It is also possible that the teachers at the St. Lawrence middle school lack experience in place-based outdoor education or require partnerships with local organizations to develop hands-on activities.

One participant named three enablers that were completely different from the ones named by the other participants: collaboration, technology, and youth's keen interest in environmental issues. They presented collaboration and technology as ways to access more educational resources. Collaboration allows sharing of resources between programs and organizations while technology allows accessing such resources from anywhere around the world. This participant explained that, in their opinion, the school has not taken full advantage of these enablers yet. Some of these online resources are in English, which could have limited their integration in the program. Not all teachers speak English and the program is being delivered in French. The participant also mentioned that technology could be used to connect with schools worldwide, across the Francophonie. When the participant talked about youth's keen interest in environmental issues, they were referring to the recent demonstrations led by Greta Thunberg. This interviewee sees this interest in climate issues as an opportunity to get youth interested in ocean issues and in the program.

3.5.2 Results from the survey

The factors identified as enablers in the survey were similar to the enablers from the interviews. Interview participants highlighted support from parents and the school community as an enabler. Out of six survey participants, four identified collaboration with the school community as "sometimes an enabler" and two participants identified it as "always an enabler". Support from parents was identified as sometimes an enabler by three participants and as always an enabler by three participants. Although access to the shore was only identified as an enabler by one interview participant, four survey participants

indicated that it was always an enabler. Time to create activities and student interest were also identified as enablers to the delivery of the program.

Two factors that were not in the list provided in the survey were added by survey participants and indicated as enablers. One participant indicated collaboration between colleagues as always an enabler. Another participant indicated support from the school principal as sometimes an enabler.

Figure 6 combines the enablers identified by interview and survey participants. Interestingly, lack of support was identified as the main barrier to the program (Figure 5), while support is identified as the main enabler of the program. Support from parents and the community act as strong enablers. Time to prepare and time to conduct activities were also identified as an important enabler.

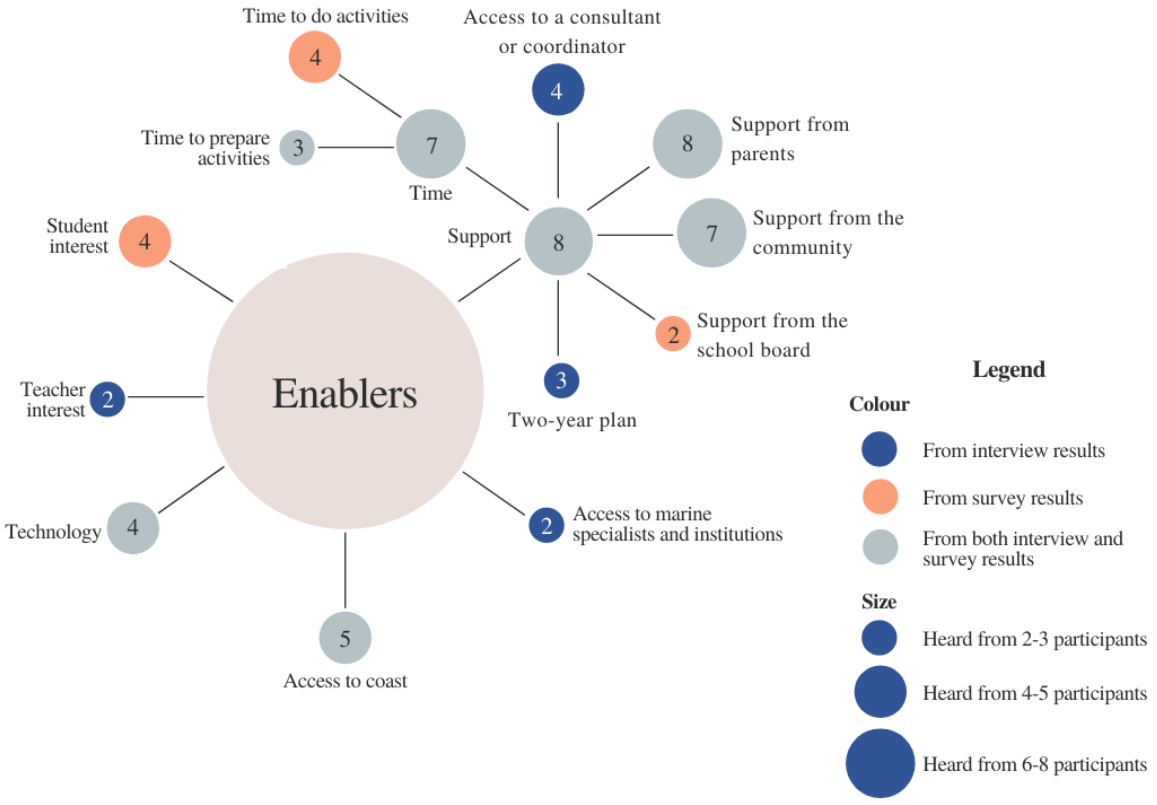

Figure 6. Enablers of the implementation and sustainability of the program *Le Saint-Laurent dans ma classe*. The numbers in the bubbles indicate the total number of interview participants that identified this factor as an enabler to the implementation and sustainability of the program added to the number of survey participants that indicated this factor as "always an enabler", "sometimes an enabler" or identified the factor as an enabler in the comment section of the survey. If a participant identified a factor as an enabler in both the survey and the interview, it was only counted once.

3.6 Influence of the program on the ocean literacy of the school community

The committee that worked to save the school saw the program *Le Saint-Laurent dans ma classe* as a natural area of specialization for the school as the local community already had many connections to the ocean. I wondered if by implementing and delivering the program, the connection to the ocean of this school community changed in any way. Through the interview and survey results, this section explores the influence of the program on the ocean literacy of the school community.

3.6.1 Results from the interviews

During the interviews, participants were asked their opinion on the influence of the program on their own ocean literacy, the ocean literacy of the students, and the ocean literacy of the school community in general. Their answers were varied and accompanied by examples. In this section, I share participants' quotes and examples as anecdotal evidence of a deep connection with the ocean within this school community. More

specifically, I highlight how these quotes or examples demonstrate understanding, valuing, or caring for the ocean, the three core dimensions of ocean literacy (Glithero, 2020).

i. Influence on the ocean literacy of participants

Participants were asked "How did the program *Le Saint-Laurent dans ma classe* influence your own ocean literacy?" Their answers differed depending on their role in the program. Teachers were the ones that expressed the greatest change in their ocean literacy, possibly because they were the most involved in the program. School community members expressed a slight change or no change in their ocean literacy. Finally, one school community member expressed a change in the methods they use to develop other people's ocean literacy.

During the interviews, teachers mentioned they had acquired knowledge through the program, such as knowledge of plastic pollution or sustainable fishing practices. Some of this knowledge had been gained at the beginning of their involvement in the program (three years prior to the interview for one teacher, and two years prior to the interview for the other), showing that it had been retained over time. They also mentioned that the value they give to the ocean has evolved, as illustrated in the following quote: "the more I learn [about the sea], the more I am impressed, amazed, and in love with the sea. […] Yes, my [connection to the ocean] has evolved, and it continues to evolve."[16] Further, teachers mentioned ocean actions they have taken since their initial involvement in the program, such as going whale watching with their family. One teacher said they were now more aware of how to choose sustainable seafood at the restaurant or supermarket. However, this

[16] Original quote: "plus j'en apprends plus je suis impressionnée, étonnée et amoureuse de la mer […] Oui, ça a évolué chez moi et ça continue d'évoluer."

teacher did not specify if they actually make more sustainable choices now that they have this knowledge.

One school community member expressed an increased awareness of ocean issues, namely of coastal erosion issues. They said that the program allowed them to interact with people involved in such issues and that it was these interactions, more than the program itself, that increased their awareness. They also shared that their interest in the ocean increased since the beginning of the program and that they were eager for their children to attend this school to learn about the ocean with them.

Another school community member shared that they already had an interest in the ocean and in environmental issues before the start of the program and that this interest was, in fact, one of the reasons they decided to move to this town. Therefore, they did not witness a change in their own ocean literacy. This participant felt like the program aimed to influence students, the next generation, rather than parents and community members. This perspective was not shared with the other interview participants.

A third community member felt that the program could have an influence both on the students and on the adults in the school community. In fact, this participant sees influencing the ocean literacy of the adults involved as part of the objectives of the program. As this participant already felt a strong connection to the ocean through their career in marine conservation, this program did not further influence their own ocean literacy specifically. Yet, this participant shared that through this program they learned new approaches to strengthening other people's ocean literacy. For instance, the program uses

a "multi-faceted approach"[17] by addressing ocean issues through all school subjects, which allows to "reach people in their individuality"[18], no matter their different interests and background. This approach is also recommended by Sauvé et al. 2018, both to reach students with different interests, and "to account for a diversity of relationships with the environment (the environment as nature, issues, resources, living space, territory, etc.)" (p. 41, translation).

ii. Influence on the ocean literacy of students

Next, interview participants were asked "How did the program *Le Saint-Laurent dans ma classe* influence the ocean literacy of students?" Participants answered by providing examples of how the program influenced student knowledge, interest, and actions regarding the ocean.

Through the program, students increased their knowledge about the ocean. This was reflected in their discourse and test answers. As mentioned previously, students from the St. Lawrence middle school won the first place at a local marine science fair where they had to present in-depth research on a marine species. Moreover, the teachers observed their students' progress in their understanding through their answers to tests and by the questions they asked.

Based solely on the interview results with adult participants, I could not tell whether the value students give to the ocean was influenced by the program. However, anecdotal responses suggest that students were certainly interested in the ocean and highly

[17] Original quote: "Approche multi-facette"
[18] Original quote: "toucher les gens dans leur individualité"

engaged in the program. A school community member shared that a student told them they liked the program. Further, teachers were impressed by the amount of enthusiasm students expressed in class. When they addressed a topic in class, students researched the topic on their own outside the classroom and voluntarily shared what they found with their classmates. One student once brought pictures to class of something they had learned online. Another student noticed clothing made of recycled plastic fibres at a store after they had watched a documentary on the topic in class and told their classmates about it.

Participants provided examples of actions undertaken by students to care for the ocean. A teacher said that for a school fundraiser, students suggested selling stainless steel straws, to reduce plastic pollution. They had learned about plastic pollution in class and wanted to take action to address this issue. Moreover, some students took the initiative to collect garbage on the local beach after having done the same activity with the school.

iii. Influence on the ocean literacy of the school community

Two participants indicated that one of the objectives of the program was to make the school a place for knowledge exchange within the local community. However, few school events have been open to the local community yet. Still, the main event organized by the school, a combined science and arts fair, was a great success. In addition to parents, many other local community members came to the event, including the mayor. The fair became an occasion for knowledge exchange among local community members.

Furthermore, the program *Le Saint-Laurent dans ma classe* influenced ocean actions within the school community. For example, after the school completed the beach

clean-up, a bucket was left available on the beach for local community members to use. Teachers attested that at least some of the students' parents have used it to collect garbage.

3.6.2 Results from the survey

In the survey, participants were asked to indicate on a likert-like scale whether they agreed with statements regarding the influence of the program on the ocean literacy of the students and other members of the school community.

The five participants that answered this question indicated that they "agreed" or "strongly agreed" with all the statements regarding the ocean literacy of the students (Table 1). These statements were: "the program *Le Saint-Laurent dans ma classe* helps students understand the influence of humans on the ocean", "the program helps students understand the influence of the ocean on our lives", "the program increases the value students give to the ocean", and "the program increases the likelihood that students will take action to take care of the ocean". Therefore, these five participants agreed that the program positively influenced the ocean literacy of the students.

Table 1. Survey answers regarding the influence of the program on the ocean literacy of the students.

Statements The program *Le Saint-Laurent dans ma classe…*	**Strongly disagree**	**Disagree**	**Neither agree nor disagree**	**Agree**	**Strongly agree**	**Prefer not to answer**
Helps students understand the influence of humans on the ocean	-	-	-	-	5	-
Helps students understand the influence of the ocean on our lives	-	-	-	4	1	-
Increases the value students give to the ocean	-	-	-	1	4	-
Increases the likelihood that students will take action to take care of the ocean	-	-	-	1	4	-

The survey provided participants with a space for comments. In a comment, a participant shared an example of how the program influenced the students' ocean literacy. They said that at the science and art fair, students were proud to present their work to their local community. Many students took time from their lunch hour to work on their science project, showing their interest in it. In fact, this participant said that all program activities have increased the student academic motivation.

Answers regarding the ocean literacy of adults in the school community were more divided than the ones regarding the students (Table 2). The five participants that answered

this question “agreed” or “strongly agreed” that the program had an influence on the ocean literacy of the teachers. Yet, only two people “agreed” or “strongly agreed” that the program had an influence on the ocean literacy of the non-teaching school staff, parents, and members of the local community. These results are similar to the ones from the interview. In the interviews, teachers (the adults most involved in the program) expressed an influence of the program on their ocean literacy. Most other participants did not observe such an influence on their own ocean literacy. Finally, all participants “agreed” or “strongly agreed” with the statement “the program *Le Saint-Laurent dans ma classe* leads adults involved in the program to become more responsible citizens regarding the ocean”. In other words, according to these participants, the program fosters ocean citizenship among school community members.

Table 2. Survey answers regarding the influence of the program on the ocean literacy of the adults involved in the program

Statements The program *Le Saint-Laurent dans ma classe…*	**Strongly disagree**	**Disagree**	**Neither agree nor disagree**	**Agree**	**Strongly agree**	**Prefer not to answer**
Increases the ocean literacy of the teachers of the St. Lawrence middle school	-	-	-	1	4	-
Increases the ocean literacy of the non-teaching staff of the St. Lawrence middle school	-	1	2	-	2	-
Increases the ocean literacy of the parents of the students of the St. Lawrence middle school	-	-	2	1	1	1
Increasing the ocean literacy of the community members in the municipality	-	-	2	2	-	2
Leads adults involved in the program to become more responsible citizens regarding the ocean	-	-	-	4	1	-

Survey participants were asked whether they use the knowledge they had acquired through the program *Le Saint-Laurent dans ma classe* in their daily lives. Five out of the six participants that answered this question provided examples of this, which demonstrates that the program had an influence on their knowledge about the ocean. For instance, one

person now feels more conscious of their role in environmental protection, especially ocean protection. Another shared that they now can better inform their children on their discoveries during their outings to the beach. One participant said that they now try to reduce their water consumption, to verify where their seafood comes from, to reduce their waste and to pick up litter when encountered on the beach or elsewhere. From this last comment, the program seems to have influenced both the knowledge about the ocean of this participant and their actions towards the ocean.

3.7 Diversity and inclusion

This project addresses how formal education can foster ocean literacy in coastal communities, as ocean literacy has been shown to support citizen engagement in sustainable ocean governance (Santoro et al., 2017). Sustainable ocean governance requires equitable citizen engagement and decision-making (Bennett et al., 2020). For this to be achieved, ocean literacy initiatives must be equitably accessible and inclusive of diversity. This section addresses the inclusivity of the program *Le Saint-Laurent dans ma classe*. As the program is currently facing many challenges, implementing diversity and inclusion may not be the priority of program managers. Although being inclusive could bring more people to participate in the program and benefitting from diverse perspectives could support its long-term sustainability, other considerations such as securing funding may come as higher priorities to program managers. Therefore, this section aims to inform future revisions of the program rather than short-term decision making. It also aims to inform other communities who may wish to implement similar programs. First, I present how, through the interviews, I explored the inclusion of youth in decision-making regarding the program.

Then, I present how, through the survey, I found whether the school implemented specific measures to be inclusive of groups often facing discrimination. To develop this aspect of my survey, I consulted with a researcher in equity, inclusion, diversity, and intersectionality who helped me identify the groups and measures presented to participants.

In the whole-school approach to Education for Sustainable Development, decisions regarding program planning are often made by a working group composed of management staff, teachers, community stakeholders, and students (Henderson & Tilbury, 2004). Such a working group allows decision-making power to be distributed across the school body and across age groups, rather than being entirely in the hands of the management staff (Henderson & Tilbury, 2004). One of the interview participants suggested multiple times in governing board meetings the implementation of a committee in charge of improving the program. This committee would be composed of students, teachers, the principal and one or two members of the community. This committee would have similar responsibilities to the ones of working groups in the whole-school approach to Education for Sustainable Development, and would allow the inclusion of youth in decision-making. The governing board expressed what the participant called "a polite interest"[19] towards the idea, but the committee has not been implemented. The participant hypothesized that the time engagement required to manage this committee may have discouraged potential committee members.

One survey question was about the inclusion of diversity in the program and the methods used to do so. The question presented four groups recognized by the Canadian Government (Government of Canada, 2016) to most often face discrimination, namely in

[19] Original quote : "un intérêt poli"

education and employment opportunities: women, Indigenous people, visible minorities (non-Caucasian people other than Indigenous people), and disabled people. I added to these groups ethnic minorities (people whose first language is not French or English) and people living in poverty. For each of these groups, participants had to identify inclusive measures taken by the school across a list of five measures: (1) showcasing diversified models (e.g., in textbooks, among guests), (2) using inclusive language, (3) adapting activities to increase their accessibility (e.g., security measures, access ramp), (4) distributing decision-making power, and (5) supporting work-family balance.

Out of the five measures of inclusion, only two were identified to be used by the school. Showcasing inclusive models was the measure selected by most survey participants. Participants indicated the program showcases women (3 participants out of 5), visible minorities (3 participants), disabled people (2 participants), and Indigenous people (1 participant). One participant indicated the use of inclusive language as a measure for the inclusion of women, disabled people, and people living in poverty. Survey participants were offered a space to comment their answers to this question. A participant indicated that the consultant that develop the program identified as a woman. This woman had major decision-making power and acted as a role model. Having a woman in this position therefore increased the inclusivity of this program. These measures are an important first step towards an inclusive program. Yet, the survey results highlight important gaps in diversity inclusion, namely for the inclusion of Indigenous people and people living in poverty.

Chapter 4: Discussion

Many ocean literacy initiatives are top-down, meaning their goals and approaches are decided at a high level of management, such as the national or international level (e.g., EU-CANADA-US. Research Alliance, 2013; National Marine Educators Association, 2019; Santoro et al., 2017) and implemented at lower management levels, such cities and communities. In Canada, the term ocean literacy is primarily used by the non-formal education sector and by some federal government agencies (Glithero, 2020). As the concept of ocean literacy was not created at a local level, it is often difficult for local communities to relate to it (Glithero, 2020). For instance, most participants in my project were unaware of the term ocean literacy and of broader ocean literacy initiatives. Therefore, they did not try to make the school part of a greater ocean literacy framework. They had to build on their local resources to create this program, which came with some challenges. This being said, as the program fully emerged as a community-based initiative, participants had more flexibility to adapt the program to their local reality. In this chapter, I discuss in more details the main barriers and enablers of the program. Then, I analyze the influence of the program on ocean literacy, diversity and inclusion, and community resilience. Based on this analysis, I provide management recommendations to support the long-term sustainability of ocean literacy programs and their role for coastal community resilience and management.

4.1 Barriers to the program

In the sustainable development literature, many papers call for "more education", especially more environmental (e.g., Österblom, Wabnitz, and Tladi, 2020) or marine

education (Gough, 2017; McKinley and Fletcher, 2012; Schoedinger et al., 2006). By providing in-depth information on the creation of an ocean education program, this case study gives specificity and context to the implications of such calls. Additionally, it shows the complexity surrounding the implementation of those calls.

Since its inception only three years ago, the program *Le Saint-Laurent dans ma classe* has met many barriers. These barriers are similar to the ones met by other schools trying to deliver environmental education programs. McPherson, Wright, and Tyedmers (2018) interviewed high school science teachers in Nova Scotia about the challenges of integrating ocean science into their courses. The teachers identified an overloaded curriculum and lack of time as the two greatest barriers. Teachers found it difficult to add ocean concepts to the curriculum and said that as long as ocean concepts are not included in the curriculum, these are likely to remain marginalized. The teachers at the St. Lawrence middle school make a dedicated effort to bring the ocean in their classroom through the program *Le Saint-Laurent dans ma classe*. Yet, as they have to teach the full curriculum in addition to ocean concepts, it can lead to a feeling of work overload. Finding creative ways to integrate ocean content within the current curriculum is possible, but only to a certain extent.

A new curriculum with greater inclusion of ocean literacy would make the implementation of this program easier. The consultant had tried in the past to convince the Quebec Ministry of Education to include more ocean-related topics in the curriculum, but without success. Changing a curriculum takes time and can be highly contentious. As one of the study participants said, time and energy invested in community-based programs ocean literacy programs may have more impact in the short-term than time and energy

invested in trying to influence the curriculum. Large-scale initiatives, such as the National Ocean Literacy Strategy led by COLC, may be better positioned than a single middle school to have an efficient influence on provincial curricula. In fact, COLC identified advancing ocean literacy in provincial curricula as a strategic action within its draft implementation plan of the National Ocean Literacy Strategy (Glithero, MacNeil, & Yumagulova, 2020).

The lack of marine education resources is a common barrier in marine and environmental education programs. It was mentioned as a barrier to marine education by the teachers of the St. Lawrence middle school, but also by science teachers in Nova Scotia (McPherson et al., 2018). Spence, Wright, and Castleden (2013) interviewed sixth grade teachers in Nova Scotia about the challenges of teaching environmental education. Lack of resources was also identified as the biggest barrier in their study. As the St. Lawrence middle school is in a rural region, access to educational resources is likely to be even more difficult than in urban areas (Arena et al., 2009). Many non-formal education resources such as museums, aquariums and educational centres are located in urban areas and are difficult to access for schools outside these areas. Therefore, visiting these locations requires full-day field trips, expensive transportation, and funding. Moreover, most of the existing resources in marine education in Canada are in English. For instance, CaNOE (the Canadian Network for Ocean Education) operates only in English (CaNOE, n.d.). COLC aims to be inclusive, but still struggles to effectively integrate francophones in its outreach and engagement efforts (Glithero, MacNeil, & Yumagulova, 2020). Therefore, as teachers at the St. Lawrence middle school are francophone, they face a language barrier further hindering their access to most of the few marine education resources available.

Kennelly, Taylor, and Serrow (2011) conducted a case study on the implementation of the whole-school approach to Education for Sustainable Development at the Girrakool primary school in Australia. This school shares many similarities with the St. Lawrence middle school. Students learn about sustainability in all of their courses through field trips and interactions with the community. The authors explain that this school has made "sustainability a celebrated focus of curriculum" (p. 141). The St. Lawrence middle school takes a similar approach by celebrating its coastal identity and focussing the existing curriculum on the ocean. In Australia, sustainable schools such as this one are supported by governmental policies and professional development opportunities. Still, teachers at the Girrakool primary school lack time, energy, and funding to invest in the program, barriers also experienced by teachers at the St. Lawrence middle school. The lead teacher in the whole-school approach education at the Girrakool primary school believed that this type of approach is more challenging for teachers than other pedagogical approaches. To address these challenges, teachers at this school benefitted from ongoing professional development.

Another major barrier identified at the St. Lawrence middle school was turnover in staff, which comes with a lot of costs. Barnes, Crowe, and Schaefer (2007) found that in the United States, at the time of their study, replacing a teacher could cost from $9,000 to $20,000 USD. These costs were for recruitment, hiring and training. The barrier of turnover in staff can therefore be linked to that of lack of funding. In addition to monetary costs, turnover can have an impact on the students, who have been shown to suffer from a decrease in teaching quality (Carver-Thomas & Darling-Hammond, 2017). The difficulty in filling teaching positions can lead to unprepared teachers, if they are hired for only a

short time before the beginning of the school year. There is an added risk that teachers with inadequate training are hired to fill empty positions (Carver-Thomas & Darling-Hammond, 2017).

The St. Lawrence middle school may have to bring teachers from outside the area to replace teachers who have left. It is likely that it would take time for teachers new to the area to establish deep relationships with the community and understand its history, challenges, and connection with the ocean. The program *Le Saint-Laurent dans ma classe* is anchored in the local context, and relationships with the community are at the heart of place-based education (Leather & Nicholls, 2016). An understanding of the reality of the students is needed for teachers to adequately support them in their transition from elementary to high school, a period of high emotional, social, and behavioural change (Longobardi, Prino, Marengo, & Settanni, 2016). If teachers are constantly changing, they may not have the time to establish the meaningful relationships needed to deliver the program and fully support their students.

Kennelly et al. (2011) found that many teachers at the Girakool primary school resisted the change towards a whole-school approach when it was first implemented. With time, however, they all came to support the approach and engage with it. Because of turnover in staff, it is difficult for the St. Lawrence middle school to make their full team of teachers supportive of the program. Once a teacher is in place, the school cannot predict when this teacher is going to be replaced by a new teacher who is unaware of the program. Of course, turnover could also mean the arrival of enthusiastic teachers at the school. A teacher told me in October 2020 that the new teachers for the 2020/2021 school year were already interested in the program and getting involved.

4.2 Enablers of the program

4.2.1 Help of a marine education consultant

Partnerships with organizations outside the school, such as a consulting firm, are a key success component of sustainability education programs (Henderson & Tilbury, 2004). These partnerships can bring expertise and knowledge to the program (Henderson & Tilbury, 2004). Lack of knowledge about the ocean was identified as a barrier to teaching about the ocean by science teachers in Nova Scotia (McPherson et al., 2018) and Ontario (Payne & Zimmerman, 2010). Teachers often feel that they lack the skills and knowledge to share complex ocean concepts with their class, especially in the case of controversial concepts (Payne and Zimmerman, 2010) such as waste management or political commitments to climate action. A consultant can provide teachers with more information on the concepts and invite specialists to the school to present these concepts.

Involving a marine education consultant in the program was a strategic decision that played a pivotal role in the implementation of the program. On the other hand, the school then became dependant on this outside help. When it no longer had funding to access this support, the program almost collapsed. The school then relied on the support of parents and the local community to be able to organize activities similar to the ones organized by the consultant. Having access to a consultant was of a contingent nature. Other schools that would like to start a similar program may not have access to an education consultant. These schools would then have to find other sources of support in their community.

4.2.2 Interactions with the local community

The program *Le Saint-Laurent dans ma classe* heavily relies on the support of the school community. According to Arena et al. (2009), educational programs that engage with the local community are key for the economic and social viability of rural communities in Quebec. Partnerships with the local community allow the exchange of knowledge between the students, teachers and the local community. Uzzell (1999) describes four types of school-community partnerships: school as an isolated island, local community invited into school, school as a guest in the community, and school as a social agent. When the school is a social agent, students work in collaboration with the community to address local environmental issues. This type of partnership is likely the most effective at helping the students become agents of change (Uzzell, 1999). Yet, for most schools using the whole-school approach to education for sustainable development, partnerships are limited to inviting the local community into the school (e.g., with a guest presenter) or inviting the school in the community (e.g., during a field trip) (Henderson & Tilbury, 2004).

In the program *Le Saint-Laurent dans ma classe*, most interactions with the local community are either through guest presentations from community members or through field trips in the community. However, the school participated in a beach clean-up in 2017 and left a bucket on the beach for other community members to pick up garbage. Through this action, the school was acting as a social agent. For this role to become clearer and to further help students become agents of change, events like this one should involve greater collaboration between the students and the community members. For instance, the students could pick up trash alongside local community members by planning a community clean-up event. Another way for the school to become an agent of change would be to partner

with the municipal council for students to participate in the local democracy and decision-making processes. At the Girrakool primary school, students did so by giving a presentation on water management to their local council (Kennelly et al., 2011). Students from the St. Lawrence middle school could do the same for their own local council.

4.2.3 The two-year plan

The two-year plan for the program *Le Saint-Laurent dans ma classe* will hopefully ensure stability in the program over the long term. The plan was implemented in September 2020. During a discussion at the end of September 2020, a teacher told me that the implementation went well. The first theme of the year was marine plastic pollution, and they had already engaged in multiple activities on that topic. For instance, students received a presentation on the *Mission 100 tonnes*, or "100 Tons Mission" (2019), a campaign aiming to collect 100 tons of garbage from waterways. Then, they collected garbage on the beach behind the school. They now plan to complete a mural with it for their art class.

When we spoke in July, teachers informed me that the two-year plan would have set activities, themes and presentations by specialists. Yet, between July and September, they realized that it would be better to allow teachers to decide for themselves which activity to organize in their classes. This autonomy gives teachers space to exert their professional judgment and to collaborate in innovative ways (Ralph, Robbins, Young, & Laurence, 2020). Teachers had access to the binder with past marine activities, but were given the freedom to pick an activity from the binder or to do something different. The school decided to keep themes and specialists fixed to provide a framework for the program.

4.3 Ocean literacy

The Canadian Ocean Literacy Coalition studies ocean literacy in terms of ocean knowledge, values and actions (Glithero, 2020). The project ResponSEAble, a project funded by the European Commission, uses the same three concepts to increase ocean literacy in Europe (European Commission, n.d.). Because of the use of these three concepts in the national and international ocean literacy context, I chose to focus on them in my research. Ocean knowledge is often believed to influence ocean values, which in turn are believed to influence ocean actions (e.g., Ashley et al., 2019; Fletcher and Potts, 2007). Although this relationship is valid in certain contexts (Kollmuss & Agyeman, 2002), its critics find it to be too simplistic to address the complex question of environmental behaviour change. Many factors such as demographics, culture, and emotions can influence the validity of this relationship (Kollmuss & Agyeman, 2002). Marcinkowski and Reid (2019) completed a review of studies on this topic and believe that the evidence behind this relationship is not well founded. They recommend moving beyond this model. My findings show anecdotal evidence of the influence of the program *Le Saint-Laurent dans ma classe* on each of these concepts (ocean knowledge, ocean values, ocean actions) individually and on ocean literacy as a whole. However, the influence of each of these concepts on each other is not interpreted from these findings.

The values expressed by interview and survey participants when talking about the ocean were mostly relational in nature. Engel, Vaske, and Bath (2020) studied ocean values and their influence on people's feeling of responsibility towards ocean health. This study found that coastal residents in Newfoundland feel a responsibility to care for the ocean. Engel et al. studied three types of ocean values: intrinsic values (the value of the ocean on

its own), instrumental values (the ocean as a resource and source of income), and relational values (protection and concern for the ocean). Among these three types of values, participants in my project mainly expressed relational values towards the ocean. For instance, participants said that they were aware of ocean issues and conscious of their role in environmental protection. One participant expressed their love for the sea. Moreover, students wanting to sell plastic straws for a fundraiser shows that these students are concerned with ocean health and therefore have relational ocean values. Participants expressed instrumental values when talking about the role of the ocean in saving their school and about the importance of marine careers in their community. Engel et al. (2020) found that among intrinsic, instrumental and relational values, relational values are the ones that have the most influence on people's ocean citizenship. It is interesting to see that participants in my project expressed strong relational values and indicated a positive influence of the program on their ocean citizenship. My results did not allow to measure whether people's relational ocean values evolved since they became involved in the program. Yet, from these results, the program seems to be a good environment to at least conserve these values.

4.4 Diversity and inclusion

4.4.1 Youth perspectives

This project focused on the perspectives of teachers and community members in the program. Because of the timeframe of the project and ethical considerations, youth were not involved in the research process. Still, one of the findings of this project is that youth are not engaged in the management of the program. As Jensen (2002) states, youth need to

engage in the management of sustainable development initiatives in order to become competent in their responses to environmental issues. At the Girakool primary school, youth were involved in the development of the program's management plan (Kennelly et al., 2011). Every teacher was provided with a copy of the management plan to show their students. Student comments were then integrated in the management plan. Further research on the St. Lawrence middle school could explore how youth could become leaders in the program and participate in the efforts to save the school, along with the adults.

4.4.2 Indigenous perspectives

One of the strengths of the program *Le Saint-Laurent dans ma classe* is that it builds on local knowledge and expertise and anchors the school in the local context. While many ocean literacy programs focus on Western ocean science, this program is inclusive of social sciences (e.g., arts, history, literature) and local knowledge. However, Indigenous perspectives are not included in the program. In the survey, one participant indicated that the program presented Indigenous models as a measure for diversity inclusion, while the other participants identified no specific measures for the inclusion of Indigenous people. Indigenous people in Canada and Quebec developed a rich relationship with Washipekuk (the St. Lawrence River in Wolastoqey, the language of the Wolastoqiyik Wahsipeku, or Malécite, First Nation), namely through navigation, trade, and fishing (Bouchard & Lévesque, 2017). The St. Lawrence middle school is located on the territory of the Wolastoqiyik Wahsipekuk First Nation. The school could partner with this First Nation to develop a deeper understanding of their interactions with the estuary and the coastal environment. This partnership would help students and the school community to develop

Two-Eyed Seeing (*Etuaptmumk* in Mi'kmaw). As explained by Elder Dr. Albert Marshall, Two-Eyed Seeing is a Mi'kmaw way of seeing "from one eye with the strengths of Indigenous knowledges and ways of knowing, and from the other eye with the strengths of mainstream knowledges and ways of knowing, and to use both these eyes together, for the benefit of all" (Reid et al., 2020, p.1). Two-Eyed Seeing is a guiding principle for collaborative engagement of people coming from Indigenous and Western knowledge systems (McMillan & Prosper, 2016) and is critical in the management of environmental crises (Aikenhead & Michell, 2011). The development of Two-Eyed Seeing is therefore an important component to the development of ocean citizenship.

To further include Indigenous worldviews in the program, the school could use Ocean School (Ocean School, n.d.) or Natural Curiosity (Natural Curiosity, n.d.) educational resources. Ocean School is a free online educational platform aiming to spark students' interest for the ocean and to increase their ocean literacy. Many of their activities include Indigenous perspectives. Moreover, they planned to release a full module on the herring and salmon harvests in the Haíłzaqv (Heiltsuk) Nation in the fall 2020. As of January 2021, this module is not released yet, but may be released in the near future. Natural Curiosity is a program from the University of Toronto which creates resources for teachers on Indigenous perspectives in environmental inquiry.

4.5 Community resilience

Community resilience unexpectedly emerged as an interview theme. When I first started studying this program, I expected to find that its main goal was to increase ocean literacy. I was surprised to find that the primary goal of the program was to save the school

from closing. To save the school, the community demonstrated resilience through collaboration, support and capacity building. Berkes and Ross (2013) describe a community's resilience "as the capacity of its social system to come together to work towards a communal objective." (p.6) Since the school community came together to work towards saving the school, it demonstrated community resilience.

Oncescu (2014) studied the role of a rural school in Saskatchewan in its community and found that recreational events hosted by the school were important to build connection and cohesion in the community, two components of community resiliency. The presence of a school in a rural community was found to increase civic engagement among residents through means such as volunteering, coaching, or fundraising (Bauch, 2001). At the St. Lawrence middle school, the local community engages with the school by supporting the creation and delivery of the program *Le Saint-Laurent dans ma classe* by and by participating in school events. This program gives opportunities for ocean civic engagement by inviting community members to give presentations on the ocean and to take action to protect the ocean.

As the program is a community-based initiative, the school has greater flexibility to adapt it to the local context. Most of the educational content is adapted to local expertise, such as whales and marine careers. This allowed collaboration with local experts on specific topics and a greater connection of the school with the local context. If students feel more connected to the local area and are more aware of the professional opportunities in the area, then they are possibly more likely to stay in the area. If this is the case, the program would contribute to building capacity for the community. In the long-term, this could have

an impact on the future of the school since students that stay in the area will possibly have children that will attend this school.

Scully and MacLoad (2018) studied the career intentions of grades 6-9 students in New Brunswick. They found that more than a third of students planned to leave New Brunswick after graduating from high school. Students were not leaving out of pessimism regarding career opportunities in the province, but rather to explore other options. They also found that only about 13% of students were interested in marine-related careers. Further research on the program *Le Saint-Laurent dans ma classe* could study which factors influence students' decision to leave the Bas-Saint-Laurent region or not. It could also study whether students are aware of marine job opportunities in this region.

4.6 Management recommendations

At the beginning of this project, I identified as a management problem the complexity of implementing ocean literacy programs that integrate coastal communities and education to support sustainable coastal governance. Modifying provincial curricula to make them more inclusive of ocean literacy is complex. Curricula are built by subjects (Sauvé et al., 2018). As ocean literacy is by nature interdisciplinary, it fits in no specific subject. The program *Le Saint-Laurent dans ma classe* offers a way to include more ocean literacy in the classroom without involving changes in curricula. Through interviews and a survey, I found that the greatest barrier to the program was a lack of support for the teachers. Even though they have the support of parents and school community members (e.g., through guest presentations), teachers feel alone when it comes to teaching ocean concepts

by themselves. They feel proud to be part of this program, but lack the support of a network and struggle to find resources.

Teachers are taught to work independently, as solitary persons in front of a classroom (Britzman, 2003). Even school infrastructure is built with this vision in mind, with independent classrooms separated by walls and closed doors (Britzman, 2003). That is how teachers are trained and it can be very difficult to change this culture towards one of collaboration (Glazier, Boyd, Hughes, Able, & Mallous, 2017), although collaboration can be very rewarding. Collaborating teachers overcome challenges together (Glazier et al., 2017) and increase student motivation (Laal & Ghodsi, 2012).

Based on the results of this research and the literature I reviewed, I identified five management recommendations. The first three recommendations apply to the program *Le Saint-Laurent dans ma classe* and coastal communities who wish to overcome barriers related to the implementation of ocean literacy programs in the formal education system: (1) to identify a program coordinator, (2) to provide teachers with professional development opportunities, and (3) to develop partnerships with other schools and organizations. The fourth and fifth recommendations are to support coastal communities struggling with the complexity of coastal management issues: (4) to use ocean literacy initiatives as an opportunity for community collaboration and increased resilience, and (5) to use ocean literacy as a tool to support citizen engagement in decentralized governance.

4.6.1 Assigning a program coordinator

Having access to an educational consultant was a major enabler of the program. The consultant acted as a coordinator and provided teachers with resources. Rehiring this

consultant would require too much funding. However, other options may be available. For instance, non-governmental organizations (NGOs) such as Exploramer, a marine education centre, might be interested in taking on this role for a lesser price. Exploramer has a mission of education and has already collaborated with the school in the past. Another option would be to collaborate with a university. The closest university to the St. Lawrence middle school is the Université du Québec à Rimouski. This university is specialized in marine research and has a teacher education program. A maritime management professor could partner with a teacher education professor to become co-coordinators of the program. A third option would be for a school teacher to become the program coordinator. At the Girrakool primary school, a teacher was appointed as the "environmental education leader" and having this leader was a major driver of the program (Kennelly et al., 2011). However, the St. Lawrence middle school teachers already feel overloaded with work. Moreover, the high turnover in school staff would make it difficult to assign a member of the staff as a permanent coordinator. Having someone outside the school as a coordinator would be best as it would ensure greater stability in the program and increase potential for exportation of the program into other schools.

4.6.2 Professional development for teachers

I recommend that the school seeks professional development opportunities through existing environmental education communities of practice and through emerging ocean literacy communities of practice (Glithero, 2020; Santoro et al., 2017). Trust and Horrocks (2017) argue that "well designed face-to-face and virtual communities of practice provide opportunities for teachers to learn, grow as professionals and make changes to their

practice with the support of peers" (p. 645). Two of the barriers identified by interview participants were a lack of resources and a difficulty to sustain teacher interest in the program. Professional development could help with both of these issues.

Henderson and Tilbury (2004) recommend professional development as a way to overcome the challenges associated with change in the school system. In fact, professional development "can assist teachers by providing support and motivation to implement changes […] and building capacities for institutional change." (p. 22) Training could also help teachers develop confidence (Oulton & Scott, 1995). Sauvé et al. (2018) indicate in their *Quebec strategy for environmental and eco-citizenship education* a need for continuous teacher training in environmental education. They explain that such training can help teachers find resources and build support networks.

As there is a high turnover in teachers at the St. Lawrence middle school, offering in-school training to all new staff would require a lot of work. The school would benefit from seeking an organization outside the school that could offer such training. One option would be for the St. Lawrence middle school to become an Établissement Vert Brundtland, a network of green schools in Quebec which offers continuous training for its members. Yet, Sauvé et al. (2018) indicate that a lack of funding prevents the Centrale des syndicats du Québec, the union behind this network, from meeting the needs of all its current members. Therefore, access to such training may be limited.

A future community of practice could emerge through the National Ocean Literacy Strategy currently being developed by COLC. The draft of this National Strategy identified creating a bilingual online portal for the Canadian ocean literacy community and establishing a network of blue schools across the country as two of its preliminary priority

actions (Glithero, MacNeil, & Yumagulova, 2020). The online community would allow teachers to meet with other ocean educators, find educational resources, and learn about funding opportunities for ocean literacy initiatives. The blue school network would connect the St. Lawrence middle school with other schools in Canada with a focus on ocean literacy. Professional development opportunities are likely to be offered through both the online portal and the blue school network, as well as opportunities for partnerships. It will be key for these initiatives to be fully bilingual in order to bridge language gaps between francophone and anglophone ocean literacy practitioners in Canada.

4.6.3 Developing partnerships outside the school

To access more educational resources, the school could collaborate with non-formal education programs that are already in place. Some non-formal education organizations build educational programs to be delivered in classrooms. Educators for such programs could lead educational activities and provide pre- and post-activity resources for teachers. Pre-activity resources introduce students to the concepts that will be discussed in the activity. Then, post-activity resources are used to reinforce these concepts. Henderson and Tilbury (2004) and Arena et al. (2009) recommend collaboration with existing initiatives to enrich the program and avoid duplication of work. The school already benefitted from such collaboration: the science fair was completed in collaboration with Exploramer and the beach clean-ups were completed in collaboration with *Mission 100 tonnes*. These collaborations are highly valuable, as they helped teachers gain experience in hands-on placed-based education.

New collaborations could also be developed. For instance, one of the themes in the two-year plan is marine mammals. La Baleine Nomade would be a good organization to partner with for this theme. This non-formal educational business leads in-school activities on marine mammals and provides toolkits for teachers. La Baleine Nomade is part of the program *La culture à l'école,* a funding program from the Quebec Ministry of Education. Therefore, the St. Lawrence middle school could access their services for free (La Baleine Nomade, n.d.). Moreover, teachers would benefit from this opportunity to learn from other marine educators.

Partnerships could also be developed with other schools, to develop a local community of practice. This collaboration can be as simple as sharing activity ideas with other schools in the area. As the St. Lawrence middle school only has a small number of teachers, teachers would benefit from a local community of practice to communicate with other people who understand the reality of teaching in this region.

A participant mentioned that new teachers sometimes find it difficult to understand their role in the program and how to build ocean-related activities. Meeting with teachers from similar programs could help them clarify their role. Partnerships could be developed with Canadian schools in the UNESCO Associated School Project Networks. These schools use the whole-school approach to Education for Sustainable Development and conduct projects similar to the ones at the St. Lawrence middle school (Sustainability and Education Policy Network, SEPN, 2018). For instance, at the Bruce Peninsula District School in Ontario, students created art with recycled material. At the high school La Poudrière in Quebec, students collected garbage in the woods around the school. Connecting with these schools would allow teachers to learn from their experiences, share

resources, and create collaborative projects. As meeting with these other schools requires time, it could be the responsibility of the program coordinator.

4.6.4 Ocean literacy as an opportunity for community collaboration and increased resilience

The lack of communication between marine sectors is generally at the core of marine issues, as it hinders collaboration and trust (Markantonatou, Noguera-Méndez, Semitiel-García, Hogg, & Sano, 2016). When decision makers from various sectors do not communicate, their decisions are uncoordinated and can have unpredicted cumulative impacts (Hughes, Bellwood, Folke, Steneck, & Wilson, 2005). For instance, in the Saguenay Fjord, in Quebec, the St. Lawrence Beluga population is in decline as a result of cumulative noise pollution from the uncoordinated management of multiple marine sectors (shipping, ferries, and whale-watching; Chion et al., 2020). The beluga being a species of cultural and economic importance in the area, its decline affects the livelihood of the coastal communities along the fjord (Maltais & Pelletier, 2018). Coastal communities could use ocean literacy initiatives in formal education as an opportunity for increased communication and collaboration between community members.

Collaboration could occur through participation in the creation of ocean literacy initiatives and through participation in events related to these new initiatives. The program *Le Saint-Laurent dans ma classe* fostered collaboration among local community members from different sectors by bringing them together around a common goal. These community members combined their respective strengths (e.g., legal expertise, event planning, and marine education) in order to save the school and ensure the resilience of this small coastal

community. As interview participants mentioned, since the implementation of the program, the St. Lawrence middle school became a platform for knowledge sharing in the community. Participants hope that more events will be open to the community in the future, as it would allow for greater connections among community members.

Parents, guardians, and other adults supporting the students work in various sectors in the community, including many marine sectors (e.g., research, fishing, shipping). Coastal schools therefore form an ideal place for members of different marine sectors to meet on neutral ground and collaborate on issues outside those they experience on the water. Through these collaborations, the fabric of a community becomes stronger and innovative solutions are easier to find when marine issues arise. This way, ocean literacy initiatives in formal education can foster coastal community resilience, as has been shown with the program *Le Saint-Laurent dans ma classe*.

4.6.5 Ocean literacy as a tool for decentralized governance

Decentralized governance happens when decision-making for an area is not made solely by one overarching organization, but through multiple levels of governance, including the community level (Cheema & Rondinelli, 2007). Decentralized governance ensures more efficient (Jentoft, 2000) and equitable management (Bennett et al., 2020). It can be achieved, for instance, through community-based management. Community-based management is a set of approaches and practices where most of the power and authority lie in the hands of local communities rather than in the hands of a central government (Mahanty, Fox, McLees, Nurse, & Stephen, 2006). It is often used to manage natural resources in a way that integrates social, economic and environmental goals (Mahanty et

al., 2006) and allows local stakeholders to be involved in the management of the resources on which they depend (White, Zeitlin Hale, Renard, & Cortesi, 1994). Canada's Oceans Act identifies coastal communities as a group of interest for marine governance (Engel et al., 2020; Oceans Act, 1996). Numerous studies have found that members of the general public often have a desire to take action for marine conservation. In a survey realized by COLC in 2020, 77% of respondent indicated that they are willing to make lifestyle changes to support ocean health (Glithero & Zandvliet, 2020). Engel et al. (2020) surveyed coastal community members in Newfoundland, Canada, and found that they expressed a strong commitment to ocean conservation and a feeling that they should engage more with ocean conservation. Likewise, Williams (as cited in McKinley & Fletcher, 2012) identified a desire to get involved in marine management among the general public in England. Yet, participants in this study expressed that they lacked information in order to fully engage in marine issues, a challenge related to the lack of marine education in schools (Castle et al., 2010).

Fostering ocean literacy through formal education should be used as a tool to foster citizen engagement in decentralized marine governance. Citizen engagement can happen through individual behaviour change, collective action or through influence on management decisions. The program *Le Saint-Laurent dans ma classe* allows citizens to become engaged by empowering them to understand, care, and take action regarding marine issues. For instance, students and teachers of the St. Lawrence middle school gained an understanding of plastic pollution management through documentaries. Then, they went to a local beach to see the impact of marine plastic pollution on this ecosystem. Experiencing first-hand the impacts of an issue on a place that they identified with

reinforced their relational values towards the ocean. The program also helped school community members take action through individual behaviour change by organizing a beach clean-up. Furthermore, when the school board threatened to close the school, local community members formed a committee to save the school. Through this committee, they gained a better understanding of the precarity of the school and of the precarity of their coastal community. They reinforced their relational values towards the school and their community by organizing events to gain support for the school. Then, they took action by creating the program *Le Saint-Laurent dans ma classe*. School decision-making is often done in a centralized manner, with the school principal taking most decisions. Through the creation of this committee, parents and other local community members gained influence on the decisions taken by the school. Therefore, this ocean literacy initiative contributed to decentralizing school, community, and ocean governance. The program allowed the community to keep their school open and increased the resiliency of the whole coastal community.

When developing ocean literacy initiatives to support citizen engagement, it should be considered that not all citizens have the capacity to participate in decentralized governance (McKinley & Fletcher, 2012). This could be because of historical relationships (e.g., colonialism) influencing relationships between the state and citizens, socio-economic situations, discrimination, or the lack of an engagement mechanism (McKinley & Fletcher, 2012). Ocean literacy initiatives should be inclusive of diversity and managers should ensure that they are accessible to all. Although the program *Le Saint-Laurent dans ma classe* should have more inclusion measures in place, the few existing measures act as examples of good practice. For instance, the beach clean-up was led by a female scientist,

an important role model for a field where gender equity remains unachieved (Thomas, Grenet, Monnet, & van Effenterre, 2020). Moreover, the clean-up took place during class hours. This allowed teachers and students who would not have been able to participate outside class hours because of socio-economic barriers (e.g., because of work obligations, or not having access to a car) to engage in the activity. In summary, creating an ocean literacy initiative does not mean that all citizens will be able to engage in the management of ocean issues. Measures to support inclusivity should be implemented to ensure equitable engagement opportunities and equitable influence on decision-making.

4.7 Conclusion

The program *Le Saint-Laurent dans ma classe* was not created as a planned initiative to increase ocean literacy. Rather, it was implemented as an ad hoc measure, driven by the urgent need to save the school. The program met many barriers, such as a lack of educational resources and a lack of funding. The COVID-19 pandemic also brought new challenges to the school and local community. Although the future of the program is uncertain, namely since the effects of the pandemic are still unfolding, the school community has already managed to overcome many barriers and foster ocean citizenship at the community level.

Best practices emerging from this case study could be useful to broader ocean literacy initiatives, such as the project ResponSEAble (European Comission, n.d.), and the Canadian National Ocean Literacy Strategy (Glithero, 2020). The program *Le Saint-Laurent dans ma classe* was developed based on the needs of the community, in this case, the need to save the school and the need to retain students in the region. Moreover, the

program builds on the strengths of the community: the local marine expertise and the attachment of the community to the St. Lawrence Estuary. Finally, the program is continuously adapted based on feedback from the people involved in the program. For instance, the program was adapted from nine themes per year to eight themes spread across two years based on the teachers' need for simplicity. These characteristics of the program are at the root of its resilience. The program allowed the school to stay open and enhanced the ocean citizenship of school community members. New collaborations were created and supported the sustainable development of this coastal community. Hopefully, this case study will inspire other communities to use ocean literacy to foster community resilience and sustain their crucial relationship with a rapidly changing ocean.

References

Adams, W. C. (2004). Conducting semi-structured interviews. In K. E. Newcomer, H. P. Hatry, & J. S. Wholey (Eds.), *Handbook of Practical Program Evaluation* (pp. 492–505). Hoboken, NJ, USA: John Wiley & Sons, Inc. Retrieved 19 October 2020 from https://doi.org/10.1002/9781119171386.ch19

Aheto, D. W., Kankam, S., Okyere, I., Mensah, E., Osman, A., Jonah, F. E., & Mensah, J. C. (2016). Community-based mangrove forest management: Implications for local livelihoods and coastal resource conservation along the Volta Estuary catchment area of Ghana. *Ocean & Coastal Management*, 127, 43–54. Retrieved from https://doi.org/10.1016/j.ocecoaman.2016.04.006

Aikenhead, G., & Michell, H. (2011). *Bridging cultures: Indigenous and scientific ways of knowing nature*. Toronto, ON: Peason Canada Inc.

Andrew, S., & Halcomb, E. (2012). Mixed method research. In S. Borbasi & D. Jackson (Eds.), *Navigating the Maze of Research: Enhancing Nursing and Midwifery Practice* (Third Edition, pp. 147–165). Chatswood, N.S.W.: Elservier Australia. Retrieved from https://ro.uow.edu.au/smhpapers/804

Arena, F., Riopel, M.-C., & Des Ruisseaux, M. (2009). *Rapport sur l'état et les besoins de l'éducation, 2006-2008. L'éducation en région éloignée : une responsabilité collective [Report on the states and the needs of education, 2006-2008. Education in remote regions: A shared responsibility]*. Québec: Conseil supérieur de l'éducation. Retrieved from http://www1.cse.gouv.qc.ca/fichiers/documents/publications/CEBE/50-0188-01.pdf

Ashley, M., Pahl, S., Glegg, G., & Fletcher, S. (2019). A change of mind: Applying social and behavioral research methods to the assessment of the effectiveness of ocean literacy initiatives. *Frontiers in Marine Science*, 6. Retrieved 16 October 2020 from https://doi.org/10.3389/fmars.2019.00288

Askell-Williams, H., & Koh, G. A. (2020). Enhancing the sustainability of school improvement initiatives. *School Effectiveness and School Improvement*, 31(4), 660–678. Retrieved from https://doi.org/10.1080/09243453.2020.1767657

Barnes, G., Crowe, E., & Schaefer, B. (2007). *The cost of teacher turnover in five school districts: A pilot study* (p. 97). Retrieved from National Commission on Teaching and America's Future: https://files.eric.ed.gov/fulltext/ED497176.pdf

Bauch, P. A. (2001). School-community partnerships in rural schools: Leadership, renewal, and a sense of place. *Peabody Journal of Education*, 76(2), 204–221.

Bennett, N. J., Blythe, J., White, C., & Campero, C. (2020). *Blue growth and blue justice* (Working Papers Series No. 2020– 02) (p. 26). Retrieved from Vancouver, BC: Institute for the Oceans and Fisheries, University of British Columbia:

Berkes, F., & Ross, H. (2012). Community resilience: Toward an integrated approach. *Society & Natural Resources*, 26(1), 5–20. Retrieved from https://doi.org/10.1080/08941920.2012.736605

Billé, R. (2008). Integrated coastal zone management: Four entrenched illusions. *S.A.P.I.EN.S. Surveys and Perspectives Integrating Environment and Society*, 1(2). Retrieved 24 September 2020 from http://journals.openedition.org/sapiens/198

Binkley, M. (2002). *Set adrift*. University of Toronto Press. Retrieved 13 November 2020 from https://utorontopress.com/ca/set-adrift-3

Bouchard, S., & Lévesque, M.-C. (2017). *Le peuple rieur. Hommage à mes amis innus [The laughing people. Tribute to my Innu friends]*. Montréal, QC: Lux.

Britzman, D. P. (2003). *Practice makes practice: A critical study of learning to teach* (Rev. ed..). Albany, Albany]: State University of New York Press. Retrieved 19 October 2020 from http://ezproxy.msvu.ca/login?url=http://search.ebscohost.com/login.aspx?direct=true&scope=site&db=nlebk&db=nlabk&AN=105450

CaNOE. (2018). What is Canadian ocean literacy. Retrieved from http://oceanliteracy.ca/wp-content/uploads/What-is-Canadian-Ocean-Literacy-Nov_19.pdf

CaNOE. (n.d.). What is CaNOE? Retrieved from http://oceanliteracy.ca/about/

Carter, N., Dawson, J., Knop, J., Joyce, J., Weber, M., Kochanowicz, Z., & Mussells, O. (2018). *Arctic corridors and northern voices: Governing marine transportation in the Canadian Arctic (Cambridge Bay, Nunavut community report).* Retrieved from Ottawa, ON: University of Ottawa: 10.20381/RUOR37325

Carver-Thomas, D., & Darling-Hammond, L. (2017). *Teacher turnover: Why it matters and what we can do about it* (p. 8). Retrieved from https://learningpolicyinstitute.org/sites/default/files/product-files/Teacher_Turnover_BRIEF.pdf

Castle, Z., Fletcher, S., & McKinley, E. (2010). Coastal and marine education in schools: Constraints and opportunities created by the curriculum, schools, and teachers in England. *Ocean Yearbook Online*, 24, 425–444. Retrieved from https://doi.org/10.1163/22116001-90000066

Cava, F., Schoedinger, S., Strang, C., & Tuddenham, P. (2005). *Science content and standards for ocean literacy: A report on ocean literacy.* Retrieved from http://coexploration.org/oceanliteracy/documents/OLit2004-05_Final_Report.pdf

Cheema, G. S., & Rondinelli, D. A. (Eds.). (2007). *Decentralizing governance: Emerging concepts and practices*. Brookings Institution Press. Retrieved 17 November 2020 from https://www.jstor.org/stable/10.7864/j.ctt1261v1

Chion, C., Bonnell, T., Lagrois, D., Guetté, A., Michaud, R., Dupuch, A., & Dupras, J. (2020). *Rapport de synthèse an 1 [Year one synthesis report]*. Retrieved from Gatineau, QC: Université du Québec en Outaouais: https://cdn-cms.f-static.net/uploads/4096923/normal_5f4d58b607ed6.pdf

Crain, C. M., Halpern, B. S., Beck, M. W., & Kappel, C. V. (2009). Understanding and managing human threats to the coastal marine environment. *Annals of the New York Academy of Sciences*, 1162(1), 39–62. Retrieved from https://doi.org/10.1111/j.1749-6632.2009.04496.x

Denny, S., & Fanning, L. (2016). A Mi'kmaw perspective on advancing salmon governance in Nova Scotia, Canada: Setting the stage for collaborative co-existence. *International Indigenous Policy Journal*, 7. Retrieved from https://doi.org/10.18584/iipj.2016.7.3.4

Engel, M., Vaske, J. J., & Bath, A. J. (2020). Value orientations and beliefs contribute to the formation of a marine conservation personal norm. *Journal for Nature Conservation*, 55, 125806. Retrieved from https://doi.org/10.1016/j.jnc.2020.125806

Erickson, A. (n.d.). Chapter 5: Case studies. In *Navigating Education Research* (Royce Kimmons). PRESSBOOKS. Retrieved from https://educationresearch.pressbooks.com

Escola Azul. (2020). Ocean Literacy. Retrieved from https://escolaazul.pt/en/escola-azul/literacia-do-oceano

EU-CANADA-US. Research Alliance. (2013). *Galway Statement on Atlantic Ocean Cooperation*. Retrieved from Galway, Ireland: https://ec.europa.eu/research/iscp/pdf/galway_statement_atlantic_ocean_cooperation.pdf

European Comission. (n.d.). New 'Ocean Literacy' tools educate, while changing attitudes and behaviours. Retrieved 16 October 2020, from https://cordis.europa.eu/article/id/254169-new-ocean-literacy-tools-educate-while-changing-attitudes-and-behaviours

Fauville, G., Strang, C., Cannady, M. A., & Chen, Y.-F. (2019). Development of the international ocean literacy survey: Measuring knowledge across the world. *Environmental Education Research*, 25(2), 238–263. Retrieved from https://doi.org/10.1080/13504622.2018.1440381

Finlayson, A., & McCay, B. J. (1998). Crossing the threshold of ecosystem resilience: The commercial extinction of northern cod. In C. Folke, J. Colding, & F. Berkes (Eds.), *Linking social and ecological systems: management practices and social mechanisms for building resilience* (pp. 311–337). Cambridge: Cambridge University Press. Retrieved 13 November 2020 from https://contentstore.cla.co.uk/secure/link?id=74bfa3f4-a552-e811-80cd-005056af4099

Fisheries and Oceans Canada. (2016). K-12 education: Stream to Sea. Retrieved from https://www.pac.dfo-mpo.gc.ca/education/index-eng.html

Fisheries and Oceans Canada. (2017). *The Gully Marine Protected Area Management Plan*. Retrieved from Dartmouth, NS: https://waves-vagues.dfo-mpo.gc.ca/Library/4083556x.pdf

Fisheries and Oceans Canada. (2018). Développement du projet École des océans – Promouvoir la connaissance des océans chez les jeunes Canadiens [Development of the project Oceans School - Promoting ocean literacy among young Canadians]. Retrieved 19 October 2020, from https://www.dfo-mpo.gc.ca/science/collaboration/partnership-projects/029-fra.html

Fisheries and Oceans Canada. (2020). Resources for educators. Retrieved from https://www.pac.dfo-mpo.gc.ca/education/resources-ressources-eng.html

Flaticon. (2020). https://www.flaticon.com/

Fletcher, S., & Potts, J. (2007). Ocean citizenship: An emergent geographical concept. *Coastal Management*, 35(4), 511–524. Retrieved from https://doi.org/10.1080/08920750701525818

Glazier, J. A., Boyd, A., Hughes, K. B., Able, H., & Mallous, R. (2017). The elusive search for teacher collaboration. *The New Educator*, 13(1), 3–21. Retrieved from https://doi.org/10.1080/1547688X.2016.1144841

Glithero, L. (2020). *Understanding ocean literacy in Canada. National report.* Retrieved from https://colcoalition.ca/wp-content/uploads/2020/08/COLC_National-Report_Final_2020.pdf

Glithero, L., MacNeil, S., & Yumagulova, L. (2020). Co-building a National Ocean Literacy Strategy. Presented at the MEOPAR ATM/ASM 2020. Retrieved from https://whova.com/embedded/session/meopa_202009/1249038/

Glithero, L., & Zandvliet, D. (2020). *Canadian ocean literacy survey highlight report*. Retrieved from https://colcoalition.ca/wp-content/uploads/2020/06/COLSurvey-Highlights-Report-FINAL-1.pdf

Gough, A. (2017). Educating for the marine environment: Challenges for schools and scientists. *Marine Pollution Bulletin*, 124(2). Retrieved 24 September 2020 from https://doi.org/10.1016/j.marpolbul.2017.06.069

Government of Canada. (2016). Équité en matière d'emploi [Job equity]. Retrieved 21 October 2020, from https://www.canada.ca/fr/commission-fonction-publique/emplois/services/emplois-gc/equite-matiere-emploi.html

Greene, J. C., Caracelli, V. J., & Graham, W. F. (1989). Toward a conceptual framework for mixed-method evaluation designs. *Educational Evaluation and Policy Analysis*, 11(2), 255–274. Retrieved from https://doi.org/10.3102/01623737011003255

Greene, S., & Hill, M. (2005). Researching children's experience: Methods and methodological issues. *SAGE*. Retrieved from https://doi.org/10.4135/9781849209823.n1

Halcomb, E., & Hickman, L. (2015). Mixed methods research. *Nursing Standard (Royal College of Nursing (Great Britain) : 1987)*, 29, 41–7. Retrieved from https://doi.org/10.7748/ns.29.32.41.e8858

Held, M. (2018). Fish WIKS PhD student Mirjam Held presents at CaNOE ocean literacy conference. Retrieved from https://www.dal.ca/sites/fishwiks/news

events/2018/08/07/fish_wiks_phd_student_mirjam_held_presents_at_canoe_oceans_literacy_conference.html

Henderson, K., & Tilbury, D. (2004). *Whole-school approaches to sustainability: An international review of whole-school sustainability programs*. Retrieved 5 October 2020 from North Ryde, N.S.W.: Australian Research Institute in Education for Sustainability, Macquarie University: http://www.aries.mq.edu.au/pdf/international_review.pdf

Hoover, C. (2020). *Understanding ocean literacy in Canada: Inuit Nunangat regional report.* Retrieved from Canadian Ocean Literacy Coalition: https://colcoalition.ca/wp-content/uploads/2020/07/COLC_Inuit-Nunangat-Regional-Report_EN_Final_July-2020.pdf

Hopkins, C. (2012). Education for Sustainable Development in formal education in Canada. In R. McKeown & V. Nolet (Eds.), *Schooling for Sustainable Development in Canada and the United States* (pp. 23–36). Dordrecht: Springer Netherlands. Retrieved 13 November 2020 from https://doi.org/10.1007/978-94-007-4273-4_2

Hughes, T. P., Bellwood, D. R., Folke, C., Steneck, R. S., & Wilson, J. (2005). New paradigms for supporting the resilience of marine ecosystems. *Trends in Ecology & Evolution*, 20(7), 380–386. Retrieved from https://doi.org/10.1016/j.tree.2005.03.022

Institut de la statistique du Québec. (2019). *Le bilan démographique du Québec. Édition 2019 [Demographic summary of Quebec. 2019 Edition]* (p. 180). Retrieved from Québec: Institut de la statistique du Québec: https://www.stat.gouv.qc.ca/statistiques/population-demographie/bilan2019.pdf

Intergovernmental Oceanographic Commission. (n.d.). Bienvenue sur le portail d'alphabétisation des océans [Welcome on the ocean literacy portal]. Retrieved 19 October 2020, from https://oceanliteracy.unesco.org/fr/home/

Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services, I. (2019). *Summary for policymakers of the global assessment report on biodiversity and ecosystem services*. Retrieved 13 November 2020 from 10.5281/zenodo.3553579

Jensen, B. B. (2002). Knowledge, action and pro-environmental behaviour. *Environmental Education Research*, 8(3), 325–334. Retrieved from https://doi.org/10.1080/13504620220145474

Jentoft, S. (2000). The community: A missing link of fisheries management. *Marine Policy*, 24(1), 53–60. Retrieved from https://doi.org/10.1016/S0308-597X(99)00009-3

Kearney, J., Berkes, F., Charles, A., Pinkerton, E., & Wiber, M. (2007). The role of participatory governance and community-based management in integrated coastal and ocean management in Canada. *Coastal Management*, 35(1), 79–104. Retrieved from https://doi.org/10.1080/10.1080/08920750600970511

Kennelly, J., Taylor, N., & Serrow, P. (2011). Environmental education and the whole school approach in one Australian primary school. *Economic and Environmental Studies*, 11(2), 125–143.

Kirk, S. (2007). Methodological and ethical issues in conducting qualitative research with children and young people: A literature review. *International Journal of Nursing Studies*, 44(7), 1250–1260. Retrieved from https://doi.org/10.1016/j.ijnurstu.2006.08.015

Kollmuss, A., & Agyeman, J. (2002). Mind the Gap: Why do people act environmentally and what are the barriers to pro-environmental behavior? *Environmental Education Research*, 8(3), 239–260. Retrieved from https://doi.org/10.1080/13504620220145401

La Baleine Nomade. (n.d.). Animation en classe - Culture à l'école [Activities in class - Culture at school]. Retrieved 14 October 2020, from https://labaleinenomade.com/culture_a_lecole/

Laal, M., & Ghodsi, S. M. (2012). Benefits of collaborative learning. *Procedia - Social and Behavioral Sciences*, 31, 486–490. Retrieved from https://doi.org/10.1016/j.sbspro.2011.12.091

Lam, S., Chen, R. W., & Ma, W. Y. K. (2009). Teacher and student intrinsic motivation in project-based learning. *Instructional Science*, 37, 565–578. Retrieved from https://doi.org/10.1007/s11251-008-9070-9

Lambert, J., & Sunburg, S. (2006). Ocean science in the classroom. *The Science Teacher*, 73(6).

Leather, M., & Nicholls, F. (2016). More than activities: Using a 'sense of place' to enrich student experience in adventure sport. *Sport, Education and Society*, 21(3), 443–464. Retrieved from https://doi.org/10.1080/13573322.2014.927758

Leininger, M. (1994). Evaluation criteria and critique of qualitative research studies. In J. Morse (Ed.), *Critical issues in qualitative research methods* (pp. 95–115). Thousand Oaks, C.A.: Sage Publicaions. Retrieved from https://www.worldcat.org/title/critical-issues-in-qualitative-research-methods/oclc/28854682

Longobardi, C., Prino, L. E., Marengo, D., & Settanni, M. (2016). Student-teacher relationships as a protective factor for school adjustment during the transition from middle to high school. *Frontiers in Psychology*, 7. Retrieved 19 November 2020 from https://doi.org/10.3389/fpsyg.2016.01988

Mahanty, S., Fox, J., McLees, L., Nurse, M., & Stephen, P. (2006). Introduction. In S. Mahanty, J. Fox, M. Nurse, P. Stephen, & L. McLees (Eds.), *Equity in Community-based Resource Management*. Bangkok, Thailand: Regional Community Forestry Training Center for Asia and the Pacific and Honolulu, HI, USA: East-West Center. Retrieved 17 November 2020 from https://vtechworks.lib.vt.edu/handle/10919/67410

Maltais, B., & Pelletier, É. (2018). Le parc marin du Saguenay–Saint-Laurent : création et gestion participative inédite au Canada [The St. Lawrence Marine Park: Creation and a participative management approach unprecedented in Canada]. *Le Naturaliste canadien*, 142(2), 4–17. Retrieved from https://doi.org/10.7202/1047144ar

Manitoba Education. (2010). *Engaging middle years students in learning: Transforming middle years education in Manitoba.* Retrieved from Winnipeg, MB, Canada: Manitoba Education: https://www.edu.gov.mb.ca/k12/docs/support/my_foundation/full_doc.pdf

Marcinkowski, T., & Reid, A. (2019). Reviews of research on the attitude–behavior relationship and their implications for future environmental education research. *Environmental Education Research*, 25(4), 459–471. Retrieved from https://doi.org/10.1080/13504622.2019.1634237

Markantonatou, V., Noguera-Méndez, P., Semitiel-García, M., Hogg, K., & Sano, M. (2016). Social networks and information flow: Building the ground for collaborative marine conservation planning in Portofino Marine Protected Area (MPA). *Ocean and Coastal Management*, 120, 29–38. Retrieved from https://doi.org/10.1016/j.ocecoaman.2015.11.023

Mason, C. M., Lim-Camacho, L., Scheepers, K., & Parr, J. M. (2015). Testing the water: Understanding stakeholder readiness for strategic coastal and marine management. *Ocean & Coastal Management*, 104, 45–56. Retrieved from https://doi.org/10.1016/j.ocecoaman.2014.12.001

McKinley, E., & Fletcher, S. (2012). Improving marine environmental health through marine citizenship: A call for debate. *Marine Policy*, 36(3), 839–843. Retrieved from https://doi.org/10.1016/j.marpol.2011.11.001

McMillan, L. J., & Prosper, K. (2016). Remobilizing Netukulimk: Indigenous cultural and spiritual connections with resource stewardship and fisheries management in Atlantic Canada. *Reviews in Fish Biology and Fisheries*, 26(4), 629–647. Retrieved from https://doi.org/10.1007/s11160-016-9433-2

McPherson, K., Wright, T., & Tyedmers, P. (2018). Challenges and prospects to the integration of ocean education into high school science courses in Nova Scotia. *Applied Environmental Education & Communication*, 19(2), 129–140. Retrieved from https://doi.org/10.1080/1533015X.2018.1533439

Metcalfe, K., Collins, T., Abernethy, K. E., Boumba, R., Dengui, J.-C., Miyalou, R., … Godley, B. J. (2017). Addressing uncertainty in marine resource management; Combining community engagement and tracking technology to characterize

human behavior. *Conservation Letters*, 10(4), 460–469. Retrieved from https://doi.org/10.1111/conl.12293

Miller, A. (2013). Principal turnover, student achievement and teacher retention. *Economics of Education Review*, 36, 60–72. Retrieved from https://doi.org/10.1016/j.econedurev.2013.05.004

Miller, R. L., Marsh, H., Benham, C., & Hamann, M. (2020). Stakeholder engagement in the governance of marine migratory species: barriers and building blocks. *Endangered Species Research*, 43, 1–19. Retrieved from https://doi.org/10.3354/esr01049

Mission 100 tonnes. (2019). Mission 100 tonnes - Prenez part au changement! [Mission 100 tons - Be a part of change!]. Retrieved 19 October 2020, from http://www.mission100tonnes.com

Mokos, M., Cheimonopoulou, M. T., Koulouri, P., Previati, M., Realdon, G., Santoro, F., … Kevrekidis, T. (2020). Mediterranean sea literacy: When ocean literacy becomes region-specific. *Mediterranean Marine Science*, 21(3), 592–598. Retrieved from https://doi.org/10.12681/mms.23400

Mullowney, D. R. J., & Baker, K. D. (2020). Gone to shell: Removal of a million tonnes of snow crab since cod moratorium in the Newfoundland and Labrador fishery. *Fisheries Research*, 230, 105680. Retrieved from https://doi.org/10.1016/j.fishres.2020.105680

National Marine Educators Association. (2019). Ocean literacy. Retrieved 13 October 2020, from https://www.marine-ed.org/ocean-literacy/overview

National Oceanic and Atmospheric Administration. (2020). *Ocean literacy: The essential principles and fundamental concepts of ocean sciences for learners of all ages*.

Retrieved 12 November 2020 from https://static1.squarespace.com/static/5b4cecfde2ccd188cfed8026/t/5eb99cc530a3d76767dc7aea/1589222614314/OceanLiteracyGuide_V3_2020.pdf

Natural Curiosity. (n.d.). Natural Curiosity: Educator resource for environmental inquiry & Indigenous perspectives. Retrieved 21 October 2020, from https://wordpress.oise.utoronto.ca/naturalcuriosity/

Ocean School. (n.d.). Ocean School. Retrieved 21 October 2020, from https://oceanschool.nfb.ca/

Ocean Wise. (2018). Ocean literacy. Retrieved 12 November 2020, from https://literacy.ocean.org/

Oceans Act, S.C. 1996, c. 31. Retrieved from https://laws-lois.justice.gc.ca/eng/acts/o-2.4/

Oncescu, J. (2014). The impact of a rural school's closure on community resiliency. *Leisure/Loisir*, 38(1), 35–52. Retrieved from https://doi.org/10.1080/14927713.2014.932969

Österblom, H., Wabnitz, C. C. C., & Tladi, D. (2020). *Towards ocean equity* (p. 64). Retrieved from Washington, DC: World Resources Institute. https://www.oceanpanel.org/sites/default/files/2020-04/towards-ocean-equity.pdf

Ostertag, J., & Ammendolia, J. (2020). *Understanding ocean literacy in Canada: Atlantic regional report*. Retrieved from Canadian Ocean Literacy Coalition: https://colcoalition.ca/wp-content/uploads/2020/07/Atlantic-Regional-Report_Final.pdf

Oulton, C. R., & Scott, W. A. H. (1995). The 'environmentally educated teacher': An exploration of the implications of UNESCO-UNEP's ideas for pre-service teacher

education programmes. *Environmental Education Research*, 1(2), 213–231. Retrieved from https://doi.org/10.1080/1350462950010207

Payne, D. L., & Zimmerman, T. D. (2010). Beyond Terra firma: Bringing ocean and aquatic sciences to environmental and science teacher education. In A. M. Bodzin, B. Shiner Klein, & S. Weaver (Eds.), *The Inclusion of Environmental Education in Science Teacher Education* (pp. 81–94). Dordrecht: Springer Netherlands. Retrieved 13 October 2020 from https://doi.org/10.1007/978-90-481-9222-9_6

Pomeroy, R., & Douvere, F. (2008). The engagement of stakeholders in the marine spatial planning process. *Marine Policy*, 32(5), 816–822. Retrieved from https://doi.org/10.1016/j.marpol.2008.03.017

Quebec Ministry of Education. (Quebec, QC). *Programme de formation de l'école québécoise. Éducation secondaire [Training program of the Quebec school. High school]*. Retrieved from Retrieved from http://www.education.gouv.qc.ca/fileadmin/site_web/documents/dpse/formation_jeunes/prform2001.pdf

Quebec Ministry of Education. (2006). *Programme de formation de l'école québécoise. Éducation préscolaire et enseignement primaire [Training program of the Quebec school. Pre-school and primary education]*. Retrieved from Quebec, QC: http://www.education.gouv.qc.ca/fileadmin/site_web/documents/dpse/formation_jeunes/prform2001.pdf

Ralph, M., Robbins, D., Young, S., & Laurence, W. (2020). Collaborative autonomy: Exploring the professional freedom of three science teachers. *Educational Considerations*, 46(1). Retrieved 14 October 2020 from https://doi.org/10.4148/0146-9282.2197

Reid, A. J., Eckert, L. E., Lane, J.-F., Young, N., Hinch, S. G., Darimont, C. T., … Marshall, A. (2020). “Two-Eyed Seeing”: An Indigenous framework to transform fisheries research and management. *Fish and Fisheries*. Retrieved 19 November 2020 from https://doi.org/10.1111/faf.12516

Santoro, Francesca, Santin, S., Scowcroft, G., Fauville, G., & Tuddenham, P. (2017). *Ocean literacy for all: A toolkit*. Retrieved from Venice, Italy: UNESCO: https://www.issuelab.org/resources/29408/29408.pdf?download=true

Santoro, Francesca, Scowcroft, G., Fauville, G., & Tuddenham, P. (2017). *Ocean literacy for all. A toolkit*. Retrieved from UNESCO Publishing: https://unesdoc.unesco.org/ark:/48223/pf0000260721

Sauvé, L., Asselin, H., Marcoux, C., & Robitaille, J. (2018). *Stratégie québécoise d’éducation en matière d’environnement et d’écocitoyenneté [Quebec strategy for environmental and eco-citizenship education]*. Retrieved from Montréal: Centre de recherche en éducation et formation relatives à l’environnement et à l’écocitoyenneté:

Schoedinger, S., Cava, F., & Jewell, B. (2006). The need for ocean literacy in the classroom. *The Science Teacher*, 9.

Scully, D. S., & MacLoad, E. (2018). *Marine people partnership. Student intentions and perception survey. New Brunswick* (p. 62). Retrieved from Institute of Ocean Research Enterprise: https://coveocean.com/download/fc6a2c8716b7250c94ac1bd71302fc75/Student%20Intentions%20and%20Perceptions%20Study%20-%20New%20Brunswick.pdf

Simons, L., & Lathlean, J. (2010). Mixed methods. In K. Gerrish & A. Lacey (Eds.), *The research process in nursing* (Sitxth edition, pp. 331–344). Oxford, U.K.: Wiley-Blackwell.

Sobel, D. (2004). *Place-based education: Connecting classroom and community.* Great Barrington, MA: The Orion Society.

Soini, T., Pietarinen, J., & Pyhältö, K. (2016). Leading a school through change – principals' hands-on leadership strategies in school reform. *School Leadership & Management*, 36(4), 452–469. Retrieved from https://doi.org/10.1080/13632434.2016.1209179

Spence, E., Wright, T., & Castleden, H. (2013). Present, absent, or tardy? A study of the barriers, bridges, and beliefs concerning environmental education among a cohort of sixth grade teachers in Nova Scotia. *Applied Environmental Education & Communication*, 12(3), 197–206. Retrieved from https://doi.org/10.1080/1533015X.2013.838874

Stake, R. (1995). *The art of case study research*. Thousand Oaks, C.A.: Sage Publications.

Statistics Canada. (2016). Data products, 2016 census. Retrieved from https://www12.statcan.gc.ca/census-recensement/2016/dp-pd/index-eng.cfm

Stewart, E. A. (2019). Ocean literacy matters in Canada. *Journal of Ocean Technology*, 14(2), 112–121.

Sustainability and Education Policy Network (SEPN). (2018). *Action climat: pratiques exemplaires de dix écoles canadiennes [Climate action: exemplary practices of ten Canadian schools]*. Retrieved 14 October 2020 from Canada:

https://sepn.ca/wp-content/uploads/2018/12/CCUNESCO-Pratiques-exemplaires-réSEAU-action-climat-2018-12-04-1.pdf

Thomas, B., Grenet, J., Monnet, M., & van Effenterre, C. (2020). *Do female role models reduce the gender gap in science? Evidence from French high schools* (Working paper No. halshs-01713068v3f). Retrieved from HAL: http://www.parisschoolofeconomics.com/breda-thomas/working_papers/wp_role_models_HAL_v3.pdf

Tiakiwai, S.-J., Kilgour, J. T., & Whetu, A. (2017). Indigenous perspectives of ecosystem-based management and co-governance in the Pacific Northwest: Lessons for Aotearoa. *AlterNative: An International Journal of Indigenous Peoples*. Retrieved 20 October 2020 from https://doi.org/10.1177/1177180117701692

Trust, T., & Horrocks, B. (2017). 'I never feel alone in my classroom': Teacher professional growth within a blended community of practice. *Professional Development in Education*, 43(4), 645–665. Retrieved from https://doi.org/10.1080/19415257.2016.1233507

UNESCO Institute for Statistics. (2012). *International Standard Classification of Education ISCED 2011* (p. http://uis.unesco.org/sites/default/files/documents/international-standard-classification-of-education-isced-2011-en.pdf). Retrieved from Montreal, QC:

Uzzell, D. (1999). Education for environmental action in the community: New roles and relationships. *Cambridge Journal of Education*, 29(3), 397–413. Retrieved from https://doi.org/10.1080/0305764990290309

White, A. T., Zeitlin Hale, L., Renard, Y., & Cortesi, L. (1994). *Collaborative and community-based management of coral reefs : Lessons from experience*. Retrieved 17 November 2020 from https://portals.iucn.org/library/node/22119

Appendices

Appendix A1: English Interview Guide

Thank you for agreeing to participate in this project. Before I start recording the interview, I want to tell you a little bit about how our conversation will go. The interview should take between 45 minutes and 1 hour 30 minutes. If it goes beyond an hour, I will ask you if you wish to take a break before we finish the interview.

The St. Lawrence middle school (pseudonym) is connected to the ocean in many ways, in particular through the program *Le Saint-Laurent dans ma classe* (pseudonym). Our conversation will be about what you think of this program and its effects on the connection to the ocean of the students and the school community. There are many ways to define our connection to the ocean. For this project, we chose to use the term "ocean literacy" to refer to this connection.

During the interview, you can always decide to answer or not answer a question. If there are certain topics that you would like to avoid, it is ok, we can avoid them. You can also decide to end the interview at any time. I would like to remind you that, if you agree, our conversation will be recorded. The only people that will have access to the recordings are my supervisors at Dalhousie University and me. If there are some parts of our discussion that you do not want to be recorded, let me know, and I will not record them. You can also decide to have a part or the entire the interview removed from the recording after the interview is completed. You just have to let me know about it before June 30, 2020, date after which I will have started analyzing the interviews.

At the end of my project I will be writing a report. The entire report will be made public on the Dalhousie website. Parts of this report may also be published as journal articles or presented in academic conferences. In all of these publications, you will not be identified. If I use direct quote from our interview it will only be with your permission and you would be quoted under a pseudonym.

Do you have any questions before we get started?

Verify that the consent form has been signed and that the participant checked the box agreeing to be recorded. Start the recorder

Introduction questions

1. What is your role in the program *Le Saint-Laurent dans ma classe*? *(teacher, parent, administrator, presenter)*
    a. How did you get involved in this program?
    b. Since when have you been involved in this program? (*month, year*)
    c. What responsibilities are associated with your role in the program *Le Saint-Laurent dans ma classe*?

Questions on ocean literacy (for all participants)

2. What do you like best about the ocean?
3. What makes you feel most connected to the ocean? (*e.g., going to the beach, talking about the ocean, teaching about the ocean*)
4. What do you think are the goals of the program *Le Saint-Laurent dans ma classe*?
    a. Is preparing students for the workforce an objective of the program?
5. Ocean literacy can be defined as "understanding the influence of the ocean on us and our influence on the ocean". However, it is only one definition among many other and these definitions change frequently. How do you interpret the term "ocean literacy"?
    a. What terms do you use to describe this pedagogy? (Ocean education, education related to the ocean, integration of the ocean into schools)
6. Through this program, students learn about the ocean in all of their courses. What effects do you think this approach has on the ocean literacy of the students?

7. How do you see this program having an effect on the ocean literacy of the community outside the school?
8. Did you own ocean literacy change since you got involved in this program?
    a. Can you describe this difference?
    b. Can you give examples? These examples could be related to…
        i. Knowledge about the ocean
        ii. Awareness of issues related to the ocean
        iii. Interest in the ocean
        iv. Interest in pursuing a career related to the ocean
        v. Taking action to protect the ocean

<u>Specific questions</u>

Group A. Teachers: Includes teachers of all subjects

9. Do you see a difference in the ocean literacy of your students between when they started this program and now?
    a. Can you describe this difference?
    b. Can you give examples? These examples could be related to…
        i. Knowledge about the ocean
        ii. Awareness of issues related to the ocean
        iii. Interest in the ocean
        iv. Interest in pursuing a career related to the ocean
        v. Taking action to protect the ocean
10. Do you see a difference in ocean literacy between your current students and students that you have taught to in the past that were not enrolled in this program? *(That can*

be either at the St. Lawrence middle school or at another school, for students of the same age)

a. Can you describe this difference?

b. Can you give examples? These examples could be related to…

i. Knowledge about the ocean

ii. Awareness of issues related to the ocean

iii. Interest in the ocean

iv. Interest in pursuing a career related to the ocean

v. Taking action to protect the ocean

Group B. Parents: Includes parents that were involved in developing the program and those that were not

9. Do you see a difference in the ocean literacy of your child between when he/she started this program and now?
   a. Can you describe this difference?
   b. Can you give examples? These examples could be related to…
      i. Knowledge about the ocean
      ii. Awareness of issues related to the ocean
      iii. Interest in the ocean
      iv. Interest in pursuing a career related to the ocean
      v. Taking action to protect the ocean

Group C. School administrators: Includes the school's principal, school staff other than teachers, school board staff that were involved in the project

9. Do you see a difference in the ocean literacy of the students between when they started this program and now?
    a. Can you describe this difference?
    b. Can you give examples? These examples could be related to…
        i. Knowledge about the ocean
        ii. Awareness of issues related to the ocean
        iii. Interest in the ocean
        iv. Interest in pursuing a career related to the ocean
        v. Taking action to protect the ocean
10. Do you see a difference in ocean literacy between the current students in the school and students that you have worked with in the past that were not enrolled in this program? (That can be either at the St. Lawrence middle school or at another school, for students of the same age)
    a. Can you describe this difference?
    b. Can you give examples? These examples could be related to…
        i. Knowledge about the ocean
        ii. Awareness of issues related to the ocean
        iii. Interest in the ocean
        iv. Interest in pursuing a career related to the ocean
        v. Taking action to protect the ocean

Group D. Community partners: Includes members of the community that did presentations or lead fieldtrips for the students in the program

No specific questions

Group E. Members of the consulting firm: Includes people that were involved with the creation of the project by working at the consulting firm that contributed to the project

No specific questions

Questions on the barriers and enablers of the program

11. What do you think are the three greatest barriers to the delivery and sustainability of this program?
    a. Why?
12. What do you think are the three greatest enablers of the delivery and sustainability of this program?
    a. Why?

Closing questions

13. What do you see as the program's greatest positive impact related to ocean literacy?
    a. This impact could be related to:
        i. Knowledge about the ocean
        ii. Awareness of issues related to the ocean
        iii. Interest in the ocean
        iv. Taking action to protect the ocean
        v. The creation of partnerships with the community
        vi. Making the school more dynamic
        vii. School funding

viii. A feeling of joy, accomplishment, or proudness related to the achievements of the program

14. Do you think ocean literacy should be addressed in the other schools in Quebec?
15. What else would you like to share about the program?
16. Do you know someone either currently involved in the program or that was involved in the past that you recommend I contact for this project?

Stop the recorder.

Thank you so much for your time. If you want to I can send you my report or a summary of my report in early 2021. Do you have my email and my phone number? Please feel free to contact me at any time if you wish to withdraw from the project or if you have questions. You can also contact my supervisors. Thank you again and have a nice day.

Appendix A2: French Interview Guide

Merci d'avoir accepté de participer à cette entrevue. Avant que je démarre l'enregistreur audio, j'aimerais vous en dire plus sur le déroulement de l'entrevue. L'entrevue devrait prendre entre 45 minutes et 1 heure 30 minutes. Si notre conversation dépasse une heure, je vais vous proposer de prendre une pause avant de revenir terminer l'entrevue.

L'école du Saint-Laurent (pseudonyme) est connectée à l'océan de plusieurs façons, particulièrement à travers le programme Le Saint-Laurent dans ma classe (pseudonyme). Notre discussion portera sur ce que vous pensez du programme et de son influence sur la connexion à l'océan des élèves et de la communauté de l'école. Il y a plusieurs façons de définir notre connexion à l'océan. Dans le cadre de cette étude, nous avons choisi d'utiliser le terme « connaissance de l'océan » pour référer à cette connexion.

Tout au long de l'entrevue, vous pouvez toujours décider de répondre ou de ne pas répondre à une question. Si vous préférez éviter certains sujets, c'est correct, nous pouvons les éviter. Vous pouvez aussi décider de terminer l'entrevue à n'importe quel moment. J'aimerais vous rappeler que, si vous acceptez, notre discussion sera enregistrée. Les seules personnes qui auront accès à cet enregistrement sont mes superviseurs à l'Université Dalhousie et moi. Si il y a certaines parties de notre discussion que vous préférez qui ne soient pas enregistrées, dites le moi, et je ne les enregistrerai pas. Vous pourrez aussi me demander d'enlever certaines parties de l'entrevue de l'enregistrement ou de supprimer complètement l'enregistrement après la fin de l'entrevue. Vous devez simplement me demander de le faire avant le 30 juin, date à laquelle j'aurai commencé à analyser les entrevues.

À la fin de mon projet de recherche, je vais écrire un rapport. Ce rapport sera disponible publiquement sur le site web de l'Université Dalhousie. Des parties de ce rapport pourraient également être publiées comme articles dans des revues scientifiques ou présentées dans des conférences. Dans toutes ces publications ou présentations, vous ne serez pas identifié. Si j'utilise des citations directes provenant de cette entrevue, ce sera seulement avec votre permission et votre nom sera changé pour un pseudonyme.

Avez-vous des questions avant que nous débutons ?

Vérifier que le formulaire de consentement a été signé et que le participant à indiquer qu'il ou elle accepte d'être enregistré. Débuter l'enregistrement audio.

Questions d'introduction

1. Quel est votre rôle dans le programme Le Saint-Laurent dans ma classe ? (parent, enseignant, directrice, etc.)
    a. Comment êtes-vous venus à vous impliquer dans ce programme ?
    b. Depuis quand êtes-vous impliqué dans ce programme ? (*mois, année*)
    c. Quelles sont les responsabilités dans le cadre du programme Le Saint-Laurent dans ma classe associées à votre rôle ?

Questions sur la connaissance de l'océan (pour tous les participants)

2. Qu'est-ce que vous aimez le plus à propos de l'océan ?
3. Qu'est-ce qui vous fait sentir connecté à l'océan? (*ex. aller à la plage, parler de l'océan, enseigner à propos de l'océan*)
4. Selon vous, quels sont les objectifs du programme Le Saint-Laurent dans ma classe ?
    a. Est-ce que la préparation au marché du travail fait partie des objectifs du programme ?
5. La connaissance de l'océan peut être définie comme « comprendre l'influence de l'océan sur nous et de notre influence sur l'océan ». Cependant, ce n'est qu'une définition parmi plusieurs et ces définitions changent constamment. Comment interprétez-vous le terme « connaissance de l'océan » ?
    a. Qu'est-ce que vous utilisez pour décrire cette pédagogie (Éducation océanique, éducation relative à l'océan, intégration de l'océan à l'école)
6. Dans le programme Le Saint-Laurent dans ma classe, les élèves apprennent sur l'océan dans tous leurs cours. Quel effet pensez-vous que cette approche a sur la connaissance de l'océan des élèves ?
7. Quel effet pensez-vous que ce programme a sur la connaissance de l'océan de la communauté à l'extérieur de l'école ?

8. Est-ce que votre propre connaissance de l'océan a changé depuis que vous êtes impliqué dans ce programme ?
    a. Pouvez-vous décrire ce changement ?
    b. Avez-vous des exemples ? Ces exemples pourraient être reliés à…
        i. Au savoir au sujet de l'océan
        ii. À la sensibilisation aux problèmes et enjeux reliés à l'océan
        iii. À l'intérêt au sujet de l'océan
        iv. À l'intérêt à poursuivre une carrière en lien avec l'océan
        v. Aux actions prises pour protéger l'océan

<u>Questions sur la connaissance de l'océan (spécifiques à certains groupes)</u>

Groupe A. Enseignants : Inclut des enseignants de toutes matières scolaires

9. Percevez-vous une différence dans la connaissance de l'océan des élèves entre quand ils sont arrivés dans ce programme et maintenant ?
    a. Pouvez-vous décrire cette différence ?
    b. Avez-vous des exemples ? Ces exemples pourraient être reliés à…
        i. Au savoir au sujet de l'océan
        ii. À la sensibilisation aux problèmes et enjeux reliés à l'océan
        iii. À l'intérêt au sujet de l'océan
        iv. À l'intérêt à poursuivre une carrière en lien avec l'océan
        v. Aux actions prises pour protéger l'océan

10. Percevez-vous une différence dans la connaissance de l'océan de vos élèves actuels et d'élèves de secondaire 1 ou 2 auxquels vous avez enseigné dans le passé qui n'étaient pas dans le programme École de la mer ? (*Ces élèves pourraient avoir été à l'École du Saint-Laurent ou à d'autre écoles*)
    a. Pouvez-vous décrire cette différence ?
    b. Avez-vous des exemples ? Ces exemples pourraient être reliés à…
        i. Au savoir au sujet de l'océan
        ii. À la sensibilisation aux problèmes et enjeux reliés à l'océan
        iii. À l'intérêt au sujet de l'océan

iv. À l'intérêt à poursuivre une carrière en lien avec l'océan
v. Aux actions prises pour protéger l'océan

Groupe B. Parents: Inclut les parents qui ont été impliqués dans le développement du programme et ceux qui ne l'ont pas été, mais qui ont des enfants qui font ou ont fait partie du programme.

9. Percevez-vous une différence dans la connaissance de l'océan de votre enfant entre quand il ou elle a débuté ce programme et maintenant ?

a. Pouvez-vous décrire cette différence ?
b. Avez-vous des exemples ? Ces exemples pourraient être reliés à…
   i. Au savoir au sujet de l'océan
   ii. À la sensibilisation aux problèmes et enjeux reliés à l'océan
   iii. À l'intérêt au sujet de l'océan
   iv. À l'intérêt à poursuivre une carrière en lien avec l'océan
   v. Aux actions prises pour protéger l'océan

Groupe C. Personnel non-enseignant de l'école: Inclut la directrice, les membres de l'administration, les membres de la commission scolaire ayant été impliqué dans le projet et autres membres du personnel non-enseignant (ex. orthopédagogue, conseiller pédagogique, etc.)

9. Percevez-vous une différence dans la connaissance de l'océan des élèves entre quand ils sont arrivés dans ce programme et maintenant ?

a. Pouvez-vous décrire cette différence ?
b. Avez-vous des exemples ? Ces exemples pourraient être reliés à…
   i. Au savoir au sujet de l'océan
   ii. À la sensibilisation aux problèmes et enjeux reliés à l'océan
   iii. À l'intérêt au sujet de l'océan
   iv. À l'intérêt à poursuivre une carrière en lien avec l'océan
   v. Aux actions prises pour protéger l'océan

10. Percevez-vous une différence dans la connaissance de l'océan de vos élèves actuels et d'élèves de secondaire 1 ou 2 avec lesquels vous avez travaillé dans le passé qui n'étaient pas dans le programme École de la mer ? (*Ces élèves pourraient avoir été à l'École du Saint-Laurent ou à d'autre écoles*)

a. Pouvez-vous décrire cette différence ?
b. Avez-vous des exemples ? Ces exemples pourraient être reliés à…
    i. Au savoir au sujet de l'océan
    ii. À la sensibilisation aux problèmes et enjeux reliés à l'océan
    iii. À l'intérêt au sujet de l'océan
    iv. À l'intérêt à poursuivre une carrière en lien avec l'océan
    v. Aux actions prises pour protéger l'océan

Groupe D. Partenaires dans la communauté: Inclut les membres de la communauté qui collaborent avec le programme l'École du Saint-Laurent (*viennent faire des présentations, des ateliers, guident des sorties éducatives etc*.)

Pas de questions spécifiques

Groupe E. Membres de la firme M – Expertise Marine: Inclut les membres de la firmes qui ont été impliqués dans la création du projet.

Pas de questions spécifiques

<u>Questions sur les barrières et facteurs facilitant le programme</u>

12. Selon vous, quelles sont les trois barrières les plus importantes à la réalisation de ce programme?

a. Pourquoi?

11. Selon vous, quels sont les 3 facteurs facilitant le plus la réalisation de ce programme ?

a. Pourquoi?

<u>Questions de conclusion</u>

13. Selon vous, quel est l'impact positif le plus important qu'a eu le programme en lien avec la connaissance de l'océan ?

a. Cet impact pourrait être relié à:
    i. Au savoir au sujet de l'océan
    ii. À la sensibilisation aux problèmes et enjeux reliés à l'océan
    iii. À l'intérêt au sujet de l'océan
    iv. Aux actions prises pour protéger l'océan
    v. À la création de partenariats avec la communauté
    vi. Redynamisation de l'école
    vii. Financement de l'école
    viii. Sentiment de joie, d'accomplissement ou de fierté lié à la réalisation du programme

14. Croyez-vous que la connaissance de l'océan devrait être abordée dans les écoles du Québec ?

a. Pourquoi ?

15. Quoi d'autre aimeriez-vous partager à propos de ce programme ?

16. Est-ce que vous connaissez quelqu'un qui est soit impliqué dans le programme en ce moment ou qui l'a été dans le passé que vous recommanderez que je contacte pour cette étude ?

Arrêter l'enregistrement audio.

Merci beaucoup pour votre temps. Si vous voulez, je peux vous envoyer mon rapport ou un résumé du rapport au début de l'année 2021. Avez-vous mon courriel et mon numéro de téléphone ? Vous pouvez me contacter à n'importe quel moment si vous souhaitez vous retirer de l'étude ou si vous avez des questions. Vous pouvez également contacter mes superviseurs. Merci encore et passez une belle journée.

Appendix B1: English Survey Questionnaire

1. I would like to be sent a summary report of this project (in French).

   ☐ Yes ☐ No

2. I would like to be sent the full final report of this project (in English)

   ☐ Yes ☐ No

3. Email

   ☐

4. Name (optional)

   ☐

5. What is your role in the program *Le Saint-Laurent dans ma classe*? (You can select more than one answer)

   ☐ a. Teacher at the St. Lawrence middle school

   ☐ b. Non-teaching staff of the St. Lawrence middle school (Principal, secretary, resource teacher)

   ☐ c. Parent of a student of the St. Lawrence middle school

   ☐ d. Community member involved in the program

   ☐ e. Member of the consulting firm involved in the program

   ☐ f. Prefer not to answer

   ☐ g. Other: ☐

6. For how long have you been involved in the program *Le Saint-Laurent dans ma classe*?

   ☐

   ☐ Prefer not to answer

7. Are you still involved in the program *Le Saint-Laurent dans ma classe*?

   ☐ Yes

   ☐ No

   ☐ Prefer not to answer

8. Below is a list of factors that could influence, or not, the achievement of activities related to the ocean for the program *Le Saint-Laurent dans ma classe*. For each factor, indicate if you think it is a barrier to the achievement of the activity or an enabler of the achievement of the activity. A barrier is a factor limiting or hindering the completion of activities related to the sea in the context of the program. An enabler is a factor supporting or allowing the completion of activities related to the sea in the context of the program.

Factors	**Always a barrier**	**Sometimes a barrier**	**Sometimes a barrier, sometimes an enabler**	**Sometimes an enabler**	**Always an enabler**	**Neither a barrier nor an enabler**	**Prefers not to answer**
Access to funding							
Access to teacher training							
Time to prepare activities							
Time to complete activities							
Access to educational resources							

related to the sea							
Access to technology for educational activities							
Access to the coast and the sea (including the St. Lawrence river)							
Interest of students							
Support from parents							
Support from the school board							
Collaboration with the community							
Risk managemen							

t related to security during fieldtrips							
Overlap of the concepts related to the sea with the provincial curriculum							
Flexibility of the provincial curriculum							
Other (specify)							
Other (specify)							

9. Do you have comments regarding your answer to question 8?

10. There are many ways through which we can define our connection to the ocean. For the purpose of this project, we chose to use the term “ocean literacy” to talk about our connection to the ocean. Ocean literacy refers to “an understanding of the

ocean's influence on us and of our influence on the ocean". Ocean literacy can be expressed by our understanding of the ocean, how we value the ocean, and the actions we take to care for the ocean. For the purpose of this project, the St. Lawrence Estuary and Gulf are considered as part of the ocean. The following statements are about the influence of the program *Le Saint-Laurent dans ma classe* on the ocean literacy of the STUDENTS. For each statement, please indicate the answer that best reflects your opinion and your observations. There are no right or wrong answer.

Statement	**Strongly disagree**	**Disagree**	**Neither agree nor disagree**	**Agree**	**Strongly agree**	**Prefer not to answer**
The program helps students understand the influence of humans on the ocean.						
The program helps students understand the influence of the ocean on our lives.						
The program increases the value students give to the ocean.						

The program increases the likelihood of students taking action to care for the ocean.						

11. The following statements are about the influence of the program *Le Saint-Laurent dans ma classe* on the ocean literacy of the ADULTS involved in the program. For each statement, please indicate the answer that best reflects your opinion and your observations. There are no right or wrong answer.

Statement	**Strongly disagree**	**Disagree**	**Neither agree nor disagree**	**Agree**	**Strongly agree**	**Prefer not to answer**
The program increases the ocean literacy of TEACHERS at the St. Lawrence middle school.						
The program increases the ocean literacy of the NON-TEACHING STAFF at the						

St. Lawrence middle school.						
The program increases the ocean literacy of PARENTS of students at the St. Lawrence middle school.						
The program increases the ocean literacy of the MEMBERS OF THE LOCAL COMMUNITY.						
The program brings the adults involved to become more responsible citizens regarding the ocean.						

12. The following statements are about characteristics specific to the program *Le Saint-Laurent dans ma classe*. We include in the term "participant" all people involved in the program *Le Saint-Laurent dans mas classe*: students, teachers, non-teaching

staff, parents, and the local community. For each statement, please indicate the answer that best reflects your opinion and your observations. There are no right or wrong answer.

Statement	**Strongly disagree**	**Disagree**	**Neither agree nor disagree**	**Agree**	**Strongly agree**	**Prefer not to answer**
The program addresses ocean literacy though all school subjects.						
The program makes the integration of school subjects easier.						
The program involves the whole school community (students, parents, non-teaching staff, etc.) in decision-making related to the program.						
The program acts as a						

platform for community discussion and sharing.						

13. The following statements are about the inclusion of various knowledge types in the program *Le Saint-Laurent dans ma classe*. For each statement, please indicate the answer that best reflects your opinion and your observations. There are no right or wrong answer.

Statement	**Strongly disagree**	**Disagree**	**Neither agree nor disagree**	**Agree**	**Strongly agree**	**Prefer not to answer**
The program includes art components in its activities related to the ocean.						
The program includes components of natural sciences in its activities related to the ocean.						
The program includes components of						

social sciences in its activities related to the ocean.						
The program includes sport components in its activities related to the ocean.						
The program includes components of local community knowledge in its activities related to the ocean.						
The program includes components of Indigenous knowledge in its activities related to the ocean.						

14. The following question aims to identify measures implemented through the program Le *Saint-Laurent dans ma classe* to be inclusive of diversity. The following groups are recognized by the Government of Quebec to be more often victim of discrimination, namely in the context of education and job opportunities:

women, Indigenous people (First Nations, Métis, and Inuit of Canada), visible minorities (people, other than Indigenous people, who do not identify as Caucasian), ethnic minorities (people, other than Indigenous people, who do not have French or English as their first language), people with disabilities (people who have a physical or mental disability, either visible or not). We add to these groups people living in poverty. Each row of the table corresponds to a group of people. Each column presents a measure to include these groups in the program *Le Saint-Laurent dans ma classe*. For each group, please indicate the measure(s) used to include this group, according to your experience. There are no good or bad answer. This question applies to all participants in the program *Le Saint-Laurent dans ma classe.* In other words, it applies to all people involved in the program *Le Saint-Laurent dans mas classe*: students, teachers, non-teaching staff, parents, and the local community.

	Presentation of diversified models (e.g., in text books, among guests)	Use of inclusive language	Adapting activities to increase their accessibility (e.g., security measures, access ramps)	Distribut of roles in position of power (principal, decision-makers)	Implementation of measures to support family-work balance	No measure used	Prefers not to answer
Women							
Indigenous people							

Visible minorities							
Ethnic minorities							
People with disabilities							
People living in poverty							

15. Is there knowledge acquired because of the program *Le Saint-Laurent dans ma classe* that you apply in your daily life?

16. Are there other information or comments you would like to share with us?

17. We would like to complete an interview with you to learn more on the program Le Saint-Laurent dans ma classe. The interview would last from 45 minutes to 1 hour 30 minutes and would be by phone or video call at a time of your choice. Your

participation in an interview is entirely voluntary. Are you interested in participating in an interview?

☐ Yes ☐ No ☐ Prefers not to answer

18. To plan the time and date of the interview, would you prefer that we contact you by phone or by email?

☐ By phone ☐ By email

19. What is your email?

20. What is your phone number?

Thank you for your participation in our survey!

Appendix B2: French Survey Questionnaire

1. J'aimerais qu'on m'envoie un résumé des résultats de l'étude (en français).

   ☐ Oui ☐ Non

2. J'aimerais qu'on m'envoie le rapport final de cette étude (en anglais)

   ☐ Oui ☐ Non

3. Adresse courriel (optionnel)

   ☐

4. Nom (optionnel)

   ☐

5. Quel est votre role dans le programme Le Saint-Laurent dans ma classe? Vous pouvez sélectionner plus d'une option.

   ☐ a. Enseignant(e) à l'École du Saint-Laurent
   ☐ b. Membre du personnel non-enseignant de l'école du Saint-Laurent
   ☐ c. Parent d'un(e) élève de l'école
   ☐ d. Membre de la communauté impliqué dans le programme
   ☐ e. Membre de la firme de consultants impliquée dans le programme
   ☐ f. Préfère ne pas répondre
   ☐ g. Autre: ☐

6. Depuis combien de temps êtes-vous impliqué(e) dans le programme Le Saint-Laurent dans ma classe?

   ☐

   ☐ Préfère ne pas répondre

7. À ce jour, êtes-vous encore impliqué(e) dans le programme Le Saint-Laurent dans ma classe?

   ☐ Oui

   ☐ Non

   ☐ Préfère ne pas répondre

8. Ci-dessous se trouve une liste de facteurs pouvant influencer, ou pas, la réalisation d'activités en lien avec la mer dans le cadre du programme Le Saint-Laurent dans ma classe. Pour chaque facteur, indiquez si, selon vous, ce facteur est une barrière à la réalisation d'activités ou un facteur facilitant la réalisation d'activités. Une barrière est un facteur qui, dans le cadre du programme Le Saint-Laurent dans ma classe, limite ou empêche la réalisation d'activités en lien avec la mer. Un facteur facilitant est un facteur qui, dans le cadre du programme Le Saint-Laurent dans ma classe, supporte ou permet la réalisation d'activités en lien avec la mer.

Facteurs	**Toujours une barrière**	**Parfois une barrière**	**Parfois une barrière, parfois un facteur facilitant**	**Parfois un facteur facilitant**	**Toujours un facteur facilitant**	**Ni une barrière, ni un facteur facilitant**	**Préfère ne pas répondre**
Accès à du financement							
Accès à de la formation pour les enseignants							
Temps pour la préparatio							

n des activités							
Temps pour la réalisation des activités							
Accès à des ressources éducatives en lien avec la mer							
Accès à des technologies pour activités éducatives							
Accès à la côte et à la mer (incluant le fleuve Saint-Laurent)							
Intérêt des élèves							

Appui de la part des parents							
Appui de la part de la commission scolaire							
Collaboration avec la communauté							
Gestion des risques liés à la sécurité lors des sorties							
Superposition des concepts enseignés au sujet de la mer et du curriculum provincial							
Flexibilité du							

curriculum provincial							
Autre (spécifiez)							
Autre (spécifiez)							

9. Avez-vous des commentaires par rapport à vos réponses à la question 8?

10. Notre connexion à l'océan peut être décrite de plusieurs façons. Dans le cadre de cette étude, nous avons choisi d'utiliser l'expression « connaissance de l'océan » pour décrire cette connexion avec l'océan. La connaissance de l'océan peut être définie comme étant la « compréhension de l'influence de l'océan sur nous et de notre influence sur l'océan ». Notre connaissance de l'océan s'exprime à travers notre compréhension de l'océan, la valeur de l'océan à nos yeux et les actions que nous prenons pour prendre soin de l'océan. Dans le cadre de cette étude, l'estuaire et le golfe du Saint-Laurent sont considérés comme faisant partie de l'océan.

    Les énoncés suivants sont à propos de l'influence du programme Le Saint-Laurent dans ma classe sur la connaissance de l'océan des ÉLÈVES de l'école du Saint-Laurent. Pour chaque énoncé, veuillez indiquer la réponse reflétant le mieux votre opinion et vos observations. Il n'y a pas de bonne ou de mauvaise réponse.

Énoncé	**Tout à fait en désaccord**	**En désaccord**	**Ni en accord ni**	**En accord**	**Tout à fait en accord**	**Préfère ne pas répondre**

			en désaccord			
Le programme aide les élèves à comprendre l'influence des humains sur l'océan.						
Le programme aide les élèves à comprendre l'influence de l'océan sur nos vies.						
Le programme augmente la valeur de l'océan aux yeux des élèves.						
Le programme						

augmente les chances que les élèves posent des actions pour prendre soin de l'océan.						

11. Les énoncés suivants sont à propos de l'influence du programme Le Saint-Laurent dans ma classe sur la connaissance de l'océan des ADULTES impliqués dans le programme. Pour chaque énoncé, veuillez indiquer la réponse reflétant le mieux votre opinion et vos observations. Il n'y a pas de bonne ou de mauvaise réponse.

Énoncé	**Tout à fait en désaccord**	**En désaccord**	**Ni en accord ni en désaccord**	**En accord**	**Tout à fait en accord**	**Préfère ne pas répondre**
Le programme augmente la connaissance de l'océan des ENSEIGANT(E)S de l'école du Saint-Laurent.						

Le programme augmente la connaissance de l'océan du PERSONNEL NON-ENSEIGANT de l'école du Saint-Laurent.						
Le programme augmente la connaissance de l'océan des PARENTS des élèves de l'école du Saint-Laurent.						
Le programme augmente la connaissance de l'océan des MEMBRES DE LA COMMUNAUTÉ LOCALE.						
Le programme amène les adultes impliqués à devenir des						

citoyens plus responsables vis-à-vis l'océan.						

12. Les énoncés suivants sont à propos de des caractéristiques spécifiques au programme Le Saint-Laurent dans ma classe. Nous incluons dans le terme « participant » tous ceux qui sont impliqués dans le programme Le Saint-Laurent dans ma classe : les élèves, toute l'équipe-école, les parents, et la communauté locale. Pour chaque énoncé, veuillez indiquer la réponse reflétant le mieux votre opinion et vos observations. Il n'y a pas de bonne ou de mauvaise réponse.

Énoncé	**Tout à fait en désaccord**	**En désaccord**	**Ni en accord ni en désaccord**	**En accord**	**Tout à fait en accord**	**Préfère ne pas répondre**
Le programme aborde la connaissance de l'océan à travers toutes les matières scolaires.						
Le programme facilite						

l'intégration des matières scolaires.						
Le programme implique la communauté de l'école au complet (élèves, parents, personnel non-enseignant etc.) dans la prise de décisions relative au programme.						
Le programme agit comme plateforme d'échange avec la communauté.						

13. Les énoncés suivants portent sur l'inclusion des types de savoirs dans le programme Le Saint-Laurent dans ma classe. Pour chaque énoncé, veuillez indiquer la réponse

reflétant le mieux votre opinion et vos observations. Il n'y a pas de bonne ou de mauvaise réponse.

Énoncé	**Tout à fait en désaccord**	**En désaccord**	**Ni en accord ni en désaccord**	**En accord**	**Tout à fait en accord**	**Préfère ne pas répondre**
Le programme inclut des aspects des arts dans ses activités liées à l'océan.						
Le programme inclut des aspects des sciences naturelles (aussi appelées science pures) dans ses activités liées à l'océan.						
Le programme inclut des aspects des sciences						

humaines dans ses activités liés à l'océan.						
Le programme inclut des aspects des sports dans ses activités liée à l'océan.						
Le programme inclut des aspects du savoir communautaire des membres de la région dans ses activités liées à l'océan.						
Le programme inclut des aspects des savoirs autochtones dans ses activités liées à l'océan.						

14. La question suivante vise à identifier les mesures mises en place par le programme Le Saint-Laurent dans ma classe pour l'inclusion de la diversité. Les groupes ci-dessous sont reconnus par le gouvernement du Québec pour être plus souvent victimes de discrimination, entre autre au niveau de l'éducation et des perspectives d'emplois : femmes, autochtones (Premières Nations, Métis et Inuits du Canada), minorités visibles (personnes, autre que les autochtones, n'étant pas de race ou de couleur blanche), minorités ethniques (personnes, autre que les autochtones, n'ayant pas comme langue maternelle le français ou l'anglais), personnes handicapées (personne ayant un handicap physique ou mental, visible ou pas). Nous ajoutons à ces groupes les personnes en situation de pauvreté.

    Chaque ligne du tableau ci-dessous présente un groupe de personnes. Chaque colonne présente un moyen d'inclure ces personnes dans le programme Le Saint-Laurent dans ma classe. Pour chaque groupe, veuillez indiquer le ou les moyens utilisés pour inclure ce groupe, selon votre expérience. Il n'y a pas de bonne ou de mauvaise réponse. Cette question s'applique à tous les participant(e)s du programme Le Saint-Laurent dans ma classe, soit tous ceux et celles qui sont impliqué(e)s dans le programme Le Saint-Laurent dans ma classe : les élèves, l'équipe-école, les parents, et la communauté locale.

	Présentation de modèles diversifiés (ex. dans les manuels scolaires, parmi les invité(e)s)	Utilisation d'un langage inclusif	Adaptation des activités pour en accroître l'accessibilité (ex. mesures de sécurité, rampe d'accès)	Répartition des rôles de pouvoir (direction, prise de décisions)	Mise en place de mesures supportant la conciliation travail-famille	Aucun moyen utilisé	Préfère ne pas répondre

Femmes							
Autochtones							
Minorités visibles							
Minorités ethniques							
Personnes handicapées							
Personnes en situation de pauvreté							

15. Y a-t-il des connaissances acquises grâce au programme Le Saint-Laurent dans ma classe que vous appliquez dans votre vie quotidienne?

16. Y a-t-il d'autres informations ou des commentaires que vous aimeriez partager avec nous?

17. Nous aimerions compléter une entrevue avec vous afin d'en apprendre davantage sur le programme Le Saint-Laurent dans ma classe. L'entrevue durerait de 45 minutes à 1 heure 30 minutes et aurait lieu par téléphone ou appel vidéo à un moment qui vous convient. Votre participation à une entrevue est entièrement volontaire. Êtes-vous intéressé(e) à participer à une entrevue?

    ☐ Oui ☐ Non ☐ Préfère ne pas répondre

18. Afin de planifier la date et l'heure de l'entrevue, préférez-vous que nous vous contactions par téléphone ou par courriel?

    ☐ Par telephone ☐ Par courriel

19. Quelle est votre adresse courriel?

    _____

20. Quel est votre numéro de téléphone?

    _____

Merci pour votre participation au sondage!