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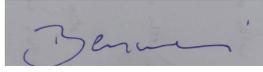
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Declaration

I declare that this assignment is my own work and does not involve plagiarism or collusion. The sources of other people's work have been appropriately referenced, failing which I am willing to accept the necessary disciplinary action(s) to be taken against me.

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ABSTRACT

Being an island nation with roots in maritime trade, Singapore has an especially close relationship with the ocean. This paper aims to find out more about the factors influencing Singaporeans to develop care and concern for the local marine environment.

INTRODUCTION

“Oceans are under threat now as never before in human history,” (David Attenborough, *Blue Planet II*, 2017). Marine pollution levels are higher than ever before, with toxic chemicals, plastic, and excessive light and sound entering the ocean in dangerous and unprecedented amounts (Worm, Lotze, Jubinville, Wilcon, & Jambeck, 2017). The World Economic Forum (2016) found that the damage that is being done is so severe that there will even be more plastic than fish in the world’s oceans by 2050. As the ocean is a key carbon sink and producer of oxygen (National Geographic, 2004), damage to the ocean ecosystems will negatively affect all world ecosystems greatly (EcoWatch, 2015).

Despite the obvious importance of the ocean as a key part of keeping world climate change under control, it is not known whether Singaporeans are aware of the great importance that the ocean holds, as well as whether Singaporeans are sufficiently concerned about the damage the ocean faces. Furthermore, as an island nation surrounded by the sea, Singaporeans should be made aware of the biodiversity of the oceans surrounding our island and how to preserve it for the generations of Singaporeans to come.

The aim of this project is to determine the motivating factors behind Singaporeans’ interests in marine conservation, where ‘Singaporean’ is defined as a Singaporean citizen or

permanent resident. Surveys will be conducted on people with differing degrees of engagement with the marine environment on their views regarding marine conservation. Suggestions on how to increase local awareness in marine issues and action for marine conservation will be made on the data collected.

DEFINITION OF TERMS

The concept of 'care' (for the marine environment) appears often within this research paper. In the paper "Measuring Love and Care for Nature", Perkins (2010) defines love and care for nature as "clear recognition of nature's intrinsic value as well as a personal sense of responsibility to protect it from harm." Perkins further elaborates by mentioning the following feelings as a way to measure how much an individual cares for nature: "(1) feelings of awe, wonder and interest in nature, which are sustained emotions said to evoke feelings of care; (2) feelings of love, emotional closeness and interconnectedness with nature, including a spiritual aspect .. and (3) feelings of care, responsibility and commitment to protect nature".

This definition is useful in categorising one's emotional connections with nature. Yet when applied to the local marine environment, it does not mention the more practical aspects for feeling 'care' for nature - such as because one depends on the marine environment for their livelihood (eg. commercial fishermen), or that the marine environment is a source of entertainment and leisure for them (eg. recreational fishermen). Therefore, this research paper will collect information on both the emotional and practical reasons of interviewees as to why they care for the environment. Furthermore, operating on the assumption that people who care more about the environment will also take action to improve the environment, information will also be collected about interviewees' concrete actions taken to directly or

indirectly improve the marine environment (eg. volunteering for beach cleanups, only choosing sustainable seafood).

Thus, reasons for the development of 'care' for the marine environment can be broadly separated into two main categories: emotional and practical. Emotional care arises when an individual acknowledges the beauty or intrinsic value of the ocean, and feels a sense of "awe, wonder and interest" for the marine environment. In contrast, practical care arises when an individual acknowledges the practical benefits that the ocean can bring them. Some examples of these practical benefits are that the continued existence of the ocean is essential to their occupation, or their hobby and leisure activities. In the data collection section of this research project, information will be collected on the degrees to which respondents feel both categories of care.

When combined, these emotional and practical aspects give rise to the degree to which a person is engaged with the ocean. Thus, when one relies more on the ocean for work or leisure, or when one feels more strongly about the beauty and intrinsic value of the ocean, there will be a higher degree to which he/she is engaged with the ocean. In this paper, my hypothesis will be that the higher the degree to which one is engaged with the ocean, the higher the degree of care for the marine environment.

RESEARCH QUESTIONS

- 1) What are the factors causing people to develop an interest in marine conservation?
- 2) How does the degree to which one is engaged with the marine environment affect one's degree of care for the marine environment?

LITERATURE REVIEW

Existing research

There are a number of existing papers that link public opinion to ocean conservation, such as “Public Perceptions of the UK Marine Environment” (Jefferson, Bailey, Laffoley, Richards, & Attrill, 2013) and “Youth and the Sea: Ocean literacy in Nova Scotia, Canada” (Guest, Wallace, & Lotze, 2015). However, this research collects only very factual, quantitative data on people’s knowledge and perceptions of the ocean. For example, a sample finding from the paper “Public Perceptions of the UK Marine Environment” is “Over 90% of respondents recognised puffin and seahorse, but only 69% and 45% of respondents respectively thought they lived in UK waters.” In this paper, I wish to also add a qualitative element to the data collected, because the factors influencing one’s degree of care for the marine environment vary greatly from person to person. Thus a purely quantitative approach may not be able to fully capture the nuances in responses from different people.

A notably similar paper to my current project is “Mind the Gap: Why do people act environmentally and what are the barriers to pro-environmental behavior?” (Kollmuss & Agyeman, 2002). However, this paper is more of a theoretical discussion about the factors causing people to act environmentally, and does not collect actual data to conduct an analysis on these factors. Furthermore, it is much more general in the sense that it looks at the environment as a whole, instead of focusing on one specific part of the environment (which in this paper will be the ocean).

There are also a few existing articles that attempt to quantify Singaporeans' degree of concern for the marine environment - the Singapore Blue Plan 2018 states that "As Singaporeans, we recognise the immense pressure on our limited land and sea areas" but these claims did not cite published research and may merely have been the author's personal opinions. What is far more common both online and offline are great numbers of anecdotes from people declaring their own personal reasons for caring about the marine environment. For example, ReleVanSea ~ A Marine Conservation Blog (2014) writes that "if the oceans crash, we as a species (will crash) with them". Carl Safina's blog mentions preserving "Spectacularity—While it lasts" (2016) and "Making a case for life on Earth" (2020). An article written by Jane Hosegood (2016), a marine researcher, mentions that she is "yet to speak to a single person who, having seen a manta ray up close in the water, has not been completely awestruck by its grace and magnificence." However, there have been few studies done to pull together these factors from different people to complete a comprehensive analysis. Furthermore, since those with a prior interest in the marine environment are far more likely to write these reasons in their blogs and articles, people without a connection to the ocean are underrepresented in this aspect. Given the lack of readily available published material on Singaporean motivating factors, I intend to fill the gap with this study by analysing the practical and emotional reasons of different people to determine general trends, and thus develop a deeper understanding of these factors and how they affect a person's degree of care for the marine environment.

Current Views

While the factors influencing people's care for specifically the marine environment have not been well explored, there is some existing discussion that has been carried out on the factors causing people to care more about the environment in general.

Per Espen Stoknes, a Norwegian psychologist and economist has brought up the perspective that "If a (climate-change-caused) drought takes away a farmer's crops or a monsoon fails, it means destitution. But here [in the United States and Western Europe], we can always go to a store and buy stuff produced elsewhere, because we have the money to distance ourselves from the immediate impact of weather disruptions." This viewpoint strongly supports the idea that practical reasons for care (in this case, the continued existence of a healthy environment's positive impact on one's livelihood) are a main proponent in influencing care for the environment. In the local context, Singaporeans are likely to be less affected by these practical reasons as Singapore is a first-world country where many goods and foodstuffs are easily purchased in a supermarket. This would lead the average consumer to be less likely to be directly affected by negative changes to the ocean environment.

However, Stoknes has also highlighted psychological denial as a possible reason why people do not care about conservation. According to him, people know that "fossil energy use contributes to global warming, yet we continue to drive, fly, eat beef, or heat with fossil fuels, then dissonance sets in." This dissonance will then be defused through pushing the blame of climate change onto another entity: For example, a person may think to himself that he is not complicit in exacerbating environmental destruction, instead pushing the blame onto friends or family who fly more or use more electricity. I believe that this refusal to see one's own negative environmental contributions would be classified as an emotional

response, since this shows an obvious emotional disconnect to the beauty and wonder of the environment, together with an inability to realise the significance of one's own actions.

Other arguments that support emotional reasons as the main factor influencing people's degree of care towards climate change include the 'tree-cutting' study done by Stanford University. In this study, participants put on a virtual reality headset and walked through a simulated forest. They were then given a joystick shaped like a chainsaw, and asked to cut down trees. After the study, researchers found that participants' paper consumption dropped by 20% and they experienced a measurable preference for recycled paper products. My interpretation of these results was that after being exposed immersively to the raw beauty of nature through the virtual reality experience, participants felt a stronger emotional connection to the environment and thus were more hesitant to carry out environmentally destructive actions by using paper. It is debatable whether Singaporeans would also experience such an effect. While some nature is indeed present in Singapore in parks such as the Botanic Gardens and Sungei Buloh Wetland Reserve, the average Singaporean would probably be far more familiar with urbanised 'concrete jungles' comprising of high-rise buildings and shopping malls. Therefore, without clear and constant exposure to the beauty of nature, Singaporeans may not fully experience this effect on their attitudes towards the environment.

Another article, this time written by Conservation Manager at the Oakland Zoo Amy Gotliffe states that "Many (conservationists) are active stewards because they formed a connection with nature during childhood", while carrying out actions such as "playing in the woods, on the rocks, in the creek, in the garden, in the dirt," et cetera. Again the theme of an emotional connection arises, since these children must clearly have forged an emotional connection with nature in their formative years, which stayed with them into adulthood and inspired them to take better care of the nature around them. Thus it can be seen from these three

examples that there are strong arguments for emotional connections to nature being powerful reasons causing people to care about conservation. Noting Singapore's status as an island-nation, it would be of interest to determine whether Singaporeans experience a similar connection with the ocean.

METHODOLOGY

Both interviews and online surveys were used as data collection methods. 5 interviews were conducted, and together with 55 survey respondents, data was collected from a total of 60 people.

Interviews were conducted by visiting various marine sites around Singapore such as St John's Island and Changi Beach, and approaching strangers for interviews. Surveys were conducted through Google Forms, and the link to the form was posted together with a short message on online platforms such as Instagram and Whatsapp.

The questions in both the interviews and survey collect both qualitative and quantitative data, in order to better understand respondents' ways of thinking and attitudes towards ocean conservation. The full list of questions can be found in the Appendix.

FINDINGS

Practical Care

		Is the ocean essential to your work?										Total	
		1	2	3	4	5	6	7	8	9	10		
Do you care about ocean conservation?	1												1
	2	1											1
	3	1											1
	4					1							1
	5	1	1										2
	6	1											1
	7	5	4	3	1								13
	8	10	2	2	3	1	2	1	1		1		23
	9	1	2	1	1	1	2	1					9
	10	1	1	2		3					1		9
Total	21	10	8	5	6	4	2	1		2		60	

Figure 1: Pivot table of “Is the ocean essential to your work?” against “Do you care about ocean conservation?”

“Is the ocean essential to your work?”

1: I do not care at all. I feel no connection whatsoever to any aspects of the ocean, and I would not put in extra effort to help conserve the ocean ecosystem.

10: I care a lot. I feel a deep connection to every aspect of the ocean, and am willing to put in immense effort to maintain the health of the ocean ecosystem.

When the results for ‘Is the ocean essential to your work?’ were plotted against ‘Do you care about ocean conservation?’ in a pivot table, a trend emerges that people whose jobs relied less on the ocean had a higher likelihood to care more about ocean conservation.

		Is the ocean essential to your hobbies?							Total
		1	2	3	4	5	6	7	
Do you care about ocean conservation?	1								
	2			1					1
	3				1				1
	4	1							1
	5		1	1					2
	6	1							1
	7	2	2	4	1	1	2		12
	8	2	3	3	3	7	2	3	23
	9		3		2	3	1		9
	10	1	2	1	1	2		2	9
Total		7	11	10	8	13	5	5	59

Figure 2: Pivot table of “Is the ocean essential to your hobbies?” against “Do you care about ocean conservation?”

Is the ocean essential to your hobbies? (On a scale of 1-7)

1: Not essential in the least. The ocean could turn to lava and I would still be relatively unaffected. (Model building, jogging, embroidery)

10: Without the ocean my hobby is nothing. It is integral to the very foundation of my hobbies. (Recreational fishing, scuba diving, beach visiting)

When the results for ‘Is the ocean essential to your hobbies?’ were plotted against ‘Do you care about ocean conservation,’ the numbers are relatively evenly distributed along the bottom four columns. This shows that how essential the ocean is to a person’s hobby has little influence on how much the person cares for marine conservation.

Emotional Care

		Do you feel any particular emotional connection to the ocean?										
		1	2	3	4	5	6	7	8	9	10	Total
Do you care about ocean conservation?	1											
	2	1										1
	3								1			1
	4					1						1
	5				1					1		2
	6			1								1
	7		1		2	1	1	4	4			13
	8					1	1	8	9	1	3	23
	9						1	1	3	3	1	9
	10						2		3	1	3	9
Total		1	1	1	3	3	5	14	20	5	7	60

Figure 3. Pivot table of ‘Do you feel any particular emotional connection to the ocean?’ against ‘Do you care about ocean conservation?’

Is the ocean essential to your work? (On a scale of 1-10)

1: Not essential whatsoever. The ocean could vanish tomorrow and my job would be minimally affected. (Office worker, mechanic, some students)

5-6: Work that relies partially on the ocean such as aquarium shop owners and wet market seafood sellers.

10: My job depends completely on the ocean, and requires me to work closely and directly with it. Without a healthy ocean ecosystem my job would not exist at all. (Scuba diving instructor, commercial fisherman, marine biologist)

The results in Fig. 3 are very different from the results in Fig. 1 and 2. Since a large number of responses have clustered in the bottom right corner of the table, it can be seen that respondents who feel strong emotional connections with the ocean are also much more likely to care about ocean conservation.

Taking Action for the Marine Environment

		Have you ever taken action to improve the marine environment?		
		Yes	No	Total
Do you care about ocean conservation?	1			
	2	1		1
	3	1		1
	4		1	1
	5	1	1	2
	6	1		1
	7	8	4	12
	8	14	7	21
	9	4	4	8
	10	8	1	9
Total		38	18	56

Figure 4: Pivot table of “Have you ever taken action to improve the marine environment?” against “Do you care about ocean conservation?”

This pivot table shows that people who scored highly for ‘Do you care about marine conservation’ were far more likely to carry out concrete actions to improve the marine environment than people who scored more lowly. This is in accordance with my hypothesis.

DISCUSSION AND ANALYSIS

In this section, when quotes are taken from respondents in the survey, their score for the question 'Do you care about ocean conservation?' will be put in brackets behind the quote.

Practical Care

The results obtained in both graphs go directly against my hypothesis that people with a higher degree of engagement with the marine environment will also experience a higher degree of care for the marine environment. Instead, it is obvious that both the factors of the ocean being essential to one’s occupation and the ocean being essential to one’s hobbies have minimal impact on a person’s degree of care for marine conservation. One possible

explanation for this discrepancy is that the makeup of my survey respondents is highly homogenous - an overwhelming majority of these respondents are students. This could have led to a gap in data because certain scores for each question were underrepresented. For example, since very few respondents wrote that their jobs depend highly on the marine environment, there is a lack of data in this area that is reflected in the blank space of the table.

Among the minority whose work and occupations rely more on the ocean, both practical and emotional reasons arise when they are asked why they care about the ocean. An "education and outreach manager" at the St John's Island National Marine Laboratory mentioned how the reason why she feels emotionally close to the ocean is because "(mangroves are) the place where scholarly .. I learn more about the environment" (8), possibly showing that she feels an emotional attachment because she has spent so much time in the ocean ecosystem. However she also brought up how "The marine environment .. buffers a lot of the (environmental phenomena) that happen .. like global warming .. (and) ocean acidification", showing how she is cognisant of the practical benefits that the ocean has offered her. Another interviewee, this time a "specialist associate" also at St John's Island National Marine Laboratory mentioned that "nature and stuff" has "all gelled into his life" (10), and that "the mysteries around the ocean" keep him "very interested with the ocean", but he also made clear that "Without the sea we don't have any source of food, you see the fish on the market" , demonstrating his understanding of the ocean's practical benefits.

Thus there is a possible trend here in that people whose jobs depend more on the marine environment tend to have more practical reasons for caring about the marine environment. This makes sense considering that the ocean provides these people with practical benefits in the form of a job. It is also possible that people who work closely with the marine environment are more aware of the many tangible benefits that the ocean can offer such as

providing food and resources, therefore making them more likely to bring up these reasons when asked why they care about the ocean.

Emotional Care

For emotional care, the results are in accordance with my hypothesis that people who feel more strongly about the inherent beauty and value of the ocean will also experience a higher degree of care for the marine environment. This factor is perhaps particularly prevalent in Singapore because of the fact that Singapore is an island nation in close proximity to the ocean. This would make it easier for Singaporeans to interact with the ocean regularly through visiting beaches, going fishing, buying seafood at wet markets, or engaging in other ocean-related activities. This increased time spent and familiarity with the ocean could then be translated into greater appreciation for the inherent beauty and value of the ocean as an important part of most Singaporeans' lives, thus also leading to a greater degree of care for the marine environment.

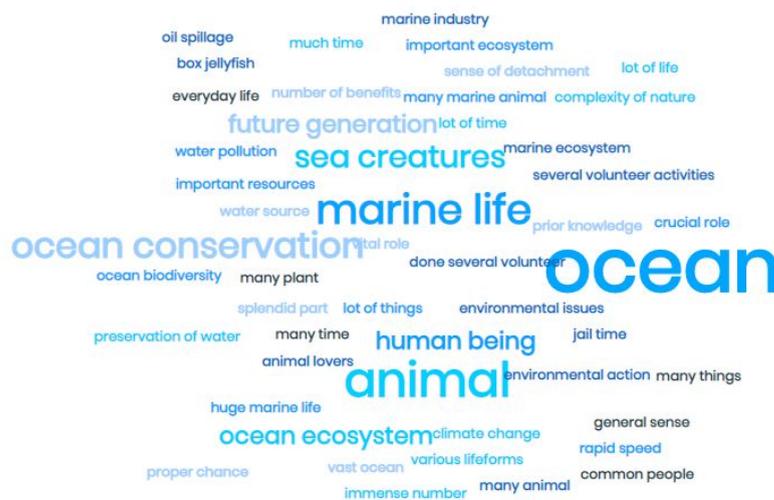


Figure 5. Word cloud formed from responses to the follow-up question “Why so?” occurring after “Do you feel any particular emotional connection to the ocean?”

It is interesting to note that in this word cloud, the most frequent words and phrases that appeared in the question were “ocean”, “animal”, and “marine life”. This hints at the possibility that marine life and marine animals play a large role in influencing respondents’ degree of care for marine conservation.

Looking more in-depth into the responses for this question, when many of the high scorers (i.e. they care for ocean conservation) were asked to provide reasons for this care, a theme that appeared frequently was the presence of sea creatures and marine life in the ocean. Out of 50 respondents for this question, 18 mentioned positive feelings towards marine life in their answer, including sentiments such as "Even more magnificent (than the ocean) are the animals that reside in it" (10), "the ocean is the home of many animals and i love animals ehe <3" (8), as well as "videos of the animals suffering just really made me like put myself in their shoes and like sympathetic" (8).

However, among some of the comparatively lower scorers there were also 2 people who mentioned negative feelings towards marine life. Their responses were: "I think that most sea creatures are incredibly creepy" (3) as well as "oh also ik it’s fallacious but stonefish. and box jellyfish." (7)

Thus it can be seen that a person's attitude towards marine life, whether viewing marine life positively or negatively is a major factor in influencing their degree of care towards marine conservation.

LIMITATIONS OF STUDY

This project is limited by three main factors.

Firstly, the research conducted is limited to only Singapore because this project focuses only on Singaporeans' degree of care for the ocean. As such, the information gathered will be most relevant only in the local context. This means that the results of this study cannot be upscaled or used as a benchmark for other regions because Singapore is very different from both other island nations and other countries in Southeast Asia.

Secondly, because of the limitations of COVID-19 making it more difficult to reach out to strangers and also because I myself am a student, an overwhelming majority of survey respondents have been students. I have tried my best to reach out to other demographics by carrying out physical interviews with a number of marine experts and other non-students. However, at 39 out of the 45 people who were willing to reveal their occupation, students have still made up an unusually large number of the survey respondents. Thus, the results may be skewed and not accurately reflect data from Singaporeans from a diverse range of age groups and occupations. Despite these skewed results, there may still be a positive outcome from this glut of student respondents which is that the results obtained in this paper would be highly relevant in discussing the factors causing students specifically to care about marine conservation.

Thirdly, because of time limitations, I was only able to complete a relatively superficial analysis of the factors causing people to care about the ocean. Given more time, I could have created more surveys and done a Part 2 of data collection, where I aim to find out how emotional connections between individuals and the ocean arise, together with what makes certain people feel positively or negatively about marine life. With more knowledge of these 'factors of factors', more accurately targeted learning packages could be developed to increase people's care for the ocean even more effectively.

CONCLUSION

People with a greater degree of care for the marine environment do indeed take more concrete actions to improve the environment.

Furthermore, practical reasons such as the ocean being important to one's occupation or hobby are not reliable factors in predicting one's degree of care for ocean conservation. Instead, the two most impactful factors influencing one's degree of care for marine conservation are:

- A person's emotional connection with the ocean, here defined as appreciating the ocean and/or its beauty, as well as feeling a deep sense of love and/or emotional and/or spiritual connection to the ocean.
- How a person views marine life and marine animals, whether positively or negatively.

This knowledge could be used to create better and more effective public education packages to improve care for ocean conservation in the general public, particularly among the student population.

RECOMMENDATIONS

Since an overwhelmingly large percentage of the data collected was from students, the recommendations here will focus on how effective the Singaporean education system has been in instilling care for the marine environment in Singaporean students. Furthermore, operating under the assumption that the findings in this paper can be extrapolated and utilised for the general environment instead of being limited to only the marine environment, recommendations will be given on increasing care for the environment in general.

Going against the findings of this paper, the Singapore Ministry of Education (MOE) continues to utilise primarily practical reasons to instil care for the environment in students through the education system. Care for the environment is taught as a topic for Primary School Science in the chapter “Man and the Environment”. However, the Science curriculum has always focused more on objectivity and practicality rather than allowing for emotional flexibility and subjectivity in the learning. Thus, when students learn about the environment, they are not taught that nature must be protected simply because it is nature and should be respected as such. Instead, they are given a scientific, reasoned approach as to why the destruction of nature is detrimental to the earth as a whole, and therefore also affects humans. As an example, educated with the hardhanded logic of science, no right-minded teacher would award marks to a student who says that we must care for nature because it is beautiful. Thus, by discouraging emotional engagement and love for the environment and instead heavily promoting the understanding of purely objective facts and data, students are conditioned to think about the environment through a purely objective lens of reasons and factors, and the emotional connection between student and nature is systematically dismantled and eroded through the education system. Apart from this weakened emotional connection making students feel less intrinsic motivation to care about the ocean, a possible side effect of this conditioning is that students who are weak in Science and are unable to visualise the importance of the environment to humankind may also experience a far lower degree of care for nature simply because they do not fully understand the practical benefits of maintaining a healthy ecosystem. Indeed, while this valiant ministerial attempt to instil care for the environment in students is effective in theory, it is focusing on the wrong factors that cause care to develop. In terms of rhetoric, students have been shown in this paper to respond poorly to logos and far more strongly to pathos - calling upon one’s emotions to drive across a point, and the present approach by MOE is deficient in utilising this pathos. This deficiency would also cause the effectiveness of the education system in cultivating

care for nature to be far lower than what it could be with some slight changes that allow for students to have more emotional engagement with the environment. In the context of the school, what method would then be more suitable to cultivate this emotional care?

Essential Takeaways	Key Inquiry Questions
<ul style="list-style-type: none"> • There are interactions among Man, living and non-living things in the environment. • Man can interact with the environment and make positive or negative impacts. • Man plays an important role in conservation to ensure continuity of life and availability of resources. 	<ul style="list-style-type: none"> • How does Man better understand the environment? • What are the consequences of Man's interactions with the environment?

Fig 6: Table of learning objectives for the chapter “Man and the Environment”. It can be seen here that students are not expected to develop an emotional connection to nature through this module.

Taken from Science Syllabus Primary (2013) by the Ministry of Education

I propose that in addition to being taught in Science, care for the environment should also be included in the Character and Citizenship Education curriculum (CCE). The CCE curriculum has historically always focused more on less tangible and more subjective content. Additionally, emotional responses and discussions from students are encouraged as they are more suitable for teaching values and morals than hard facts and objective data. For example, according to the Character and Citizenship Education Syllabus Primary (2012) released by MOE, one of the first things that students are taught is that “some emotions such as anger, fear, guilt, anxiety and stress, etc, make one feel uncomfortable”. The obvious subjectivity in this clause and the many other clauses throughout the booklet show that the objective of CCE is to teach values and morals simply because values are valued and morals are morals, and not for any other practical reason other than it helps to uphold a harmonious society. Similar parallels could be drawn with the cultivation of emotional care

for the environment, where nature is seen as valuable not primarily because it provides resources for humans, but simply because it *is* nature, it is beautiful, and thus should be valued as such. I strongly believe that since this study has shown that developing an emotional connection with nature is directly related to greater care for the environment, there should be an addition made to the CCE curriculum to develop this emotional care for nature.

How then can this emotional care be developed? I believe that showing students the beauty of nature and teaching them how to appreciate it is a good way to start. In order to give students an understanding of the rich biodiversity available in the environment, nature documentaries can be screened and particularly breathtaking scenes of nature presented and explained to students. Tying back to the finding that people who view marine life positively care more about the marine environment, students can also be taught about cute and lovable animals such as baby pandas, fennec foxes or dolphins to cultivate a positive impression of wildlife within students. To increase the amount of firsthand exposure that students have to nature, school field trips can also be arranged to places such as the beach or the zoo. Arrangements should be made for students to have fun in these places, so that they are left with good memories and have positive associations with the natural environment. Artistic expression can also be utilised here, where students are encouraged to draw, write or compose songs about nature in an attempt to stimulate deeper thinking about the different facets of the natural world. I hope that these measures will be able to effectively instil care for nature in the next generation of students.

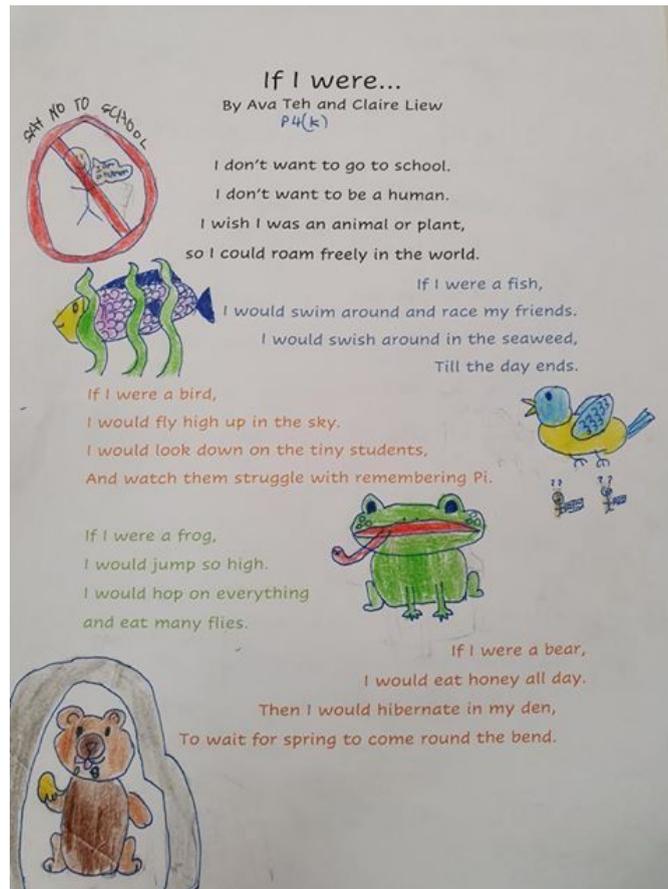


Figure 7: A poem written by P4 students in Nanyang Primary School about wildlife. It is clear from the poem that these students view wildlife positively.

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APPENDIX/APPENDICES

Appendix A: Ocean Conservation Survey

Hello! I'm a Sec 3 student from Hwa Chong Institution doing a project to find out about the factors that cause people to develop care for the ocean. Today I'll be asking you a series of questions about the ocean, such as whether the ocean is important to you, how closely you work with the ocean, et cetera. This survey should take around 10-20 minutes. Your responses would really help with my research! There's no need to give really long answers for each question, a few sentences would be more than enough. But if you feel that you want to share more, please do go ahead!

Part 1: Personal Details

Just a little bit about yourself.

What is your gender?

Male

Female

Prefer not to say

Other:

What is your residency status?

Singaporean Citizen

Singaporean PR

Malaysian Citizen

Other:

What is your age?

What is your highest education level?

Less than secondary school degree

Secondary school degree or equivalent

College degree

Associate degree

Bachelor degree

Graduate degree

Part 2: You and the Ocean

This section will consist of both multiple choice questions and open ended questions. Please don't think too hard about the multiple choice questions, simply choose whatever comes to mind. Collecting genuine data is of utmost importance here, so please do answer honestly even if your choice is not as positive as you might like. It would also be best if you did not change your answer afterwards!

Thank you!

Do you care about ocean conservation? (On a scale of 1-10)

1: I do not care at all. I feel no connection whatsoever to any aspects of the ocean, and I would not put in extra effort to help conserve the ocean ecosystem.

10: I care a lot. I feel a deep connection to every aspect of the ocean, and am willing to put in immense effort to maintain the health of the ocean ecosystem.

Why so?

Is the ocean essential to your work? (On a scale of 1-10)

1: Not essential whatsoever. The ocean could vanish tomorrow and my job would be minimally affected. (Office worker, mechanic, some students)

5-6: Work that relies partially on the ocean such as aquarium shop owners and wet market seafood sellers.

10: My job depends completely on the ocean, and requires me to work closely and directly with it. Without a healthy ocean ecosystem my job would not exist at all. (Scuba diving instructor, commercial fisherman, marine biologist)

What is your occupation?

Is the ocean essential to your hobbies? (On a scale of 1-7)

1: Not essential in the least. The ocean could turn to lava and I would still be relatively unaffected. (Model building, jogging, embroidery)

10: Without the ocean my hobby is nothing. It is integral to the very foundation of my hobbies. (Recreational fishing, scuba diving, beach visiting)

What are your hobbies?

Do you feel any particular emotional connection to the ocean? (On a scale of 1-10)

1: The ocean seldom, if ever, crosses my mind. I do not find it particularly beautiful. The ocean has no purpose other than practical reasons such as to provide resources, or as a means of travel.

10: The ocean is extremely important to me, and not for practical reasons. I often ponder the ocean and/or its beauty. I feel a deep sense of love and/or emotional and/or spiritual connection to the ocean.

Why so?

Have you personally seen the effects of climate change or pollution on the ocean? If you answered 'yes', what did you see and how did it make you feel?

What comes to mind when you think of the ocean? Are the thoughts positive or negative?

Have you ever taken any action to improve SPECIFICALLY the marine environment? For example, buying sustainable seafood or volunteering for beach cleanups, or even being mindful of using too much water. It will count as long as you did it with an aim to improve the marine environment. Without the clear intention to improve the marine environment, (eg improving the environment in general), it does not count.

If you answered 'yes', could you give some examples of these actions? (Checkbox question)

Volunteering at marine sites (beach, mangrove, etc)

Eating sustainable seafood

Managing your water use

Donating to relevant charities

Reducing plastic use

Other:

That's all! Thank you so much for your time and effort! Do you have any thoughts, questions or feedback?