How the terms used for describing tidal flats influence their image: Case study of students from two high schools in Vietnam

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Certification Page

I, PHAM Thu Huong (Student ID 51216601) hereby declare that the contents of this Master's Thesis are original and true, and have not been submitted at any other university or educational institution for the award of degree or diploma. All the information derived from other published or unpublished sources has been cited and acknowledged appropriately.

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Abstract

Tidal flats are unique landscapes which play an important role in the health of the coastal ecosystem. However, they are still neglected or even perceived negatively by the public. This research reveals the perceptions of Vietnamese high school students towards tidal flats. The research methods adopted were questionnaires distributed at two high schools, and semi-structured interviews with geography teachers from these two schools and an official from the International Union for Conservation of Nature (IUCN, Vietnam). Three factors influencing the mental image of the students are identified: a metaphor, a name and an experience. Using the metaphor of "migratory birds' home" or "a water filter machine" helps to improve the students' mental image of tidal flats. The machine metaphor is effective in explaining the function of tidal flats but it might lead to a negative image of tidal flats being dirty and smelly places while the home metaphor, to a certain extent, helps to create feelings of respect and love for tidal flats. The research also identifies the influence of the different names for tidal flats on the perceptions of the students. Even when a student has some experience of tidal flats, which name is used still has an influence on the students' mental image. In addition to metaphors and names, experience of a tidal flat is also considered a factor which has positive influences on the way the students perceive tidal flats. Students who have previously visited a tidal flat have more positive images than those who have not. The research also discusses how a direct experience with tidal flats can be provided for the students.

Key words: tidal flat, mental image, name, metaphor, experience, Vietnam, high school students

1. INTRODUCTION

1.1. Background to the research

Wetlands are unique landscapes, which provide not only a diversity of ecological functions but also economic and cultural values for humans. They are "areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed six meters" (Ramsar Convention Secretariat, 2016).Wetlands cover many types of ecosystems such as mangroves, coral reef, mudflats, rivers etc. Among the wetland types, tidal flats seem to be less attractive while mangroves and coral reefs receive much more attention from researchers and the media (Duarte, Dennison, Orth, & Carruthers, 2008).

Tidal flats are located in coastal areas or on the shores of lagoons and estuaries, where mud or sand is deposited in shallow areas of coastal water and appear when the tide is low and are flooded when the tide is high (Waterfront Vitalization and Environment Research Foundation, n.d.). Tidal flats are important not only for their rich biodiversity but also for their food supplies, water purification and erosion control (ibid). They are home to many kinds of animals such as mussels, crabs and shellfish, and provide stopovers for migratory birds. However, tidal flats are exposed to many threats including climate change, human overexploitation, pollution and especially, people's lack of knowledge. It is important for people to know about tidal flats to make them participate actively in the protection of their

valuable ecosystem (Miththapala, 2013). Although the importance of tidal flats is increasingly recognized, they seem to be neglected by many people. The dramatic loss of tidal flats over recent decades has been attributed to the lack of a close relationship with these environments (Miththapala, 2013). The image of a tidal flat with grey coloured mud and animals that are not "visible" living under the mud might be one of factors making tidal flats boring when they are compared with the colourful and vivid images of coral reefs.

The terms used to describe tidal flats may be considered a reason for a weak relationship between tidal flats and people. Different terms are used to describe the same place with different images. For example, when I searched for information about tidal flats in Vietnamese, the common term I came across from the internet and several television shows was "bãi bùn" (muddy area). Although "bãi bùn" brings to mind an image of a muddy area, it does not always refer to a coastal ecosystem. More negatively, it may be used for smelly and dirty waste areas. However, there are also other terms used to describe tidal flats in Vietnamese in the media and scientific documents such as "vùng triều" (tidal shallow water area) and "bãi bùn triều" (muddy tidal area). These terms include the word "tide", which may remind people that they relate to coastal areas with a rise and fall in sea level. It can be said that different terms come from different information channels and this difference might confuse people about the image and characteristics of tidal flats. In Japanese, a similar situation happens when the common term used to describe tidal flats, "higata", usually makes the Japanese have difficulty in imagining the place. "Higata" means shallow water that dries out (Yamashita, 2014), which is not an actual function of a tidal flat. Apart from

"higata", there are also many other terms used to describe tidal flats in Japanese. This diversity is shown clearly in the survey conducted by Yamashita and Mikami (2016). The survey was conducted with a sample of 1500 people in Shima city, Japan to understand the perceptions of local people towards tidal flats and tidal flat restoration projects. There were 417 valid responses from the 1500 questionnaires sent out. For the question about local terms used to refer to tidal flats, although only 74 respondents provided answers, the result was more than 50 terms used in their local area. From the phenomenon in Vietnamese and Japanese, the names used for tidal flats are various and this may be one of the factors influencing the recognition of tidal flats, especially for those living far away from this coastal ecosystem.

Another problem that tidal flats are facing is the way they are described. The common words I came up with when I talked with my friends about tidal flats are "muddy", "wet", "dirty" and sometimes "scary". Only a few have a positive image of tidal flats. Furthermore, media news and reports focus mainly on the biological functions and economic value of tidal flats, especially for migratory birds and local people harvesting seafood. Vivid comparisons are rarely used for tidal flats. In contrast, for some other types of wetlands such as mangrove, coral and seagrass, metaphors are usually utilised to highlight their importance. For example, mangrove forests being "a natural world for coastal area protection" or "a solid natural wall to protect coastal areas" (Nguyen, 2012, p.11). Seagrass as "an important shelter for marine species" and coral reefs with their colourful beauty are compared to "a rainforest under the sea" (ibid, p.12).

1.2. Research questions and research objectives

From the problems stated in the previous section, the main research question of this research is:

"How do the terms used for describing tidal flats shape their image in people's perception?"

It might be impossible to understand the perception of the general public as a whole. Therefore, it was necessary to identify a group of respondents to focus on to have a better understanding of how different terms for tidal flats influence their perception. The Vietnamese high school students were chosen as target respondents for this research because they are focus groups studying at identified schools and have quite similar backgrounds. Moreover, one of my hypotheses is that education has a big influence on how people perceive an ecosystem. Hence, choosing high school students who are still following a designed curriculum of many different subjects can help me to understand better the effects of education on people's perception of tidal flats.

The research objectives for this research are identified as follow:
- To explore high school students' images and knowledge of tidal flats
- To understand the influence of current terms used to describe tidal flats on high school students' images of them

- To explore whether or not a metaphor can be an effective way of communicating the functions of tidal flats

1.3. Significance of the study

Tidal flats have been considered one of the most important areas in conserving the health of the wider coastal and oceanic environment. However, among different kinds of wetlands, tidal flats seem to be inferior to others, such as mangroves or coral reefs, in terms of media and scientific interest. Most of the studies about tidal flats are natural studies with only a small proportion being social studies about the perception towards tidal flats. In addition, the problem of the terms used to describe tidal flats has been little studied despite the name of a place playing an important role in human perception about the ecosystem (Macfarlane, 2016). This research is carried out in an attempt to bridge a gap in the literature on understanding people's perception of tidal flats from the linguistic perspective. In addition, the research also aims to explore the effects of metaphors on the image of tidal flats. The results are expected to make a contribution to the promotion of tidal flats in an attempt to make their image become more attractive to the public.

2. LITERATURE REVIEW

This research studies the problem of tidal flats' image promotion from the linguistic perspective to understand the influence of language on perceptions towards tidal flats. Therefore, this literature review section will discuss the existing researches related to the connection between linguistic aspects and environmental issues and then review the literature on the topic of tidal flat perceptions.

2.1. The importance of words in different fields

Language is a complex system, consisting of many factors such as spelling, words, grammar, accent, pronunciation and dialects. Each factor influences people's attitude in its own way (Garrett, 2010). Even a simple word is able to make a big change to people's lives. As a fundamental element of every language, words have more power than just a means to make a sentence. It can be said that a word is a doubled-edge sword which can bring about both sweet and bitter results. The words we choose and the way we use them can either get us into trouble or bring us success and money (Garrett, 2010). The importance of words has been demonstrated in different fields such as marketing, politics, personal lives and communicating environmental issues.

2.1.1. *The importance of a name in the marketing field*

Studies on the influence of a brand name on a customer's purchase decision are popular in the marketing field. A company may be willing to spend a huge amount of money in choosing a brand name to attract more customers (Garrett, 2010). Alamgir, Nasir, Shamsuddoha and Nedelea (2010) conducted an empirical survey to identify the influence of a brand name on the customer's decision-making process in a car choice. The brand name can become a means of communication between a company and customers. It is not only used to differentiate different products but also has a strong impact on justifying the purchase decision. From the survey of 100 respondents, Alamgir et al. (2010) identify the five most popular car brands in the research area and examine different factors that affect the customer's decision when buying a car. More than 50% of the respondents preferred branded products and about 70% considered there to be an important relationship between a brand name and desired attribute.

Another study of how brand names affect customer perception and decision making was conducted by Forbes and Dean (2013). The authors examine the influence of the brand names of seven wine categories on brand perceptions and then their relation to the customer's decisions. Unlike the survey conducted by Alamgir et al. (2010), where the respondents already had experience with the product, this study mainly focuses on the brand name by not giving the respondents any other information and prior experience of the wine products. Forbes and Dean categorise 600 real wine names into seven groups,

including an official wine growing region, place name, indigenous name, animal, comical name, personal name and international sounding name. Only the data from 141 respondents from the 218 respondents who completed the survey was analyzed in terms of likely to purchase, quality expectation, price they are willing to pay, ability to pronounce the name and their comfort in asking about the wine product. The authors conclude that when the customer does not have any information and prior experience, the thing they rely on is the brand name.

Brand names play a vital role in a customer's decision-making process when they buy a product. As Forbes and Dean (2013) cite, the old belief that "the name says it all", emphasising the importance of a brand name, remains true. They provide a strong association with the brand perception and also can represent a product.

2.1.2. The importance of words in politics

Politics is a field where the power of words can be shown clearly, where the combination of words becomes an art bringing a politician advocacy or protests from the public. Garrett (2010) gives the example of the "Word Lab" run by a Republican political consultant, Frank Luntz, which provides useful words and phrases for political candidates to get more attention and desired reactions from voters. "Climate change" instead of "global warming", "tax relief" instead of "tax cuts", "opportunity scholarship" instead of "vouchers" are some of advice from Luntz (Lemann, 2000). The nature of the issue has not changed but the word

used to describe it can change the attitude of the audience. For example, Luntz proposes the use of "energy exploration" rather than "oil drilling" to attract more positive attitudes from Americans (Hoggan, 2009). The term "energy exploration" is "more precise", "cleaner" and "more careful" (ibid, 2009, p.63).

2.1.3. *Personal names and their influences on people's lives*

People are given names at birth and that name might stay with them until they die. Names form part of an identity and are an integral part of a person's life. There are many psychological studies conducted to explore whether a name can affect the individual's life or not. Bertrand and Mullainathan (2003) carried out an experiment to explore the racial discrimination in the labour market between employees whose names sound "white" and those whose names sound African-American. The author created a bank of artificial resumes and sent about 5000 suitable resumes in response to 1300 employment advertisements in Chicago and Boston newspapers. The crucial feature in the resumes was the names of the applicants, which were selected from the name data of all babies born in Massachusetts from 1974 to 1979. The results show that there is significant discrimination between white-sounding names and African-American names. The resumes with the white names receive 50% more call backs for interview. Even though the author sent high-quality resumes under both white and African-American names, the white names still got 30% more call backs.

Racial discrimination in the labour market is one example showing the effects of names on people's lives. Our name reveals details about our origins, religion, where we are from and even who we are (Konnikova, 2013). Their effects may be unconscious and can be interpreted in many different ways (ibid).

Language is not only a means of communication in the community but it also has a power to shape our understanding and change behaviours. This influence of language plays an important role in many fields in our daily lives to business and work to politics. And environmental issues are no exception. When environmental issues are increasingly complicated due to the negative impacts of economic activities, the way these issues are communicated to the public becomes particularly important to promote understanding and encourage them to participate actively in environmental protection.

2.2. Language and ecology in the field of ecolinguistics

The study of the relationship between language and ecosystemscomes under the umbrella term "ecolinguistics". This field developed in the 20th century and deals with the "role of language in the life sustaining interaction of humans, other species and physical environment" (The International Ecolinguistics Association, n.d.). Ecolinguistics covers two complementary branches: "the ecology of language(s)" and "ecological linguisitics" (Fill & Penz, 2017).

2.2.1. Two strands of ecolinguistics

The first branch includes linguistic studies which does not mainly focus on grammar, lexicons or phonology but utilises the concept of "ecology". The concept was first introduced by Einar Haugen in the seminal article "The ecology of language" in 1972. Haugen (1972) claims that language is not an isolated system but has interactions with the environment surrounding it. And in line with this, there is a related theoritical strain called the "Haugenian tradition" (Chen, 2016). The studies that use the "Haugenian tradition" usually see language as a component of a larger ecology in the interaction with the human mind, society and the natural environment (Haugen, 1972; Chen, 2016). One example is found in research conducted by Ng (2014) about the attitudes of individual dialect speakers regarding the Speak Mandarin Campaign in Singapore which was launched in 1979. Many dialects were used in Singpore, which was considered by the government as one of the factors preventing the unification of Singapore. Therefore, in 1979 the Singaporean government introduced language policies which promoted the use of English as an offical language and encrouraged Chinese communities to speak Mandarin instead of their dialects. From 126 surveys and 26 semi-structured interviews with dialect speakers in Singapore about the Speak Mandarin Campaign, the author found that although dialect speakers agreed with the campaign and had even switched to using Mandarin, they still considered English to be more important than Mandarin.The research showed that the value and status of a language is influenced by the attitudes of its users, while the language attitudes of its users also can be shifted by a change in language policy.

Another theoretical strain that is in line with the "Haugenian tradition" is the "biolinguistics tradition" (Chen, 2016). This strain also utilises the ecology concept and sees "the existing multilingual system across the world as an ecological system"(ibid, p.110). However, this strain focuses more on the endangered language or minority language and considers the death of a language as the loss of biodiversity in the ecological system. In the context of globalisation with the increasing popularity of English, the scholars of this strain attempt to protect and revise endangered languages which are at the edge of extinction to preserve the cultural values of the communities using those language.

Unlike the two theoretical strains above, an emerging approach which has become more popular in the field of ecolinguistics is the integration of an ecological point of view with the study of language, whereby the impacts of language on environmental issues are explored. Language is not only able to reflect how people see the environment but also shape their view about the ecosystem (Halliday, 1990; Cox, 2012; Fill & Penz, 2017). This strand of ecolinguistics tries to explore the influence of linguistic patterns on the survival of species and support the search for new forms of language to inspire people to protect the natural world (Fill & Penz, 2017). The pioneer of this approach is Michael Halliday with the seminal paper "New ways of meaning: The challenges to applied linguistics" in 1990. The author criticises the use of language in the society we are living in, which promotes growthism and consumerism. The texts being used tend to convey a message that "growth is good" and economic indexes such as gross national product (GNP) and productivity must

increase (Halliday, 1990, p.192). This point of view in language use is one of the factors leading to unecological conduct and prevention of the communication of environmental issues (Chen, 2016).

2.2.2. *Language and environmental issues*

The importance of language in the communication of environmental issues has been emphasised by many scholars (Cox, 2012; Fill & Mühlhäusler, 2006; Fill & Penz, 2017; Schultz, 1992; Stibbe, 2015). Language has a power to shape our perception, attitues and even to change our behaviour towards nature (Schultz, 1992). Through language, a serious environmental issue can become such a normal phenomenon or even actions harmful to the environment can be described as something beneficial to gain the support of the public (ibid).

Climate change communication is one typical example of the influence of language on environmental issues. Changes in the climate such as the amount of rain, sunor storms are considered normal to many people. However, in the context of increasing environmental degradation, the meaning of climate change is much more than that. It has become a global issue causing severe consequences with the continuing increase in carbon dioxide emissions and more frequent extreme climate phenomena like droughts and floods at unusual times. Although these consequences of climate change are happening around us, there are many difficuties in conveying the message that climate change has become a

serious environmental issue. Many people are sceptical about climate change and its impacts on their lives while the things around them remain the same and extreme climate phonomena are happening elsewhere (Sheppard, 2012). Moreover, the impacts of climate change are on a large scale, happening gradually and are not visible in many areas. Therefore, the uncertainty of the scale and impact of climate change is a big challenge for climate change communication (Cox, 2012).

"Global warming" and "greenhouse gas" are two common terms used when people talk about climate change. However, Schultz (1992) shows how these terms could mislead and hide unpleasant facts about climate change. For some people who are experiencing very cold weather, they may feel "global warming" is not happening to them despite the fact that the impacts of global warming are much more extensive than a rise in temperatures and a warmer climate. Moreover, Schultz also points out that the word "warming" itself is a benign word and can bring about positive connotations, for example, "warm" greetings or the "warmth" of love and care. The same pleasant feelings can also be produced by the term "greenhouse gas". In many circumstances, the colour green has a positive meaning, relating to the colour of trees, forests or a peace symbol etc. Therefore, "greenhouse" also creates an image of a treehouse or a place to produce high-quality flowers and vegetables.

As can be seen from the climate change example, language has a strong influence on our perception towards environmental issues. However, the communication of environmental issues is facing many problems due to the growthism and consumerism in language.

Moreover, the representation of environmental issuses currently is considered ambiguous and even misleading (Penman, 2001). Therefore, it is crutial to consider the importance of language in the communication of environmental issues.

2.2.3. *Metaphors and environmental issues*

In communication, a metaphor is considered a powerful tool to persuade the audience (Ottati & Renstrom, 2010). "The essence of metaphor is understanding and experiencing one kind of thing in terms of another" (Lakoff & Johnson, 2003, p.5). Many people think that a metaphor is something extraordinary used in literature and poems rather than a language used in daily lives. However, in fact, metaphors appear in our daily conversations and contribute greatly to our communication (Lakoff & Johnson, 2003). An abstract concept can become easier to understand or a boring object can become more vivid through a metaphor (Ottati & Renstrom, 2010). Although Keulartz (2007) emphasises the ability to structure perception and even the actions of the audience of a metaphor, the way the audience react depends a lot on the topic and an image used in a metaphor (Thibodeau & Boroditsky, 2011).

In terms of environmental issues, metaphors have become a popular linguistic tool to make scientific facts more familiar to the public. However, similar to the argument of Thibodeau & Boroditsky (2011), environmental metaphors can produce both positive and negative impacts. For example, there is a popular metaphor of "mother nature". In this metaphor,

nature is compared to our mother, who we love and respect. In this sense, nature is given human characteristics and in our relationship with nature, we also need to behave nicely and treat the environment with respect. However, from the ecofeminism point of view, Berman (2001) criticises this metaphor because in many cases, a mother is a person who takes care of children, satisfies needs and does the housework. Especially in the capitalist society, a mother's work is often "unrecognized and devalued" (Berman, 2001, p.263). Moreover, by comparing nature to a mother, some people may have an expectation that a mother is unlikely to hurt her children and she gives love and care without any need to be paid back. Following this expectation, it is possible for people to consider nature as being "limitless for human use" and even to mistreat nature without any pay back (Berman, 2001, p.263). Berman also condemns this metaphor from another angle, in which a mother is perceived as a natural resource to be utilised, harnessed and exploited.

From the "mother nature" metaphor, we can see the very different inferences of a metaphor. However, similar to many ecolinguistic studies, the majority of metaphor studies are qualitative and mainly non-experimental (Chen, 2016; Ottati & Renstrom, 2010; Thibodeau & Boroditsky, 2011; Thibodeau, Crow, & Flusberg, 2017). Chen (2016) conducted an extensive literature review of ecolinguistic researches in three major academic databases on language and communication: Linguistics and Language Behavior Abstract (LLBA), Communication & Mass Media Complete (CMMC) and Social Science Citation Index (SSCI) from 1991 to 2015. The author's data selection resulted in 76 peer-reviewed articles using ecolinguistics as a key concept but only two publications adopted a quantitative

analysis and experiment as their methodology while 38 publications adopted literature review and synthesis. The studies of metaphor effects are along the same lines with very little empirical work done to show the influence of a metaphor and how it is understood (Thibodeau & Boroditsky, 2011; Thibodeau, Crow, & Flusberg, 2017).

2.2.4. *Name and a landscape identity*

A place name is not only simply used to distinguish one landscape from another but it is also able to evoke an image of the place in the human mind (Graham & Howard, 2008). A name is also an indicator that shows that a landscape is an "individual entity" with different charateristics (Seidl, 2008) and stories (Graham & Howard, 2008). Seidl (2008) emphasises the importance of a name as the first step in establishinga relationship between people and a place. "A space becomes place and a territory becomes landscape through the process of naming" (Seidl, 2008: 35). There is a strong connection between the existence of a landscape and its name. Macfarlane (2016) explains that when people are unable to describe features of a place, they cannot understand and imagine it and then the relationship between people and the place will be depleted. In a great attempt to collect 1000 landscape names, he shows the neglected names of many landscapes. Eventhough the landscape is still there, not many are able to name it, decscribe it and then "once they go unnamed they go to some degree unseen" (Macfarlane, 2016:24). Language is a tool that helps people to describe a place clearly and encourage a connection with it.

Mactaggart, Bauer, Goldneyand Rawson (2008) give a more specific example in the problem of naming and defining swampy meadows. By reviewing Australian and international English language terms used to describe swampy meadows, they show the confusion in the definition and naming of this landscape. Without consistency in definitions, the public may find it difficult to understand what a swampy meadow is and its characteristics. Moreover, different names and definitions of the same natural system may prevent its appropriate management and conservation. Swampy meadows used to be considered low value, harmful and even scary landscapes by people. However, an increase in the awareness of their importance is shown in the name change to the more fashionable "spring-fed gullies". Under the threat of climate change and with more reliance on this environment, the value of swampy meadows has been recognised by more peopleand they have a more positive image(Mactaggart, Bauer, Goldney, & Rawson, 2008). It seems that if a landscape is named appropriately, this will contribute to bringing a clearer image of the place to the public. In other words, language is able to reshape the image of the landscape (Cox, 2013).

In the environmental communcation field, the importance of language and environmental rhetoric is considered one of the broadest areas of study. Language is used as a tool for communication between people and the environment. People use language to describe, to show their feelings and even to protect a place. Language not only represents nature but also actively shapes understanding; the sense of people towards nature (Cox, 2013).

2.3.Social studies on tidal flats and language problems

Although the importance of tidal flats has been more widely recognised, public interest and available information is still lacking. In addition, among the limited social studies on tidal flats, very few have touched language's influence on the perception of people towards tidal flats. The following sections will discuss the existing social studies on tidal flats and the problems with language.

2.3.1.   Exisiting social studies on tidal flats

There is an imbalance in the research interest and public attention on different types of coastal ecosystem. In 2008, Duarte, Dennison, Orth and Carruthers conducted research addressing the imbalace in the appeal of coastal ecosystems inspite of the strong connection between them. The study shows the imbalance in both research efforts and public awareness towards different types of coastal ecosystems, including sea grass, salt marsh, mangroves and coral reefs. The authors compare the number of published research articles concerning coastal ecosystems on the database of the Web of Science to see the trend in scientific research. To assess the extent of public attention, the authors collected data from 13 international media outlets. They argue that there is a connection between more media reports and greater public awareness. Coral reefs are found to be the most popular topic in the published research and media reports while mangroves tend to draw more media attention relative to scientific efforts.

Within the domain of coral reefs and mangroves in scientific research, studies on tidal flats only account for a small number. While most of the studies on tidal flats focus on the physical characteristics of this environment, some studies illustrate the social perception on tidal flat restoration. Miththapala (2013) provides a booklet to introduce tidal flats. Their ecological characteristics, importance and the threats they are facing are mentioned to give a brief overview of this environment. There are also many other topics in the researches on tidal flats such as fauna and vegatation systems, sedimentation, reclamation and contamination aspects. However, the number of researches on the topic of perception about tidal flats is quite limited. By reviewing 110 articles about social perception of tidal flat restorations, Yamashita (2015) identifies the lack of scientific papers about social perception on tidal flat restoration. Only nine articles of the 110 directly focus on the perception towards tidal flat restoration projects.They emphasise the importance of the study of social perception on the implementation of restoration projects. Most of these studies focus on the perception of local people as Goeldner-Gianella (2007) explains,the place where people live can strongly affect their opinon about the environment. While many local people are aware of the importance and benefits of coastal marsh (Curado, Manzano-Arrondo, Figueroa, & Castillo, 2014), not many of them are able to describe the coastal ecosystems and restoration projects (Goeldner-Gianella, 2007). .

2.3.2. Language problems in tidal flat-related studies

Yamashita (2014) points out that tidal flats have been experiencing problems related to

naming and definitions. Similar to the example of swampy meadows shown by Mactaggart, Bauer, Goldney and Rawson (2008), tidal flats have been associated with a negative visual image of mud and worms. The difference in the terms used to describe tidal flats is due to user perspectives, the purpose of definitions and the lack of knowledge about this ecology (Yamashita, 2014). For example, reclaimation projects define tidal flats in a negative way while organisations trying to protect tidal flats define them in a much more positive way. The misunderstanding in the toponyms of tidal flats is also mentioned as a challenge in the attempt to conserve and introduce tidal flats to the public. Yamashita (2014) focuses on the common Japanese terms used to describe tidal flats to illustrate the problem. The most common term is "higata", which literally means a shallow water area that dries out. Another term used is "hedoro" which usually refers to a smelly and contaminated area, while fisherman use it to simply talk about tidal flats. These examples of different terms used to describe tidal flats in Japanese illustrate the influence that a name can bring to the image of a place in the human mind. However, the problem of naming tidal flats studied by Yamashiata (2014) is demonstrated in Japanese language while there is no study about the problem in other languages.

Goeldner-Gianella (2007) mentions how the lack of clear understanding of the term used in coastal marsh restoration projects contributes to the "scant knowledge of marsh and polder environments" (p.172). Only one-fifth of the respondents clearly understood what a "polder" ("reclaimed land", "land taken from the sea") is (p.172). In addition, eventhough many of the local respondents claimed to be aware of the biodiversity of the coastal ecosystem with

plenty of animals and plants, they did not give the specific names of any birds or plants. This means they lack the language to express their opions about the environment they want to show to others. Many local residents considered marshes and polders to be a "plain landscape" rather than "nature" to observe without understanding their function and biodiversity (p.172). In other words, they did not regard marshes and polders as an "entity" (Seidl, 2008) and lack a means to appreciate these environments (Basso, 1988).

It can be seen that in social studies tidal flats are not a popular topic. Some researches on the topic of tidal flats try to portray the physical characteristics of this ecosystem such as the fauna system, biochemistry and sedimentation. On the aspect of social perception about tidal flat restoration projects, there are a limited number of scientific studies. These studies focus on the perception of local people who usually have a direct connection with a tidal flat. The study by Yamashita (2014) is one of the few academic papers that show the perception of people living far away from tidal flats about this ecosystem. Although languages and ecosystems have a strong connection and the role of language in the existence of an ecosystem has got more attention from researchers, the linguistic aspect has been little studied in the researches of tidal flats. Therefore, this research is conducted in an attempt to fill the gap in knowledge and explore a new aspect of the influence names for tidal flats have on people's perception.

3. RESEARCH METHOD

The main purpose of this research is to explore how different names for tidal flats influence the perception of high school students towards tidal flats. The research methods adopted are questionnaires and interviews.

3.1.Pilot research activity

A pilot study was conducted with a sample questionnaire before distribution to a larger group. The pilot questionnaires were conducted in October 2017 and February 2018. Because of the name confusion of tidal flats in Vietnamese and Japanese, my assumption was this phenomenon is also happening in other countries and could be a factor that affects people's ability to recognize tidal flats. Therefore, the aim of the questionnaire in the first pilot study in 2017 was to have a collection of names for tidal flats in different countries from international students who are studying at the international Ritsumeikan Asia Pacific University, Japan (APU). Then, I also wanted to see how these names affect the perception of the students.

3.1.1. The first pilot research activity

In the first pilot study in 2017, the sample questionnaire was distributed to five Vietnamese students and two international students (Chinese, Indonesian) who are studying at APU.

The questionnaire focused on

- What image the respondents have when they hear the term "tidal flat"

- What a tidal flat is called in their native language and the meaning of the terms

- The image that the native terms bring to mind

One of the problems with this questionnaire was the question which required the respondents to write down the terms used to describe a tidal flat in their native language. It was a crucial question because the rest of the questionnaire was related to the native terms given in this question. However, there was a high chance that the respondents would answer "Don't know" to this question and leave other questions blank. Another problem with this sample questionnaire was the open-ended question on the image the students have towards tidal flats. The data from this question was too limited to fully understand the perception of the respondents towards tidal flats, with responses comprising single words such as "mud", "shell" and "landscape".

3.1.2. *The second pilot research activity*

In the second pilot study in 2018, the aim of the research was not only to understand the influence of different names on the students' mental image of tidal flats but also to explore the potential of metaphors in shaping their perception towards this ecosystem. The format of the question on the mental image of tidal flats was changed from an open-ended question into a multiple-choice question. In addition, a question on tidal flat metaphors was added,

in which a list of the functions of tidal flats was provided and the students were asked to give metaphors to illustrate the functions. The target respondents in this second pilot study were still international students at APU. Seven students (Vietnam, China, Indonesia, Philippines, Thailand, USA) participated in this pilot research.

Analysis of the sample questionnaire showed that the question on the metaphors about tidal flats elicited few answers from the respondents. The impact of metaphors was also not explored through this question. Moreover, the fact that the respondents come from different cultural background might influence the results collected from this questions when cultural difference is considered a factor affecting the effect of metaphors (Keulartz, 2007; Steen, Reijnierse, & Burgers, 2014).

In addition, I realised that the language I used to conduct the questionnaire might be problematic. Because I aimed to distribute the questionnaire to international students at APU, the questionnaire was made in English. However, even though international students study in English, it is not the mother tongue of many students: the five countries that have the largest number of students at APU are the Republic of Korea, Socialist Republic of Vietnam, People's Republic of China, Republic of Indonesia and King of Thailand (APU website). Therefore, in the question asking about the native names of tidal flats and their meaning, it might be difficult for the respondents to use English to explain the meaning of the native terms.

3.2.The main questionnaire

After the results from the pilot studies and additional literature review, there were some changes to the questionnaire in terms of question format, language used to make the questionnaire, sample area and target respondents. The target respondents for the main questionnaire were Vietnamese high school students and the language used in the questionnaire was Vietnamese. It was hoped that by using the native language of the respondents in the questionnaire it might be easier for them to understand the questions and explain their thoughts. Moreover, as mentioned above, cultural difference may affect the impact of metaphors on the perception of the respondents so I only conducted the questionnaire with Vietnamese high school students to reduce the cultural difference factor in exploring the impact of metaphors.

3.2.1. *Key referenced studies for making the questionnaire*

The main questionnaire was based on three main studies, including a survey of tidal flat restoration projects and environmental communication in Shima city, Mie prefecture, Japan by Yamashita and Mikami (2016), the metaphor experimental framework by Thibodeau and Boroditsky (2011) and their follow-up study conducted by Steen, Reijnierse and Burgers (2014).

The survey of tidal flat restoration projects and environmental communication by

Yamashita and Mikami in 2016,conducted in a coastal city called Shima city in Mie Prefecture, Japan was to explore the relationship between the citizens living in coastal areas and the sea and to understand how they perceive tidal flats and tidal flat restoration projects. The survey was distributed to 1500 citizens who were born before 1 April 2000 through the Shima City Municipal Office to protect their personal information, and eventually 417 valid questionnaires were collected. The survey's content was about the memories, feelings and relationships of the respondents to the sea; the opinions of the respondents about tidal flat restoration projects in terms of indicators to make tidal flat restoration projects successful, citizen's participation and how tax revenue is used for restoration projects; and the opinions of the respondents about community development in Shima city.

The questions on the mental image of tidal flats, their functions and local terms for tidal flats in the survey of Yamashita and Mikami (2016) were utilised in the questionnaire of this research. The format and content of these questions mostly remained unchanged. In the question on the mental image of tidal flats, the survey provided a list of options of tidal flats' characteristics, which might help the respondents to understand and answer the questions. Therefore, I decided to use the same format for this question in the questionnaire and added two more options, including "a place for entertainment" and "an interesting place to explore".

Other studies that had an influence on the questionnaire used for this research were the metaphor experimental framework by Thibodeau and Boroditsky (2011, 2013) and a

follow-up study to Thibodeau and Boroditsky (2013) by Steen, Reijnierse and Burgers (2014). In 2011, Thibodeau and Boroditsky carried out experiments to explore the impact of metaphors through the way people created solutions to a crime problem under two different metaphors: "Crime is a beast" and "Crime is a virus". Two groups of respondents were divided between the crime and the beast metaphor. The authors provided the respondents with a text with different positions of a metaphor in the experiments. Then, the participants were free to create the solutions to the crime problem. The results showed that under the metaphor of "crime is a beast", the respondents tended to propose law enforcement and punishment solutions more than the metaphor of a virus. On the other hand, the solutions of social reforms such as education and economic reform were more likely to be proposed under the metaphor of "crime is a virus" than "crime is a beast". In 2013, Thibodeau and Boroditsky continued a series of experiments on the two metaphors "crime is a beast" and "crime is a virus" with the same text but the respondents chose the solutions from a provided list of five measures for the crime problem instead of freely creating their own solutions. The results from this research supported the results from their previous study, in which the respondents under the metaphor of "crime is a beast" were likely to choose the law-enforcement measures, and social reform measures under the metaphor of "crime is a virus".

However, in follow-up research by Steen et al. (2014), the authors identified some holes in the Thibodeau and Boroditsky (2013) experiments. While Thibodeau and Boroditsky focused on the effects of two metaphors frames (beast/virus) and did not take into account

the effects of a non-metaphor frame, Steen et al. added to their experiments a non-metaphor control. Moreover, Steen et al. also considered that the text provided by Thibodeau and Boroditsky (2011, 2013) contained some descriptive words which helped to increase the effects of a metaphor in the text. Therefore, to understand more clearly how a single-word metaphor guides the choices of respondents, Steen et al. conducted an experiment which had no supportive words for a metaphor. The results from Steen et al. (2014) showed that a metaphor and non-metaphor frame had the same impacts in terms of crime solutions, namely a law enforcement-oriented result. Supportive words for the metaphor helped to improve the memory of the respondents about the metaphor but had no effects on the crime solutions preference. However, in spite of the difference in the results between their research and the research conducted by Thibodeau and Boroditsky (2011, 2013), Steen et al. also point out that using crime to test the impacts of a metaphor, which is an important and familiar issue with people can affect the results of the experiments.

Among the limited experimental literature of metaphor effects, Thibodeau and Boroditsky's experiments (2011, 2013) and the follow-up study by Steen et al. (2014) were noticeable studies and provided a guide for this research. In my research, the questionnaire used both metaphor and non-metaphor frames, which was similar to the study of Steen et.al (2014). However, the metaphor was provided in the question instead of in a paragraph, which the respondents read and then answered the questions. There was also no supportive word with a metaphor in the question because the aim of this research was to explore the impacts of a metaphor on the perception of the students towards tidal flats rather than their memory of

the metaphor.

3.2.2. *Respondents of the questionnaire*

The main research question of this study is how the terms used to describe tidal flats influence their image in people's perception. The focus of this research was not local people who are familiar with tidal flats but the people who are living far away from the sea and are not familiar with this ecosystem. As tidal flats are not recognised well by the public, it is important to understand how they perceive tidal flats in order to promote the image of this important coastal wetland in the future.

The respondents who were chosen are Vietnamese senior high school students. In the education system of Vietnam, unlike university students whose educational programmes focus more on their major and specialisation, high school students are still required to study many subjects including core subjects such as science and literature alongside subjects such as information technology and physical training. The curriculum is also designed by the Ministry of Education with the same textbooks for all students. In the last year of high school, the senior students have almost completed the curriculum designed by the Ministry of Education and are expected to have a general knowledge according to the curriculum. Therefore, with an assumption that education can be a factor which influences the students' perception of tidal flats, senior high school students became the target respondents of this research. In total, there were 152 high school students responding to the questionnaire.

Sample schools for the questionnaire

The respondents for the questionnaire came from two high schools: Kim Lien High School in the capital city Hanoi (hereafter school A) and Xuan Truong B High School in Nam Dinh city, Nam Dinh province (hereafter school B). Both school A and school B are public high schools and located in the city. They can be regarded as typical high schools in Hanoi and Nam Dinh province, where the students follow the same curriculum designed by the Ministry of Education.

The main difference between these two high schools is that school B is located closer to a Ramsar site[1], which is called Xuan Thuy National Park. This school was chosen to explore if there is a difference between the mental image of the students from Hanoi, which is a big city and far away from the sea, and those who are living closer to the coastal areas and a Ramsar Site (Xuan Thuy National Park) in Nam Dinh Province. Xuan Thuy National Park, the largest coastal wetland in the North of Vietnam, is the first Ramsar site of Vietnam and the Southeast Asia region as well. The Park plays an important role in terms of nature conservation and migratory birds' habitat and is about 70 km from the city centre where school B is located.

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[1]A Ramsar site is a wetland site which is recognised as being of significant value not only for the country or the countries in which they are located, but for humanity as a whole. A Ramsar site is designated based on the criteria for identifying Wetland of International Importance by the Ramsar Convention (Ramsar website)

3.2.3. *The questionnaire design*

There was a difference between the questionnaires distributed in the two schools in terms of the number of questions. The questionnaire set distributed in school B consisted of 11 questions while the questionnaire set in school A had only nine questions. The two questions omitted in the school A questionnaire set were about the local name for tidal flats. The other nine questions in the school A set remained the same as those in the school B set.

In each target school, there were three sets of questionnaire: set 1 – non-metaphor control; set 2 with metaphor 1 (denoting a tidal flat as the migratory birds' home); and set 3 with metaphor 2 (denoting a tidal flat as a water filter machine). The references to "home" and "a water filter machine" are easy to understand and familiar to most people. In addition, because there is a close relationship between tidal flats and migratory birds, and providing a resting place for birds is a very important function of this ecosystem, I used the metaphor of the "birds' home" to make a connection between tidal flats and birds in the definition of a tidal flat. In terms of the metaphor of "a water filter machine", this was used to explain the tidal flats' function of water purification, which is considered a very unique function of this ecosystem and wetland in general (U.S. Fish and Wildlife Service, 2004).

The metaphors were added into question 5 in set 2 and set 3 without telling the participants there was a metaphor in the question. The provision of a metaphor in question 5 in questionnaire set 2 and 3 was expected to see whether or not it had an impact on the

respondents' mental image of the tidal flats in the next question.

Table 1: Questionnaire design

		School A (Hanoi city)	School B (Nam Dinh city – which is closer to a Ramsar site)	Note
Number of Questions		9	11	The two questions on local terms for tidal flats were added in the questionnaires distributed in school B
Number of respondents	**Set 1 (without a metaphor)**	46	22	The content of these questions are the same in both questionnaires
	Set 2 (with metaphor 1 – migratory birds' home)	24	22	
	Set 3 (with metaphor 2 – water filter machine)	21	17	
Total		**91**	**61**	152 in total

The questionnaires were distributed on March 3rd 2018 in school A and on March 10th 2018 in school B

Content of the questionnaire

In terms of content, there were two main parts in the questionnaire.

Part 1: General knowledge about wetland (first 2questions)

Questions were about which types of wetland the students know about and how they know them. One of my hypotheses through these questions was that tidal flats are not a familiar ecosystem compared to other coastal wetland types such as mangroves and coral reefs.

Part 2: The mental image of a tidal flat (7 questions in the school A questionnaire and 9 questions in the school B questionnaire)

The questions asked if they know the term "bãi triều" (tidal area)(the official name of tidal flats in the media and scientific documents), the mental image they have when they hear the term, their experience with tidal flats and the functions of tidal flats. Two other terms (bãi bùn – muddy area and bãi lầy – boggy area) referring to a tidal flat were also mentioned and the students were asked about how their mental images of tidal flats changes when they hear these two terms. The students in school B were also asked two more questions about the local terms used to describe tidal flats.

The hypotheses regarding these questions were:

- The official name is not common among the students in both schools

- The students would have different images (positive/negative) for different names for tidal flats

- Metaphors help to improve the image of a tidal flat

3.2.4. Limitations of the questionnaire design

The questionnaire was designed to explore the mental images of high school students from two high schools in Hanoi city and Nam Dinh city. The impact of metaphors and different names used for describing tidal flats were also identified through the questionnaire. Although some adjustments were made to improve the quality of the questionnaire, there are still some limitations.

- *The representativeness of the sample schools*: The questionnaire was conducted in two high schools in Hanoi city and Nam Dinh city. It is not possible for these two high schools to represent all the students in two cities. The results from the questionnaire might be able to reflect only a small proportion of the high school students in both cities. However, I hope that the results could shed light on how Vietnamese high school students perceive tidal flats and the influence of different names and a metaphor on their perception.

- *The metaphors used in the questionnaire:* There are many metaphors used to describe a tidal flat and each of them can lead to different reactions from the readers. It is difficult to choose which the best metaphor to be used is. Therefore, I chose two metaphors "migratory birds' home" and "a water filter machine", which are familiar and easily understandable images to high schoolstudents. These were used to explore how they impact the perception of the students. However, they can be considered too closely related images compared to other metaphors of tidal flats such as "kidney of the earth" or "the womb of the sea". Because the questionnaire was conducted in Vietnamese, I originally tried to translate these terms into Vietnamese but the translation seemed not to be as attractive as the English

version.

- ***The lack of questions about a Ramsar site in the questionnaire*:** There was no specific question about the Ramsar site (such as whether or not the students know about the Ramsar site in the province; is the Ramsar site mentioned in the lessons in classes; if the students know the Ramsar site, how do they know etc.). If these questions had been added into the questionnaire, this would have been very helpful to understand the role of a Ramsar site in shaping the students' mental image of tidal flats in school B.

3.3. Semi-structured interviews

There were three interviews conducted for this research. The first interview was conducted through a face-to-face meeting with an official from the Media and Communication Department of International Union for Conservation of Nature (IUCN, Vietnam) in February 2018. The main purpose of this interview was to gain information about education and communication activitiesto raise the awareness of the importance of wetland in general and tidal flats conducted by IUCN and, if possible, other organisations in Vietnam.

The second and third interviews were online interviews conducted in May and June 2018, with geography teachers from both high schools, A and B. The main purpose of these interviews was to understand the how education activities about wetland are being conducted at the schools and whether or not a wetland site is a destination for school trips

at both schools. Moreover, the interview with the teacher in school B was essential for me to have more information about the connection between the students and Xuan Thuy National Park to cover the absence of questions on the National Park in the questionnaire previously distributed at school B in March 2018. The main questions asked in both interviews were about how information of wetland/tidal flats was provided during classes; whether there are school trips to wetland sites (I focused on Xuan Thuy National Park for school B) and educational activities organised by wetland education centres at the schools.

4. FINDINGS

In this chapter, I describe the results from the questionnaire one question at a time and then combine the questions to gain a deeper analysis.

4.1.Basic analysis of the questionnaire results from both schools

Q1. Among different types of wetland, which types do you know?

Result from the school A questionnaire (Hanoi):

	Total (number)	Total (%)
River, lake	74	81.3
Swamp	70	76.9
Marsh	46	50.5
Peatland	32	35.2
Oasis	32	35.2
Estuary	53	58.2
Delta	52	57.1
Tidal flat	41	45.1
Mangrove	54	59.3
Coral reef	34	37.4
Artificial wetland	69	75.8
Do not know	1	1.1
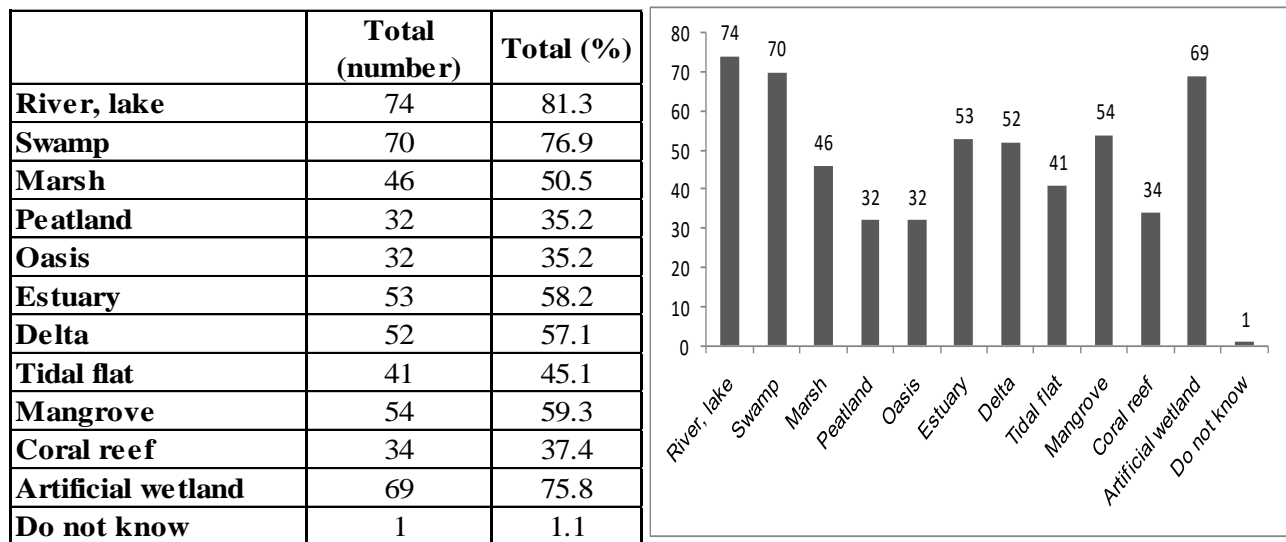
For the students in school A, the most common wetland types are river, lake (81.3%), swamp (76.9%), artificial wetland such as rice fields and salt fields (75.8%) and mangrove (59.3%). Tidal flats are not a familiar ecosystem with the students in school A (45.1%), together with coral reefs (37.4%), peatland (35.2%) and oasis (35.2%).

Result from the school B questionnaire (Nam Dinh):

	Total (number)	Total (%)
River, lake	54	88.5
Swamp	41	67.2
Marsh	41	67.2
Peatland	8	13.1
Oasis	14	23.0
Estuary	26	42.6
Delta	40	65.6
Tidal flat	12	19.7
Mangrove	32	52.5
Coral reef	12	19.7
Artificial wetland	52	85.2
Do not know	1	1.6
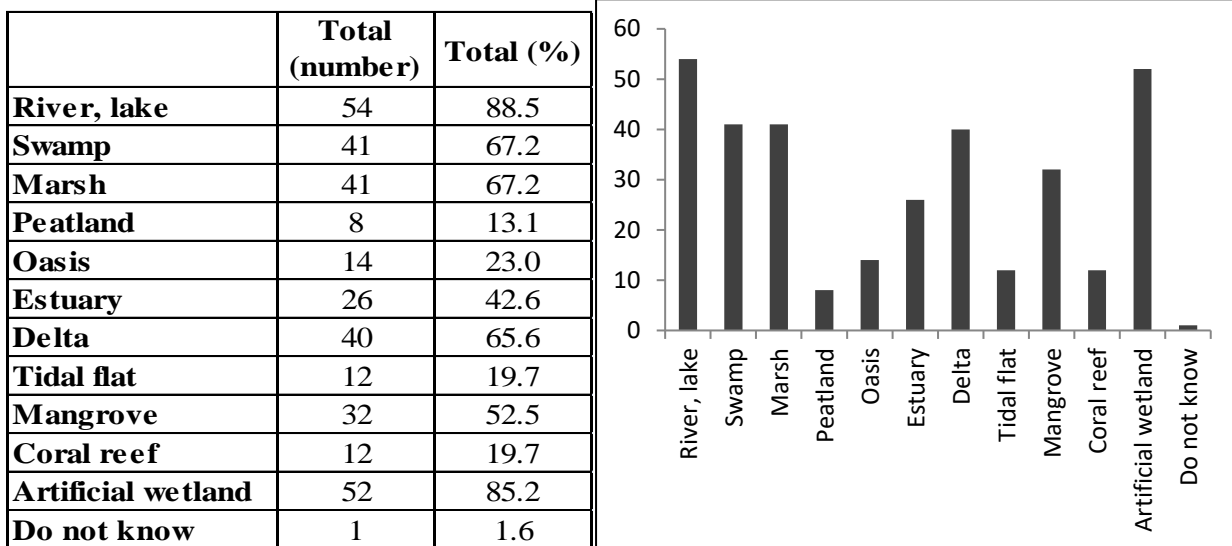
The most familiar wetland types with the students in school B are: river, lake (88.5%), artificial wetland such as rice fields and salt fields (85%), swamp, marsh (both 67%), delta (65%) and mangrove (52%). Only 20% of the students know tidal flats.

Q2. How do you know about wetland?

Result from the school A questionnaire (Hanoi):

	Total (number)	Total (%)	
1. Lessons in classes	51	56.7	51
2. Media (TV, Newspaper, Radio,…)	68	75.6	68
3. Excursion	39	43.3	39
4. Daily life	51	56.7	51
5. Information from acquaintances	18	20.0	18
6. Other	2	2.2	2
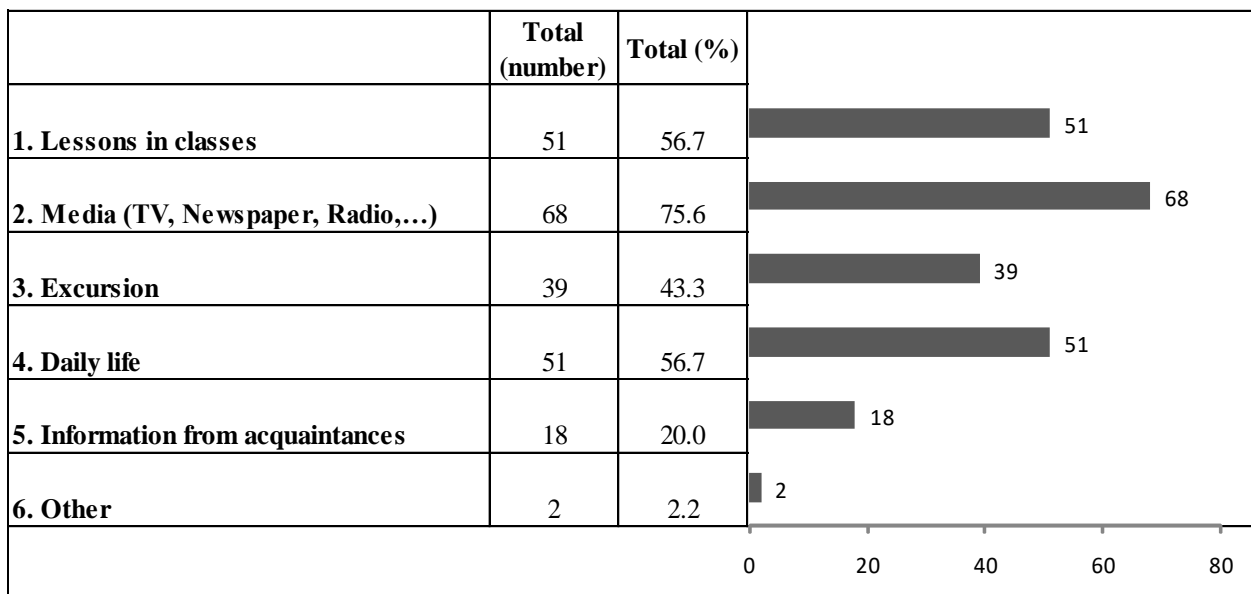
The students in high school A know about wetland mainly through the media (75.6%), lessons in classes (57%) and daily life activities (57%).

Result from the school B questionnaire (Nam Dinh):

	Total (number)	Total (%)	
1. Lessons in classes	25	41.7	25
2. Media (TV, Newspaper, Radio,…)	43	71.7	43
3. Excursion	14	23.3	14
4. Daily life	41	68.3	41
5. Information from acquaintances	16	26.7	16
6. Other	2	3.3	2
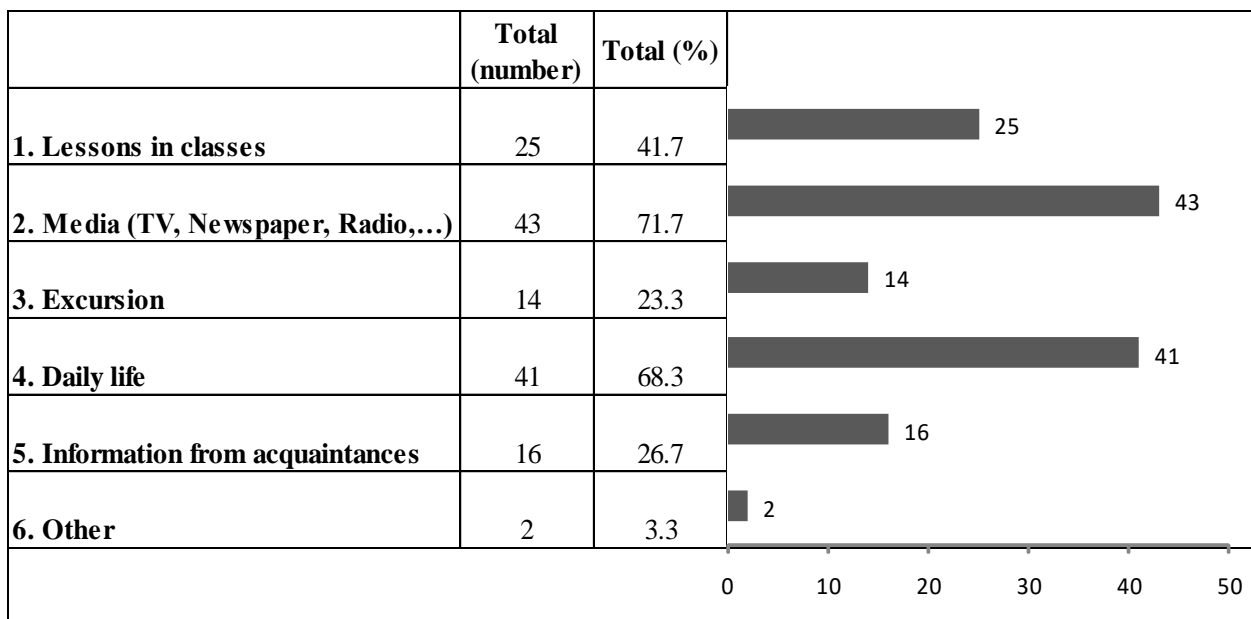
The students in school B know about wetland mainly through the media (72%) and daily life activities (70%).

Q3. Have you heard the term "bãi triều"?

"Bãi triều" means a tidal area. This term is the official name of a tidal flat and used in government, scientific documents and the media. The number of the students who know the term and who do not know the term is shown below:

		Total (number)	Total (%)
School A	**1. Yes**	37	40.7
	2. No	54	59.3
School B	**3. Yes**	19	31.1
	4. No	42	68.9
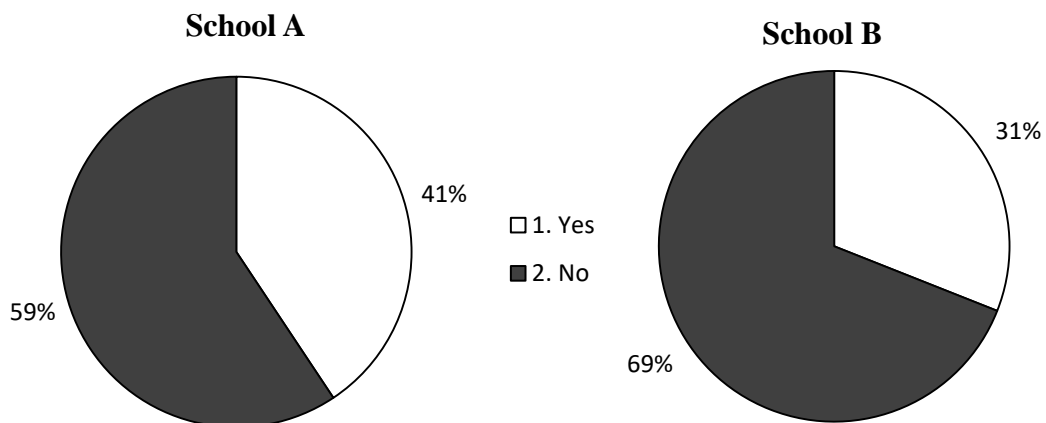
About 60% of the students in school A (54 students) and 70% of the students in school B do not know the term "bãi triều".

Q4. In what situation have you heard the term "bãi triều"?

The students in school A mainly know the term through lessons in classes and the media such as TV, newspaper and radio. Among the 37 students in school A who know the term, 51.4% know through media channels and 40.5% know through lessons in classes. In school B, the media is the main source of information through which the students know the term "bãi triều". The results of this question for both schools are shown in the graph below.
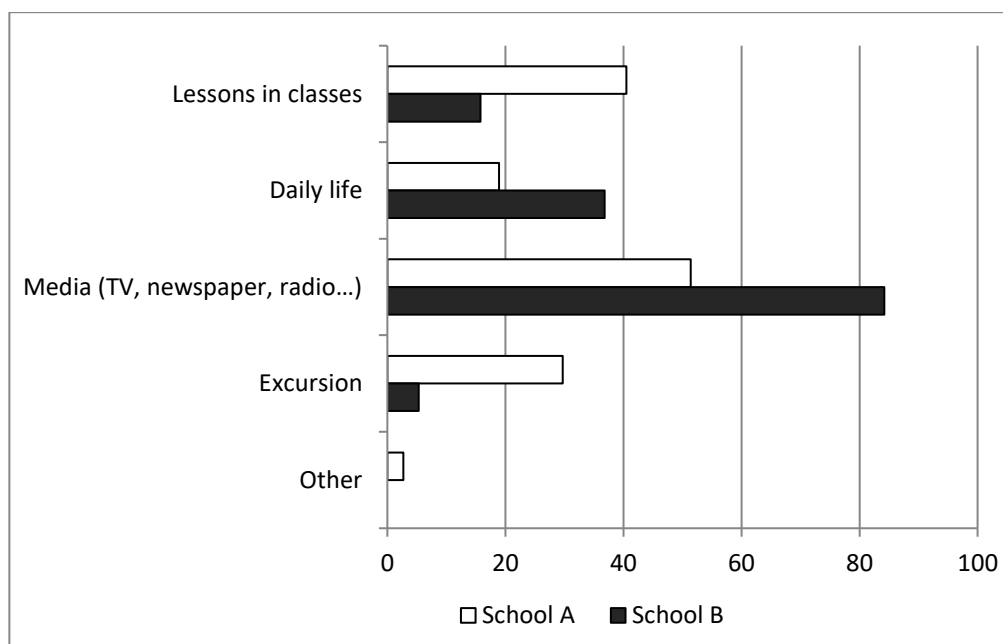
Q5. Tidal flats are located in coastal areas where mud or sand is deposited in shallow water areas and appear when the tide is low and are flooded when the tide is high. Do you know this type of ecosystem?

In this question, the definition of a tidal flat was provided. In questionnaire set 1, only the definition was provided and without a metaphor, while questionnaire set 2 and 3 consisted of both the definition and a metaphor of a tidal flat (a migratory birds' home for questionnaire set 2 and a water filter machine for questionnaire set 3).

School A

	Set 1 (without a metaphor)	Set 2 (a migratory birds's home)	Set 3 (a water filter machine)
☐ 1. Yes	37	7	8
■ 2. No	8	15	12

School B

	Set 1 (without a metaphor)	Set 2 (a migratory birds' home)	Set 3 (a water filter machine)
☐ Yes	17	9	3
■ No	5	13	14
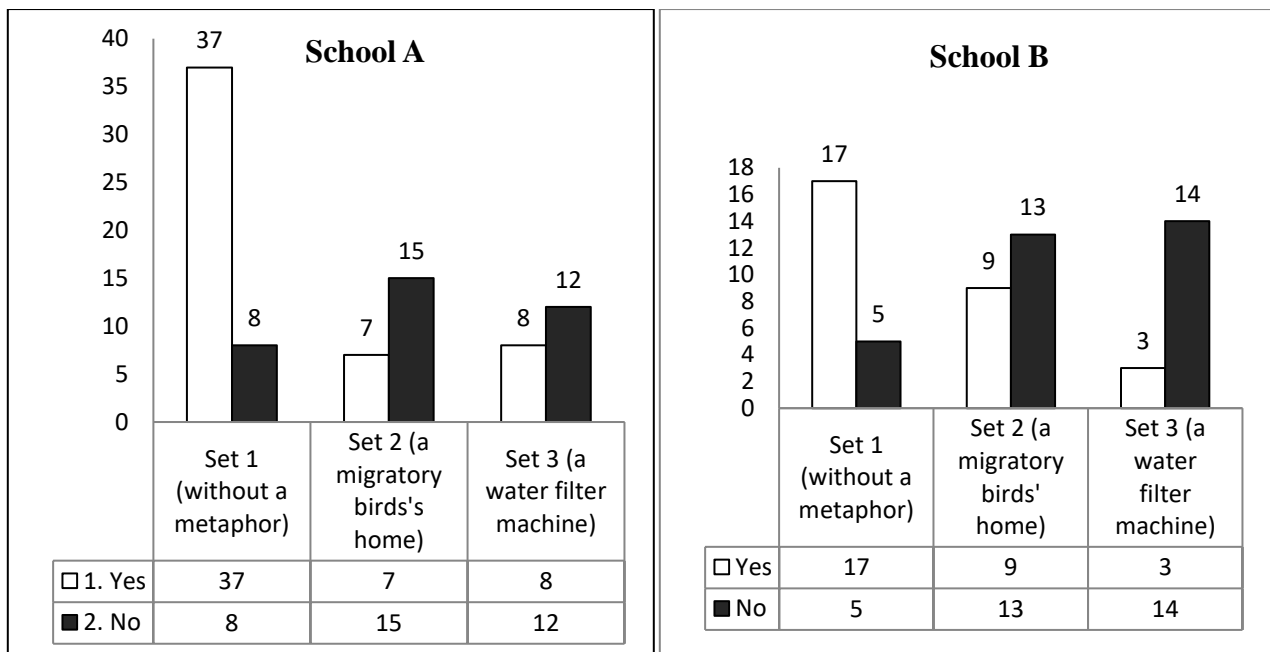
Result from the school A questionnaire (Hanoi):

In total, 52 students (about 60%) know about a place with the features provided in the question (a tidal flat). In questionnaire set 1 (without a metaphor), the number of students

who know tidal flats (37 students) is greater than those who do not know (8 students). However, this trend is reversed in questionnaire set 2 and 3 where the number of students who do not know tidal flats (25 students) is greater than those who know (15 students).

Result from the school B questionnaire (Nam Dinh):

The trend in the results of the questionnaire in school B is similar to the results of school A. In questionnaire set 1, more students know the place than those who do not while in questionnaire set 2 and 3, the results were reversed.

Q6. With the definition given in question 5, what is your mental image of tidal flats?

Result from the school A questionnaire (Hanoi):

	Total (number)	Total (%)	Set 1 (without a metaphor)	Set 2 (migratory birds' home metaphor)	Set 3 (a water filter machine metaphor)
1. Polluted	53	58.2	30	12	11
2. Not polluted	36	39.6	16	11	9
3. Do not know	2	2.2	0	1	1
1. Many living creatures	52	57.1	23	18	11
2. No living creatures	36	39.6	21	5	10
3. Do not know	3	3.3	2	1	0
1. Beautiful	39	42.9	14	15	10
2. Not beautiful	47	50.0	30	6	11
3. Do not know	5	5.6	2	3	0
1. Can collect food	42	46.2	20	13	9
2. Cannot collect food	42	46.2	24	8	10
3. Do not know	7	7.7	2	3	2
1. Clean and not smelly	35	38.5	19	8	8
2. Dirty and smelly	49	53.8	25	13	11
3. Do not know	7	7.7	2	3	2
1. A place for entertainment	32	35.2	16	8	8
2. Not a place for entertainment	55	60.4	29	13	13
3. Do not know	4	4.4	1	3	0
1. An interesting place to explore	49	53.8	21	15	13
2. Not an interesting place to explore	40	44.0	24	8	8
3. Do not know	2	2.2	1	1	0
1. Other	2	2.2			

The students in school A's mental image of tidal flats is not positive:"polluted"(60%), "not beautiful" (50%), "cannot collect food" (46%), "dirty and smelly" (54%)and "not a place for entertainment" (60%).At the same time, 57% of the students think that a tidal flat has "many living creatures" and 54% chose "an interesting place to explore". However, in the options of "beautiful/not beautiful" and "an interesting place to explore/not an interesting place to explore", there is a difference among the three questionnaire sets. In questionnaire set 2 (with

the metaphor "migratory birds' home" and set 3 (with the metaphor "a water filter machine"), more students think a tidal flat is "beautiful" and 'an interesting place to explore" than those who had the opposite choices.

Result from the school B questionnaire (Nam Dinh):

	Total (number)	Total (%)	Set 1 (without a metaphor)	Set 2 (migratory birds' home metaphor)	Set 3 (a water filter machine metaphor)
1. Polluted	17	27.9	5	9	3
2. Not polluted	34	55.7	12	12	10
3. Don't know	10	16.4	5	1	4
1. Many living creatures	45	73.8	16	17	12
2. No living creatures	10	16.4	3	4	3
3. Don't know	5	8.2	3	1	1
1. Beautiful	37	60.7	12	11	14
2. Not beautiful	16	26.2	6	8	2
3. Don't know	7	11.5	3	3	1
1. Can collect food	39	63.9	11	14	14
2. Cannot collect food	13	21.3	6	6	1
3. Don't know	9	14.8	5	2	2
1. Dirty and smelly	31	50.8	8	9	14
2. Clean and not smelly	19	31.1	7	10	2
3. Don't know	11	18.0	7	3	1
1. A place for entertainment	26	42.6	8	6	12
2. Not a place for entertainment	28	45.9	9	15	4
3. Don't know	7	11.5	5	1	1
1. An interesting place to explore	34	55.7	10	13	11
2. Not an interesting place to explore	18	29.5	5	8	5
3. Don't know	9	14.8	7	1	1
1. Other	2	3.3			

The students in school B's mental image of tidal flats is quite positive: "not polluted" (56%),

"many living creatures" (74%), "beautiful" (61%), "can collect food" (64%) and "an interesting place to explore" (56%). At the same time, 51% of the students think a tidal flat is "dirty and smelly" and 46% of them do not think a tidal flat is a place for entertainment.

Q7. Have you been to a place described in question 5? [Tidal flats are located in coastal areas where mud or sand is deposited in shallow water areas and appear when the tide is low and are flooded when the tide is high.]

(This question is question 9 in the school B questionnaire)

		Total (number)	Total (%)
School A	1. Yes	29	32.6
	2. No	60	67.4
School B	1. Yes	15	24.6
	2. No	46	75.4

School A

33%

☐ 1. Yes
■ 2. No

67%

School B

25%

75%
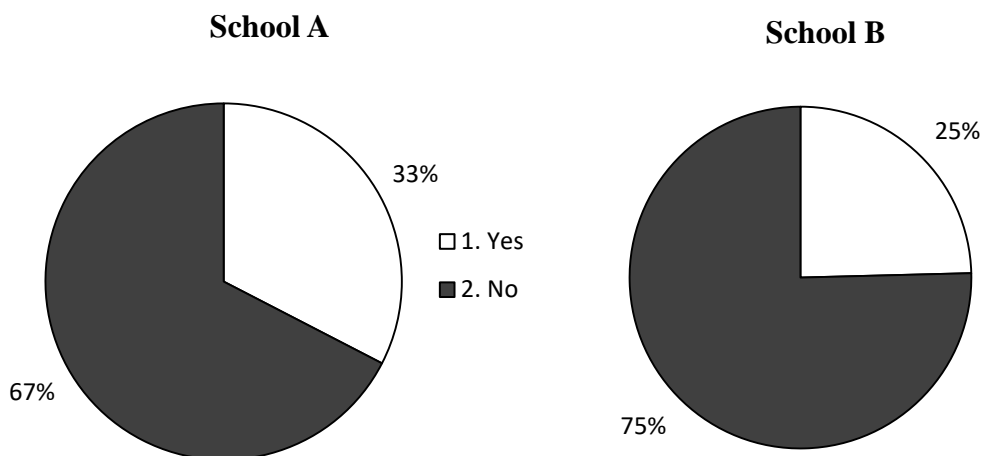
Many of the students in both school A and B have not been to a tidal flat before with 67% of the students in school A and 75% of the students in school B saying "No" in this question.

Q8. How does your mental image of tidal flats change when you hear different names for a tidal flat?

(This question is question 10 in the school B questionnaire)

There are three different names for tidal flats provided in this question. Their meaning and where they are used are shown in the table below:

Table 2: Different names for a tidal flat and their meanings

Name	Meaning	Where it is used
Bãi triều	Tidal area	Official name, scientific documents, media
Bãi bùn	Muddy area	Educational materials, TV shows, Wikipedia
Bãi lầy	Boggy area	Local name, educational materials

The term "bãi bùn":

The mental image of tidal flats is quite negative for the term "bãi bùn" for the students in both school A and B. Many of them agreed that a tidal flat is a place which is "not beautiful", "dirty and smelly", "not a place for entertainment" and "not an interesting place to explore".

Bai bun	School A (%)	School B (%)
1. Polluted	45.1	54.1
2. Not polluted	52.7	36.1
3. Don't know	2.2	9.8
1. Many living creatures	39.6	42.6
2. No living creatures	56.0	41.0
3. Don't know	4.4	16.4
1. Beautiful	13.2	11.5
2. Not beautiful	84.6	75.4
3. Don't know	2.2	13.1
1. Can collect food	28.6	49.2
2. Cannot collect food	63.7	39.3
3. Don't know	7.7	11.5
1. Dirty and smelly	76.9	78.7
2. Clean and not smelly	19.8	13.1
3. Don't know	3.3	8.2
1. A place for entertainment	24.2	8.2
2. Not a place for entertainment	70.3	80.3
3. Don't know	5.5	11.5
1. An interesting place to explore	35.2	24.6
2. Not an interesting place to explore	63.7	65.6
3. Don't know	1.1	9.8
1. Other	3.3	0.0

Although the term "bãi bùn" is not really effective in improving the image of tidal flats, this term also has some positive impacts on the image of tidal flats in terms of "not polluted" (students in school A) and "many living creatures" (students in school B).

The term "bãi lầy":

With the term "bai lay", the mental image of a tidal flat for the students becomes negative in all options: "polluted", "no living creatures", "not beautiful", "cannot collect food",

"dirty and smelly", "not a place for entertainment" and "not an interesting place to explore". In addition, compared to the term "bai bun", the number of the students who chose negative options with this terms was also greater.

Bai lay	School A (%)	School B (%)
1. Polluted	60.4	70.5
2. Not polluted	37.4	23.0
3. Don't know	2.2	6.6
1. Many living creatures	31.9	31.1
2. No living creatures	63.7	54.1
3. Don't know	4.4	14.8
1. Beautiful	15.4	9.8
2. Not beautiful	82.4	73.8
3. Don't know	2.2	16.4
1. Can collect food	22.0	27.9
2. Cannot collect food	74.7	54.1
3. Don't know	3.3	18.0
1. Dirty and smelly	74.7	78.7
2. Clean and not smelly	23.1	9.8
3. Don't know	2.2	9.8
1. A place for entertainment	15.4	3.3
2. Not a place for entertainment	79.1	80.3
3. Don't know	5.5	16.4
1. An interesting place to explore	23.1	11.5
2. Not an interesting place to explore	72.5	75.4
3. Don't know	4.4	13.1
1. Other	2.2	0.0

Q9. What kinds of functions do you think tidal flats have?

(This is question 11 in the school B questionnaire)

Result from the school A questionnaire (Hanoi):

	Total (number)	Total (%)	
1. Cleans seawater	53	58.2	53
2. Provide a nursery habitat for growing fish	39	42.9	39
3. Support fishery	51	56.0	51
4. Enriches ocean biodiversity	52	57.1	52
5. Reduces damage from storm, flood	33	36.3	33
6. Prevents coastal erosion	51	56.0	51
7. Reduces CO2 released into the atmosphere	22	24.2	22
8. Provides a place for people to entertain	23	25.3	23
9. Provides areas for migratory birds to stop over	35	38.5	35
10. Other	2	2.2	2

The students in school A think the functions tidal flats have are: "cleans seawater" (60%), "support fishery"(56%), "enrich ocean biodiversity" (57%) and "prevent coastal erosion" (56%). Only 25% of the student think that tidal flats can provide a place for people to entertain.

Result from the school B questionnaire (Nam Dinh):

	Total (number)	Total (%)	
1. Cleans seawater	24	39.3	24
2. Provide a nursery habitat for growing fish	30	49.2	30
3. Support fishery	32	52.5	32
4. Enriches ocean biodiversity	28	45.9	28
5. Reduces damage from storm, flood	11	18.0	11
6. Prevents coastal erosion	22	36.1	22
7. Reduces CO2 released into the atmosphere	6	9.8	6
8. Provides a place for people to entertain	13	21.3	13
9. Provides areas for migratory birds to stop over	23	37.7	23
10. Other	1	1.6	1

The functions the students in school B think tidal flats have are: "support fishery" (52%), "provide a nursery habitat for growing fish" (49%) and "enriches ocean biodiversity" (45%). About 40% of the students think that a tidal flat "cleans seawater".

There are two other questions in the school B questionnaire, which were omitted in the school A questionnaire. They are questions about local names for describing tidal flats in the students' residential area. The results from these questions are presented as follow:

(In the school B questionnaire only) Q7. In your local areas, what is a tidal flat [bãi triều]called?
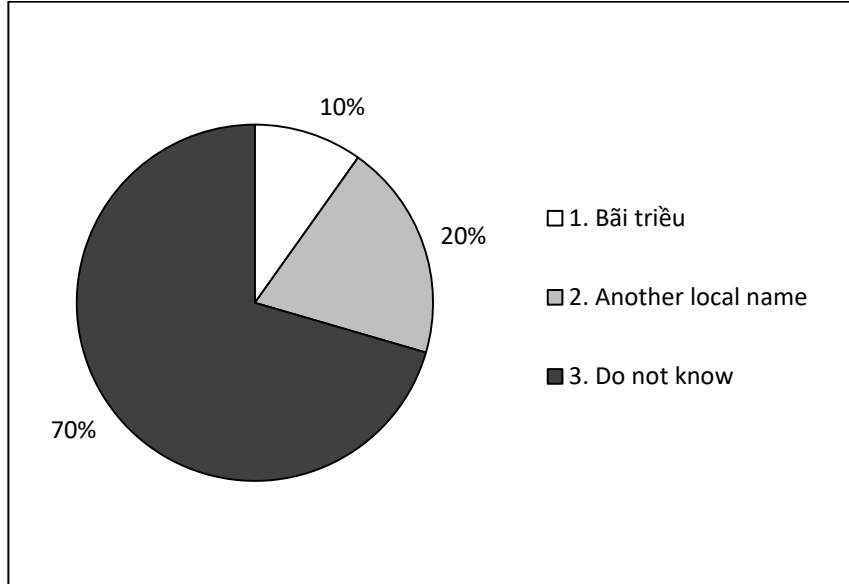
70% of the students do not know whether or not a tidal flat has a local name in the area they live in. 10% of the students chose the term "bãi triều" and 20% provided local names for a tidal flat. The local names given by the students in school B are:

- Ao tù (billabong)

- Nước đọng (pool)

- Vùng ngập úng nước (waterlogged area)

- Bãi lầy, vũng lầy (boggy area)

- Sông, hồ, đầm cỏ ngập nước (lake, river, marsh)

(In the school B questionnaire only) Q8. How do you know the term(s) given in question 7?
80% of the students know the local terms of tidal flats through daily life activities, the media and excursions.

	Total (number)	Total (%)	
1. Daily life	14	77.8	14
2. Lessons from classes	5	27.8	5
3. Media channels (TV, newspaper, radio)	14	77.8	14
4. Excursions	14	77.8	14
5. Other	1	5.6	1
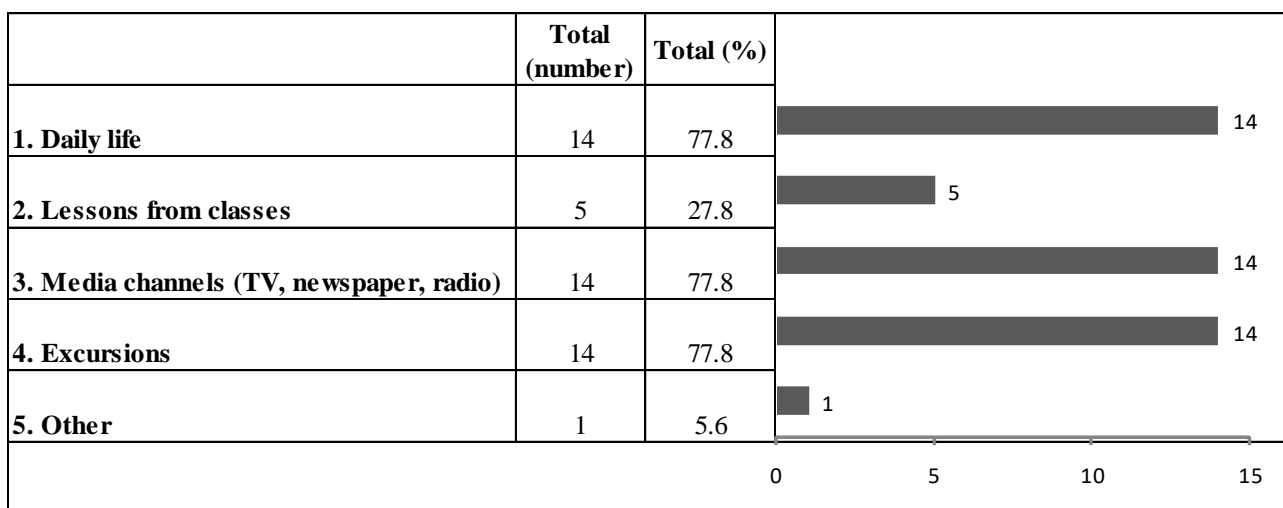
Up until this point, I have provided the basic analysis of the questionnaire results, question by question with a simple description. In the next section, I combine different questions together to analyse the perception of the students towards tidal flats more deeply through different aspects. In section 4.3, I use the data from the interviews with the teachers from schools A and B and the media official from IUCN to understand the role of environmental activities in shaping the students' mental images of tidal flats.

4.2. Students' perception of tidal flats

4.2.1. Students' awareness of tidal flats through the term "bãi triều" (tidal area)

In the question asking about the term "bãi triều" (question 3), which is an official name for tidal flats in Vietnam, 40% of the students in school A and 30% of the students in school B know the term. There are more students who know tidal flats than those who

know the term "bãi triều". 60% of the students in school A and 48% of the students in school B know tidal flats compared to 39% and 30% of the students who know the term "bãi triều" in school A and B respectively. It can be said that the term "bãi triều" is not popular among the students. Table 3 illustrates the number of students who do and do not know tidal flats and the term "bãi triều".

Table 3: The number of students who know and not know tidal flat and the term "bãi triều" (tidal area, an official name)

		Know tidal flat	Do not know tidal flat	Total % (number of respondents)
School A	**Know the term "bãi triều"**	23	11	**39% (34)**
	Do not know the term "bãi triều"	29	24	**61% (53)**
	Total % (number)	**60% (52)**	**40% (35)**	**87**
School B	**Know the term "bãi triều"**	11	8	**31% (19)**
	Do not know the term "bãi triều"	18	24	**48% (42)**
	Total % (number)	**48% (29)**	**52% (32)**	**61**

Among the 52 students (60%) who know tidal flats in school A, only 23 of them (44%) know the term "bãi triều". In school B, 11 out of 29 students (38%) who know tidal flats know this term. Also, among the students who do not know tidal flats, 11 students in

school A (31%) and 8 students in school B (25%) still know the term "bãi triều". In other words, some students may know tidal flats by another name or some may hear the term "bãi triều" somewhere but do not know what it is.

When the definition of a tidal flat was provided instead of the term only, more students know tidal flats. Question 5 provided a definition of tidal flats: "located in coastal areas where mud or sand is deposited in shallow water areas and appear when the tide is low and are flooded when the tide is high". Questionnaire set 1 (without a metaphor) includes this definition only while questionnaire set 2 and 3 include both the definition and a metaphor of "migratory birds' home" (set 2) or a water filter machine (set 3). The results for the number of students who know tidal flats when more information about them was provided, is given in Figure 1.

Figure 1: The number of students knowing tidal flats when a definition of a tidal flat was provided

School A	Set 1 (without a metaphor)	Set 2 (a migratory birds's home)	Set 3 (a water filter machine)
□1. Yes	37	7	8
■2. No	8	15	12

□1. Yes ■2. No

School B	Set 1 (without a metaphor)	Set 2 (a migratory birds' home)	Set 3 (a water filter machine)
□Yes	17	9	3
■No	5	13	14

□Yes ■No
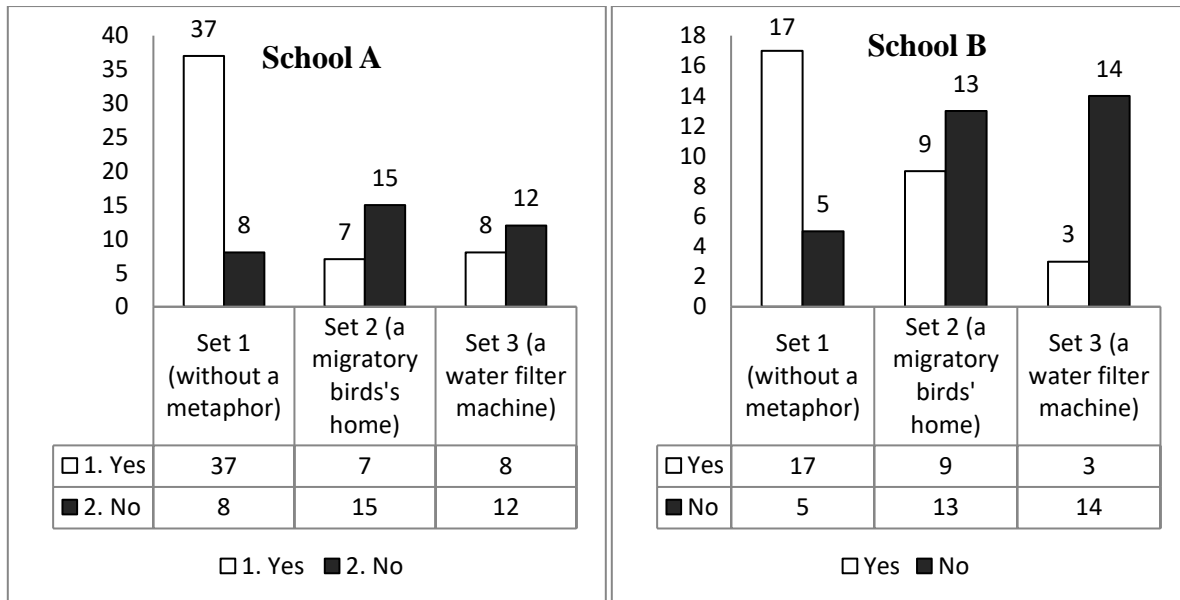
In questionnaire set 1, which provided the definition of a tidal flat only, 60% of the students in school A and 47% of students in school B know the place. However, in questionnaire set 2 and 3, when more information on the functions of tidal flats was given by using the metaphors "migratory birds' home" or "a water filter machine", more students do not know a tidal flat than those who know.

There might also be a misunderstanding among the students about tidal flats and beaches. They know the place which is located in the coastal area, flooded when the tide is high and uncovered when the tide is low but they might not think this kind of place has important functions such as seawater purification or a stopover for migratory birds. The students were likely to link the place in the description with a beach rather than a tidal flat. The question

about their experience with tidal flats (question 7 in the school A questionnaire and question 9 in the school B questionnaire) also supports this argument as many examples of tidal flats provided by the students were actually beaches.

4.2.2. The students' general mental image of a tidal flat

The students' mental image of a tidal flat in both schools is illustrated in Figure 2 below.

Figure 2: The students' general mental image of a tidal flat
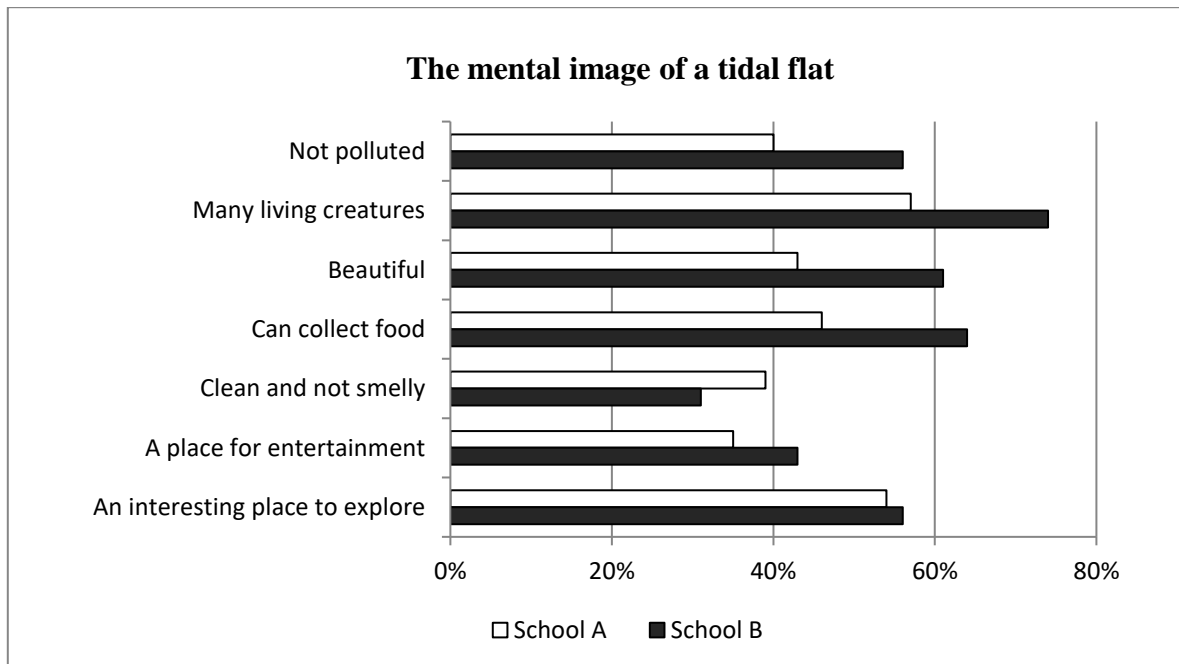
Compared to the mental image of the students in school A, the mental image of the students in school B is more positive. Many of the students in both schools think a tidal flat is dirty, smelly and not a place for entertainment. However, at the same time they also agree that there are many living creatures in a tidal flat and it is an interesting place to explore. A

closer distance to a coastal area can be considered a factor which affects positively the students' mental image in school B.

4.2.3. *The influence of experience with tidal flats on the mental image of the students*

The students' mental images of tidal flats vary according to who has visited a tidal flat and who has not. The mental image of tidal flats for the two groups of students (with and without experience) is shown in Figure 3.

Figure 3: The students' mental image of tidal flats with and without experience of a tidal flat in school A and B

School B

Legend: □ With experience ■ Without experience
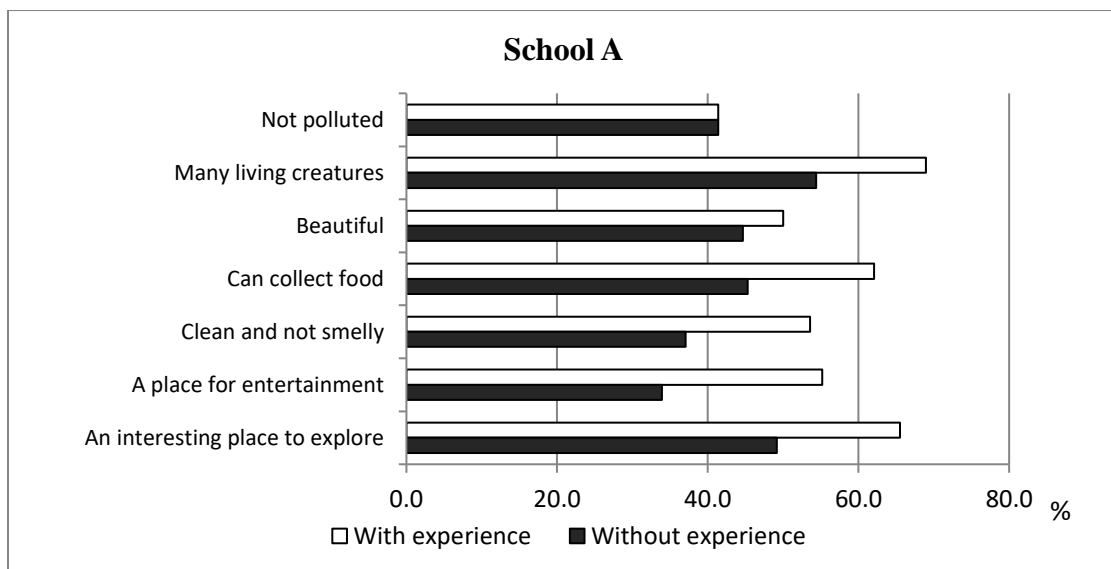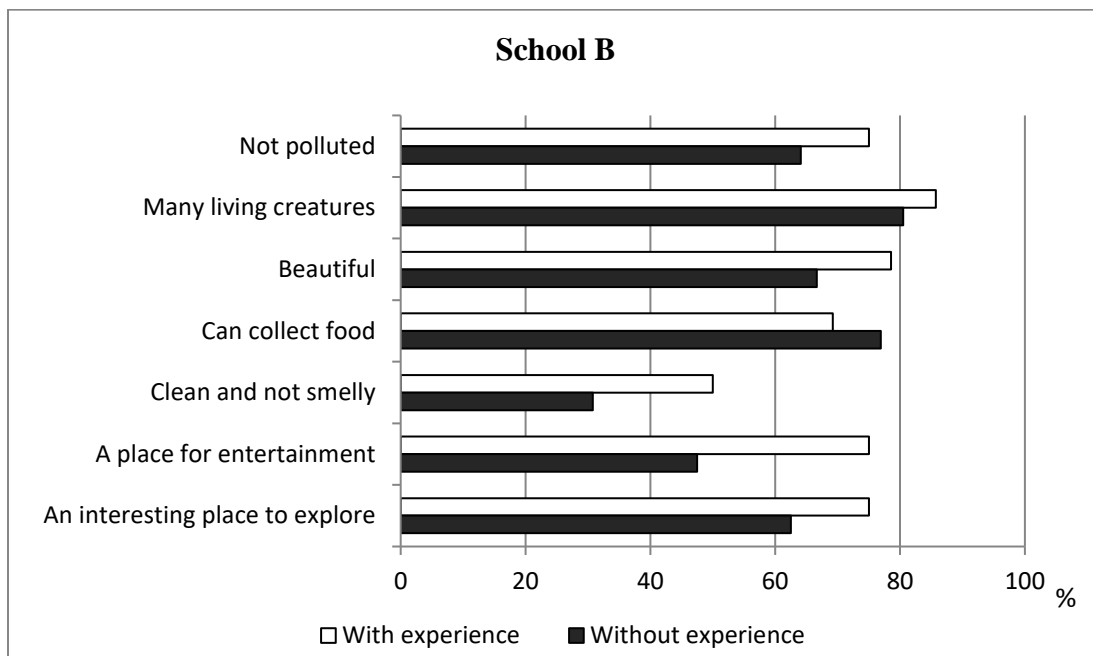
In general, the students who have no experience with a tidal flat have a more negative image than those who have visited before. In school A, there is a clear improvement in the image of the students who have visited a tidal flat in terms of "can collect food", "clean and not smelly", "a place for entertainment" and "an interesting place to explore". However, in the option of "polluted/not polluted" there is not much change in the mental image of the students.

Similar to school A, the students in school B who have visited tidal flats have a more positive image than those who have not. Experience of a tidal flat has a big influence on the students' image in terms of "clean and not smelly" and "a place for entertainment".

4.2.4. *The influence of a metaphor on the students' mental image of tidal flats*

Two metaphors "migratory birds' home" and "a water filter machine" were used respectively in questionnaire set 2 and 3. Figure 4 shows the difference in the mental images of the students of tidal flats when no metaphor is used and when one is used.

Figure 4:The influence of a metaphor on the mental image of the students of a tidal flat

School B

Legend:
- Set 1 (no metaphor)
- Set 2 (migratory birds' home)
- Set 3 (a water filter machine)

Categories (top to bottom):
- Not polluted
- Many living creatures
- Beautiful
- Can collect food
- Clean and not smelly
- A place for entertainment
- An interesting place to explore
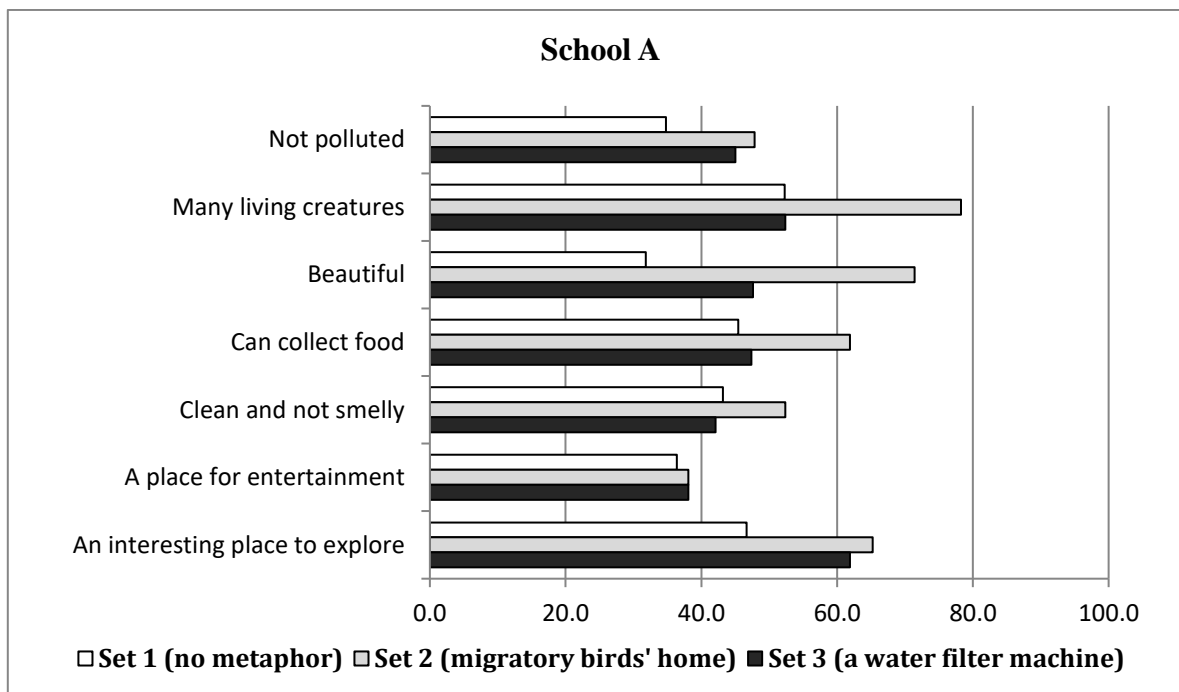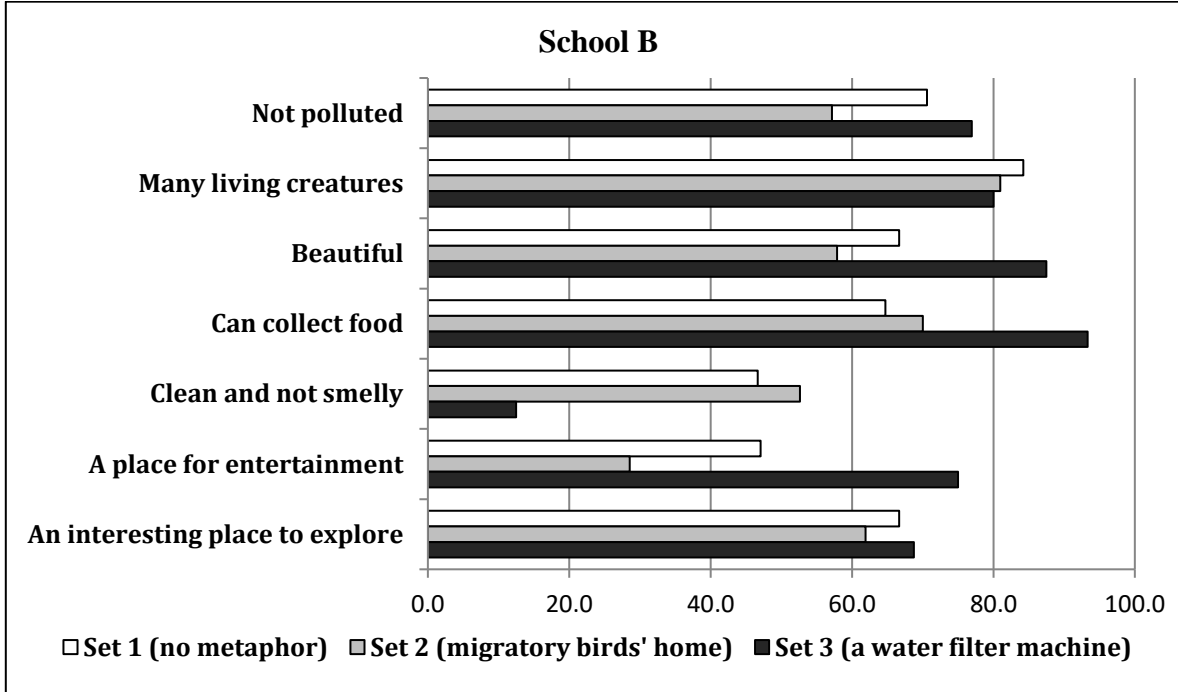
Under the influence of the metaphors provided, there is a difference in the mental image of the students. The image of a tidal flat is improved in the questionnaire sets that had metaphors. In school A, the image of tidal flats becomes more positive with both metaphors but the positive effects of the metaphor "migratory birds' home" were clearer than the metaphor "a water filter machine".

In contrast, in school B, even though the metaphor of "migratory birds' home" still brings a positive image of tidal flats among the students, it is not as effective as the metaphor "a water filter machine" in terms of tidal flats' image improvement. However, the metaphor of "a water filter machine" also had a negative impact on the image of a tidal flat when about 90% students link a tidal flat with a dirty and smelly place. At the same time, it is also in

this questionnaire set that nearly 80% of the students think a tidal flat is a place for entertainment.

4.2.5. *Students' mental image of tidal flats with different names*

Three terms are usually used to refer to tidal flats in Vietnam: "bãi triều", "bãi bùn" and "bãi lầy". Their meanings and the situations they are used in were provided in Table 2.With different names, the students' images of tidal flats changed, which is illustrated in the following graph.

Figure 5: The image of tidal flats with different names

School B

Legend: □ Bãi triều (tidal area) □ Bãi bùn (muddy area) ■ Bãi lầy (boggy area)
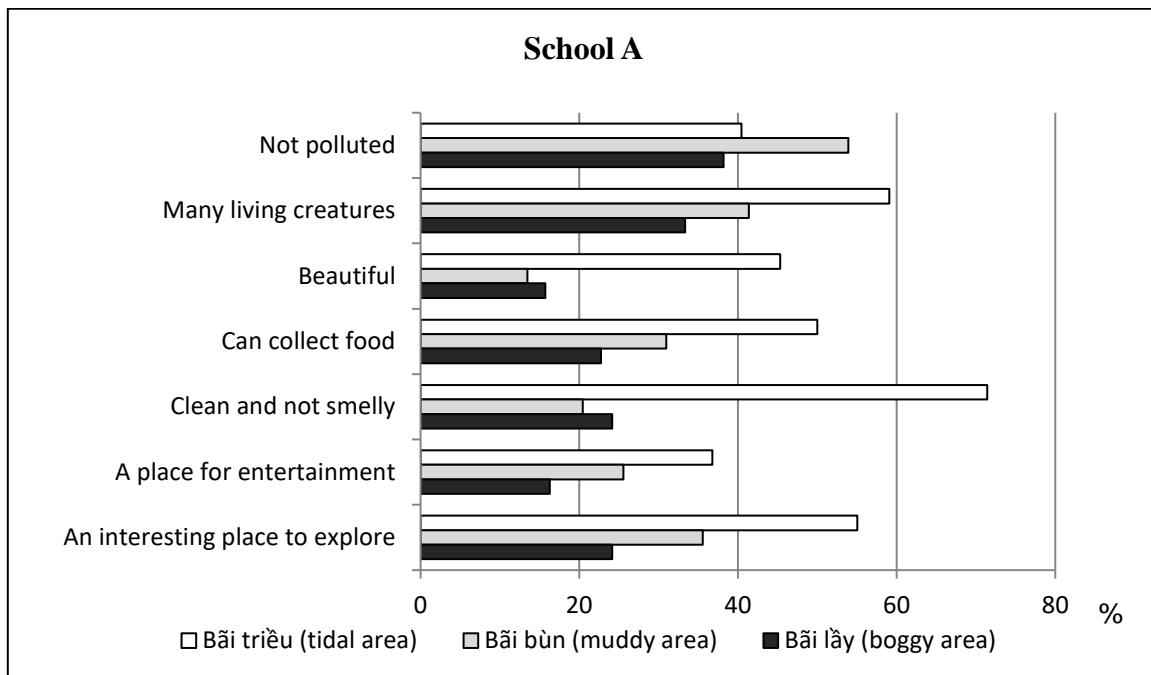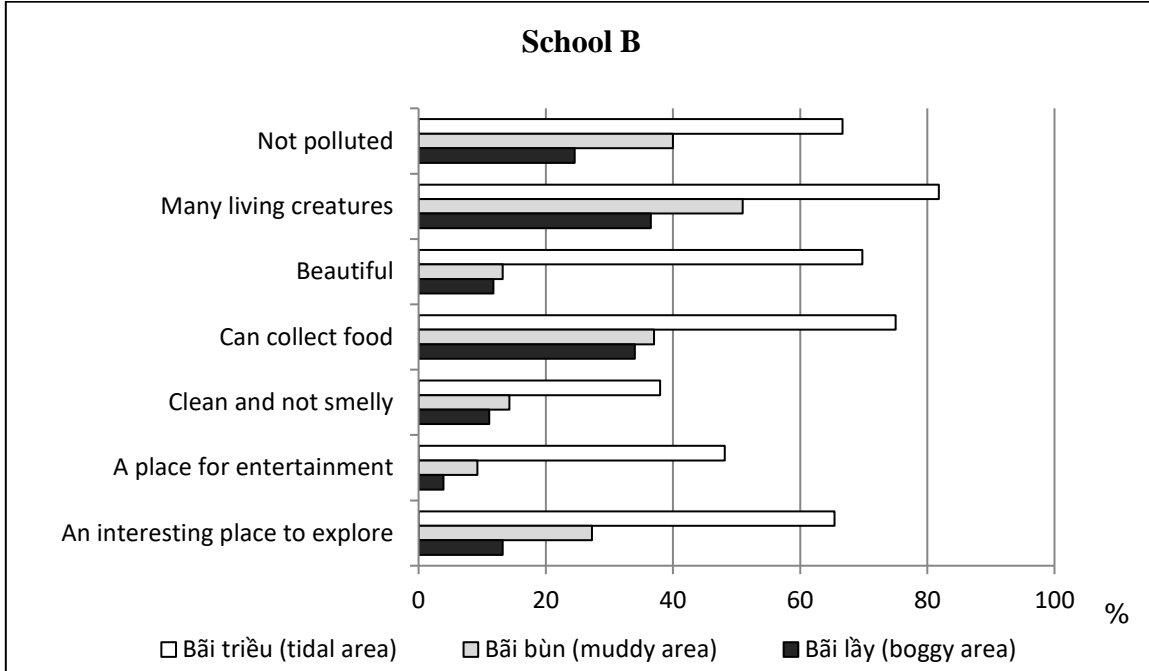
As can be seen from the figure above, the term "bãi triều" brings about a more positive image of a tidal flat than the two terms "bãi lầy" and "bãi bùn". With the term "bãi bùn", the image is becoming negative but still has some positive points such as "not polluted", "many living creatures" and "can collect food". However, the image becomes very negative when the term "bãi lầy" is used. Moreover, this term is also provided by some students in school B as one of local names of a tidal flat. In other words, this local name seems not to bring a positive image of a tidal flat to the students.

The influence of a name on the perception of the students towards tidal flats still remains even when the students have previous experience of a tidal flat. Figure 6 below shows that among the students who have visited a tidal flat, the term "bãi triều" is still the term which

brings the most positive image to them while the other two terms "bãi bùn" and "bãi lầy" have more negative impacts.

Figure 6: The mental image with different names for tidal flats for students who have already visited a tidal flat
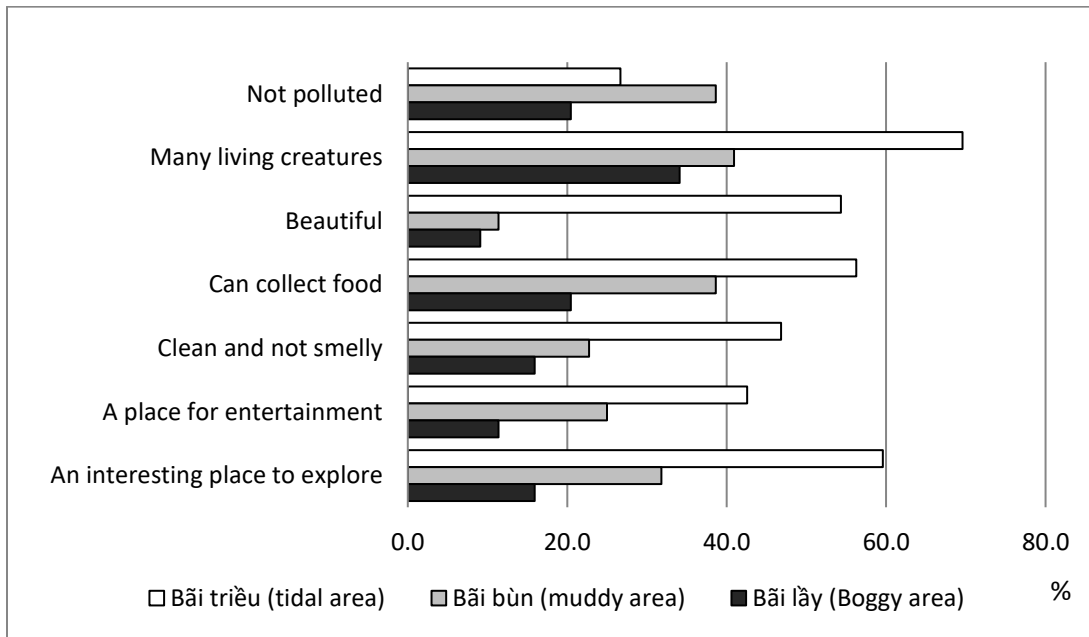
4.2.6. Awareness of the functions of tidal flats among the students

Figure 7: The functions of tidal flats

The functions of a tidal flat

(bar chart comparing School A and School B percentages for each function)

1. Cleans seawater
2. Provide a nursery habitat for growing fish
3. Support fishery
4. Enriches ocean biodiversity
5. Reduces damage from storm, flood
6. Prevents coastal erosion
7. Reduces CO2 released into the atmosphere
8. Provides a place for people to entertain
9. Provides areas for migratory birds to stop over
10. Other

X-axis: 0.0 10.0 20.0 30.0 40.0 50.0 60.0 70.0 %

□ School A   ■ School B

In terms of tidal flats' functions, the common functions that many students in both schools think of are "provide a nursery habitat for growing fish", "support fishery" and "enriches ocean biodiversity". From the question where the students were asked to provide examples of tidal flats they have visited before, most of the examples are the famous tourist beaches. The students seem to link tidal flats with beaches and even mistake these places. This might contribute to the trend among the students in choosing the functions which are related to fishery and ocean biodiversity.

In contrast, only a small number of students know about the functions of a tidal flat of reducing CO2 released into the atmosphere with only 22% of the students in school A and

9% of the students in school B choosing this function. The function of a place for entertainment is also not chosen by many students. Tidal flats do not bring an image of a place where people can have fun, even to those who have visited a tidal flat before. Only 25% of the students in school A and 21% of the students in school B chose this function. As tidal flats are not common tourist destinations, it may be difficult for the students to imagine how they can play on tidal flats. Also, few students chose "provides a place for migratory birds to stop over" as a function of a tidal flat. However, under the metaphor of migratory birds' home in questionnaire set 2, a tidal flat becomes a more interesting place to the students. In other words, when the image of a tidal flat is linked with birds, this not only promotes the importance of tidal flats but can also make them become more attractive.

The students in school A are more aware of the importance of tidal flats than the students in school B. There is a big difference in the two functions: "cleans seawater" and "prevents coastal erosion". Respectively, nearly 60% and 55% of the students in school A chose 'cleans seawater" and "prevents coastal erosion" as functions of tidal flats while only 40% and 35% of the students in school B (a coastal school) chose these functions.

4.3. Impacts of environmental education activities on the students' mental image of tidal flats

4.3.1.   Environmental educations about tidal flats conducted at the school A and B

Through interviews with teachers from both school A and B, there are different environmental education activities about wetland conducted at the two high schools. Both teachers said that they mention wetland during the geography lessons but do not focus on it. There is also a similarity between the two teachers in that they follow quite a similar curriculum about wetland with much of the focus and examples used in common. For example, both teachers talk about mangrove forests and use Cuu Long Delta as an example to illustrate wetland. Also, neither has a specific lesson about tidal flats. The teacher in school A does not go deeper into the topic of wetland because of the class time limit and curriculum design. However, the teacher in school B has designed a lesson about local geography, which mentions the typical wetland site in the province, Xuan Thuy National Park. The relationship between the students in school B and Xuan Thuy National Park will be discussed later in the next two sections (4.3.2 and 4.3.3).

In terms of the school trips and activities of wetland education centres, school A has not chosen a wetland site as their destination for a school trip. They usually choose a place with historical value such as the home towns of historic heroes or temples. The trip is usually organised in one day so the distance between the school trip destination and the city is not

too far. School B organised one school trip to a coastal wetland site in the province, which is called Xuan Thuy National Park for the purpose of enhancing the students' understanding of the local geography. In the question about concerns with the school trips to a wetland site, both teachers mentioned their concerns for the safety of the students and the difficulties in supervising them outside of the classroom.

Through the interviews with the geography teachers from high school A and B and a media official from IUCN Vietnam, I realised environmental education and awareness raising activities could play an important role in shaping the mental image of tidal flats among the students. Because school A has not organised any school trips to a wetland site, in the next part, I will mainly use the data from the interview with the teacher from school B to discuss how the students experienced a National Park and then the relationship between them and a wetland site (a National Park).

4.3.2. The students' experience at a tidal flat site

As school B is closer to a National Park (a Ramsar site) than school A, I expected that the students in school B might have a higher chance of visiting or knowing about a Ramsar site and mention it in the questionnaire. However, none of the students in school B mentioned the National Park as an example of a tidal flat even though there is a large area of tidal flats at the Park, part of which is considered a core zone with special importance at the Park.

The lack of a relationship between the students and the National Park lies at the experience the students may have at the Park. The National Park is also not a popular destination for school trips in Nam Dinh province, even though it is not located too far from the centre city of Nam Dinh province. Some reasons were revealed through the interview with the teacher in school B. The National Park is a very big coastal area, which makes it difficult for the teachers to manage the students. The teachers need to take into account the tide times to organise the trip and be more cautious in watching the students because there have been several cases of incidents happening when other schools have taken their students to coastal areas. Moreover, to explore the Park thoroughly, the students need to walk about 10km, which requires them to have good health and can be a factor reducing their excitement during the trip.

There have been some efforts made by the school in recent years to promote the students' understanding of the local geography. In the 2016-2017 school year, school B organised a school trip for 250 senior students to Xuan Thuy National Park with the aim of making students understand the importance and functions of wetland. The teacher also confirmed that after the trip, the students now understand more about the National Park, which is the biggest mangrove forest in the North of Vietnam, and an important place for migratory birds. They also know about the value of wetland as a place that can be used for aquaculture.

However, through the interview with the teacher, I realised that even though school B has

made some efforts to make the students understand the importance of wetland, the focus of the excursion needed to be discussed more. During the school trip, Xuan Thuy National Park was not the only destination for the students. Before getting to the Park, the students went to discover two other places, a museum and a church. Therefore, they had only one hour at the Park, which may not be enough to discover the Park well. It is understandable that because the school trip is organised only once a year and the teachers want their students to explore more of the local landscape, they try to combine different places in one trip. This is good in that the students have a chance to know more about their own area but the negatively they do not have enough time to get a good understanding of each site.

4.3.3. The role of the National Park in raising the students'awareness of the importance of tidal flats and wetland in general

Xuan Thuy National Park is trying to raise awareness in the local people of the importance wetland and the Park itself. They are conducting several education activities in some schools in Nam Dinh province. Though environmental protection lessons and coastal clean-up campaigns have been conducted, these awareness raising activities are still considered weak and mainly limited to students in the buffer zone communities (Xuan Thuy National Park website). This could be a reason for a lack of relationship between the Park and the students who are not in the buffer zone. In addition, the environmental education activities conducted by the Park might not be strong enough to make the students interested in the Park. During school B's excursion to Xuan Thuy National Park, the staff from the Park only

showed the students and teachers a video and gave them a 25–30 minute presentation about the Park; the students were then free to explore the Park with their teachers in a designated tourist area. Compared to other types of tours provided for visitors, such as cruises, bird watching or local culture, the content of this environmental education tour is quite simple.

It can be seen that, even though the Park has been conducting eco-tourism and environmental education, these activities are still considered weak in attracting more people to come to the Park. Like other national parks and nature reserves, the management of Xuan Thuy National Park seems to focus more on the protection of the biodiversity of the wetland in the Ramsar site than wise use[2] of the wetland resources (Tran, Nguyen, & Nguyen, 2014; Vietnam Environment Protection Agency, 2005). Eco-tourism is the main activity conducted by the National Park considered as wise use, while communication and environmental education activities are not promoted strongly.

As the first Ramsar site in Vietnam and Southeast Asia, Xuan Thuy Nation Park plays an important role in protecting wetland biodiversity and providing a resting place for migratory birds. However, the concept of wise use is still new in the management of the Park. With the positive results from the questionnaire in school B where 65% of the students responding to the questionnaire thought that tidal flats are interesting places to explore, there is potential to develop detailed environmental education programmes at the

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[2]The wise use of wetland is a concept introduced by Ramsar, which is "the maintenance of their ecological character, achieved through the implementation of ecosystem approaches, within the context of sustainable development" (Ramsar Convention Secretariat, 2016).

Park, not only for students in the buffer zone but also in other communities in the province. These activities can help to provide more chances for the students to have direct experience and understand the importance of tidal flats and wetland in general.

4.4. "Language of exploitation" in describing wetland and tidal flats in high school geography textbooks

Another interesting finding of this research came from the geography textbooks for high school students in Vietnam. The language used for describing tidal flats and other coastal wetland can be considered as "language of exploitation". This term was mentioned in Schultz's (1992) paper "Language and the natural environment", in which she said the language in common use is "the language of the commercial user of the environment" or "the language of exploitation" (p.109). In trying to increase the human benefits, this kind of language is usually used to describe nature and environmental issues and wetland is no exception.

Wetland in general, and tidal flats in particular, are not common topics in textbooks for high school students in Vietnam. They are usually mentioned in the lessons about the coastal environment in geography textbooks. However, the situation in which they appear is to illustrate the diversity of the coastal environment in Vietnam rather than to show their own importance and functions.

"*Vietnam has a diversity of coastal ecosystems, which are estuary gulfs, tidal flats,*

lagoons, coral reef…" (Geography textbook 12, p.37)

In addition, within a limited space in the textbooks, economic benefits are usually
mentioned to describe the values of tidal flats. For example:

"*In the coastal area in the Song Hong and Cuu Long delta area, there are many*

mudflats and mangroves which are suitable for aquaculture development"

(Geography 8, p.107)

"*Along with the coastal line, there are tidal flat areas, lagoons and mangroves*

forests, which are advantageous for aquaculture"

(Geography 9, p.121)

The way tidal flats are being described in the Vietnamese geography textbooks partially
shows how humans are considering the value of tidal flats. It is exploitation. Through this
view, tidal flats become places that are "suitable" and "advantageous" for humans'
exploitation. Furthermore, the image of economic development activities on wetland has
become more and more popular with the fact that a huge area of wetland is being used for
agricultural production and aquaculture.

The language of exploitation in textbooks can also be regarded as a factor influencing the
perception of the students towards the importance of tidal flats, which is reflected in the

question about the functions of tidal flats in the questionnaire. The students know tidal flats as places that people can utilise and gain economic benefits from through lessons in geography textbooks. Then, they tend to link this with the importance of tidal flats when the popular trend among the students in both schools was choosing the function of supporting fishery. The students thought the most common function of tidal flats is to support human economic activities. It can be seen that, through the language of exploitation, the economic value of tidal flats seems to get more attention from the readers than other values.

5. DISCUSSION

5.1. The potential of using metaphors to communicate the value of tidal flats: a metaphor for home or a machine?

From the results of the questionnaires distributed in two Vietnamese high schools, two metaphors of a tidal flat, "migratory birds' home" and "a water filter machine", help to improve the image of tidal flats among the students in both schools. However, there is a difference in terms of how much the metaphor changed the mental image of the students. Two noticeable things can be identified from the findings. Firstly, through the metaphor of "a water filter machine", many students were likely to link a tidal flat with a dirty and smelly place but at the same time also as a place where they can have fun and entertainment. Secondly, the metaphor "migratory birds' home" provoked feelings of protection and respect among the students towards tidal flats.

5.1.1. A classification of metaphors for nature

The first thing that can be discussed from these results is the type of the two metaphors provided and their effects. There are many ways to categorise different types of metaphors but in this section, I use the categories of Stibbe (2015) and the concept of "nature" from the book "Ecolinguistics: language, ecology and the stories we live by". The reason why I used this classification is that metaphors about nature are the most common environmental metaphors in the field of ecolinguistics (Stibbe, 2015). Therefore, there are many images

used to describe "nature", "the planet", "ecosystems" or "the earth", which helps me see how nature is being described through different perspectives. Stibbe (2015) divided the sources of the images used in the metaphors about nature into five main categories: places (a garden, an island, a home), machines (a spaceship, a lifeboat, a clock, a storehouse), goods(a work of art, a tapestry),organisms (an organism, a person, a goddess) and networks (a web, a community). Some other metaphors are a competition, a war, a battle and a struggle. Based on this classification, the metaphor of "migratory birds' home" belongs to the category "places" and "a water filter machine" belongs to the category "machines".

5.1.2. *A home metaphor for a tidal flat*

A home metaphor is usually a favourite image used to describe the relationship between humans and nature (Thibodeau, Frantz, & Berretta, 2017). A home is a place that "provides food and shelter and is embedded in a larger community" (Princen, 2010, p.65). Therefore, it is the image that usually provokes positive emotions among readers and is able to connect them with the natural world (Thibodeau, Frantz, et al., 2017). The results from questionnaire set 2 with the metaphor "migratory birds' home" in my research also are in line with this argument. When a tidal flat is described as a home for migratory birds, its image becomes more positive among the students. However, at the same time, this metaphor does not promote the entertainment values of a tidal flat. In other words, using the image of "migratory birds' home" makes a tidal flat become more beautiful and interesting but not a place where people can spend leisure time. As most people love and

want to protect their homes, it is understandable when the "migratory birds' home" image seems to bring a sense of respect and protection to a tidal flat. In addition, in my opinion, this home metaphor also implies that humans are part of nature when humans have their homes, the birds also have their homes in tidal flats where they take rest, feed and give birth, and we live together in a larger community. Therefore, this metaphor appears to be effective in terms of promoting a respectful relationship between humans and tidal flats.

5.1.3. *A machine metaphor for a tidal flat*

The metaphor "a water filter machine" belongs to a different line of environmental metaphor which mechanises an ecosystem. Unlike the home metaphor, the image of a "machine" when it is used to describe the relationship between humans and nature is much less preferable (Thibodeau, Frantz, et al., 2017). Furthermore, it is the metaphor that is considered as destructive for nature (Stibbe, 2015). Stibbe mentions two destructive reasons regarding this kind of metaphor. Firstly, considering nature as a machine might make nature become a thing consisting of different parts which can be repaired or replaced when an incident happens. The broken part might be fixed and replaced and then the system can be returned to its original function. Secondly, through a machine metaphor, nature becomes an object which humans can exploit and control. It does not take into account the thousands of living organisms and different ecosystems in the environment. However, Thibodeau, Frantz, et al.(2017)also point to a positive aspect of this machine metaphor in terms of fragility and the machine having its own limit, which might refer to the environmental limits (Stibbe,

2015).

The metaphor "a water filter machine" also brings about the sense that people can exploit the ecosystem. It promotes the entertainment value of a tidal flat as many of the students thought of it as a place people can play and be entertained, in contrast to the result from the metaphor "migratory birds' home". More students under this machine metaphor also chose the option "can collect food" than under the migratory birds' home metaphor. In addition, the image of a filter machine is quite negative to the image of a tidal flat when it linked the ecosystem with a dirty and smelly place. However, not only are these negative impacts taken into account but also there are positive effects. Because a water filter machine is a very popular object in every household in Vietnam, students are used to it and understand what it is used for. Hence, they might feel it is easy to understand the functions of a tidal flat through this image. From the results of the questionnaire, the positive effects of the metaphor "a water filter machine" are greater than for "migratory birds' home" in 5 of the 7 categories used to evaluate the students' mental image of a tidal flat, except for the options of "many living creature" and "clean and not smelly".

Using a household object to illustrate the functions of wetland is popular in educational materials. One of the most preferred educational materials is "Wetland Metaphors", which came from the Project WILD, Aquatic K-12 Curriculum and Activity Guide, 1987. Project WILD is an environmental education programme for students from kindergarten to high school, which focuses on wildlife conservation and encourages responsible actions towards

nature. Project WILD is managed by the Council for Environmental Education and Western Association of Fish and Wildlife Agencies, USA. The functions of wetland are illustrated through common household objects. The list of household objects used to demonstrate wetland's functions and their meaning are shown in the table below.

Table 4: Wetland metaphors

Household object	Metaphorical Wetland Function
Sponge	Prevents floods, absorbs water, holds moisture
Cradle	Raises young, provides shelter
Pillow	A resting place for migratory birds, home for resident wildlife
Strainer	Strain out debris and pollution
Egg beater	Mix and cycle nutrients
Flower	Beautiful places
Can of soup	Food, nutrients

Source: (U.S. Fish and Wildlife Service, 2004)

The target students of the educational materials who use these metaphors are mainly elementary students. Therefore, using these common household objects can help to make them imagine and understand the functions of wetland easily.

To sum up, each of the two metaphors "migratory birds' home" and "a water filter machine"

has its own pros and cons. The relationship between humans and nature and the effects on the mental image of readers about tidal flats are depicted differently through the image of "home" and "machine". In other words, even though environmental metaphors can be used as powerful tools to convey environmental issues, they can produce both negative and positive impacts on the cognition of the readers (Thibodeau & Boroditsky, 2011). Therefore, instead of deciding which metaphor is the best, developing different versions of metaphors can help to improve the effectiveness of communication and cooperation (Keulartz, 2007).

5.2. Negative implications of using different terms to describe tidal flats

The name of an ecosystem plays an important role in the existence of that landscape in the human mind (Macfarlane, 2016). When "they go unnamed they go to some degree unseen" (ibid, p24). However, what might happen if one ecosystem has many different names? Mactaggart et al. (2008) claim that when a place has many names the public may have difficulty in recognising it and understanding its characteristics. In terms of management and conservation, this confusion of names can be a factor in hampering efforts to address communication environmental problems related to the place (ibid).

In the case of tidal flats, even though it has its own name, tidal flats somehow are still neglected by the public. Tidal flats are popular among people who are concerned about them such as conservationists, people associated with reclamation projects and local people who depend on tidal flats for their living. Because not all of these stakeholders have a

connection with each other, they might use different terms to express their interest and concerns about tidal flats. Then, from a different information channel, the public who do not have a direct relationship with tidal flats may hear different terms used for describing one ecosystem.

For example, in this research, I have shown only three different names, including "bãi triều" (tidal area), "bãi bùn" (muddy area) and "bãi lầy" (boggy area). "bãi triều" (tidal area) is the official name and is usually used in governmental and scientific documents while the other two terms usually appear on the Internet and in some educational material. In addition, there might be other local names for tidal flats in different areas which I have not explored yet. As can be seen, even with not taking into account the diversity of names of tidal flats in local areas, there are at least three different names for tidal flats in Vietnam which people may encounter in their daily lives. They may get confused as to whether or not these three terms refer to the same ecosystem. In some cases, some people might know tidal flat by one name but hear another for it, which does not remind them of the tidal flat ecosystem. This result is also in line with the argument of Mactaggart et al. (2008), which shows that not every name or definition of an ecosystem is able to convey an accurate image.

Not only does the diversity of name lead to a difficulty in recognising a place, it is also a risk for its existence because some names bring about very negative connotations for the landscape. What may happen if a reclamation project uses the name "bãi lầy" (boggy area), which has the most negative image of tidal flats among the three names presented in this

research, to communicate about a project in a tidal flat area with a public who might never have been to a tidal flat? A project would sound nice if it tries to turn a place which seems to be "polluted", "not beautiful", "dirty and smelly" and "not interesting to explore" into a place that can be used for agricultural production and gain some economic benefits. People who agree with this kind of project may not know what a tidal flat is or they may even know it with a different name such as "bãi triều" or "bãi bùn". It is difficult for them to link the image described in the project and the image of a tidal flat in their mind, which they know through a different name. Therefore, the misunderstanding caused by the confusion of terms used for describing the same ecosystem might lead to its disappearance.

It is important that different stakeholders understand they are talking about the same thing even if different terms used to describe it exist together. It may not be possible to deny the diversity of local names for the ecosystem which may reflect some cultural values in the area. However, in communication there is still a need for a common name for a place to help people who do not have a close relationship with it to be able to know what is going on in that landscape and avoid misunderstandings among different stakeholders.

5.3. The influence of direct experience with tidal flats on the perception of the students

5.3.1. Relationship between direct experience and attitudes towards nature

Direct experience plays an important role in establishing the relationship between people and nature. Contact with nature helps to support and reinforce the favourable attitudes of people towards nature and then enhance their interest and willingness to conserve nature (Soga, Gaston, Yamaura, Kurisu, & Hanaki, 2016; Zhang, Goodale, & Chen, 2014). Moreover, direct experience with nature also helps people to address and understand environmental issues better (Floyd et al., 2016). However, in a rapid urbanisation context, natural places become limited and opportunities for people to interact with nature are reduced. There are also social factors which prevent people, and especially children, living in urban areas from having contact with nature, such as screen-based entertainment, parents' concerns for the safety of children and pressure from schools (Soga et al., 2016). If the phenomenon of loss of interaction with nature continues, it could lead to the "extinction of experience" and then disconnect humans and nature further (ibid, p2).

This research focuses on high school students who are living in the city and not close to a tidal flat. They are familiar with artificial wetland types and know about tidal flats mainly through indirect experiences such as lessons in classes and from the media. The lack of direct experience with a tidal flat has been identified through the questionnaire results of this research with only one-third of the students having already visited a tidal flat. These

students have a more positive image of this ecosystem than those who have never been to a tidal flat before (see Figure 3). This finding is in line with the conclusion of Soga et al., (2016) and Zhang et al., (2014), which found that children with greater experience of nature have more positive attitudes and willingness to protect nature than those who have less. However, there are some cases of students where the influence of a direct experience is not strong enough to create a positive image of an ecosystem. The questionnaire results show that 20-30% of the students who have visited a tidal flat did not see it positively and some of them did not even know what a tidal flat is (Figure 3). Therefore, the difficulty in enhancing the connection between tidal flats and the students who are not familiar and far away from tidal flats might not only be the limited chance for them to visit and see an actual tidal flat in their daily life, but also the way they have direct experience of it.

5.3.2. *Making direct experiences with tidal flats more meaningful*

The interview with the geography teacher in school B shows that the students had a chance to visit a tidal flat at a wetland National Park but they did not experience tidal flat-based activities. They explored the tidal flats' characteristics through a presentation conducted by the staff at the Park and then they walked around and observed a tidal flat from a certain distance. The students were also not equipped with boots to go further and deeper into the mud to explore more about the biodiversity of tidal flats. In other words, their experience of a tidal flat seems to be similar to a visit to a zoo where there is a boundary between the visitors and the animals. However, the difference at a tidal flat is that the creatures there are

too small to observe from a distance and the enjoyment of mud can only be felt by touching and walking on it.

A tidal flat is a quite special ecosystem as we can see it only twice per day. The grey and muddy appearance of a tidal flat also seems to be boring compared to other colourful wetland such as coral reefs and mangroves. In addition, the rich biodiversity of tidal flats is beneath the surface with many tiny living animals. Therefore, when students come to a tidal flat, the distance from which they observe it and the reluctance of the students to be exposed to the mud can be factors affecting their direct experience with tidal flats.

Curiosity may be considered an important factor in improving the willingness of students to explore a particular ecosystem. Because students living in urban areas usually do not have much chance to visit an actual tidal flat, indirect experience may be a necessary condition to make the direct experience of students at a site more interesting. Indirect experience such as lessons in class or watching a video about tidal flats can help to trigger curiosity and positive feelings among students before they go to the site.

The impacts of curiosity can be seen through the example of life under the sea, which is usually mysterious and attractive for many people but few have a chance to go deeply into the sea to explore it. New findings about the mysterious world under the sea, such as new creatures, might make people more curious about it and stimulate them to explore it more. There are also different stories trying to depict the marine lives under the sea in an

interesting way. For example, there is a royal family with beautiful mermaids under the water through the famous story The Little Mermaid or the legends about hidden treasures in the deep sea. The similarity between the cases of tidal flats with life under the sea is that it is difficult for people to observe what is going on under the surface with the naked eye. However, the difference is that even though the deep sea world might be dark and cold with scary and unknown creatures, it is still attractive to many people but few people care about the rich biodiversity under the mud. It could be useful to engage students to explore tidal flats if some of the things they cannot see under the mud could become imaginable to trigger curiosity among them like the example of the story of The Little Mermaid or legends of treasure. Using animation, video, pictures or creating stories to show how creatures are living and connect with other animals may be helpful in bringing a more vivid image of tidal flats to students and encourage them to actively explore tidal flats when they go to a site.

In terms of direct experience with a special ecosystem like tidal flats, ecological characteristics such as the tide time, tiny creatures and the mud need to be considered when students have some tidal-flat based activities. Some tidal flat sites are trying to conduct different activities to make it look more fun and interesting to the visitors. One of my most memorable experiences was the tidal flat Olympics conducted at Kashima city, Saga, Japan. The Olympics are held every year and there are many interesting activities for the visitors such as running, sliding on the mud with wood boards or a bicycle race on the mud. The participants are free to participate in the event, not reluctant to get dirty and have a lot of

fun with a tidal flat. The event has been organised 33 times and attracts many visitors to Kashima every year. Some schools in Japan also take their students to a tidal flat and enable them to learn about tidal flats from local people and to experience collecting clams, mud shrimp and jackknife clams.

6. CONCLUSION AND RECOMMENDATIONS

6.1.Conclusion

The aim of this research was to explore the influence of the different terms used to describe tidal flats on the perception of Vietnamese high school students. From 152 questionnaires collected in two high schools in Vietnam and information from three semi-structured interviews with an official from IUCN, Vietnam and the teachers from the two high schools A and B, I have come to some conclusions.

Firstly, it is the students' perception of tidal flats. Tidal flats are not a popular ecosystem among Vietnamese high school students. They are more familiar with artificial wetland such as rice paddies or salt fields than natural wetland. In terms of their source of information, the students know about tidal flats mainly through lessons in classes, the media and some daily activities. The perception of the students towards tidal flats is quite negative with many of them thinking that tidal flats are not beautiful, dirty, smelly and not a place for entertainment.

Secondly, through this research, I have identified three factors which influence the perception of the students towards tidal flats. They are: **metaphor, name and experience**. The effects of a metaphor on the students' mental image depend on the image used in the metaphor. The two metaphors used in this research are "migratory birds' home" and "a

water filter machine". Both metaphors helped to improve the students' mental image of a tidal flat. The metaphor "migratory birds' home" brings a sense of respect and protection to a tidal flat while the metaphor "a water filter machine" promotes the entertainment value of this coastal wetland. However, using metaphor does not always produce positive effects. The metaphor of "a water filter machine" had the effect of making the students link a tidal flat with a dirty and smelly place.

The diversity of names referring to a tidal flat has an influence on the perception of the students towards this ecosystem. There are three common names used to label tidal flats in Vietnam, including "bãi triều"(tidal area), "bãi bùn" (muddy area) and "bãi lầy" (boggy area). "Bai triều" (tidal area) is the official name of tidal flats, used in government and scientific documents while the other two terms "bãi bùn" and "bãi lầy" appear in some educational material and on TV shows. Among the three terms, the term "bãi triều" brings the most positive image of tidal flats to the students while the term "bãi lầy" results in a very negative image. The diversity of names for tidal flats may affect the recognition of this environment among the public when some of them may know tidal flats through different names with different images.

Another factor that impacts the way the students perceive a tidal flat is their experience with it. The students who have visited a tidal flat before have a more positive image than the students who have never been to a tidal flat. The image of tidal flats has been improved considerably in terms of cleanliness and entertainment value. To improve the positive

effectiveness of direct experience with the image of tidal flats, indirect experience plays an important role in triggering curiosity and a willingness to explore the place among the students. In addition, because tidal flats are an ecosystem with special ecological characteristics, it is also essential to take these elements into account when providing a direct experience with tidal flats.

Thirdly, it is the role of the National Park, which is a Ramsar site, to shape students' mental image of tidal flats. The environmental activities conducted at the wetland sites could be an important factor affecting the students' perception and support the direct experience of the students at the site.

Finally, I discussed the language of exploitation about tidal flats in the textbooks for high school students. The economic benefits of tidal flats are at the centre of this kind of language. The value of tidal flats as a place for aquaculture development is mentioned most of the time when describing them.

6.2. Limitations of this research

Even though this research provided some answers to the research question, there are still limitations in the research target respondents and the metaphors used to explore the metaphoric impacts on the students' mental image. First of all, the results of this research only reflected the perception of a small number of high school students. They are a very

small group in comparison to the total number of high school students in Vietnam and even smaller when compared to the whole population. Another limitation with the respondents is that the high school students chosen for this research come from the north of Vietnamwhile there are very famous and typical wetland ecosystems in the south. There are only two Ramsar sites in the north but six in the south of Vietnam. Hence, the way students from the south perceive tidal flats and wetland may be different from students from the north. Moreover, the results were mainly from high school students. Therefore, if there is any recommendation made from the findings of this research, it might be suitable to apply to other high school students but not to other groups.

Another limitation, as I mentioned in the research method section, arises from the metaphors used in this research. Only the effects of two metaphors "migratory birds' home" and "a water filter machine" were explored from them any other wetland metaphors. Each metaphor can lead to different reactions from the readers so the effects of other tidal flat metaphors are still unknown. There are several types of environmental metaphors and this research has focused the effects of two metaphors from two different types. Hence, it might be interesting and necessary to investigate metaphors from other categories.

This research interviewed two geography teachers in the two high schools, A and B, and one staff member from the NGO IUCN in Vietnam. Due to the constraints of time, I have not conducted interviews with representatives from Xuan Thuy National Park or local people in Nam Dinh city. Their opinions would provide more insightful perspectives to

understand the perception of local people and the efforts of the National Park to promote the importance of tidal flats and wetland in general.

6.3.Recommendations

Some recommendations can be made from the findings of this research.

First of all, in Vietnam different names are used for tidal flats and these convey different images of them, which may lead to confusion for the public in recognising this ecosystem. Moreover, different names for tidal flats are also being used in textbooks for high school students in Vietnam such as "bãi lầy" and "bãi bùn", which do not present a positive image of tidal flats to the students. Therefore, there is a need to use one common term to label a tidal flat and promote it among the public. Among the three common names for tidal flats in Vietnam, "bãi triều", "bãi bùn" and "bãi lầy", the term "bãi triều" brings the most positive image to the students. This term is also an official name for tidal flats in Vietnam in government and scientific documents, which could be advantageous if promoted.

Secondly, using a metaphor can be a potential way to communicate the functions of tidal flats. Both metaphors used in this research were effective in improving the students' mental image of tidal flats. However, it may be difficult to decide which metaphor is better because the effects of the metaphors differ depending on the image used. Therefore, I agree with the multiplicity of metaphors. We can use different metaphors for different purposes. For

example, using the home metaphor "migratory birds' home" is effective in provoking a sense of protection and respect towards tidal flats while the metaphor "a water filter machine" is a very familiar and easy to understand image in explaining tidal flats' function of water purification. This "water filter machine" metaphor also helps to promote the entertainment values of tidal flats. However, it also leads to negative images of a tidal flat when it links it with a dirty and smelly place. Therefore, it is important to consider that using a metaphor can lead to both positive and negative impacts.

Finally, I want to make a recommendation about providing students with direct experience with tidal flats. Tidal flats are not always visible for visitors to observe as they only appear twice per day. The mud and the image of getting dirty in mud may not bring positive feelings to many people, especially students living in urban areas who may be reluctant to expose themselves to the natural environment. The invisibility of the rich biodiversity may also hinder people from feeling curious about tidal flats. Therefore, it is vital that when providing students with a direct experience of tidal flats, it triggers their curiosity and willingness to explore them. There are many forms of possible indirect experience such as using animation; presenting stories to depict the animal world under the mud in a vivid way; and showing pictures and videos of a tidal flat at different times to illustrate the changes in its appearance and the animals present. These could help in bringing positive feelings towards tidal flats in students before they visit an actual site. In terms of tidal-flat based activities, playing games with mud or participating in some local and cultural activities at tidal flats might help to promote them as more fun and interesting.

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Appendix 1

QUESTIONNAIRE

Perception of Vietnamese high school students about tidal flats

Thank you for taking time to answer this questionnaire. I am PHAM Thu Huong from Ritsumeikan Asia Pacific University, Japan. I am doing a research on the perception of Vietnamese high school students about tidal flats, a type of wetland. You responses will be used for research purpose only.
It takes about 5 minutes to complete this questionnaire.
There are 11 questions in total.

1. Wetland includes lake, river, swamp, marshland, peatland, oasis, estuary, tidal flat, mangrove, coral reef and artificial wetland such as rice field and salt marsh. Among wetland types listed above, which type do you know? Choose that all apply.

   a. Lake, river
   b. Swamp
   c. Marshland
   d. Peatland
   e. Oasis
   f. Estuary
   g. Delta
   h. Tidal flat
   i. Mangrove
   j. Coral reef
   k. Artificial wetland such as rice field and salt marsh
   l. Do not know about wetland

2. How do you know about wetland? Choose all that apply.
   a. Lessons in classes
   b. Media channels (TV, radio, newspaper)
   c. Excursions
   d. Daily life
   e. Information from acquaintances
   f. Other:...

3. Have you have heard of the term "bai trieu"?
   a. Yes
   b. No

4. In what situations you hear the term?
   a. Lessons from classes
   b. Daily life
   c. Medial channels (TV, newspaper, radio)
   d. Excursions
   e. Other: ....

5. Tidal flats are located in coastal areas where mud or sand is deposited in shallow water area sand appear when the tide is low and are flooded when the tide is high. Do you know this type of ecosystem?
   a. Yes
   b. No

   In questionnaire set 2, this question is added the metaphor "a migratory birds' home" as following:

   "Tidal flats are located in coastal areas where mud or sand is deposited in shallow areas of coastal water and appear when the tide is low and are flooded when the tide is high. Tidal flats are considered migratory birds' home. Do you know this type of ecosystem?"

   In questionnaire set 3, this question is added the metaphor "a water filter machine" as following:

   "Tidal flats are located in coastal areas where mud or sand is deposited in shallow areas of coastal water and appear when the tide is low and are flooded when the tide is high. Tidal flats are considered an important water filter machine of the ocean. Do you know this type of ecosystem?"

6. With the definition given in the question 5, what is your mental image of tidal flats?

Choose 1 or 2 from A to H.

A. 1. Polluted2. Not polluted
B. 1. Many living creatures2. No living creatures
C. 1. Beautiful2. Not beautiful
D. 1. Can collect food2. Cannot collect food
E. 1. Clean and not smelly2. Dirty and smelly
F. 1. A place for entertainment   2. Not a place for entertainment
G. 1. An interesting place to explore   2. Not an interesting place to explore
H. Other:...

7. In your local area, how the place described in the question 5 is called? *(This question is omitted in the questionnaire distributed in the school A)*
   a. Still a tidal flat
   b. Another name: ....
   c. Do not know (move to the question 9)

8. How do you know the term given in the question 7? *(This question is omitted in the questionnaire distributed in the school A)*
   a. Daily life
   b. Lessons from classes
   c. Media channels (TV, newspaper, radio)
   d. Excursions
   e. Other:...

9. Have you been to the place described in the question 5?
   a. Yes (at: ....)
   b. No

10. In some documents, a tidal flat is also called "bai lay" or "bai bun". With each term, is there any change in your mental image of a tidal flat?

    Choose 1 or 2 for from A to H.

    10.1. _Bãi bùn:_
    A.   1. Polluted   2. Not polluted
    B.   1. Many living creatures   2. No living creatures

C.   1. Beautiful2. Not beautiful
D.   1. Can collect food2. Cannot collect food
E.   1. Clean and not smelly2. Dirty and smelly
F.   1. A place for entertainment   2. Not a place for entertainment
G.   1. An interesting place to explore   2. Not an interesting place to explore
H.   Other:...
...

10.2. *Bãi lầy:*

A.   1. Polluted   2. Not polluted
B.   1. Many living creatures   2. No living creatures
C.   1. Beautiful2. Not beautiful
D.   1. Can collect food2. Cannot collect food
E.   1. Clean and not smelly2. Dirty and smelly
F.   1. A place for entertainment   2. Not a place for entertainment
G.   1. An interesting place to explore   2. Not an interesting place to explore
H.   Other:...

11. What is the function of tidal flats? Choose all that apply.
    1. Cleans seawater
    2. Provides nursery for fish
    3. Supports fishery
    4. Enriches ocean biodiversity
    5. Reduces damage from storms, floods
    6. Prevents coastal erosion
    7. Reduce CO2 released into the atmosphere
    8. Provides a place for entertainment
    9. Provides a stopover for migratory birds
    10. Other:..

Personal information
1. Name: ....
2. Hometown:..
3. Sex:
a.   Male   b. Female   c. Other:.............................

This is the end. Thank you for your cooperation!

Appendix 2

The questionnaire content and hypotheses

Question	Expected results		Hypothesis& note
	School A (Hanoi)	School B (Nam Dinh)	
1. Among wetland types listed, which types do you know?	The majority of the students know lake, river, mangrove, coral reef and artificial wetland	Lake, river, tidal flat, mangrove, coral reef, artificial wetland More students know tidal flats	Mangrove is very popular in media and educational materials School B is closer to the coastal area than school A. There is a famous National Park (a Ramsar site-tidal flats, mangrove,) in Nam Dinh province (school B)
2. How do you know about wetland?	Mainly from media Lessons in classes	Mainly from daily life and media Lessons from classes	There is no tidal flat in Hanoi
3. Have you heard the term "bãi triều"?	The terms is not popular among students in both schools		School A: many of the students do not know about this ecosystem School B: students may know this ecosystem with another local term
4. In what situation you hear the term?	Mainly from lessons in classes; Media	Daily life; excursions Media	School A: there is no tidal flats in Hanoi, education has a big influence on the perception of students about tidal flats School B: There is a famous Ramsar site in the province; students might have a higher chance to encounter a tidal flat.

5. Tidal flats are located on coastal areas…flooded when the tide is high. Do you know this type of ecosystem?	Mainly do not know	More students know than school A.	The students in the school B might have a higher chance to visit a tidal flat
6. What is your mental image of tidal flats?	Set 1: Polluted, no living creatures, not beautiful, cannot collect food, dirty and smelly, not a place for entertainment and not an interesting place to explore Set 2: not polluted, many living creatures, beautiful, can collect food, clean and not smelly, not a place for entertainment, an interesting place to explore Set 3: not polluted, many living creatures, beautiful, can collect food, clean and not smelly, not a place for entertainment, not an interesting place to explore	Set 1: Polluted, many living creature, beautiful, can collect food, dirty and smelly, not a place for entertainment, an interesting place to explore Set 2: not polluted, many living creatures, beautiful, can collect food, clean and not smelly, not a place for entertainment, an interesting place to explore Set 3: not polluted, many living creatures, beautiful, can collect food, clean and not smelly, not a place for entertainment, an interesting place to explore	Set 1: There are tourism activities are being conducted at the National Park; Tidal flats are usually used for raising and collecting mussels. Set 2: the metaphor – migratory birds' home (there is a close relationship between tidal flats and migratory birds): can make the image of tidal flats more positive and vivid Set 3: the metaphor (water filter machine) is used to provide more information about the importance of tidal flats to make their image more positive.
7. Have you been to the place described in the question 5?	A few students have been to the place	More students have been to the place	Experience with the place can affect the mental image of the students about tidal flats
8. There are other	Bai bun: polluted, no	Bai bun: polluted, no	Different names can lead

terms referring to a tidal flat: "bai bun" and "bai lay". With each term, is there any change in your mental image of tidal flats?	living creatures, not beautiful, cannot collect food, dirty and smelly, not a place for entertainment, not an interesting place to explore Bai lay: polluted, many living creature, not beautiful, can collect food, dirty and smelly, a place for entertainment, not an interesting place to explore	living creatures, not beautiful, cannot collect food, dirty and smelly, not a place for entertainment, not an interesting place to explore Bai lay: polluted, many living creature, not beautiful, can collect food, dirty and smelly, a place for entertainment, not an interesting place to explore	to different images of tidal flats
9. What are the functions of tidal flats?	Most of the students may choose "provides nursery for fish", "support fishery" and "enriches ocean biodiversity" Set 2: provide a stopover for migratory birds Set 3: cleans seawater	Most of the students may choose "provides nursery for fish", "support fishery", "enriches ocean biodiversity", "prevent coastal erosion", "provides a stopover for migratory birds" Set 2: provides a stopover for migratory birds Set 3: cleans seawater	How do the students perceive the importance of tidal flats?
10. In your local area, how is the place described in the question 5 called? (asked in the school B only)		Some local terms may be provided	The students may know the place with another term rather than the official term
11. How do you		Daily life activities	

know that local term? (asked in the school B only)			

know that local term? (asked in the school B only)			