European Journal of Geography

Volume 13, Issue 5, pp. 045 - 057

Regular Issue
published quarterly

Editor: Dr PanosManetos, pmanetos@uth.gr

Article Info
Received: 11/08/2022 · Accepted: 18/11/2022
Corresponding Author: (*) naudetc@free.fr
DOI: https://doi.org/10.48088/ejg.c.nau.271

Research Article

Using "Spontaneous Geography" to reason about environmental problems

Cédric **NAUDET**[1]

[1] Paris-Cité University, France

Keywords
didactics,
environmental problems,
spontaneous geography,
abstraction,
experiential learning

Abstract
Climate change is a major challenge for societies, especially for future generations. Since 2018 and the large protests initiated by Greta Thunberg, an international youth protest movement has emerged in favour of action against climate change. Yet recent surveys have shown that, despite being aware of these issues, young people's level of analysis of climate phenomena and their capacity for abstraction to understand environmental issues remain low. Consequently, developing didactic scenarios which enable students to understand this complexity appears to be a significant challenge in teaching curricula. Our hypothesis is that drawing on concrete situations presenting the actions of geographical agents would make it possible to overcome the barriers of abstraction. The "Spatial Thinking" group of the Paris-Cité University has formalized an experiential geography based on learning theories which show that learning is a process that can only take place by going back and forth between what the student knows and what they learn. This article first presents a teaching scenario designed to facilitate the teaching of environmental issues. It then examines the results obtained by the students and the new abstraction capacities offered to them.

Highlights:

- *Propose didactic scenarios that convey the complexity of environmental issues.*
- *Climate change requires a rethinking of didactic scenarios.*
- *To make students understand the systemic relationships linked to human activities.*

*The publication of the **European Journal of Geography** (EJG) (http://eurogeojournal.eu/) is based on the **European Association of Geographers**' goal to make European Geography a worldwide reference and standard. Thus, the scope of the EJG is to publish original and innovative papers that will substantially improve, in a theoretical, conceptual or empirical way the quality of research, learning, teaching and applying geography, as well as in promoting the significance of geography as a discipline. Submissions are encouraged to have a European dimension. The European Journal of Geography is a peer-reviewed open access journal and is published quarterly.*

1. INTRODUCTION

Climate change is a major challenge for societies, and particularly for future generations. They will have to adapt to changing climatic conditions and extreme events, for which strong actions and adaptations will be (and already are) necessary. The year 2021 was a striking illustration of this: in France, a late cold snap devastated French crops, particularly vineyards and fruit trees. Severe flooding affected the Rhine basin, causing severe damage in Germany and Belgium. Finally, on a global scale, storm Ida, the fires in Canada and the droughts in Madagascar are signs that the human and economic costs of climatic events are increasing.

However, since 2018 and the major demonstrations initiated by Greta Thunberg, an international youth protest movement has emerged in favour of action to combat climate change. In several European cities, climate marches have been organized over the past several months especially, including 50,000 demonstrators in Paris on 16 March 2019. It would therefore seem that we are witnessing a massive increase in awareness among younger generations. Despite this, two recent surveys among young people presented an objectified measure of the levels of knowledge and investment they demonstrate regarding environmental issues. Both surveys showed how, although they were aware of these problems, their level of analysis of climate phenomena and their capacity for abstraction to understand environmental issues remained low (REFEDD, 2020; APED, 2019; CREDOC, 2019).

Therefore, developing educational scenarios that allow students to understand this complexity seems to be a promising addition to the curriculum. Such scenarios have a major role to play in addressing the challenges of climate change although they are still underdeveloped in many countries, although clearly expanding (Bhattacharya & al., 2021). Increasing education on climate change in the context of Education for Sustainable Development (ESD), or Climate Change Education for Sustainable Development (CCESD), requires that learners gain a better understanding of the causes and consequences of climate change and are prepared to take action to address it (Mochizuki & Bryan, 2015).

Our hypothesis is that by drawing on concrete situations which present the actions of geographical players in and with space, the observed barriers of abstraction can be overcome. Indeed, according to the geographer D. Retaillé (1997), " geography is a spontaneous activity that everyone practices. We have to establish travel routes, recognize places and their characteristics, get to them… we note directions, distances, judge the feasibility of the journey, we imagine, we anticipate, we sometimes dream when met with the spectacle of reported images. We select places, for a day, a week, a year or for life… for a simple visit out of curiosity, to move their or just to dream about them" (op.cit.: 37). Thus, each of us has an experience of the world based partly on concrete practices on spaces, partly on mediations, which participate in social representations. As a result, each student has experience of individual spatial practices (Cailly, 2004) related to a process of socialization which constitutes types of knowledge - not academic, nor formalized - but which can be a lever for conceptualization. "Spatial Thinking", a research group created by Paris-City University, was developed to address this need to make greater use of individual spatial practices in order to work on geographical abstraction. It formalized a concept of "experiential geography" (Leininger-Frézal, 2018; 2019) inspired by D.A. Kolb's experiential learning theory (Kolb, 1984) and others which demonstrate how learning is a process that can only occur through a process of back-and-forth between what the student knows and what he or she learns (Dewey, 1938; Piaget, 1937; Vygotski, 1962; Molin & al., 2015).

This approach is organized in four phases: 1) an initial "immersion" phase in which students are confronted with direct or indirect spatial practices. 2) a second interaction phase in which spatial practices are discussed using geographic tools. 3) a phase of institutionalization during which concepts and knowledge are defined. 4), an implementation phase wherein the acquired knowledge is validated by experience.

This article will first describe the experiment which was considered to facilitate the teaching of environmental issues before discussing the results.

2. METHODOLOGY: A CLASSROOM DEBATE ON AN ENVIRONMENTAL CONTROVERSY.

The scenario is constructed from a spatial experience in the sense defined by L. Cailly: "an experience is spatial if it is centred on a spatial practice; [this] manifests itself, via language, in the form of spatial ideologies, a concept that designates the set of judgments that individuals produce about space and its objects" (Cailly, 2004: 14).

The experience can be indirect. As such, it is no longer the learner's experience, but that of other agents who report their practices or their spatial representations in their discourses. These practices can also be simulated in role-playing or simulation games.

The didactic scenario was thus developed from a role-play (Rao & Stupans, 2012). In this classroom practice, students must adopt specific stances according to a character they are designated to play. This role should enable them to better understand the content of a course or to assimilate "complex or ambiguous concepts" (Sogunro, 2004: 367). Several contemporary studies have moreover presented this approach as being more adapted to social developments (Rosa, 2012; Bobbit & al., 2001). By having students take on the role of another person, role-playing encourages empathy and the consideration of other perspectives (Westrup & Planander, 2013; Sogunro, 2004). Furthermore, the process of appropriating discourse arguably creates a deeper cognitive connection to the subject, thereby facilitating learning (Johnson & Johnson, 1997).

In order to assist the students in interpreting their geographical representations, a problematic situation (Gerin-Grataloup et al., 1994) leading to controversy affecting the students in their daily lives was developed. For this purpose, I chose to develop a scenario regarding the organization of the football World Cup by Qatar. This information made the headline news in 2010 because Qatar was not intended to host such sporting events. Indeed, not only is football not a particularly developed sport there, but above all, it has a desert climate in summer, the period in which the event is usually held.

The scenario is set out as follows: "a televised debate is held among several agents after the 2022 football World Cup was awarded to Qatar: in the context of climate change, is it right that Qatar should hold this event? The spatial experience is indirect, as documents are used to enable students to identify with five agents in order to reflect on their positions regarding this event. The five agents were: a Qatari (here, the president of the Paris Saint-Germain football club: Nasser Al-Khelaïfi); a representative of Greenpeace (a non-governmental organisation working to defend the environment); a representative of the Anticor association (which fights against corruption); a representative of Saudi Arabia; and a French entrepreneur (here, the CEO of Total Energie: Patrick Pouyanné).

The aim was to enable students to grasp the arguments of the above-mentioned agents and thereby understand their spatial representations and strategies. To do this, the students had to look for arguments in documents, considering the economic, social and environmental dimensions involved in organising this competition in Qatar and which present, for each agent, a specific discourse on resources and on space (see Table 1), according to the role each has been assigned. The class was then divided into groups of four students, each assigned to play a different agent.

An interaction phase takes place in the form of an open debate. Within each group, four roles are allocated: a speaker intervening in the debate, a reporter taking notes of the content of the debate and advisers helping the speaker to argue. The debate is chaired by the teacher who can refocus the discussion, but only as a last resort, as this phase, inspired by socio-constructivism, should enable students to compare their opinions and experiences. To facilitate the analysis, this phase was recorded.

Table 1. The corpus of documents used during the immersion phase and the discourses on space and on the resource they should make explicit

	Common corpus for all students	**Qatari corpus**	**Greenpeace corpus**	**Anticor corpus**	**Saudi Arabia corpus**	**French entrepreneur corpus**
Documents available in the corpus	1/ Doc. 1: a map of Qatar with two surface figures indicating oil and gas deposits; four linear figures (the route of oil/gas pipelines, export flows to major regions of the world, the limits of the Exclusive Economic Zone (EEZ) and the main roads); four-point figures (areas of contestation of the EEZ route, the main export ports, main cities and main airports); 2/ Doc. 3: Extract from an article in "World Cup 2022: why Qatar is paying 200 billion euros", Le Figaro, 12/07/2013; 3/ Doc. 6: report "Qatar builds air-conditioned stadiums", LCI, 18 November 2018	1/ Doc. 2: graph showing the evolution of Qatar's energy consumption and production in millions of TOE; 2/ Doc. 4: article "Modifier les comportements énergétiques, un défi pour le Qatar, Le Monde, 25 November 2012; 3/ Doc. 5: article "Comment le Qatar a acheté la France (et s'est payé sa classe politique)", Slate.fr, E. Leser, 6 June 2011.	1/ Doc. 2: graph showing the evolution of Qatar's energy consumption and production in millions of Tons of Oil Equivalent; 2/ Doc. 4: article "Modifier les comportements énergétiques, un défi pour le Qatar, Le Monde, 25 November 2012; 3/ Doc. 7: Map of water resources in Qatar: three surface figures represent aridity, the fossil water table and irrigated agriculture; three-point figures (agglomeration, desalination plant and mega-reservoir).	1/ Doc. 5: article "Comment le Qatar a acheté la France (et s'est payé sa classe politique)", Slate.fr, E. Leser, 6 June 2011; 2/ Doc. 10: article "Le prix du foot: 6500 travailleurs migrants morts sur les chantiers liés au Mondial 2022 au Qatar", Bastamag, T. Creach', March 2021	1/ Doc. 8: article "Pour les entrepreneurs français, investir au Qatar ou en Arabie Saoudite? Le bras de fer diplomatique", France TV Info; 2/ Doc. 9: article "Qatar-Saudi Arabia: deciphering an unexpected reconciliation", La Tribune.fr, L. Kennouche, 4 Feb. 2021	1/ Doc. 5: article "Comment le Qatar a acheté la France (et s'est payé sa classe politique)", Slate.fr, E Leser, 6 June 2011; 2/ Doc. 8: article "Pour les entrepreneurs français, investir au Qatar ou en Arabie Saoudite? Le bras de fer diplomatique", France TV Info.
Discourses on space and the environment	1/ The country is rich in hydrocarbons and has a financial income from this source; 2/ Hydrocarbon resources are drying up and the country must develop new activities; 3/ Energy exploitation and the construction of stadiums have environmental and social consequences.	1/ Qatar is a major producer of fossil fuels but also a major consumer; 2/ The country promotes sustainable development; 3/ The country needs powerful allies to assert itself on the international scene.	1/ The country is a high emitter of greenhouse gases; 2/ The country is very energy-intensive, contrary to the speeches presenting it being as part of a sustainable development approach; 3/ The country is a desert, and only large-scale water supply systems can enable it to develop.	1/ Qatar is diversifying its income by investing abroad and benefiting from tax deductions; 2/ There is a high human cost to prepare this World Cup	1/ Saudi Arabia wants to compete with Qatar by attracting foreign investment; 2/ The two countries are geopolitical competitors. They clashed diplomatically between 2017 and 2021…; 3/... but a partial reconciliation is now taking place.	1/ French investors have had privileged links with Qatar since the tax agreements signed in 1990 and 2009; 2/ Saudi Arabia also wants to attract investors with a similar strategy.

3. RESULTS

The analysis of the recording, presented in Table 2 below, shows that the students address different arguments, highlighting tensions between the agents. The fourth column of the table suggests that each student intervention should be linked to an abstraction that can be applied to all environmental issues.

Table 2. Extracts from the interaction during the experiential geography scenario: "Should the World Cup be held in Qatar?".

Timing	Stakeholder	Transcript	Abstraction observed
0.20	Moussa1 (Qatar)	"So, first of all, we would like to say that there is no risk in holding the World Cup in Qatar. The temperatures in Qatar are high, but changes are planned to make sure it goes well. We will air-condition the stadiums."	Belief in technical progress
00:44	Lila 1 (Greenpeace)	"You talk about the heat, but due to oil and gas revenue, Qatar has spent 400 million a week on these stadiums. I find it unacceptable to invest such sums in a stadium in this context of climate change."	Major ecological impact Rent-seeking countries
01:50	Caroline 1 (Anticor)	"We have evidence that the air-conditioned stadiums are built by EDF and that there is a corrupt deal in with France."	Need for economic development
03:33	Caroline 2 (Anticor)	"So, we have evidence of this corruption. There is an agreement between France and Qatar for military collaboration. EDF won the deal right afterward this deal was signed, so, um, there you go."	Corruption
04:14	Gwendoline 2 (French entrepreneur)	"So, for you an investment is corruption?"	Higher economic interests
04:30	Caroline 3 (Anticor)	"No, I'm talking about the money that circulates. When the Emir builds himself a villa in Marne-la-Coquette without paying taxes. That's what we are criticizing. And the buying of votes to organise the World Cup, with oil and gas money."	Higher economic interests. Corruption
05:26	Ylan 1 (Saudi Arabia)	"I want to come back to the organisation of the World Cup. There was corruption by Zidane and Platini to buy this World Cup, with oil money."	Corruption
07:12	Moussa 4 (Qatar)	"You talk to us about corruption of football players and companies, but it takes more than that to organise a World Cup. Honestly, do you think that we could organise a World Cup just by buying Zidane? We invest a lot of money in stadiums and infrastructures. That's why we won the right to organise it.	Need for economic development
07:58	Lila 2 (Greenpeace)	"The CO2 emission per capita in Qatar is three times higher than that of in America. It should also be pointed out that in Qatar, the population demand for energy is increasing by 6%, given that fossil fuels are non-renewable and therefore very harmful to the environment. What do you have to say about this, Mr. Representative of Qatar? When the World Cup is held, Qatar will increase its consumption of fossil fuels."	Major ecological impact Rent-seeking countries

08:40	Gwendoline 3 (French entrepreneur)	"Qatar is an emerging country, it is one of the richest countries in the world with a very high GDP per capita, so this development requires demand. Many resources are needed. Qatar has many oil and gas deposits, especially gas. By investing in developments such as pipelines, the problem concerns less exploitation of the resource than its depletion, as there are a lot of deposits."	Need for economic development Belief in technical progress
09:23	Ylan2 (Saudi Arabia)	"Let me intervene in the debate, oil is not a resource issue. Do I have to remind you that our country is currently fighting with Qatar to see who will gain ownership of the gas fields on the border, especially in the Persian Gulf?"	Geopolitical risks
09:42	Moussa5 (Qatar)	"Well, we have a project. And what we know is that the gas will soon be exhausted. Our project is to find other solutions to diversify and find other sources of money. We are going to develop tourism and the World Cup is important for that."	Need for economic development
10:18	Gwendoline4 (French entrepreneur)	"And we are also looking for alternatives to the depletion of gas and oil. We are looking for other economic inputs, and that is why French companies are working with Qatar. There are other economic sectors than the energy sector investing in the country, thanks to the World Cup in particular. It is important to boost the country's image."	Need for economic development
14:11	Nora 1 (2nd representative of Greenpeace)	"Yes, then I would like to add a document for the environmental issue. I am referring to a graph that shows us the increase in Qatar energy consumption since 1990. It has clearly skyrocketed. Doesn't that worry you?"	Need for economic development. Belief in technical progress
14:26	Yvan1 (Qatar)	"So, we don't just sit around when it comes to global warming. We build public transport. We are reducing the number of cars per capita. We are going to build hotels that respect the environment. And don't forget that we moved the World Cup to winter to avoid the heat of summer."	Need for economic development. Belief in technical progress
16:05	Maxence1 (French entrepreneur)	"In terms of energy consumption, as the country develops, it is logical that demand increases. I also wanted to say that Total is fully committed to renewable energies such as hydroelectricity and wind power. We are reducing energy consumption."	Need for economic development. Belief in technical progress
16:44	Elise 1 (Anticor)	"We want to add that the alliance between Qatar and France is unfair. The Qataris have a tax exemption during their first 5 years in France and this is really not normal."	Higher economic interests. Corruption
18:04	Ylan3 (Saudi Arabia)	"And we oppose Qatar, which is an ally of Iran. They lend them money and we can't tolerate that. It destabilises our country."	Geopolitical risks

At the end of the debate, the students write their own text, enabling them to summarise their agent's point of view. This is the first step in the abstraction process, and highlights the interpretation each person has made of the object of reflection. This writing constitutes a break between the linear modality of oral language and the graphic modality of written language (Goody, 1979). It also encourages a gradual transition between knowledge drawn from immediate experience, which has enabled a protoconceptualisation (Brooks, 2017) to emerge, and reflective knowledge.

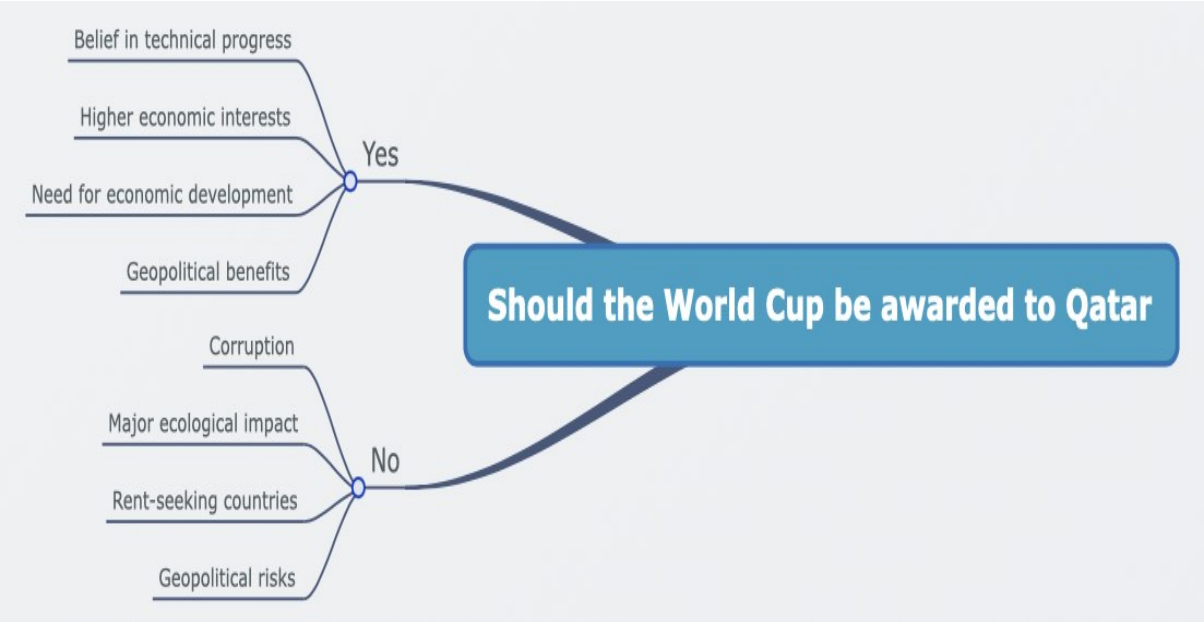
The more the content of the debates has been rich in examples, the more the students will be able to develop their stance. Indeed, since knowledge is evolving, it is structured, according to Barth (1987), as a network of interconnections that is constantly being reorganised. As such, each individual creates their own knowledge by associating what they already know, their feelings, experiences, and the elements that are significant for them. Table 3 presents some of the students' arguments, classified according to the elements of abstraction to which they can be linked :

Table 3. Classification of students' written arguments according to the elements of abstraction

Higher economic interest; Need for economic development	"The influx of tourists will help the country to reshape itself. The oil fields will no longer be operational after 2023 and tourism seems to be the only valid solution to develop the country and compete with Dubai. Qatar has made huge investments to prepare for the World Cup: $140m for the construction of roads, bridges, airports, metros, etc. As well as $20m for hotels. French investors have already signed contracts with Qatar and foreign competitors are in discussions to sign contracts. (Isabelle, Anticor group) "For Qatar, gas is a great asset. Indeed, it is this resource that makes it the 3rd largest producer in the world, therefore becoming constantly richer. However, it is also a problem, as gas is not a permanent resource and alternatives must be found" (Mylène, Qataris group).
Belief in technical progress	"Qatar is the world's third largest gas reserve and its economy is essentially based on this. In twenty years, the country's natural gas production has risen from around 5 million TOE to almost 135 million. Qatar is working to reduce its pollution by trying to replace oil with natural gas" (Daniel, Anticor group).
Geopolical risks;Corruption	"For my character, Salmane Al Saud, Qatar should not organise the World Cup because of suspected links with Al Qaeda, the Islamic group, and the Muslim Brotherhood, a brotherhood classified as terrorist by some countries. Since Saudi Arabia has severed ties with Qatar, it is natural that they do not want the World Cup to be hosted there" (Olivia, Saudi Arabia group). "For my character, Salmane Al Saud, Qatar should not organise the World Cup. Indeed, Saudi Arabia has severed its ties with Qatar over accusations of terrorism (suspected links with al-Qaeda, the Islamic State group and the Muslim Brotherhood). For some researchers, this is a vague justification hiding other motivations. There is also the fact that Qatar has a good relationship with Iran because they both operate the North Dome, but America and Saudi Arabia have a very bad relationship with Iran. (Anaïs, Saudi Arabia group)
Major ecological impact; Rent-seeking countries	"For my character, Qatar should not organise the World Cup because it is doing so out of self-interest, to ensure a future in tourism once its oil fields are depleted. Moreover, the country is not suitable for a sports competition, because in summer the temperatures go from 40 to 50 degrees, which forces them to air-condition the stadiums in the open air. They boast that they can cool them down in 30 minutes, but this is an ecological disaster. On top of that, there are heavy suspicions of corruption by FIFA" (Yvan, Greenpeace group). "Gas has been an asset because it has allowed us to have the highest per capita income on the planet. But it is not a sustainable resource and so by 2023 it will be depleted. That's why Qataris are anticipating the end of resources and investing in new economic sectors" (Gwendoline, "entrepreneur group"). "Lack of water used to be a problem but is no longer so thanks to air-conditioned stadiums that cool the atmosphere. However, if we look further, it is an ecological problem, as air conditioners are extremely polluting and require water that only desalination plants can provide. (Marie, "Greenpeace group")

The second stage was supervised by the teacher. This stage sought, through interactions with the class group, to bring out the conceptual network of reasoned geography (Retaillé, 1997). The aim was to highlight the elements of abstraction that emerged. The teacher previously identified these in the writing. The students' arguments were read out loud and the class had to decide on a classification, following the example of what was outlined in Table 3. A mind map was drawn up by the students using the free software Wise mapping, with which we can highlight the complexity of environmental issues and the obstacles to, and levers for, profound policy change (Figure 1).

Figure 1. The mind map produced by the students using Wise mapping software



The main material collected in order to measure implementation was therefore the autonomous texts written by the students after the debate. The analysis of these is presented in the following sub-section.

It is possible to analyse the students' writings produced after the debate. Data were collected over the course of the 2017-2018 school year, in the second-grade class[1] ("2ndeB"). The class was composed of twenty girls and fifteen boys.

In analysing the writing, we considered a student to have a good understanding when they demonstrated abstraction and were able to provide at least three arguments to qualify their point of view. Weak understanding was demonstrated when the student showed abstraction but did not clarify their point of view beyond two types of arguments. Finally, the student demonstrated insufficient understanding when they did not show abstraction and presented an unqualified opinion.

Table 4. Level of abstraction of pupils

	Good understanding		**Weak understanding**		**Insufficient understanding**		**Total**	
	In no.	In % of → / ↓	In no.	In % of → / ↓	In no.	In % of → / ↓	In no.	In % of → / ↓
Male	5	33,5 / 26	4	26,5 / 50	6	40 / 75	15	100 / 42
Female	14	70 / 74	4	20 / 50	2	10 / 25	20	100 / 58
	19	54 / 100	8	23 / 100	8	23 / 100	35	100 / 100

Table interpretation: percentages are established in rows and columns. 26 % of males demonstrated a good command of the concept. Of all the pupils demonstrating a good grasp of the concept, 33.5% were male.

[1] UK: Year 11; USA: 10th Grade.

This table shows that more than half of the class had a good grasp of the concept. Less than a third had a fragile grasp of the concept, i.e., they had begun the conceptualisation phase even though it was still fragile. Less than a third of the pupils still had difficulty with the conceptualisation exercise required. One could assume a gender gap, as boys are a priori more sensitive to football-related issues. However, this was not the case, with the girls being particularly well informed about sports issues, which have become real social debates in light of the organization of the World Cup in Qatar.

A detailed analysis of each of these levels of mastery, based on examples of pupils, reveals three main categories presented below.

3.1. A complex abstraction in which the environmental issue is apprehended in its multiple geographical dimensions

The first type of student seems to be able, at the end of the didactic scenario, to demonstrate an elaborate abstraction. They are able to reuse at least three arguments to clarify their point of view. Three students illustrate this type.

Table 5. "Conceptualizing" students' arguments following the debate "Should Qatar host the World Cup?"

Abstraction Criteria labels 1/ Higher economic interest: a need of society; agents who produce, consume, export 2/ Tensions: geoenvironmental, geopolitical and geoeconomic
Cathy's argument, in the role of representative of a French transnational firm "Qatar should not organize the World Cup because it has economic problems, its gas resources are decreasing, so Qatar will not be able to rely on the sale of its productions. Moreover, it subject to an embargo, which is depriving the country of food. It will therefore have difficulty in supplying tourists and players for the event. Qatar is prepared to spend 200 billion euros on infrastructure for the World Cup, even though the country is on the verge of a crisis. It is also one of the most polluting countries in the world, so with double the usual population, waste and pollution will increase. On the other hand, Qatar uses tourism as a way to increase its economy while the money from tourists will only be used to pay for infrastructure. Politically, Qatar is accused of helping terrorist groups, so its security is questionable. It wants to organize the World Cup only to compete with Dubai and not for the welfare of its population. Finally, it is too hot in the country to practice physical activities and sports during the summer."
Patrick's argument, in the role of a representative of the NGO Anticor "I am against the fact that Qatar is organizing the World Cup because its aim is just to recreate a dynamic within the country. Without the help of other countries (such as Turkey), Qatar would not be able to organize it because of its gas fields which are starting to run out. A country that is so lax on financing terrorism should not host the WCD. Qatar should instead invest the money put aside for the World Cup in addressing its ecological issues: wasting electricity is not penalized there, and with all the tourists, there could be a lot of waste. Qatar is looking for sources of income by buying football clubs (e.g. PSG), the president of PSG is known to be corrupt. They use football to make themselves known, because without their fossil resources, this country would be nothing."
Cassandra's argument, in the role of a representative of Qatar "I am in favour of the World Cup being held in Qatar. This event would help them to develop while they are in crisis. Tourism will be a good alternative when Qatar runs out of gas. The country intends to invest a lot in improving its image, buying sports clubs, companies, schools... It made a deal with the former French president Nicolas Sarkozy to support them. Qatar likely bribed FIFA to hold the World Cup games in their country. Nevertheless, they invest heavily in their country (I find this positive). Despite its investment, the problems are the exploitation of gas, waste of electricity and the country's unstable politics (coup d'état). But by hosting the World Cup, the population could potentially become more aware and waste less."

These three students developed arguments showing the different dimensions of an environmental issue, shedding light on the interplay between agents and the complexity of decision-making. The tensions between geopolitical, economic, and environmental conservation issues are highlighted. These students presented nuanced opinions and were from this able to make choices informed by a plurality of the different dimensions of the problem.

3.2. A fragile abstraction focused on crises or risks of crisis

This second category identifies students who present an awkward abstraction but do not specify their point of view beyond two types of arguments.

Table 6. Students' arguments showing "fragile conceptualization" following the debate "Should Qatar host the World Cup?"

Legend of the identification of the abstraction criteria 1/ Higher economic interest: a need of society; agents who produce, consume, export 2/ Tensions: geoenvironmental, geopolitical and geoeconomic
Caroline, in the role of a representative of Qatar "Qatar should not organize the World Cup because it is a small country which will not be able to accommodate a million fans and four million people. Moreover, this country is experiencing economic problems with food and oil. For them, organizing the World Cup is a pretext to make money because there is less and less gas. They buy football clubs for the sake of the country's reputation but they paid FIFA representatives off to award them the organisation."
Adama, in the role of a representative of Saudi Arabia "In view of all the arguments, I am against the World Cup being held in Qatar, because I don't believe that Qatar has the necessary means. Indeed, it is currently subjected to an economic, productive and food embargo. Indeed, Qatar, after the Saudi blockade, does not have enough to feed its population. Turkey has sent 105 cargo planes with food. In addition, Qatar has invested a large amount of money to buy the footballer Z. Zidane, despite having big money problems, and will have to prepare its grounds in readiness for the World Cup. Finally, Qatar has a very shaky policy, after being accused of financial terrorism: there are multiple coups and therefore cannot host in such an important event appropriate conditions."
Cyril, in the role of a representative of a French Transnational Firm "I am against holding the World Cup in Qatar in 2022. First of all, the climate in Qatar in summer is very hot and as a result, the World Cup had to be moved to winter, which means that the league and cup matches will be moved. This means the players will not be in top shape. Qatar plans to spend 200 billion for this World Cup, including 160 billion for roads, airports, and transport. This is a lot of money just for a World Cup. Qatar is a small country with a small population and during this World Cup millions of people will come from other countries. The country will be overwhelmed, maybe in food crisis. Finally, Qatar has recruited a world class coach, Z. Zidane. We conclude that Qatar cannot organize this World Cup because of the climate and having to change the event to winter."

For these students, secondary, non-geographical arguments are, on the other hand, central to the argument (sports or organizational arguments). These students demonstrate the beginnings of abstraction, but their argument is not nuanced, remaining centred on an opinion developed from the agent they embodied during the debate.

3.3. A focus on the country or a judgment constructed via the media

The analysis of the students' arguments revealed a third category: those who do not demonstrate abstraction, remain focused on the experience, without managing to take a step back and conceptualize their knowledge. This was particularly the case for Paloma, Léandre and Ilam.

Table 7. Arguments from students presenting "insufficient understanding" following the debate "Should Qatar host the World Cup?"

Abstraction Criteria labels 1/ Higher economic interest: a need of society; agents who produce, consume, export 2/ Tensions: geoenvironmental, geopolitical and geoeconomic
Paloma, in the role of a representative of Saudi Arabia "I am not in favour of the World Cup being held in Qatar because Qatar needs to invest more in their needs than to spend time organising the World Cup. With 200 billion euros, Qatar could have invested better, but they think football will help them. Moreover, Qatar has received aid from Turkey for food. This shows that, despite their oil and gas wealth, they have other more important difficulties, and it is imperative that they address these."
Léandre, in the role of a Saudi "The World Cup must not be held in Qatar, because they have a CO2 record, and this must not increase. Above all, the Qataris cannot organize the World Cup because they do not play football. Moreover, the pollution is already too high, and their tourism could increase. They would use the money they have for the World Cup and not for ecological issues. The energy produced is used to gain wealth and the electricity is not paid for (sic)".
Ilam, in the role of a French entrepreneur "Qatar is spending a total of more than $200 billion for the 2022 World Cup. Qataris are all rich from oil and gas. Qatar wants to organize the World Cup even though it is a small country, they have never participated in the World Cup. Qatar wants to organize the World Cup during the winter (in December) because it is very hot in summer, but the problem is that we are used to following the World Cup in summer. They have also proposed to close their stadiums completely to air-condition them during the games."

These three students developed arguments centred on their respective personal opinions, without abstracting from the issue at hand. This occurred for eight students in the sample. For them, the experience is sufficient in itself and they did not reach a stage where they could generalise. Thus, their answers failed to meet the objective of explicitness: they generalised without taking into account the diversity of the society in question ("Qataris are all rich because of the petrol they have "). They also used football-related sweeping statements (e.g., "Qataris can't organize the World Cup, they don't play football!").

In conclusion, it should be noted that this type of practical exercise is not typical in the French geography curriculum. Common exercises are rather based on case studies that consist in studying documentaries set in specific geographical spaces and related to specific themes. The students therefore particularly appreciated this approach.

4. CONCLUSIONS

This didactic scenario based on the spontaneous geography of young people opens up rich perspectives to encourage them to think about environmental issues. The analysis of the debate between the students and the writings they produced afterwards shows that most have the necessary capacity for abstraction to grasp the complexity of these issues. Indeed, spontaneous geography underpins how the World Cup Football scenario could be a reference shared by all the students. By embodying an agent with a specific world view, the students are confronted with new knowledge, which may confirm or contradict their initial representations. The didactic scenario provides space for this shift: from it emerges a protoconceptualisation by enabling elements of abstraction around environmental issues to be clarified. An anchoring in the spatialities of the different agents allows the class group to adopt another angle, thus nuancing their initial spatial representations. The table and heuristic map co-constructed by the students are all metacognitive artefacts, which therefore make it possible to examine the questions raised by this environmental problem in greater depth.

We can therefore affirm that the role-playing game was a good way to modify the students' initial representations. This confirms the studies presented above concerning the contributions of such teaching tools (Rao & Stupans, op.cit.; Rosa, op. cit.). However, although abstraction was acquired by the majority of students, a small group still struggled. Other more in-depth

studies - longitudinal, comparative - will be pursued in further research[2]. These experiments demonstrate how the passage through spontaneous geography can anchor the pupil in a discourse of common sense. This is in fact highlighted by the writings of the third type of pupil, those who remain anchored in the discourse of the mainstream media. For these students, more intensive support could help them to distance the experience. The lines of inquiry outlined by B-M. Barth, based on the work of Bruner (1990), suggest that understanding emerges "in a back and forth between contextualised situations that each person can live as a personal experience and the common abstract words that we will look for together to refer to. Thus interaction is transformed into thought' (Barth, 2019: 148-149). It is likely that students who remain in difficulty after the learning scenario are not aware of the knowledge mobilised. Therefore, the system must consider more individual support, or organise further accompanying stages, between the different phases of an experiential geography scenario. Also, one must not neglect social constraints, and recognise that some students need more time to fully understand a given approach. Thus, finding a way to systematise the approach can promote such appropriation, because it helps students to incorporate what they learn into their existing knowledge and awareness.

REFERENCES

APED (2019). *École, savoirs, climat, Enquête sur les connaissances et la conscientisation des élèves de fin d'enseignement secondaire, à propos du dérèglement climatique*. APED. https://www.skolo.org/CM/wp-content/uploads/2019/10/Ecole-savoirs-climat-Aped-2019.pdf.

Barth, B-M. (2019). "Chapitre 8. Jerome Seymour Bruner et l'orientation culturelle de la psychologie cognitive" in Ph. Carré éd., *Psychologies pour la Formation*. Dunod, 139-155. https://doi.org/10.3917/dunod.carre.2019.02.0139

Barth, B-M. (1987). *L'apprentissage de l'abstraction*. Retz.

Bhattacharya, D., Carroll Steward, K. & Forbes, C. T. (2021). Empirical research on K-16 climate education: A systematic review of the literature, Journal of Geoscience Education, 69:3, 223-247, https://doi.org/10.1080/10899995.2020.1838848

Bobbit, L.M., Inks, S.A., Kemp, K.J. & Mayo, D.T. (2000). Integrating marketing courses to enhance team-based experiential learning. Journal of Marketing Education, 22(1), 15-24. https://doi.org/10.1177/0273475300221003

Brooks, Cl. (2017). Understanding conceptual development in school geography in Jones, M. & Lambert, D. (ed.), *Debates in geography education*, Routledge, 103-114. https://doi.org/10.4324/9781315562452-8

Bruner, J. S. (1990). *Acts of meaning.* Harvard University Press.

Cailly, L. (2004). *Pratiques spatiales, identités sociales et processus d'individualisation. Etude sur la constitution des identités spatiales individuelles au sein des classes moyennes salariées du secteur public hospitalier dans une ville intermédiaire : L'exemple de Tours* [Thèse de doctorat, sous la direction de M. Lussault]. François Rabelais - Tours.

CREDOC (2019). *Environnement, les jeunes ont de fortes inquiétudes pour le climat mail leurs comportement restent consuméristes*, CREDOC. https://www.credoc.fr/publications/environnement-les-jeunes-ont-de-fortes-inquietudes-mais-leurs-comportements-restent-consumeristes.

Dewey, J. (1938). *Experience and Education*. Collier.

[2] The recent work of the "spatial thinking" group has set itself this new objective of a comparative exploration, using similar criteria of observation from one class to another, from one didactic scenario to another.

Gerin-Grataloup, A.-M., Solonel, M., & Tutiaux-Guillon, N. (1994). Situations-problèmes et situations scolaires en histoire-géographie. *Revue française de pédagogie*, 106(1), 25-37. https://doi.org/10.3406/rfp.1994.1270

Goody, J. (1979). *La Raison graphique : La domestication de la pensée sauvage*. Les Editions de Minuit.

Johnson, D.W. & Johnson, F.P. (1997). *Joining Together: Group Theory and Group Skills*, 6th ed.Boston, MA: Allyn & Bacon.

Kolb, D. A. (1984). *Experiential learning*. Prentice-Hall.

Leininger-Frézal, C. (2019). Apprendre la géographie par l'expérience : La géographie expérientielle [Habilitation à diriger des recherches]. Caen Normandie.

Leininger-Frézal, C. (2018). Training Primary Teachers through Experiential Geography, *European Journal of Geography*, 9:2. https://eurogeojournal.eu/showPaper.php?id=1342

Mochizuki, Y., & Bryan, A. (2015). Climate Change Education in the Context of Education for Sustainable Development: Rationale and Principles. *Journal of Education for Sustainable Development*, *9*(1), 4–26. https://doi.org/10.1177/0973408215569109

Molin, L., Grubbström, A., Bladh, G., Westermark, Å., Ojanne, K., Gottfridsson, H.-O., & Karlsson, S. (2015). Do personal experiences have an impact on teaching and didactic choices in geography?, *European Journal of Geography*, 6:4,6-20. https://eurogeojournal.eu/showPaper.php?id=688

Piaget, J. (1937). *La construction du réel chez l'enfant*. Delachaux & Niestlé.

REFEDD (2020). *Les étudiants face aux enjeux environnementaux, Synthèse des résultats de la CNE2020*, REFEDD. https://le-reses.org/wp-content/uploads/2021/05/2-SYNTHESE_CNE2020_REFEDD-1.pdf

Retaillé, D. (1997). *Le monde du géographe*. Presses de Sciences Po.

Rao, D. & Stupans, I. (2012). Exploring the potential of role play in higher education: development of a typology and teacher guidelines. *Innovations in Education and Teaching International,* 49(4), 427-436. https://doi.org/10.1080/14703297.2012.728879

Rosa, J.A. (2012). Marketing education for the next four billion: Challenges and innovations. *Journal of Marketing Education*, 34(1), 44-54. https://doi.org/10.1177/0273475311430802

Sogunro, O.A. (2004). Efficacy of role-playing pedagogy in training leaders: Some reflections. *Journal of Management Development*, 23(4), 355-371. https://doi.org/10.1108/02621710410529802

Vygotski, L. S. (1962). *Thinking and Speech*. The M.I.T. Press.

Westrup, U. & Planander, A. (2013). Role-play as a pedagogical method to prepare students for practice: The students' voice. Ogre utbildning, 3(3), 199-210.