Doussot Sylvain
IUFM des Pays de la Loire
4 chemin de Launay-Violette
BP 12227
44322 Nantes Cedex 3
sylvain.doussot@univ-nantes.fr

Geography and political skills: a case study in a school of education

Abstract: this article is a case study based on the work of a group of students trained to teach. They build a lesson for 10-11-year-old pupils on geography and education for sustainable development aiming at linking civic and social skills to scientific geography. This example is changed in a case study by questioning a prevailing idea about relations between school knowledge and "…educations" (citizenship education, environmental education): disciplines such as geography are *serving* the development of citizenship skills in order to promote a critical education instead of a standard one. Beyond the questioning, this case study offers alternative ways based on philosophy, history and sociology of science to understand how pupils could become critical citizens. Theses ways focus on the hypothesis of a general skill often unseen though essential to any critical approach of world problems: what knowledge should be used when? Geographical knowledge then refers less to "knowing that", than to scientific, collective and language practices, specific to the viewpoints built through scientific disciplines; among which, the building of space problems.

Résumé: cet article est une étude de cas basée sur le travail d'un groupe d'étudiants en formation pour devenir enseignants. Ils travaillent à construire une séquence pour des élèves de 10-11 ans en géographie et EDD. Ces deux thématiques s'articulent dans le développement de compétences civiques et sociales, et du savoir géographique de référence. Cet exemple constitue un cas dans le sens où il remet en question une idée dominante concernant les rapports qu'entretiennent les savoirs disciplinaires et les "éducations à": les disciplines enseignées seraient *au service* du développement de compétences citoyennes, dans le but de permettre une éducation critique plutôt qu'une inculcation. Au-delà de la remise en question, ce cas donne des pistes alternatives qui s'appuient sur la philosophie, l'histoire et la sociologie des sciences pour penser le développement de l'esprit critique des élèves. Ces pistes travaillent l'hypothèse d'une compétence générale souvent non questionnée, mais essentielle dans toute approche critique du monde: quel savoir utiliser à quel moment ? Le savoir géographique réfère alors moins à des savoirs propositionnels qu'à des pratiques scientifiques, collectives et langagières, propres au point de vue spécifique qu'institue la discipline de référence. En particulier, la construction de problèmes spatiaux.

Keywords: geography, criticism, skills, problems

Fifteen students in a master degree (education, teaching and training for primary school teachers) are involved in a course named *Teaching geography and education for sustainable development, critical approaches*. 15 hours out of 30 take place during the first semester and focused on the building of a course for pupils of 10-11 year-old about a local issue: the soon opening of a tram-train way in the Nantes urban area. This issue links the teaching of geography to education for sustainable development. The students' work is organised by this town and country planning project, and aims at linking learning of geographical concepts and approaches (on the planning of a metropolitan area, scales and density) to development of political skills that are supposed to foster learning of citizenship.

Actually, this first statement displays the structure of the training course. What the students do with it is what matters here: this paper deals with how I made the students discussions (transcribed) into a case study that challenges the relation between (geographical) knowledge and (political) action.

What is disciplinary knowledge good for? could be the guiding thread of this case. It indicates the scope of the questioning: sciences – among which social sciences – are constantly looking for balance between independence from society's requests and normative stand point; they challenge questions built upon the stream of life but claim they tell the truth about it[1]. This gap however does not always mean that science has an overhanging position. In society and at school, relationship between knowledge and action can be depicted through the following linear pattern: political question → detour through knowledge (scientific, school) → back to the question.

At school, projects to educate pupils to sustainable development are thus implemented in classes where teachers call knowledge up from different disciplines (Maingain, Dufour, Fourez 2002, 83) in order to face non-disciplinary questions (Audigier 2001). In the media, experts recognized as scientists answer journalists' questions, or are asked to debate among themselves according to questions from the everyday world.

My starting hypothesis states that this way of making use of knowledge in school projects passes over an obstacle to educate pupils to sustainable development and, generally speaking, to citizenship education, about their relation to specific knowledge: the ability to choose what knowledge to use in what situation. Leaving out this problem of development of a general skill (Rey 1996; 2011) is not taking into account the fact that scientific realms have emerged from the building of specific tools and practices to ensure their autonomy. When geographers build such concepts as urban sprawling, they intend to escape common sense categories (suburbs, town versus countryside, etc.). But autonomy does not come magically from the concepts themselves; it mostly comes from the vindication of the relevance of theses conceptual tools: some settle while others disappear in the course of investigation. Autonomy from society's requests, together with the arbitration of reality (society in social sciences). Can education for sustainable development projects ignore this essential process of construction of knowledge?

Before considering the part my case study could play in this inquiry (parts 3 and 4), we should first go deeper into this hypothesis.

1. Science as an autonomous and vindicated outlook on the world

This general skill – to know when using what knowledge – is often passed over in official texts. I shall take two examples at two different levels. It is firstly eluded in the latest texts published by the ministry of education to help teachers implementing case studies in geography. They systematically refer to a split between pupils work on documents and the teacher's role to "put into perspective": the choice of relevant concepts is the teacher's responsibility only. Besides, this skill is overshadowed in the multiple examples showed by the ministry of education, like in the following:

> "In third year of secondary school, pupils have worked in history, geography and maths through an IDD (itinéraire de découverte) about fair trade. The final item was the making of two meals at the school cafeteria with fair trade products. The positive making of the menus and the cost calculation of the meal showed the pupils that solidarity cost money to north countries citizens".

Why taking into account this cost criteria? According to what reference? Theses questions do not belong to this presentation: there are no vindications for the pupils, nor for the teachers who would like to work from this example. The relation between data and assessment criteria is left out of account because it seems obvious: data should tell the world.
There we have two examples of what distinguishes expert work and scientific work about action. Which should help us design our didactical problem. History and sociology of science may then be helpful.

1.1 History of sciences: how to build a suitable distance to the world

The history of sciences tells us how they progressively develop, aiming at building a distance to the world: neither embedded nor regardless, they constantly go from radical empiricism (embedded) to scholastic positions (that moves towards loneliness). Search for objectivity and control over subjectivity is at the heart of the gradual construction of scientific communities separating from the rest of society. This autonomy is the main support of the critical dimension of scientific knowledge, and this process has led to more and more specialized realms of research, which means more disciplines and borders between disciplines. However, this autonomy simultaneously puts scientists on the edge to forget the real world. That is the reason why this process has gone together with his opposite: these communities have not only studied the world (in a descriptive and analytical perspective), but they have also studied the relation between these data and the explanations they have produced[2] (in a commentary way) (Boltanski 2009; Bourdieu 1997; Berthelot 1996).
This phenomenon is more recent in social sciences than in Nature sciences and had got strength through out the XIXth century in Europe. Thus, in History, Grafton (1998) showed how tools and language operations in communication devices had embodied in foot notes, leading to critical history at the turn of the XIXth century. Foot notes add an annotation to fellow historians' explanations (passed, present and anticipated) into the narrative text (mixed with quotations of historical sources). They thus play a part in the implementation of dialogism that guaranties a triangulation between relics of the past, explanations and critique.
Thanks to sociology and history of sciences (Fleck 2005; Bourdieu 2001; Pestre 2006) we can figure out how far scientific activity seems to be from a common sense merely linking a subject (the scientist) and an object (from the world). According to Bourdieu (2001, 151), sciences rather operate on "a relation between subjects (all the agents engaged in the field) about the relation between the subject (the scientist) and his object". Thus, "scientists are never "lonely genius" as put in hagiographic history; they are collective subjects who, as embodied collective history, make present all the relevant history of their science (…) and work among communities with instruments that are also objectified collective history" (ibid., 139). Thanks to this shift we are able to account for the scientific generalisation showing that "science is a construction that set out a discovery that overpasses the construction and social conditions that made it possible" (2001, 151).

1.2 Science and appraisal

The distinction between science and appraisal given by Roqueplo (1997) accounts for this specificity on a synchronic level. An expert is a scientist who loses his autonomy by answering questions he does not chose. Moreover, appraisal texts and scientific texts are nearly the same.
A scientist who takes on a political stake not only gives away his usual activity of building problems ("the construction of research questions is an essential part of scientific investigation and the art of the scientist dwells in his ability to ask the "right" questions, that is those which are scientifically fruitful", ibid., 36). But he gets involved in the appraisal field while taking the risk to mix things because both use the same words. Because the statements

backgrounds are different: you do not speak to high ranking official like you do to other scientists in a conference.
It is actually "through their effective capacities to translate social and political questions they are asked (or they have to answer) that sciences of social world prove their scientific strength and vitality" (Johsua, Lahire 1999, 36). As Roqueplo puts it, when a scientist becomes an expert he "inevitably breaks the borders of his own knowledge" (1997, 20). With this distinction we are able to specify scientist main activity compared to the expert's: he builds or rebuilds problems by establishing them in a field of knowledge structured by its own tools and its own means of communication.
Those two categories (scientist and expert) enable us to escape from a purely theoretical approach of scientific investigation[3]. Concepts are the instrumental frame of science, but they do not have any value outside a community that ensure the critical part of these tools through specific ways of thinking, talking and acting (Berthelot 1996; Bernié 2004; Jaubert 2007). To make a long story short, conceptual tools and academic practices are bound together (Bachelard 1949). Thence, what happens when you take these concepts out into another community? What happens when schools take them? What happens then of the critical value of this knowledge?

1.3 Science and science practices, through their instruments

These questions make us confront a didactical problem. In a recent research Audigier et al. (2011) have worked on an issue they qualify as "detour/return" according to which studying social and political situations at school requires cognitive resources from social sciences. This linear sketch is challenged in their article: also these resources are made for "giving details on the knowledge" and "providing a frame to analyse and interpret data" (58), there are no mechanical links between scientific disciplines and political questions. The inquiry of schoolroom situations built according to this frame leads Audigier to conclude that the abilities to be developed are based on the fact that "knowledge is transformed by an imaginative interpretation that calls for a strong culture of interpretation" (231) due to a wide diversity of paradigms under way. It appears to me that we should try and imagine how the relationship between these general principles (such as "culture of interpretation") and the real world of the schoolroom situations (4 types of debates: political, scientific, judiciary and press) could be figured out. In order to understand how the pupils "should be taught to use these tools to understand the situation and its issues" (55), we certainly must open this black box called "the study" of the situations: according to what practices and what concepts? How can political and scientific problems be linked? Indeed, critical anthropology is warning us about categories such as *culture*: they do not deal with causes but rather with a global point of view that may prevent us from considering strategies. We should "not work on how the rules apply but on the area of possible" (Bensa 2010, 71).
In that respect, we should not split knowledge as text and text production practices as if production and learning contexts do not matter. This demands us to first think about relation between social knowledge of pupils and scientific knowledge. They represent two different texts, and the first ones are about everyday practices of the children. Moreover this issue is also relevant in scientific communities. Some science sociologists (Latour 1984) pretend that scientific and everyday knowledge is the same (that engineer and physicists do the same kind of work on knowledge). The "pragmatic sociology of critique" for its part aims at rejecting "the difference between the enlightened sociologist (by science) and the common people" (Boltanski 2009, 46). The way these sociologists care about critical capacities of the people is close to our didactic issue, especially when we aim at developing "critical spirit" through social sciences (history, geography) as well as through sustainable development education.

This use of science studies is essential to underline that the issue does not necessarily make sense by separating school from scientific communities. Instead, the attention to knowledge production and learning processes in both contexts (laboratories and schools) is willing to give us new didactic perspectives. On that purpose, theoretical and language tools are essential[4].

Based on Vygotski's psychological instruments, Rabardel (1995, 1997) has built "mixed bodies" that are both artefacts and individual schemes. According to him, "the instrument changes some functions with others, rebuilds and reshapes the whole behaviour structure. The explanation of the upper behaviour types rely on the means that allow man to control its own behaviour" (1997, 37). Thus, theoretical instruments can only be thought through collective "instrumental genesis" which deny that users and designers are different. These genesis show on the contrary that scientific tools to handle the world can not be understood through a simple outside "instrumentalisation": it takes both "instrumentalisation" (by those who make tools their own), and "instrumentation" that changes their action schemes. In our case study tools such as set of scale in geography, or various aspects of the notion of distance can be seen as part of instrumental genesis.

By following these considerations we aim at withholding a direct link between scientific and school practices, but also at considering scientific concepts as independent tools (not designed to answer questions from outside the scientific community). Collective, tooled up practices give us an opportunity to rely on the links between scientific and pupils' social thought of the social world, as suggested by Vygotski with the double growth of everyday concepts to the top and scientific concepts to the bottom. All this could help the growing of a school community based on the switchover from an every day type of discourse and action to a scientific one (Jaubert 2007).

2. From political to scientific problems

We now have a better view on the danger to hide relevant practices if we keep separating school and scientific subjects, and scientific and social knowledge. On the contrary, choosing – epistemologically speaking – the non separation option is to inquire how these elements can be related. As seen before, a scientist – but not an expert – focuses on the building of problems with specific tools and approaches; but we also stated that this process should focus on the assessment of the relation between data and explanations in order not to forget the field-part of the inquiry. How can such a problem building process help us thinking that knowledge is not designed to serve action on the world? This process is unique in the way that it makes it possible to think of data from the world and explanation solutions in a vindication text (one that gives reasons).

2.1 The problem and the test

Framing a geographical problem can first be seen through the idea that living in the world means that you are regularly under stress to make decisions and compare possible solutions (Fabre 2003). In such a way of living, problems and solutions are always bound together by previous experience and remembered through practical knowledge. When new situations show up various answers can thus be inspiring. Afterwards, reality picks up the relevant answer. That is what happened to Phileas Fogg whose bet to go round the world within 80 days is based on his knowledge of the world transportation system, and checked by the actual journey (Fabre 2003, chap. 3). The trouble emerging when what is at stake requires a collective decision and can not be easily verified (as for town and country planning: test would be extremely expansive). In that case risk is high that we talk about solutions without envisioning the problem at stake, as seen in numerous press debates.

Another option would be to assess these available solutions in order to build the problem disclosed by the starting question. We could then escape from the linear approach (from data to solutions) to think together data and requirements (for solutions to be accepted). In the case of Phileas Fogg this would mean to add schedules and length of the journeys for the different means of transportation to assess which ones would be the best suited. These data would be assessed according to the following requirements: "if there are no blanks in the web and if the following mean of transportation only leaves after the arrival of the former" (ibid, 68). But the best way – belonging to this novel - is to make the journey: that is to validate the hypothesis with reality.
This case is however barely relevant on sustainable development issues. This kind of validation is painful or impossible. We have to rely on debates and knowledge, whereas decision is often compulsory and thus made without calculation (Roqueplo 1997).

2.2 Concepts and their field of relevance
This problem building approach provides us with some analysis tools: solutions, data and requirements of possibility have to be played together. But these tools do not supply the player with fixed strategies: combining solutions, data and requirements of possibility depends on the problematical background through which we consider the world. In the *Tour du monde en 80 jours*, one can identify "three problematical backgrounds: the transportation network engineer's, the traveller's whose aim is to race through this network as fast as possible, and detective Fix' whose problematical background is to catch Philéas. From one background to the other, the problematical tools get new functions: there are no solutions, data or requirements of possibility in themselves (…). A micro-world can thus be described as the unity of numerous problematical backgrounds, as a cross of problems: each one defining the functionality of its components" (ibid., 71).
In a way this means there is nothing without a context. Every time we try to understand a situation we talk about data, requirements and solutions. However, we can face problematical backgrounds more or less visible and structured, according to the uniqueness of the situation. When this is about training for civic and political issues (unlike Jules Verne who takes his reader to local issues), debates need to be openly expressed and built to lead to a collective decision that relies on specific reasons. This is the reason why M. Fabre's studies in philosophy and education (1999 ; 2009) have always been linked to C. Orange's epistemological approach of education (1997 ; 2005): a scientific approach first aims at explaining, organising and stabilising a problematical background, and has a universal aim.

2.3 Back to our first hypothesis
Under such a theoretical framework, considering knowledge as a mere tool is no longer possible. Concepts and their relevant field of validity are bound together in a specific and structured realm of knowledge. Using geography as a discipline to discuss a political issue thus means that we should work on both text and text writing practices instead of the alternative action (political) *versus* knowledge (geographical).
For instance, in a specific political issue, one could build a new problem and discover that the initial one was a non-problem, and that nothing should be done at all (which still is a decision). On the contrary, we should insist on the fact that there are no actions without thought, and that thinking means acting. That is, theory of knowledge and theory of power are closely linked (Boltanski 2009, 62-63). We should then think in terms of action when we think about language and theoretical activities (Lahire 2001) such as scientific activities. Building problems would thus make it possible to practise the skill to choose a relevant knowledge: learning to build geographical problems is then learning to reshape an enforced political question free of others' categories:

“possibility to build (or re-build) problems is the most visible evidence of freedom of thought. Democracy can not be based on a bounded-freedom that consists on solving problems set and expressed by others, or on casting a vote for this or that answer. The actual participatory – or outreach - citizenship (the one which is precisely under the idea of sustainable development) call for a right to set problems and simultaneously to denounce non-problems (Deleuze 1969)” (Fleury, Fabre 2007, 77).
We shall now start our analysis according to this background.

3. Students' epistemological strategies

3.1 Learning geography to solve political problems ?

My data are made of the written papers of the four groups of students. They let us know how their proposals change overtime. Along with these papers we work on the voice recordings of their talks.
According to a usual approach for a project-session building (*versus* a curriculum-based session) the starting proposals of the four groups are focused on the outputs the pupils are supposed to produce. These outputs show straight off the way how students consider “education to choice” (one of the main aims officially defined to sustainable development education), and the part geographical knowledge should play in such projects.
First about citizenship education. One group (number 4) of students plan to have the pupils work on an advertisement poster to promote tram-train. The search for arguments in favour of this facility is devised to help pupils inquiring for advantages to get details. This may lead them to avoid political issues[5] and – as in many press papers – to concentrate on side-issues (such as delays). Meanwhile geographical knowledge has for this group no relation at all to questioning and is considered as a medium to illustrate (to sketch the location of the tracks).
In a more visible way, two other groups (1 and 3) suggest that pupils could achieve an exhibition to be watched by families and other pupils. Group 1 want to state “benefits and problems”. Under this point of view, the political issue is raised according to a press-pattern debate listing various answers. The first part of their lesson would ask pupils to confront the tram-train solution with the car solution through a questionnaire to families about the way they commute. The exhibition planed by group 3 is about the possible changes in landscapes after the tram-train implementation. It would be achieved through various unconnected activities about transportation habits of families and decision making for such a devise. This landscape analysis is a traditional activity in school geography and has little to do with a scientific approach of space[6]. In both groups geographical knowledge is not there to cross-examine a town and country planning policy but instead to illustrate or describe it.
The last group (2) goes further into the political dimension of the project. They plan to ask pupils to write a press paper for a local newspaper through a press-like inquiry (interviews with operators of the tram-train project, use of maps, questionnaires to the inhabitants). The final product – the paper - is the logical output of the whole inquiry process that frames the lessons. We can assume by reading their proposal that this process is aimed at avoiding instilling the right way of thought and allow the social and civic skills at stake to be practised. However, there are barely any differences with the other groups in the way they consider geographical knowledge. Hence maps are typical geographical tools to be used to find answers to the political questions; those tools are here to deal with data the world is supposed to give us: in an empiricist way.

3.2 Back to the geographical knowledge at stake, and the idea of skill

The second lesson with the students was elaborated according to theses conclusions, specially the lack of geographical knowledge inside the activities planned. It is thus based on a few

scientific papers such as one of J. Lévy (2010): *Le développement urbain durable entre consensus et controverse.* Its main point is the essential part the concept of density (of people, housing, jobs...) plays in understanding how metropolis grow and get organised. Students work on that paper to think over the local situation of the peri-urban city where the school is supposed to be. This paper touches on "the urbanisation of the suburban areas" (50) to envision an alternative to every day move to work, whether by car or by tram-train. Through this extension of the possible answers the political issue is partly changed: from the starting pollution problem to a job-housing distance problem which can be solved through mobility or co-spatiality (Lussault 2007, 56-58). The word "périurbain" in the "*Dictionnaire de la géographie et de l'espace des sociétés"* (Lévy, Lussault 2003) is also studied to characterize the peri-urban cities (discontinuity, low density, low diversity) to think over requirements for public transport to be possible, along with access to the tram-train option (this article insists on the idea of accessibility). Finally, the word "Métropolisation" from the same dictionary helps students to take into account the multiple scales to be thought over to understand town planning, from the urban area level to the world level. It also emphasizes that these different spaces are linked by relations of power, specially the power of the urbanised area over the peri-urban cities, along with the power of Paris over the regional metropolis.
This work on papers is completed with another on the notion of skills at the beginning of the third lesson. This notion is studied through excerpts of a text by Rey (1996) emphasizing the difference between procedural skills (that can be trained and are valid for related situations) and general skills (valid for various situations). The political skills the students choose to put at stake for the pupils (*knowing how to assess subjectivity or partiality of a speech*) belong to this category. This work on skills is completed with a paper by Audigier (2009) stating the necessity to "introduce pupils to subject-matters concerns" along with skills. Let us concentrate now on the third lesson when students use these papers to work again on their lesson projects.

3.3 The development of the relations between geographic knowledge and political choices
Initial projects of students have been modified, and I want to concentrate on the place they now allow to geographical knowledge.
Students' paper works first show a list of elements in the first column ("knowledge/skills") that do not mix up. However they also show the beginning of a debate between different points of view in order to allow pupils to discuss among them and with project stakeholders; direct or indirect talks (through the writing of a press article for example) that aim at linking political skills and the understanding of the town and country planning situation.
This can be identified in group 1 when they suggest to have the pupils write to the mayor to adapt the new parking project according to the possible traffic increase in the area of school: "through this letter and the answer, pupils – who may disagree among each other – would certainly call into question their opinion in order to find a common statement". This discussion is based on a trumped up issue: the extension of the parking lot would shrink a parkland. To show the negative impact of this project, students plan to "have the pupils use their geographers' skills through maps and sketches; and their citizens skills confronted to the environmental issue and the relations between various stakeholders". To cut a long story short, the geographical knowledge keeps serving a cause – a noble one: environment. In this group of students knowledge and skills are used to build a structured school project, but the noble cause at stake is not called into question. In that respect there are no problems: neither geographical, nor political; it is just that some go wrong or are not aware.
In group 4 a meeting is planned to talk with a representative of the local assembly: "we will check that pupils' questions are focused on the impact on school and pupils (as citizens) instead of general impact. Work on geographical problems and concept of scale (to think

local)". Though short this excerpt suggests that pupils could see the difference between the global approach of the representative (at the urban area scale: which is the usual scale for this town and country planning projects as can be read in all official papers) and their local approach (city and school area). This would give knowledge a new place in the learning situation: instead of being an external resource it would be part of the process that give them access to a political situation. Since they will have to devise questions about the school area to talk with the representative they will need to change scales to match questions and answers. This is a critical point for our study the two other groups also display.
Starting with their initial idea to separate benefits and problems, group 2 now plan to bind them with the notion of scale by working on the situation through "various sketches" taking together local and global scales: "the idea is to explain benefits and problems thanks to notions [cited before: urban area, metropolisation, density]". Here too geographical knowledge is no longer a mere tool serving the political issue: it rather gives a clearer understanding of the political explanations. We can thus assume that the number of benefits and problems will not be the way to assess the situation and lead to a decision. Assessment through geographical criteria will rather play this part by "explaining benefits and problems". This also shows up in group 3:
Table 1 here
In the left column ("activités") "prospective", "impacts" and "scénarios de développement[7]" (action plans) show a worthy relation. In this group the idea of prospective comes from a professional dimension of geography: geographers can work for local communities to help designing future. Based on this professional practice[8] students relate geography to political issues as done outside school: as experts. But what kind of appraisal is it? An appraisal to design arguments for a pre-existing answer, or to enforce a solution to decision-makers (see 1.2 about Roqueplo 1997)? What we know from their papers is that this appraisal should end up in (step 8) a talk with a stakeholder: a talk in a critical way (see central column "savoir/savoir-faire" and right column "justification"). This is about meeting with the mayor but "relying on the action plans" which suppose a previous geographical check.
This way to understand their paper is confirmed by the recording of their talks. In fact, "meeting with a representative" is the activity first planned. But facing the difficulty to cope with a critical approach for pupils (the skill they aim at developing) they think about using the last activity they planned (scénarios de développement) in relation with geographical knowledge. At that moment of their argument the professional practice of geography is used as a third part in order to make the visit of a project stakeholder in the classroom meaning-full: it has a dialogic function. The idea being that pupils will lead part of the discussion despite the ready-made speech of the representative ("using a power-point" as the students say, assuming that if this happens, "bang, this is a catastrophe" (511-512[9])).

This essential move in the way students take scientific knowledge into account dealing with a political issue has to do with the idea of knowledge serving politics. What is at stake beyond my counter-example is to design a new possible bind between them.
The peculiarity of this case is essential to shape this new link. Its double dimension (students thinking about how pupils would manage) is a critical point for my inquiry in that it provides students with an in-between object. This mediation gives them opportunities to discuss and build possible answers about the relation between knowledge and action. Hereafter this makes it possible to avoid a short-cut that would let the pupils (or the students) with disciplinary scientific knowledge face to face with the world as a non-disciplinary whole (Audigier 2001).

4. Geographical problems, didactic problems and political problems

Our previous analysis of group 3 has displayed the way these students are trying to go beyond the mere list of activities and knowledge contrary to what all groups had done first. This is in fact the result of a long process of discussion among the students, specially during the third lesson. For the first 45 minutes they resume the initial work (from their table) : "we could add another activity"(312), "That's already enough" (314), "since we still have to deal with the skill *acting as a citizen*" (315). But after that, they gradually work on the logical links between activities because of the training situation.

4.1 Handling data means assessing their argumentative value

Our first episode focuses on the efforts students make to link two activities they initially listed: a questionnaire about the everyday moves of the families – before and after the set up of the tram-train line – and a list of means of transport available:

319 (D): "OK, good, then let's recap the three lessons. First, they build the questionnaire they will give their parents. For the trips. The, second lesson, they have collected these questionnaires, the draw a sketch including arrows…"

331 (D): "Then, second lesson... then they draw sketches with... the questionnaires they got. Then there... they have a clue of the trips according to the different... to the two scales."

Activities are made for pupils to get closer to geographical knowledge ("the new frame of cities": 332), in order to reach the learning target. This is made through a usual geographical practice: "they'll have to make another map" (336). This move from one activity to the other to learn geography goes through handling data, but also through the integration of these data into geographical concepts ("the two scales": 331). However, the students always relate their goal to the "real[10]" situation: listing benefits and disadvantages of tram-train (this is the 5th activity in their table), in order to rationalize the political issue ("Using, hum..., using their own car, or by train, but this is much less flexible, see": 339; "We have to write down benefits and disadvantages": 342). All this leads them to create a tool to make the analysis: "well a table, to be filled up; exactly; a comparative table"(343-345).

That is the moment when geographical knowledge becomes a stake as a way to put into perspective the didactic problem the students start to conceive. They notice that the choices to be made to build the comparative table can not be based on simple trips from one point to another:

346 (B): "Yeah... but I don't know, it is easy to say that the tram is a choice, but they don't know if it starts from home"

Since they are aware of the way regional metropolises such as Nantes work (lesson 2), they have to set this transport comparative problem up geographically:

357 (D): "This is to go into Nantes here, those who live in Nantes.
358 (C): "Well [reading the papers] those living into the Nantes ring road. Is it OK?"
359 (A): "No"
360 (C): "Hum Clisson is in the outskirts of Nantes"
361 (A): "Oh, outskirts? I thought it was about the ring road"
362 (C): "You're right the ring road. Is there any differences?"
363 (A): "Of course"
364 (D): "What is it, could you repeat?"
365 (A): "Ring road means around Nantes"
366 (C): "Oh, ok"
367 (A): "Well ok but however it is also used by many people dwelling there"
368 (C): "Wait, residents inside the ring road, residents outside the ring road"
369 (A): "Ah ok, yeah, there you go, then this matches... well we'll find them anyway. So"

The students show here they have troubles dealing with the questionnaire to the families, so that they must have it interpreted by the pupils thanks to the whole possible trip solutions.

That is, they have to think about the tram-train solution as one among others that belong to a set of possibilities[11] processed by geographers. Doing this they face the pupils difficulties they anticipate (346), but also their own troubles to figure out the situation (357-368). They are thus starting to sketch a geographical problem of zoning[12] through the case of everyday mobility. The comparative table of means of transport can not be easily thought out – in an empirical way with data from the pupils – without using geographical zoning conceived upon the way a metropolitan area works (outskirts, urban sprawling, housing, job localisation...). Though this issue is barely sketched at that moment because of a lack in data, it leads to a new problem based on the need for everyday moves and the location of jobs and housing (and the distance between them). This problem starts to be thought over.
This first episode can be interpreted as the sketch of the problem. The initial didactic question (how to help pupils learning geographical knowledge) is first dealt with by its possible answers (giving them a map to draw, having them filling a table). Working on the data to get at these answers leads the students to a theoretical and complex geographical knowledge: they anticipate that the troubles they face will be troubles for the pupils too. Comparing trips (to choose the best one) means locating them among the functional zoning of the urban area. If these concepts are only words at first for the students (after lesson 2) then they become tools to deal with data to assess the various solutions. Thus their empiricist bias is challenged: if they start confronting data to solutions they have to stop because they know the geographical concepts and their constraints. Concepts as tools, but tools made by geographers: tools to handle data from the living world to think over self-built problems (that, according to Roqueplo, singles them out from experts who answer questions asked by others). Requirements stemming from zoning, urban area, peri-urban sprawling and other concepts guide the search for new data (new transportation means according to location in the urban area) and how to deal with them. A possible extension to what they reach here could be to do another questionnaire to bring new data according to these new concepts (asking for instance whether people would prefer local jobs or new means of transport).

4.2 The geographical problem gives meaning to the political problem

The second episode is when students put the interview with the mayor into perspective with the pupils' work on the different *scenarios of development* (see 2.3). This can be seen as a radical change in the relations between knowledge and action: data (such as the mayor's speech) depend on the conditions with which they are valuable (such as the role the mayor plays in the project). That is what can be found in the students' discussion which leads them to abandon their usual empiricism (directly confronting an explanation to the world).
Between those two episodes, students try to conciliate their proposals with the curriculum requirements. They do so by listing their planed activities as landmarks in their work. What they call "decision-making process" and "scenarios of development" are the two activities at stake in this second episode:
422 (A): "I do believe it's important to let them know the decision-making process... It does not just happen"
515 (B): "I don't know, otherwise we could link to... link the interview with the mayor to the scenarios of development, you know what we said we were keeping for the end"
As in the previous episode, what is at stake is how to link activities:
426 (A): "I would see this afterwards... and I would include this... it would be ok to do this and the decision-making process"
427 (B): "Yeah, right, I would link both but not..."
428 (D): "Why are they going to make a tram-train indeed, this is it? What are they doing that for?"

The first idea is to play with both decision-making process and the advantages of the tram-train. In that purpose they rapidly consider a direct solution: asking a stakeholder of the project to come and explain the positive aspects of this investment:
430 (C): “Ok then we call the lesson… yes... I don't know, why the project...”
431 (A): “The birth of a project”
442 (B): “Getting in touch with these representatives to know how this decision was made”
But soon students put into question knowledge as a text (here the organisation chart for decision-making in such a project), the citizen skills and the ability of pupils to understand:
443 (A): “And if you want to act as a citizen, you have to know who you are talking to... In what background you...”
Their own troubles get them to anticipate the pupils':
457 (C): “I do consider that we often loose time, well, when..., because these are very complicated issues, I am not sure pupils... have much to say about that, you know.”
468 (B): “We do not know, then teaching to 10 year-old pupils...
514 (C): “You're gonna loose those little kids”.
On the other hand, the textual nature of the organisation chart is not compatible with the idea to develop citizen skills.
Finally geographical concepts appear again unavoidable to deal with the emerging problem. Understanding of the role and the place of the mayor depends on the place in the project and scales at stake. One can not understand the chart if he does not localise the stakeholders in the operation of the metropolis:
448 (A): “Yeah because I think that in town and country planning everyone has a specific role”
449 (D): “Yeah while here we are not talking about the township any more, but squarely the urban area”
450 (A): “Yes”
451 (D): “Or maybe even further away to Clisson, and you will obviously have the nation level too…”.
The didactic problem (how to have the pupils show critical distance with an adult talking in the classroom?) means more through the geographical issue. Students themselves have to clarify the different scales of the project which leads them to complete the geographical issue (the cutting of the space and the drawing of limits) by comparing the stakeholders scale with the users' (an issue sketched by comparing the different means of transport, see 3.1).
Therefore the students hesitate between just listening to the mayor and preparing questions before the meeting.
485 (C): “But the mayor, what is he doing, is he explaining the project or... say well he has...”
486 (D): “Well he answers questions”.
The way students anticipate the meeting focuses on the way to understand where the mayor and his speech are situated in the project.
To make a long story short, students believe that pupils can not assess this kind of speech unless they previously work on the project itself in which the mayor would be included:
515 (B): “I don't know, otherwise we could link to... link the interview with the mayor to the scenarios of development, you know what we said we”
516 (A): “Ah, yeah, no. No, no, but yes, that's true it can be cool”
517 (B): “Well in fact a talk about...”
518 (C): “About the future of the township”
519 (B): “About the impact of the tram-train”
520 (C): Ok, but then”
521 (B): “But the meeting with the mayor comes later indeed”
522 (C): “What about the decision-making process?”

523 (B): “What?”
524 (A): “Do we leave the decision-making process aside?”
525 (D): “We don't but we do otherwise”
What has changed here is the way they deal with knowledge as a text (the decision-making organisation chart, the organisation of the urban area). The prospective work (building possible scenarios of town and country planning after the tram-train) play an intermediary part between the mayor and the pupils. And this go-between should run the meeting, or at least the analysis of the mayor speech[13].
The first two lessons allowed the students to theoretically study the project, challenging the one-way technical solution (tram-train is good against pollution). This new look on the project leads them to consider several other solutions by stretching the initial problem: they know that tram-train could only be a way to move the traffic problem to another place in the urban area, and that it does not deal with the whole job-housing distance. These various possible answers and the need for a critical approach (skills to be trained) help them to understand the personal interests under every answer. That is what they do by localising the viewpoints of both pupils and the mayor in the metropolis operations. Therefore these viewpoints are related to data and speeches (stand takings): the mayor would promote what would help bringing his city closer to the major city focusing on the trip duration; the pupils would talk about the impact of the increased traffic around the school or on their trip to school, focusing on the size of the parking lots planed. This is only through a global understanding of the operation of the whole urban area that we could compare those two ways of relating data to explanations.
Through these moves in their reasoning we have observed students dealing alternatively with epistemic (knowing this situation) and epistemological (comparing opinions by focusing the way they deal with reality) issues; which potentially leads up to a more general statement. The students are managing both logical and practical issues.

The lesson they plan for the pupils make the geographical problem-building a necessary condition to discuss with the mayor in order to develop citizen skills. The geographical anticipation of the effects of the tram-train put them at a distance from the project, namely from the specific interests of ones (pupils, their families) and the others (stakeholders):
537 (C): “Acting as a citizen… Acting as a citizen…”
538 (A): “Acting as a citizen means asking him if he has anticipated the... an extension of the school, you know, if the population grows”
539 (B): “So this still is in relation to the mayor”
540 (C): “It is, yes”
541 (B): “So this will be done with the scenarios?”
542 (A): “The prospective scenarios, yes.”
543 (B): “The scenarios we will have built together”
544 (A): “Isn't that acting as a citizen to ask one-self, well..., what will become of us?”
545 (C): “Well of course”
546 (B): “Absolutely”
547 (A): “Before acting on the world, you act on your own vision of the world.”
Acting do not only refer to action as moving[14] (going out of school, talking to real people and not only teachers...), but also to science under process which gives you means to “act on your own vision of the world”. At that point students have left their tendency to separate knowing and acting. And the way they link them together has to do with different kinds of problems: the political situation is squeezed between the geographical problem and the didactic problem to be reshaped.

5. Conclusion

This case study is more than an example due to its dialogic nature based on the didactic questioning of the students.
In fact, this dialogicism is possible thanks to the position of students at a distance from the classroom and the knowledge/action issue. If at the beginning they focus on the choice of activities for the pupils, they gradually deal with the pupils initial ideas. The lesson preparation is a go-between that allows them to deal with the troubles pupils would face to articulate geographical knowledge and citizenship education by anticipating and transferring the way they could themselves deal with them. Anticipating and transferring give access to the way students deal with the others' speeches: the ones of the pupils, of the stakeholders, but also of the other students and the teacher that are to be convinced.
This dialogicism is highly developed through the device that makes them think about civic and social skills. These skills are so general that teachers usually lower them to training situations that could be applied easily. This deadlock (Rey 2011) is left over by these students because they do not think about their own critical skills but the pupils'. Thus they consider all the viewpoints on the political situation (including classroom as part of the affected territory). They do so because they are at a distance from the classroom, and because they have to give reasons for their choices. But this objectification does not only rely on this distance. It is built on the set up of a new problem from the town and country planning issue. Based on this process they try to transfer it for the pupils: if they are to do the same objectification they have to set up a new problem too, using the geographical concepts and approaches. The building of prospective scenarios, previously planed is used in that purpose (becoming the main idea in the critical approach of the interview).

This case study is thus a counter-example: it shows that knowledge can not merely be considered as serving political issues. But as a counter-example it may provide little to design an alternative way of thinking links between action and knowledge. In fact, we do not aim at designing an alternative explanation, but rather at thinking the previous one though the one suggested by our case.
In the previous, prevailing explanation – which has to do with an appraisal – scientific concepts are supposed to relate data to political solutions. The relevance of these concepts is not at stake: they “are” scientific and they tend to become only words instead of tools.
This can be seen in the way students deal with the decision-making process: the concept of scale is first a simple word to describe the chain of command from the state, to the district and the city. But in the course of the work, students change this use of scale from a simple word to a tool to understand positions and statements of the different people involved. Initially, the scale is a way to speak geographically in order to make a description of the issue. Later it becomes an instrument for them to localise the stakes not only in the urban area, but also in the space of interests. One can talk about the urban area (cartographic scale) to promote specific interests (mobility of employees: social groups scale); and one can talk about a section of the peri-urban area (cartographic scale) to promote general interest of the whole urban area (all inhabitants of the urban area: social scale). This set of scale has only been sketched by the students during the two episodes highlighted previously, but it shows how concepts can be re-thought on the occasion of a political problem. Which take us back to history and sociology of sciences: the scientific dimension of critic (assessing the limits of explanations in how they deal with data) may be serving the ability of citizens to deal critically with political issues, not knowledge as results.

Bibliography

Audigier, François. 2001. Le monde n'est pas disciplinaire, les élèves non plus, et les connaissances ? In: Baillat, Gilles; Renard, Jean-Pierre. Interdisciplinarité, polyvalence et formation professionnelle en IUFM, Actes de l'université d'automne. Reims, 43-59.
Audigier, François (2009) Ne pas renoncer à introduire aux univers disciplinaires. In: Les cahiers pédagogiques, n° 476, 13-15.
Audigier, François; Fink, Nadine; Haeberli, Philippe, eds. 2011. L'éducation en vue du développement durable: sciences sociales et élèves en débats. In: Cahiers de la section des sciences de l'éducation de l'Université. Genève, n°130.
Bernié, Jean-Paul (2004) Pour un ensemble co-disciplinaire. In: La lettre de l'AIRDF, n° 35. Lille.
Berthelot, Jean-Michel. 1996. Les vertus de l'incertitude. Paris: PUF.
Boltanski, Luc. 2009. De la critique: précis de sociologie de l'émancipation. Paris: Gallimard.
Bourdieu, Pierre. 1997. Méditations pascaliennes. Paris: Seuil.
Bourdieu, Pierre. 2001. Science de la science et réflexivité. Paris: Raisons d'agir.
Doussot, Sylvain. 2011. Didactique de l'histoire: outils et pratiques de l'enquête historienne en classe. Rennes: PUR.
Fabre, Michel. 1999. Situations-problèmes et savoir scolaire. Paris: PUF.
Fabre, Michel. 2003. Le problème et l'épreuve: formation et modernité chez Jules Verne. Paris: L'harmattan.
Fabre, Michel. 2009. Philosophie et pédagogie du problème. Paris: Vrin.
Fleck, Ludwik. 2005. Genèse et développement d'un fait scientifique. Paris: Flammarion.
Fleury, Bernadette; Fabre, Michel (2007) La pédagogie sociale : problématisation ou inculcation ? In: Recherches en éducation, n° 1.
Maingain, Alain; Dufour, Barbara; Fourez, Gérard. 2002. Approches didactiques de l'interdisciplinarité. Bruxelles: De Boeck.
Grafton, Anthony. 1998. Les origines tragiques de l'érudition: une histoire de la note en bas de page. Paris: Seuil.
Jaubert, Martine. 2007. Langage et construction de connaissances à l'école. Bordeaux: PUB.
Johsua, Samuel ; Lahire, Bernard (1999) Pour une didactique sociologique. In: Education et sociétés, vol. 4, n°2, 29-56.
Lahire, Bernard. 2001. L'homme pluriel. Paris: Hachette.
Latour, Bruno. 1984. Les microbes: guerre et paix. Paris: Métailié.
Lévy, Jacques (2010) Le développement urbain durable entre controverse et consensus. In: L'information géographique, n° 3, 39-50.
Lévy, Jacques; Lussault, Michel (dir.). 2003. Dictionnaire de la géographie et de l'espace des sociétés. Paris: Belin.
Lussault, Michel. 2007. L'homme spatial: la construction spatiale de l'espace humain. Paris: Seuil.
Orange, Christian. 1997. Problèmes et modélisation en biologie: quels apprentissages pour le lycée? Paris: PUF.
Orange, Christian (2005) Problématisation et conceptualisation en sciences et dans les apprentissages scientifiques. In: Les sciences de l'éducation – Pour l'ère nouvelle, vol. 38, n°3, 69-93.
Pestre, Dominique. 2006. Introduction aux *Science Studies*. Paris: La Découverte.
Rabardel, Pierre. 1995. Les hommes et les technologies. Paris: Armand Colin.
Rabardel, Pierre. 1997. Activités avec instruments et dynamique cognitive du sujet. In: C. Moro, B. Schneuwly & M. Brossard. Outils et signes. Perspectives actuelles de la théorie de Vygotski. Paris/Berne: Peter Lang.

Rey, Bernard. 1996. Les compétences transversales en question. Paris: ESF.
Rey, Bernard. 2011. Pour comprendre comment on apprend. In: Les cahiers pédagogiques, n° 491, 22-23.
Roqueplo, Philippe. 1997. Entre savoir et décision, l'expertise scientifique. Paris: INRA.

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1 Didactics as a social science is in the same situation: in that respect, "(school) world ask didactics researchers for direct prescriptions" (Joshua & Lahire 1999, 36) while didactics researchers acting as scientists try to keep social demands at a distance.
2 Bourdieu (2001, 138) states two specifications for the scientific field ("champ") "closely linked: closing (or pairs competition) and arbitration of reality".
3 At least on that point Bourdieu and Latour meet: "focus on practice – including theoretical practices – rather than linking concepts" (Latour 2005, 253).
4 On that respect see Doussot (2011): how pupils (from 9 to 15 year-old) have access to problem based knowledge through specific use of graphical tools (tables and lists).
5 This has been confirmed by classroom tests such as the production of video imitating TV news: it shows how pupils tend to focus on technical details or side-problems.
6 Only 4 among the 14 students have geography degrees (most of them graduated in history).
7 The recording of their talks indicates that these scenarios are supposed to describe the city surroundings after the implementation of the tram-train. They would be made out of questionnaires to the families.
8 There too, the recording allows us to identify the source for this idea. One of the students graduated in geography takes up an idea stated by the teacher (lesson 2).
9 These figures relate to the transcription of the whole lesson 3.
1 0 This refers to the opposition enlightened by Boltanski (2009, 93) between reality and the world. Here the situation is real in that it ties in the students' representation of the world.
1 1 See Boltanski (2009, 24-25). Sociology separates from common critique since it follows two steps : "getting out of reality by imagination first means to deprive reality of it implicit necessity in order to do as if it was arbitrary (as if it could be different or could not be at all) ; this leads to a second step : getting reality back with necessity. This move gives necessity a global reflexive feature; namely, local necessities are now referred to a set of possibilities".
1 2 I follow here categories set by Lussault (2007).
1 3 One of the other groups plans to record the interview in order to work on it later.
1 4 See Lahire (2001, 126).