Learning and teaching through the online Environmental Justice Atlas: From empowering activists to motivating students.

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In this paper we examined how the Environmental Justice Atlas (www.ejatlas.org), an online platform that was initially developed to make visible and systematize contemporary struggles against environmental injustice worldwide -with and for affected groups- is becoming an attractive interactive tool to teach and learn about environmental and sustainability concepts and trends from an engaged and innovative approach.

Since its launch in 2012, the EJAtlas has become a research, teaching, networking and advocacy resource with thousands of daily visits. As of January 2019, it contains 2684 cases, worldwide. Strategists, activist organizers, scholars, and teachers are finding many uses for the database, as well as citizens wanting to learn more about the often invisible conflicts taking place. The map has become a valuable teaching resource for curricula about social and environmental issues. It has also fulfilled a valuable networking function connecting groups and actors globally. According to a survey responded to by Atlas users (600 responses), over 37% of Atlas

survey respondents report using the EJAtlas for teaching and presentations, representing the most common use of the Atlas by visitors.

As developed in this special issue, different scholars and policy makers are signaling the improvement of environmental education tools to teach about sustainability as a key strategy to address ongoing environmental crises (Cotton and Winter 2010), and the need to further develop adequate tools to address this complex issue (Besong and Holland, 2015). Yet, amongst this broader improvement and development of tools for sustainability education, there is a noted lack of resources for and inclusion of *environmental justice* curricula that is attendant to issues of racism, poverty, capitalism, and inequalities (Garibay et al. 2016), reflective of the historical exclusion of marginalized communities from mainstream environmentalism (Garibay and Vincent 2018).

As argued by Bowman (2010, 2011), Denson (2009) and Engberg (2004) in Garibay et al. (2015), diversifying perspectives in curriculum can improve students' civic behaviour and cognitive development while diminishing prejudices towards marginalized groups. Furthermore, interdisciplinary environmental and sustainability programs in the United States with more diverse voices included in their curricula tend to increase enrolment of minority students (Garibay and Vincent 2018), suggesting that use of a pedagogical tool like the EJAtlas can have real implications for Bonta's (2008) call to diversify the educational pipeline into environmental work. Moreover, literature on environmental justice education tends to focus on debates and experiences in the United States (Garibay et al. 2015). Examining EJAtlas pedagogical uses allows us to broaden environmental justice education considerations including experiences and challenges from other contexts (countries, languages, approaches to environmental justice).

In the context of these debates, this paper presents initial results of an on-going systematization and analysis of the pedagogical uses of the Environmental Justice Atlas (www.ejatlas.org). This research aims to explore how environmental justice is being included in higher education curricula -as proposed by Garibay and colleagues (2015)- with the EJAtlas and to examine why and how the EJAtlas is used for teaching/learning environmental justice and sustainability.

This chapter develops empirical, conceptual and practical contributions. From an empirical approach we aimed to study how the EJAtlas is used in (formal) teaching. What is taught, to whom and which were the main challenges and lessons. From a conceptual perspective we aimed to examine how the EJAtlas contributes to environmental justice and sustainability teaching/learning debates. Finally, this research is part of a larger effort to improve the functionality of the online platform for pedagogical uses, identifying technical and content developments needs.

After this introduction, we briefly address some relevant debates in learning studies to which the paper contributes. Next, we present the EJatlas, its origins and conceptual background. Moving onward, we outline our methodological approach to examine the main uses of the EJAtlas as a pedagogical tool, we present the results and discuss the main conceptual findings. Finally, we conclude the chapter with closing remarks.

Teaching Environmental Justice, New technologies, Activism and Learning

It has been pointed out that there is a notable lack of diverse voices in mainstream environmental education programs and course materials (Garibay et al. 2016, Garibay and Vincent 2018, Bonta 2008), which risks reinforcing the invisibilisation of power dynamics and social roots behind our current environmental

challenges. Lack of engaged attention to tangible environmental justice issues can cause a sense of demotivation and what Val Plumwood (2002) calls epistemic remoteness amongst students - a central characteristic of the 'crisis of relationships' behind socio-ecological destruction (Weber and Hermanson 2015).

Incorporation of environmental justice in higher education can help better equip future leaders in sustainability to address both environmental *and* social aspects of pressing socio-ecological challenges (Garibay et al. 2016). However, Garibay et al. (2015) have found that even when higher education programs in the United States highly value the incorporation of EJ in ideal sustainability curriculum, only a little over half actually implement it at a corresponding level. While this may be due to a variety of factors, they point to one as the lack of resources available, and call for more research into how EJ is implemented in the classroom (ibid.).

Analysis of the EJAtlas online platform as a pedagogical tool responds to the call to expand research on environmental justice education (Garibay et al. 2015), and can also contribute to different debates in learning studies, regarding, for instance, the features, strengths and weaknesses of emergent new technologies (Cotton and Winter 2010, Mayes et al. 2015) or Virtual Learning Environments (e.g. Dillenbourg et al. 2002) in teaching. As pointed by Mayes et al (2015), the exposure to new technologies in teaching often meets student expectations, improves the productivity of student and complements life-long learning competencies. Moreover, an important motivation is in the challenge to find solutions that are sustainable and that have an impact beyond the specific and immediate context. In this regard, the EJAtlas, is an innovative platform for students. The process of analysing and adding cases to the Atlas has proven to be a powerful experience for students that have the opportunity to become involved in ongoing environmental justice struggles.

Moreover, as a collaborative learning platform for researchers and activists, the Atlas can contribute to an emerging field that explores the pedagogical opportunities inherent within social movements and activist work, a field of research that different scholars signal as promising (Clover 2010, Hall 2009, Lowan-Trudeau 2017).

Environmental justice movements can result in diverse intentional and unintentional learning outcomes for participants and observers (Clover 2010; Hall 2009, Lowan-Trudeau 2017). Hall (2009, 46) highlights the individual, collective, spontaneous and (re)generative pedagogical nature of social movements and outlines three common forms of learning related to social movements: 1. informal learning occurring by persons who are part of any social movement; 2.intentional learning that is stimulated by organized educational efforts of the social movements themselves; and 3. formal and informal learning that takes place amongst the broad public, the citizens, as a result of the activities undertaken by a given social movement. The EJAtlas can be seen as an unintended consequence related to this third avenue of learning.

The Environmental Justice Atlas

Communities and social movements across the world struggle to defend their livelihoods, land, air, water and forests from projects and extractive activities that threaten to or already impact them with heavy environmental and social impacts. Large scale activities such as dams, mining, tree plantations, waste disposal, fracking, and incinerators are the object of high stake disputes (Gerber 2011, Walter and Urkidi 2017, Temper et al. 2018). As resources needed to fuel our economy move through the commodity chain from extraction, processing and disposal, environmental impacts are externalized at each stage onto the most marginalized populations. Often this all

takes place far from the eyes of concerned citizens or consumers of the end-products (Martinez-Alier et al. 2010). This is the starting point of the EJAtlas.

The EJAtlas is a repository of environmental justice struggles worldwide. This tool was developed to structure a deeper systematic evidence-based enquiry into the politics, power relations and socio-metabolic processes surrounding these environmental justice struggles. It is born from a research stream that aims to increase the understanding of the constituents and determinants of resource extraction and waste disposal conflicts in the world within a framework of engaged research with the movements struggling for social and environmental equity (Leah Temper et al. 2015, Temper et al. 2018)[2].

The Atlas offers an opportunity to tune into the plurality of grassroots voices that are opposing specific economies, institutions, infrastructures and cultures that are at the root of the ecological crisis. It demonstrates the diversity in these movements as well as the commonalities that join them under a global and globalizing movement for environmental justice (Martinez-Alier et al. 2016).

[Insert Figure 1]

The EJAtlas includes socio-environmental conflicts defined as:

"mobilizations by local communities, social movements, which might also include support of national or international networks against particular economic activities, infrastructure construction or waste disposal/pollution whereby environmental impacts are a key element of their grievances. (...) The atlas documents social conflict related to claims against perceived negative social or environmental impacts with the following criteria: Economic activity or legislation with actual or potential negative environmental and social outcomes; Claim and mobilization by

environmental justice organization (s) that such harm occurred or is likely to occur as a result of that activity; Reporting of that particular conflict in one or more media stories." (Environmental Justice Altas, 2018)

The Data Sheet or Form (with 5 or 6 pages of information) which is used to add cases was developed collaboratively between scholars and activists in the EJOLT project (EJOLT, 2018) at the Institute of Environmental Science and Technology (ICTA) of the Autonomous University of Barcelona (2011-15) (Temper et al. 2015, Temper and Del Bene 2016). Cases can be added across 10 main categories: Nuclear energy; Mineral Ores and Building Materials Extractions; Waste Management; Biomass and Land Conflicts; Fossil Fuels and Climate Justice/Energy; Water Management; Infrastructure and Built Environment; Tourism Recreation; Biodiversity Conservation Conflicts; and, Industrial and Utilities Conflicts.

Table 1 presents the sections and content of the form used to add cases in the EJAtlas. Figure 2 is an example of the type of featured maps that Atlas visitors can build with existing cases. For instance, in figure 2 we have selected those cases related to mining conflicts in the world and further selected one case. Complex filtering can be done by selecting different categories of the form to identify cases. For instance, a map could be built selecting only those conflicts related to biodiversity where there are indigenous groups mobilizing.

[Insert Table 1]

[Insert Figure 2]

Methods

In this paper we analysed a range of teaching experiences from the US, UK, China, Turkey and Spain where the EJAtlas was used as a pedagogical tool, both in class and via online classes. We also reviewed the examination conducted (in parallel to our research) by Scheidel and colleagues (2019a) on their own course conducted in China in 2018 using the EJAtlas.

We analysed different sources of data to identify: in which contexts the Atlas is used for teaching (country, type of course, level of teaching), course content and learning objectives (which concepts, theories, etc), pedagogical approaches (lesson plans, exercises, length, etc.) and the key challenges and lessons (including technological, language, cultural, etc) emerging. Table 2 outlines some details of the courses examined in this paper.

[Insert Table 2]

Five in-depth semi-structured interviews with professors that used the EJAtlas in the aforementioned countries were conducted across a diversity of contexts and approaches. We also reviewed teaching plans and cases added by students to the EJAtlas during two courses. Student´s comments from an international online course on environmental justice (MOOC) were also used to gauge students views on the platform.

Finally, we analysed the results of an online survey responded to by 600 EJAtlas visitors (from 2015 to April 2018). The survey allowed us to examine the profile of the visitors (i.e. students, academics, activists, journalists, etc), the reason for visiting, and a short description of their experience including perceived strengths and weaknesses of the platform.

In order to analyse data we built a qualitative matrix and identified for each course: the country, type of course (subject, university, level), students profile, to teach what, how (exercises details), challenges and lessons. In the cases where interviews were conducted more information was available. Cases developed by students were reviewed as part of the EJAtlas moderation process, notes were taken, listed and we systematized emerging issues. Considering all data sources we examined, specifically, how the EJatlas was used (lesson plans, exercises, etc) and the main approaches to this use based on the complexity and length of the exercises developed by educators.

Results are developed and discussed in the following section.

Results

In this section we identify the contexts in which the EJAtlas was used for teaching and we examine two main pedagogical approaches to the use of the EJAtlas in class. A first pedagogical strategy used the atlas to explore and learn about concepts and trends in sustainability and EJ. A second approach went a step further asking students to add or update a case to the EJAtlas, allowing for additional learning opportunities. We examine the key lessons issued from these experiences. In the discussion section we discuss the potential of the atlas to connect students with action-based approaches and real world environmental issues based on these experiences.

Teaching contexts

The EJatlas is used in the context of undergraduate and graduate courses in a wide range of countries around the world (e.g. Latin America, North America, Europe, Asia, Africa, Middle East, Australia). The online platform is mainly used in English

speaking courses, however there are also examples of Spanish-language courses (many cases in Latin America are in Spanish).

The platform is mainly used in environment and sustainability related courses (e.g. Ecological Economics, Political Ecology, Environmental Sociology, Environment and Development, Environmental Justice, etc), but also as part of courses on Ethics, Human Rights, Political Economy and Public Administration. Some of the key concepts studied through the EJAtlas are: environmental justice, environmental conflicts, ecological unequal exchange, commodity chain, extractivism, ethics or business and human rights. In the next two sections we outline two main strategies chosen by educators for using the EJAtlas in their courses.

EjAtlas to explore and understand concepts and trends in sustainability and Environmental Justice.

The survey provided some examples of the motivations of professors visiting the EJAtlas:

> *"I am a social sciences teacher. I am interested in finding out about territorial conflicts to teach my students about them" (Colombian professor, EJATLAS survey)*
>
> *"The Map is useful to getting global perspective and easy to find project level examples".(US professor, EJAtlas survey)*
>
> *"Looking for case studies for public school and business school teaching on ethics, sustainability and other subjects." (South African professor, EjAtlas survey).*

Users signaled that the EJAtlas offered a large and diverse number of detailed environmental conflicts aiding professors to: a) choose cases or build tailored maps to explain concepts and illustrate ongoing trends to support their classes and/or; b) build practical exercises to guide students in the exploration and comparison of cases of EJ struggles at national and international levels, as well as with diverse thematic foci (e.g. mining, land-grabbing, oil, plantations, etc). We will give some examples of these approaches and some lessons and challenges.

One common exercise signaled by different professors is structured in two parts. First, the professor introduces the EJAtlas platform along with its background (i.e. origin, how EJ struggles are defined, how it is built collaboratively), the platform structure (i.e. how to access, read and filter cases, create maps), the different components of the case description (conflict type, actors, strategies, outcomes, impacts, etc) and to show examples with specific cases and searches (from the professor's computer to the class). In the MOOC we reviewed, a video tutorial presents the EJAtlas structure (University of East Anglia 2018). At least two interviewees that conduct presencial courses indicated that they were using this video tutorial in their classes and syllabuses, allowing students to explore the EJAtlas with some guidance before class.

Presenting the structure of the EJ struggle cases published in the EJAtlas allowed for introduction of different themes and concepts. Conflicts are categorized based on key commodities and activities (see section 3). This classification allowed for discussion of the different underlying socio-environmental particularities and stakes, as well as the concept of commodity chains (e.g. how and where commodities are extracted, processed, transported, and disposed, creating socio-environmental pressures and conflicts across the chain, connecting struggles and actors worldwide) or trends of ecological unequal exchange (e.g. how environmental burdens and

benefits are distributed spatially and socially, between sites of extraction and consumption). Cases are also structured with a typology of actors, strategies, impacts and outcomes that allowed for engagement with different bodies of social science literature (social movements, environmental sociology, political ecology, etc). Authors can specify in each case whether they consider it an EJ success. A professor in the UK identified this question as very useful for triggering debate amongst students about what EJ is. Information provided in the cases regarding outcomes and alternatives born from these struggles allowed for discussing how EJOs are forces for transformation towards sustainability (see more on this in Scheidel et al. 2018b, Temper et al. 2018a, 2018b).

"The Environmental Justice Atlas turned out to be a useful teaching tool to provide concrete empirical case material, on which basis theoretical concepts from Political Ecology and Ecological Economics were discussed. Based on illustrative cases from both China and outside, students could realize the connections between society's material and energy use and the frequently unequal distribution of environmental benefits and burdens across different actors and scales. Thanks to the EJAtlas, students could also see that several environmental problems are not limited to a few single cases, or apply only to countries like China. Rather, they are a systemic feature of those places around the globe where intensive resource extraction and processing is taking place" (Examination of China´s teaching experience by Scheidel and colleagues (2018a, 5))

In a second part, students were given some time (minutes or days) to conduct an exercise based on EJAtlas cases and some guiding questions. For instance, students

were asked to explore the online database and select one or more cases and describe them to then discuss in class. This exercise can be done in the classroom with students laptops, smartphones or pads. This exercise was conducted in a course on EJ in the U.S., where students were asked to search for cases outside the U.S. and compare them with U.S. ones. This allowed them to broaden their EJ (US) framework identifying, for instance, different features of EJ outside the US such as high levels of violence (i.e. deaths, repression). In a similar vein, a Chinese professor pointed the value of the EJAtlas to challenge and broaden Chinese´s common understanding of EJ as a synonym of environmental pollution. The Chinese professor also signaled how the EJAtlas allowed public administration students in China to broaden their views regarding the relevance of including multiple actors in public decisions making (beyond state actors) (see also Scheidel et al. 2018a).

As one student commented in the EJAtlas user survey, it was "hugely beneficial having a visual of what I am studying and also very encouraging to see what is being done on a global scale." (University student from the United Kingdom, EJAtlas survey).

In the MOOC, some students highlighted how the EJAtlas drew attention to nearby conflicts that they had been not aware of, or offered new information on cases they knew:

"Very impressive and useful! I had a look at the environmental justice issue that is right on my doorstep." (MOOC student)

" I can say is that this website has good information about the problem and explain things I did not know."(MOOC student)

Interviews, the survey and the MOOC reflected that use of the EJAtlas creates surprise, interest and motivation among students. Students value its interactivity, its connection with ongoing processes, that it is useful for activism and social change, and some express their interest to keep exploring the platform after class and become active in adding new cases or sharing with their networks:

"Wonderful resource. I have been exploring all the sites in South Africa and share it with my network via social media." (MOOC student)

"Many local activist groups, researchers and conservation practitioners are mobilising against these expansions. I am proud to be involved in this struggle for environmental justice for the local people of ___, and will definitely be working with my friends and colleagues there to register this case in the EJ atlas!" (MOOC student)

"If I use the Atlas it's to find places where I could volunteer and for me, a map full of former battles is not really useful." (Student from unidentified location, EJAtlas survey)

The potential of the EJAtlas to motivate in a context of classes of "disaffected" students has been explicitly raised in a comment:

"(the EJAtlas is) perfect for showing class of disaffected students all the instances of resistance and creativity that are currently going on. very empowering for them I think." (Masters student from California, USA, EJAtlas survey).

However, during their course in China, Scheidel et al (2018a) found that some students had strong emotional reactions to the cases examined and signaled that:

"As teachers of Political Ecology, we have realized how important it is to show not only the destructive sides of conflicts (e.g., environmental degradation, tensions and sometimes also violence between stakeholders, etc.), but also the productive and creative parts of conflicts when seen as spaces of transformation, where injustices and unsustainabilities are exposed and politicized and where alternative ways to development as usual are explored and put forward (…). As probably many lecturers do, we believe that teaching can make a strong impact in the lives of young students. This impact should be, despite of the heavy topics at times, a positive one that doesn't take away students' hope, but rather motivates them to further unpack and confront problematic issues. In this context, Ecological Economics and Political Ecology as teaching subjects may have an important future in China. As one student said, "*I think this is not the end of exploration to environmental problems!*" (Scheidel et al 2018a, 12)

Finally, professors and students identified some key challenges to use the EJAtlas in class. There was a central technical challenge as the platform works better on computers than on smartphones and tablets. High internet speed was also necessary for smooth use of the platform. Although not explicitly mentioned, there were also language challenges as the platform operates mainly (but not only) in English. Another challenge identified was the need to invest time in explaining the platform background to improve class discussions. Some students were struck by or made emphasis on the lack of coverage in some geographic areas, for instance. This can be explained by the way in which the EJAtlas is built, based on collaborations and active networks, as result it still has geographically uneven coverage.

The EJAltas as a way to deepen understandings of Environmental Justice struggles and learn to do case study research: adding/updating a case

The process of adding/updating an EJAtlas case was also used as a course exercise. This entails the student identifying, defining and entering a new case into the Atlas or updating an existing case. This assignment was labour intensive for the professor (who does the initial review); the student; as well as the EJAtlas moderation team; however it motivated students who felt that their class-work published online with their name as author had a real world impact, and contributed to visibilizing a struggle.

The process of adding a case developed research skills in searching, analyzing and summarizing primary and secondary sources; it enabled students to identify concepts and phenomena learned about in class in real cases and; to work collaboratively when done in groups.

This exercise was used as a course project for individual or small groups of students. Here we outline the main stages used for the exercise of adding/updating cases and some of the lessons learnt and challenges. We then highlight some research skills deployed by students in the process.

a) Introduce and explain the EJAtlas background and case structure.

Similar to the exercise explained in the previous section, professors invest time presenting and explaining the EJAtlas. The dataform has a pre-defined structure on how to describe a conflict that needs to be understood by students to be able to add cases. One professor claimed to have spent 4 hours in the introductory class.

b) Selection of case: What is an EJ conflict? How to select a case study?

A second stage was the selection of the case study to be developed. This allowed for in-class exploration and discussion of what qualifies as an EJ conflict or not. Moreover, the EJAtlas has its own definition of EJ conflicts that can be mapped in the platform so cases need to be reviewed for appropriate scope and scale (see section 3).

Professors took differing approaches to case selection including:

- total freedom (geographic and thematic) to search and select a case to be added

- partial freedom, in which students were mainly asked to identify cases in a known context, such as their own countries.

- A list of pre-selected cases.

- A list of already published cases to select one to be updated.

We identified some challenges and lessons in this step. Professors signal the need to invest time in discussing well case selection to avoid future problems in their development. For instance, in a course held in Latin America some students selected local cases and developed them well, but these were not included in the online database as they did not fit the database definition regarding relevance. Or, for instance, a student developed a case of EJ conflict from his perspective: according to this student, exploiting a mine could be the solution to environmental injustices. However, no proof of local communities claims and views were provided. The selection of cases can give room for discussions regarding what qualifies as an EJ conflict or not, and if these fit the EJAtlas definition.

From the EJAtlas team's perspective, we need to review proposed case studies to ensure that there are not overlaps with other cases in progress and that they appropriate in scope and scale.

c) Development of the case: How to research, structure and explain an environmental justice conflict.

At this stage professors were in contact with the EJAtlas team to coordinate the adding of cases. Professors and students had to create an account in the EJAtlas, which allowed access to a dataform to add a new conflict. Once the EJAtlas team was informed of the list of cases that students were working on, their professors could be added as co-moderators of these cases, allowing them to read and comment (in the online form) the work of students during the process of developing a case.

This stage was the most intensive in terms of time and work for students and professors. There were different strategies regarding how professors interacted with students in this process, some comment online or via email, some discussed the development of the work in the classroom, other just reviewed in detail the final version.

d) Marking, reviewing and online publication

Once the final case was developed by students, it was reviewed by professors in an online or printed form. In some courses, the EJAtlas form was used to develop a case study in class but the result was presented and marked offline, not added online or submitted for moderation. When the case was filled online, the final version was submitted for moderation to the EJAtlas team. Students that submitted their cases had two processes of evaluation, one done by their professor according the course time

schedule and courses criteria, and another conducted by the EJAtlas team following the platform definitions, requirements of quality, with a different timeline, and ending with final approval and online publication.

Research skills

The development of a case study allowed to develop different research, hermeneutic, conceptual and narration skills.

Regarding research skills, to add a new case or update an existing case, students needed to know how and where to search for information and register the data sources. They could use primary and secondary sources. A main source of information was the Internet and grey literature. Professors usually advised on how to use online search engines (such as google or other), online newspapers, local actors websites and other resources. This was a real challenge in contexts where online search engines were limited or mass media does not publish information on certain conflicts, requiring experience and imagination to find useful sources of information. There were also language challenges as the form can be completed in some languages (English and Spanish mainly), and some students were non native speakers or were documenting cases in another language. The Chinese professor interviewed reported devoting a large part of her time to language and expression corrections or insisting on the need to have multiple sources or information to examine a case. The EJAtlas required detailed referencing of the information provided that is also a valuable exercise for students.

Regarding hermeneutic skills, students also could also learn to use primary sources by interviewing affected groups in order to reflect views of mobilised actors respectfully, avoiding under and over interpretation of discourses. This offered

students the challenge of interpreting discourses, experiential testimonies and documents in context.

A third learning opportunity centers on conceptual skills. Adding a case required understanding different concepts and phenomena used in the EJAtlas forms, such as actor, projects features, networks, strategies, impacts, commodities, etc. The EJAtlas allowed for learning about a wide range of concepts in a structured exercise with real cases.

Finally, we observed learning opportunities surrounding narration skills. Developing a case required synthesis and expression skills. This is a challenge for non-native speakers but also for native speakers. From the perspective of the EJAtlas team, a central challenge was explaining well what the aim of the EJAtlas is and the approach of cases. Cases were not meant to be essays or conflict analysis, but aimed to describe and reflect the views, actions and concerns of affected groups. In this vein, relevant cases have to be added from a local approach, and ideally with the insights of affected groups (interviews, local sources, etc).

From the perspective of the EJAtlas team, some lessons and challenges are identified. Case entry is difficult and contributors usually hone their skills and familiarity with the database through entering multiple cases and a back and forth process with the moderators. Moderating multiple cases from students entering their first case is thus extremely time intensive as the cases often require considerable extra research and time to make them publishable.

Once action taken to address this is the development of more detailed annotated instructions to the data-base form. Further, it has been recommended it is at the Masters´ level that students are most apt at doing this work. Moreover, improving

the engagement of professors to have students submit well-developed, written and referenced cases and erase those that do not fill the EJAtlas requirements (but perhaps do fill the class expectations) was also identified as key.

Discussion

In this section we discuss some central contributions of this research to ongoing debates on sustainability and EJ teaching.

The EJAtlas, as a worldwide structured repertory of environmental justice struggles allowed teachers to work on complex themes with their classes (social movements theory, environmental justice theory, etc) with real case studies with which students could connect with. The exploration of nearby and faraway environmental struggles, as well as their differences and similarities allowed teachers to examine EJ concepts and struggles, their roots, power dynamics and reach. Moreover, the possibility of adding cases, as part -or not- of class offered students the possibility to become activists and actors of change (Scheidel et al 2018a).

While further research is needed, this initial results suggest that the EJatlas has the potential to address some key concerns emerging in sustainability studies in higher education- the demotivating 'remoteness' students might feel from tangible, on-the-ground issues and activism, the lack of diverse voices present in course material (Garibay et al. 2016, Garibay and Vincent 2018) (particularly voices from the frontlines of environmental injustices and resistance movements), and the difficult balance to strike between theory and practice (Weber and Hermanson 2015). The Atlas offers a platform that students and educators can use to help bridge these gaps- by providing a way for students to tangibly engage with important environmental resistance movements, visibilizing diverse, frontline voices and experiences, and connecting the

theoretical to the practical via a range of opportunities for promoting environmental justice work outside of the classroom including advocacy, documentation, networking, and solidarity-building (Weber and Hermanson 2015). In this vein, Osborne (2017; 852) describes the atlas as a tool for what she terms "Public Political Ecology", in that it "builds a *community of praxis* by using theories of environmental justice and PAR methodologies to unite scientists, activist organizations, and policymakers around issues of ecological distribution while rendering resource struggles visible to broader publics."

However, since the atlas was not designed for teaching purposes, but as a research and activist collaborative learning platform, this creates some challenges, such as the tension between timelines for reviewing cases for teachers and the atlas team or the requirements for case study selection or the dataform development (e.g. data quality, referencing, narrative voice). Nevertheless, the atlas is a showcase of the pedagogical opportunities inherent within social movements and activist work (Clover 2010, Hall 2009, Lowan-Trudeau 2017). As such, we claim that the EJAtlas is a tool that allows students to learn from and engage with the global Environmental Justice movement (Martinez-Alier et al. 2016, Temper and Del Bene 2016).

The EJAtlas interactive online functionalities, that allows users to search, classify and add cases also offers a tool for professors to structure dynamic teaching lessons on Environmental Justice and sustainability related issues. However, we claim that the main strength of the altas as a technological development used for teaching is not only grounded in its interactive functionalities (Mayes et al 2015), but in its live connection with real world processes and its capacity to connect with emotions and inspire students inside and outside the classroom.

However, the experience of Scheidel and colleagues (2018) also suggest that the deep examination of concepts and real cases of environmental injustice, can also be a source of feelings of despair. In this vein, they point to the need to counterbalance the examination of the negative trends and sad stories with the positive processes of social mobilization and the transformations these produce.

Conclusion

The EJAtlas was developed for and by activists and action research scholars to make visible and connect worldwide EJ struggles, as well as to improve understanding and research in this field. This paper aimed to make empirical, conceptual and practical contributions. From an empirical perspective we examined how the EJAtlas was used in different geographical and learning context to teach environmental justice and sustainability themes. The analysis of learning and teaching experiences showed that the EJAtlas, as a tool developed for research, social action and transformation, allowed educators to develop short or long exercises that can motivate students. The possibility of adding a relevant case, which is a more complex, time and effort consuming exercise, is attracting interest. The platform offered a pre-built interactive form that allowed for structuring a learning process on understanding the key components of an environmental struggle. Moreover, the result of this exercise can transcend classroom walls and contribute to a wider EJ worldwide collaborative work. Our examination has, however, pointed to some needs and challenges, such as the limited capacity of the current EJAtlas team and the need to improve the involvement of teachers in the final moderation of cases.

From a conceptual approach, the Environmental Justice Atlas contributes to the understanding of what the EJ movement is about, its claims and how environmental justice organizations are working around the globe against environmental injustices. The interactive functions of the online platform also allow a wide range of uses and explorations by teachers and students. These features address some of the challenges of learning (with and without new technologies) (Dillenbourg et al. 2002).

Moreover, we have claimed that the EJatlas has the potential to address some key concerns emerging in sustainability studies in higher education- the demotivating 'remoteness' students might feel from tangible, on-the-ground issues and activism, the lack of diverse voices present in course material (Garibay et al. 2016, Garibay and Vincent 2018), and the difficult balance to strike between theory and practice (Weber and Hermanson 2015). We have also suggested that while the debate on the use of new technologies for teaching has focused on the ability of these interactive tools to develop capabilities and improve productivity (Mayes et al 2015), the EJatlas showcases the potential to inspire and motivate students of interactive technological tools developed with/for social movements.

Finally, we would like to signal that the results of this ongoing research are feeding the discussion and development of improvements for the platform (professors functionalities, available tutorials, lessons plans and guidelines, multiple language functionalities) as well as feeding a self-reflexive process on how to improve the support of the EJAtlas team to educators and their needs without weakening the original objectives of the platform.

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[2] A more detailed explanation of the EJAtlas background and methodology can be read here: Temper et al. 2015
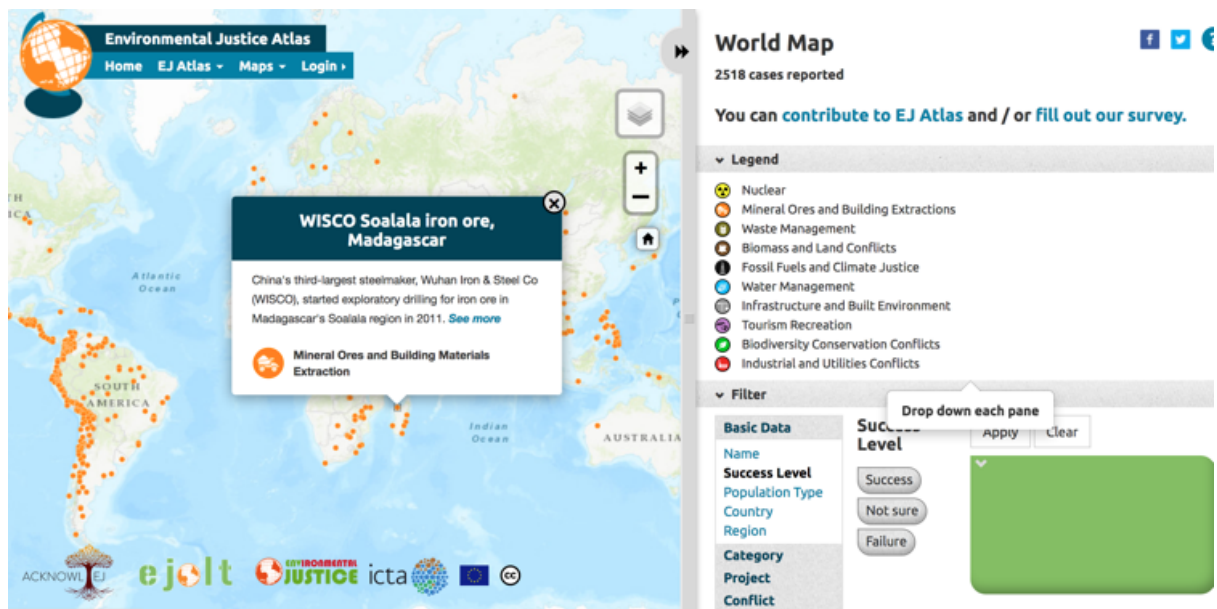
Figure 1. Environmental Justice Atlas (July 2018)
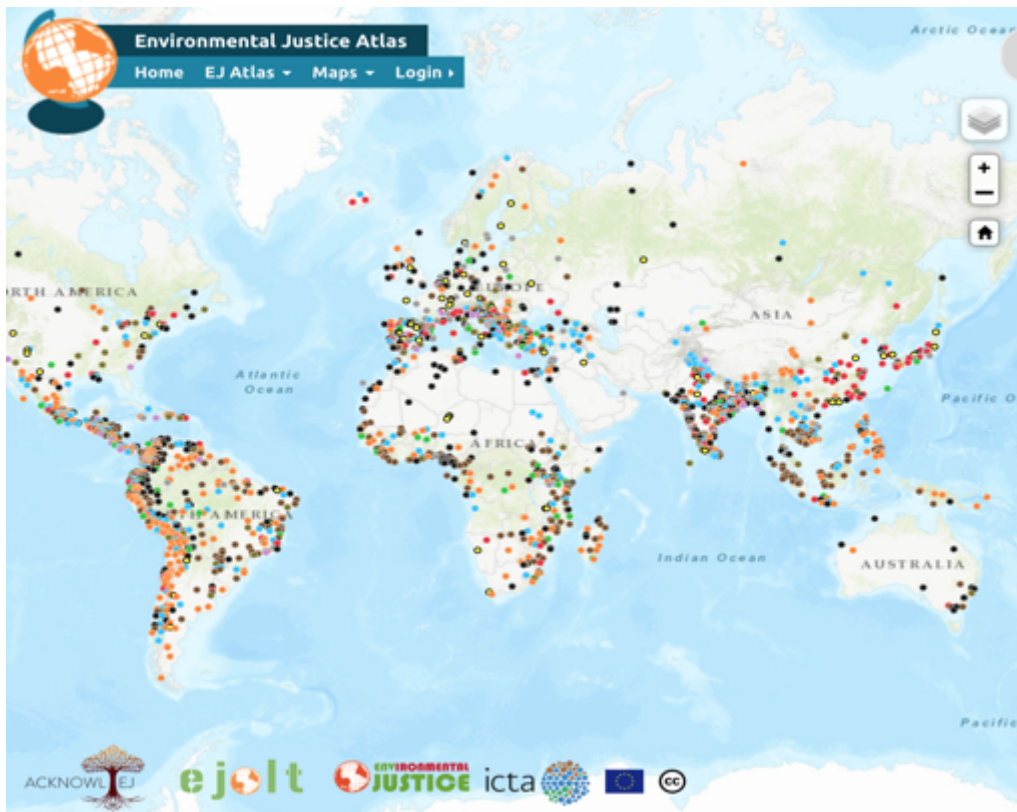
Source: Environmental Justice Atlas (2018)
Note: each point has information on an environmental justice struggle

Figure 2. EJAtlas conflict categories and selection of conflicts on Mineral Ores and Building Extractions.

Source. Environmental Justice Atlas, 2018

Table1. Structure and Content of the EJAtlas data form.

Basic Data	-Name of Conflict -Location and Area (Country, etc) -GPS coordinates and Degree of accuracy -Type of population involved (e.g. rural, urban)
Source of Conflict	-Type of Conflict -First level (from typology of conflicts) -Second Level (from typology of conflicts) -Commodities involved (e.g. gold, oil…) -Description of the Conflict (text)
Project Details and Actors	-Level of Investment in the project -Technical details (e.g. MW produced, tonnes of extraction) -Companies and State enterprises involved (& home countries) -International and Financial Institutions Involved. -Number of Affected people -Environmental Justice Organizations involved - Government organizations involved
The Conflict and the Mobilization	-Intensity (maximum historical conflict level) -History of Mobilization (e.g. preventive, post-Impact) -Groups mobilizing (e.g. indigenous groups, women, unionized workers). -Forms of Mobilization (e.g. blockades, referenda, petitions) -Cross-involvement with other EJAtlas cases?
Environmental Impacts	Some options provided (Choose if visible/potential/No Data)
Health Impacts	Some options provided (Choose if visible/potential/No Data)
Socioeconomic Impacts	Some options provided (Choose if visible/potential/No Data)
Outcomes	-Current status of the project (proposed, under implementation, stopped) -Conflict outcome (e.g. negotiation, repression, remediation, etc) -Proposal of alternatives (describe) -Is this a case of EJ success? Was EJ served (Yes/No/Not sure) Explain.

	-Relevant legislation (Links and documents)
Sources and Materials	-Relevant legislation (Links and documents) -Academic sources (Links and documents) -Journalistic sources (Links and documents) -Multi-media sources (Links and documents)
Contributor Data	-Author contact information -Contact information of local activists and Environmental Justice Organization -Other comments
Multimedia	Upload relevant photos, videos, PDFs

Source: own elaboration base don EJAtlas dataform.

Table 2. Data sources and courses assessed in this research

Data source type	Country of course	type of course	Students profile
	China	Master course. Seminar on environment and poverty. Northwest Agriculture and forestry University.	Different backgrounds (Sociology, lawyers, social workers, public administration). Chinese and Asian students.
Interview	China	Public Administration degree. Critical issues in rural studies. Session on Environment Northwest Agriculture and forestry University.	3rd year undergraduate. Mainly Chinese students
Interview	US	Week on EJ. Course on Environmental Governance. Colorado State University.	Undergraduate. Mainly US students
Interview	Turkey	Special topic in International Development. Class on "Development and Environment". Bogacizi University.	Undergraduate. Mainly Turkish students
Interview	Spain	"Human uses of the Earth" Environmental Sciences degree. Autonomous University of Barcelona	Undergraduate. Mainly Spanish students

Interview	UK	Environmental Justice course. Field trip course to Latin America. University of East Anglia	Undergraduate. Maily UK students
Review of cases by students	US	Environmental Studies. Salsbury University	Undergraduate. Mainly US students
Review of cases by students	US	EJ course. Bishop University	Undergraduate. Mainly US students
Lesson plans: Introductory exercise & Mid term project	US	Introduction to EJ. University of Michigan	Undergraduate. Maily US students
MOOC	UK based	Environmental Justice course. University of East Anglia	International MOOC. Different nationalities

Source: own elaboration

Bios

Dr. Leah Temper is a trans-disciplinary scholar-activist specialized in Ecological Economics and Political Ecology. She is the founder and director of the Global Atlas of Environmental Justice (www.ejatlas.org), and currently works as the Principal Investigator for the Academic-Activist Co-Produced Knowledge for Environmental Justice project (www.acknowlej.org) and as a Research Associate with Leadership for the Ecozoic based at McGill University.

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