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Barriers and success factors for collaborative active learning in a *glocal* course

Master of Science Thesis

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Barriers and success factors for collaborative active learning in a *glocal* course

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ABSTRACT

There is a need for negotiation and collaborative skills across geographical and cultural borders to tackle the sustainability challenges of today. To enable and train future leaders, policy makers, advisors and scientists in these skills, a concept for a *glocal* collaborative programme focusing on economics of sustainable development in a changing climate is being developed. Where glocal is the combination of global and local, both particularizing and universalising. The programme is being developed by the organisation Environment for Development, which focuses on research and higher education in developing countries.

The pilot for this glocal collaborative programme is a glocal course about environmental policy with flipped classroom and active learning as core pedagogical concepts. As this will be a pilot course which eventually will be expanded there is a need to find potential success factors and barriers. This especially for the main exercise in the course about environmental policy as it focuses on glocal collaboration and the students changing of perspectives.

The study used a qualitative approach with nine semi structured interviews as the main data source. The analysis used an inductive thematic approach and found eight themes, four of which were success factors and four which were barriers. The success themes were that (1) the exercise was perceived as fun and motivating, (2) the students and teachers perceived learning, (3) technical tools enhanced learning and (4) the students felt that the exercise made the world a smaller place. The barriers were (1) problems with the collaborative work and discussion, (2) technical problems, (3) that a few students made broad and generalizing remarks from a small data pool and (4) smaller practical problems.

All in all, there seems to be a solid foundation to expand upon the course and there was also a wish from the students that the interaction between countries would expand. In other words, to expand the exercise or having similar ones seems to be something that could enable learning. But the barriers should also be addressed during the next run of the exercise.

Keywords: Active learning, glocal education, collaborative course, flipped classroom, online learning, international collaboration, changing perceptions, Environment for Development.

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1. INTRODUCTION

This chapter presents the purpose and context of the master thesis, beginning with an introduction to the field learning in a glocal context and the background of this study. This is followed by the purpose and aim of the study, the research questions and delimitations and ending with the layout of the thesis.

Climate change is a complex and challenging societal problem and higher education plays a critical role in creating a sustainable future (Cortese, 2003). There is a need of negotiation and collaborative skills across geographical and cultural borders, something that would require well-designed well-educated decision makers:

“Imagine what would happen if students from all over the world, from different geographical and cultural contexts, were able to learn together how to address the pressing sustainability issues of our time, from loss of biodiversity and climate change to rapid urbanization and pandemics. Students could work on joint research questions related to sustainability in their own different environments while collaborating with instructors from different cultures and nationalities. They could learn about the local nature of sustainability problems while dealing with the interconnections of these problems on a global scale. Students would feel empowered to contribute to social change and transformation in the context in which they live and work, while building alliances with peers across social, cultural, and geographical boundaries. They could learn to capitalize on synergies and differences and thus contribute to a more sustainable future.” (John, et al., 2017, p. 18)

This vision of future education has two major aspects to it, it focuses both on *the local nature of sustainability problems* but in combination with *joint research, different cultures, and the dealing with problems on a global scale*. This combination of global and local, of both universalizing and particularizing tendencies in both education and sustainability, is sometimes referred to as *glocal* and is a core principle in the Glocal Learning for Climate Action-initiative, which this study is a part of.

The *Glocal Learning for Climate Action: A Collaborative Program in Climate Change and Development Economics*, or 3CDE for short, is a concept for a *glocal* collaborative programme focusing on economics of sustainable development in a changing climate (Alpizar, et al., 2017). It's for students at the MSc and PhD level and the objective is to empower and train future leaders and educators from mainly developing countries in climate science and economic tools and methods to tackle climate change-related challenges. The collaboration is established in various parts of the world and is based around the Environment for Development-network, or EfD for short. EfD is a scientific network that works with policy interaction and research in mostly developing countries. It has centres in Chile, China, Colombia, Costa Rica, Ethiopia, Kenya, India, South Africa, Tanzania and USA. EfD's main financier is SIDA (Swedish International Development cooperation Agency).

In the first phase of the development of this programme a pilot course was designed, and it was carried out in early 2018. The course, about environmental policy instruments, used the pedagogical concept *flipped classroom*, a format where the students already have taken part of the

study material before the lectures so that more time can be spent at active learning activities such as discussion, questions and tasks (Adawi & Stöhr, 2018). In practice, the six different participating countries included as much of the material as they wanted from a common learning platform, which included videos, texts, quizzes and references for further reading. This is by itself not something unique, but what made the course a glocal one, not just a purely online course, was in part a local and flipped classroom aspect of teacher lead discussion and collaboration and in part the global exercises conducted.

Because this glocal pilot course and collaborative exercise eventually will form a basis for future expansion of the collaborative programme, both courses and exercises, there is a need to evaluate the course. This to maximize the students learning but also to facilitate the expansion of the programme and to save energy and resources by implementing any eventual changes at an early stage. Operating a project between several countries and sharing material pedagogical methods between teachers requires more planning and logistics than just having the course locally. Therefore, the programme's more unique aspects of collaborative learning, both on site and between students, is of particular importance for the development of it. Is the extra administrative work worth it? Does the exercise achieve its vision? What were the success factors and barriers?

1.1. Aim of study and research questions

This study aims at investigating how the exercise was carried out and how it was experienced to harness what worked better and to find any development potential in an early stage. In the centre of all educational processes are the teachers and students (Pruett & Sesen, 2017), therefore, it is necessary to have a better understanding of what these central participants believe. Hence, their experiences will be the core focus of this study. How do they experience the activities? Are there any differences in perceptions between the two different sites? Are there any complications that could not be expected beforehand?

The teachers at the different universities conditions for keeping the course are also of interest. How do these teachers relate to the common material and teaching in the course? What is their perspective on the benefits from the collaborative learning activities?

To support this thesis aim it investigates the following two questions:

RQ1: What were the success factors and barriers of collaborative learning activities for teachers and master-level students in a course about environmental policy performed in two different sites (in Costa Rica and Sweden)?

RQ2: What were the differences and similarities in the experienced benefits for the students from performing the collaborative learning activities in the course for the different sites?

1.2. Delimitations

This study is centred around the collaborative exercise that was carried out, both on the interaction between students in the specific country and between students in different countries. However, it does not focus on the other parts of the pilot course to a greater extent and it does

not investigate if the pedagogical concept flipped classroom was used optimally. This, as it has been researched repeatedly in other contexts and not deemed as too different from this context. Further, it does not focus on the actual material of the course, only how it was experienced and how the exercise was carried out.

Six countries participated in the collaborative glocal pilot course, but only in two of those the exercise was investigated in depth. The two countries, Sweden and Costa Rica, were chosen based on availability, contacts and how much of the course material that was used.

The exercise was organised into three parts, this study focuses on the two first parts. This as the third and smallest part was carried out later than the data gathering phase of this study and one of the two countries of focus did not participate.

Moreover, this study does not deeply narrate how theory defines different pedagogical concepts or conducts a thorough literature review on course design. Instead it is used as an example, a case-study, potentially contributing to the understanding of how the collaborative exercise was carried out, experienced and to learning in a glocal context.

1.3. Thesis outline

This section describes the content of the thesis.

1. **Introduction** – Introduction to the concept of *glocal* collaborative learning and the context and purpose of this study. Followed by a summarization of what the study is trying to achieve, the research questions it tries to answer and the delimitations.
2. **The *glocal* course and the collaborative exercise** – The pilot course and collaborative exercise is described in more detail, what is it that this study investigates and what was the aim and vision of the exercise?
3. **Theoretical framework** – The theoretical lens used in both the collaborative exercise and the analysis of the data collected in this study, social constructivism, collaborative learning and perspective on motivation.
4. **Methodology** – The methodology used for investigating the research questions is described. Starting with the research layout and followed by a description of the different data collection methods, ending with a description of how the validity in this study is regarded.
5. **Results** – The data collected from the analysis, summarized themes with supporting quotes.
6. **Discussion** – The student's and teacher's perceptions of the exercise presented in the results-section is discussed.
7. **Conclusion** – Summarization of the study and presentation of the main conclusions.

2. THE GLOCAL COLLABORATIVE EXERCISE

This chapter describes the background and vision of the glocal collaborative exercise. It describes the different parts of the exercise in more detail, what the vision and purpose of the exercise was and a bit of background of why the pilot course and collaborative exercise is being developed.

2.1. Background of the exercise and underlying pedagogics

This thesis doesn't focus on the course in general, but primarily on evaluating the development of the collaborative exercise. To provide an overview of the exercise's purpose, vision and development this section will briefly explain the context of the pilot course, the capacity building programme that is being developed and the organisation behind it. The information is rendered through direct observation and literature review, especially the concept note for the programme: *Glocal learning for climate action* (Alpizar, et al., 2017):

As mentioned in the introduction the pilot course is an extension of the course Environmental Policy Instruments at Chalmers University of Technology and the University of Gothenburg. The course is about, as its name suggests, environmental policy instruments. It includes basic economic concepts underlying environmental policy-making, as well as insights into the practicalities of these sorts of policies, both from the perspective of those implementing the policy, but also of those facing new regulations. Insight into international challenges and collaboration in environmental policy matters is an important part of the learning objectives in both the course and the collaborative programme. The exercise that this study mainly focuses on is about negotiating greenhouse emission rights.

The overall perspective and underlying theory about learning as seen by the course and exercise designers was a *social constructivist* one. This view is also used in the analysis in this study and is explained in further detail in the theoretical framework, but in general there is an emphasis on discussion and reflection on perspectives and concepts to facilitate learning and generate understanding (Mezirow, 1990). Even though the underlying theory is social constructivist, the subcategories used in both the design of the pilot course and the exercise are the pedagogical concepts: *flipped classroom*, *blended learning* and *collaborative learning*.

Flipped classroom is a model that has gained an increasing interest among university teachers in recent years (Adawi & Stöhr, 2018). In the flipped classroom students are encouraged to watch short video lectures (or reading assignments) as preparation for class, and classroom time is dedicated to more active forms of learning. Such activities could be, but not restricted to, asking the professor questions about the recorded mini-lectures or readings, individual or group exercises and discussion of the material from the recorded lectures. This format is also the intended main format for the glocal collaborative programme, as it is easy to access the same material in all the participating countries. The aim of this format is that it will lead to a more active and student-centred learning where the students can reflect over the course material and carry out tasks both on site and with students from other institutions. The professors on site are responsible for activating the students and facilitate the discussion and student's learning.

Two other pedagogical concepts emphasised are *blended learning* and *collaborative learning*. Blended learning combines both digital and in-person interfaces and emphasises the central role of computer-based technologies (Graham, 2006). Collaborative learning is an extension of the social constructivistic theory where pair or groups learn through intensive synchronous joint problem solving to facilitate learning (Dillenbourg, 1999).

During the spring term of 2017 a "test exercise" was conducted to get some initial experiences of conducting collaborative learning at a distance between various parts of the EfD network. The pilot course Environmental Policy Instruments was held in between week 3-11 2018 at Chalmers and at in whole or partly at universities in Costa Rica, Kenya and India. Universities in China and Colombia participated in the collaborative exercise and used the material necessary for the exercise but did not take part of rest of the course material.

This study mainly focuses on experiences at two sites, Sweden (at Chalmers University of Technology and the University of Gothenburg) and Costa Rica (at CATIE, Centro Agronómico Tropical de Investigación y Enseñanza). Most students attending CATIE take between four to five courses at the same time. The course has therefore adapted a smaller part of the material than the original Chalmers course. Due to the student's insufficient experience with mathematics, most of the economic parts were cut down. In total there were ten seminars, each about an hour long, for six weeks, each with a few videos to watch beforehand.

2.2. The collaborative exercise

The exercise in question that this report examines, is about negotiating greenhouse emission rights and is a step toward developing a global master's program with environmental economics as its focus. In this first version of the exercise, six countries participated, and there are plans to expand. The exercise itself is about negotiating and discussing climate emission rights. The background is the Paris Agreement in 2015, where it was decided that the global average temperature increase should be kept far below 2 degrees Celsius, preferably near a 1.5-degree increase (UNFCCC, 2015). Something that would require many profound changes, among these are cutting carbon emissions to about half by 2030.

The exercise was divided into three parts. The first part was done locally where small groups had to decide on a possible fair distribution of emission in 2030 between major world regions. This on the assumption that world would have to cut their emissions by half. The next step was to agree between the groups on a mutual answer for the university. Before the exercise, the students in all countries took part of the same material and background information from a common learning platform. Part two was about trying to reason like other countries and estimate their answers for a fair emission distribution. This followed by comparing their own answers they had come with in the first part of the exercise with to the other countries answers. The third and last part was a Skype conference between the countries where the answers from the first two exercises were discussed. There was also a focus on discussing how climate negotiations have gone from a more mutual way of negotiating a more national responsibility after Copenhagen (UNFCCC, 2009). This research report focuses to a lesser extent on the third part. Below is part one and part two described in more detail followed by the pedagogical reasoning behind it and the vision of the exercise.

2.2.1. Part 1 – A fair distribution of the carbon budget

This part of the exercise was, as the title implies, about distributing carbon emission rights to different world regions. The core question is “*What would be a fair allocation of the CO₂-budget by 2030?*”. Groups of students considered aspects of fairness and decided as a group what emissions each world region should get to emit by 2030 based on the that the world would have to cut their emissions by half the year 2030. The regions (and countries) in question were China, USA, Latin America and the Caribbean, India, European Union and the rest of the world.

The four questions the students had to answer were:

1. What is a fair sharing of this limited global resource? Do you have any general comments on the changes between current and future shares of emissions following your suggested emission allocation? (up to one short comment per country or region)
2. How did you agree within your group on what shares of emissions you suggest being a fair allocation of emissions in 2030? (describe the procedure you used)
3. What principle(s) were used when answering the allocation question, why, how and were they used consistently? Please list the strongest arguments for the this/these principle(s).
4. (Bonus question if you have time) What policy instrument(s) (Policies might be carbon taxation, tradeable permits, subsidies for renewables etc) does your group think is most suitable for the respective countries doing this exercise? (it can be different or the same)

In preparation for the exercise the students had to read an introduction on the common learning platform, contemplate the questions above and watch a twenty-minute video introducing some aspects of climate change economics. They also had to familiarise themselves with three often refereed to or used arguments for different reasoning around a fair distribution of the remaining CO₂-emissions. Per capita, per GDP and Grand fathering, the principle of keeping the percentages of emissions as they are currently. The students were also encouraged to come up with their own principles of fairness and arguments for them. They were also given data on emission and population sizes from the World Bank (The World Bank, 2015).

The amount of time the students were given, and the number of participants in the exercise varied between the participating countries. In Costa Rica there was one group of five students and they were given one hour to complete the task. In Sweden there were five groups with four to five participants in each group.

2.2.2. Part 2 – Comparing our views on a fair sharing of the carbon budget

The second part of the exercise was about trying to reason like students from other countries. It was done using the online tool *mentimeter*, so that the students could watch their aggregated answers and compare them to the other countries answers in real time. The purpose of the exercise was to compare views on fairness aspects between countries and to reflect upon differences and similarities and the ability to take other perspectives on issues such as this one. In practice the students were asked three questions for each other participating country:

1. How do you think [Country name] answered the question of fair allocation of CO₂ emissions?

2. Which guiding principles do you think [Country name] used? (with a couple of alternatives, where the alternatives were the stated arguments that the different countries had used as arguments in part 1 of the exercise)
3. How accurate do you think you are in taking this country's perspective? (Where the students could answer on a scale 1 to 10, where 1 is not accurate at all and 10 was very accurate)

These questions for each country were then followed by questions regarding the reasoning about the questions above and their reactions when comparing their answers to what the students in other countries actually answered. These were questions such as “*What do you build your reasoning upon when shifting perspectives?*” and “*What interested you regarding the principle(s) used and the arguments used for using them?*”. These answers were (anonymously) shared and discussed and reflected upon.

In Sweden the exercise was carried out during a two-hour seminar with ten participants. In Costa Rica the exercise was carried out a bit differently, with the exercise split into two parts, each an hour long. The first seminar of these two did not include a live update between the students' answers and the other countries. Instead it focused on discussion about the questions and the comparing part of the exercise was done on the second seminar, five days later. All five students from the first part of the exercise participated.

2.3. The vision of the exercise

The exercise was developed with several purposes in mind and goals it wanted to achieve. In this section the idea and vision behind the exercise is described in more detail. Both from a learning and teaching perspective.

When it comes to the learning experience, the main goals of the exercise consisted of making the students practice changing perspectives and to consider differences between different perspectives. This, where different perspectives are different ways to look at what is a fair distribution of emissions that can be emitted while still reaching the two-degree goal (UNFCCC, 2009). Also, to help the students to expand their own perspective and “getting a better perspective on their own perspective”, to get a deeper understanding of what would be both fair and feasible. Also, to gain insight into perspective shifting dependent on community and culture. Then from what it looks like historical emissions, how different parts of the world will be affected by climate change and so certain aspects of culture and identities. To get insight into how difficult it can be to agree from such different perspectives and to practice negotiating and discussing.

3. THEORETICAL FRAMEWORK

*This chapter introduces each of the theories and concepts that are referred to and discussed in this study. It also starts with putting this study into this framework, with similar research that have and have not been conducted. To answer **RQ1** and **RQ2** about success factors and barriers and their differences and similarities, it is necessary to understand what learning is and which processes facilitates learning. This, beginning with the general perspective on learning and how it is achieved as seen in this study, social constructivism. This followed by the more specific pedagogical tools used in the investigated collaborative exercise. Lastly, theories of motivation and the effects of learning in global contexts, which also are important goals of the exercise, are put into perspective.*

3.1. Similar research

The literature review, that this theoretical framework has been built around, has been conducted mainly by using Chalmers University of Technology's Library Search Engine and from recommended articles from supervisors. This review has found that even if active learning, flipped classroom, motivation and learning in a global context are widely discussed, and there are studies of learning in a glocal context for example *The glocal curriculum* (John, et al., 2017), they tend to focus on the whole curriculum and how to implement it or distance learning in general. There have been relatively few findings of literature going into depth of the student's experiences from participating in such a collaborative glocal exercise. Those that have been conducted have been either more specific in its focus, for example, in *Bridges for global learning* (Gulay & Georgiadis, 2015) which is a study that focuses on student's perceptions, but the main focus is on cultural diversity (with the findings that exercises done globally does increased students' knowledge about other cultures and work habits). Another example is *Engaging "Students as Partners" in Global Learning: Some Possibilities and Provocations* (Green, 2018) which focuses on how students adopting international partnerships and getting to know each other can be a success factor and help students engage in global learning.

This study has also focused on students' experiences and perspectives in an exercise about emission rights. There have been studies about sustainability and global learning for example *The effect of local and global learning on the cost of renewable energy* (Huenteler, et al., 2016) and *Critical Realist Approach to Global Learning: A Focus on Education for sustainability* (Khazem, 2018). But those studies have focused on technology sharing or sustainability in general and concluded that global learning can be useful for the sharing of ideas and new perspectives.

The research that most closely resembles this study, that is, research that focuses on students' perspectives through interviews and which deals with global collaborative exercises on sustainability, points out that "*Research indicates that students experience and understand internationalization of the curriculum in diverse, often unintended ways.*" (Green, 2018). Further, it is also pointed out that there is a great deal of variation between exercises and setups (this study highlighted the importance of reciprocity between students and of students recognizing their cultural ignorance in a productive way).

Since global collaborative exercises seem to yield quite different results depending on context and no previous studies have been done on exercises about climate emission negotiations, this study will hopefully contribute to shed light on the student's perspectives and be used to improve not just this exercise for future years, but also other similar exercises, especially those with a focus on global discussion and emission rights conducted in an international setting.

3.2. Social constructivism

The framework and lens through which this thesis is viewing learning, is a social constructivist one. Learning as it is seen in social constructivism, is the process of an individual building internal cognitive structures of knowledge by experiencing and interacting with the world and adapting to it, this is mainly done through social interaction (Phillips & Soltis, 2015).

When people use an interpretation of an experience to guide decision-making, that's when meaning becomes learning (Mezirow, 1990). Mezirow thus defines learning in a constructivist sense as *"The process of making a new or revised interpretation of the meaning of an experience, which guides subsequent understanding, appreciation and action"*.

Another way to describe learning is that everyone has a sort mental map of the world (Yudkowsky, 2009). Just like a real map, it would be ponderous if it was as detailed as the real thing, because it would require the map to be as big the area it describes. Instead, mental maps are a generalization of how the world looks and when a new area is discovered, the mental map is updated (hopefully).

A core of learning is critical reflection, which builds on critique of the beliefs that we have built, and different perspectives, as perspectives provide principles for interpreting (Mezirow, 1990). Perspectives delimit what we learn, as Karl Popper emphasized, they affect the significantly affect perceiving and remembering meaning within the context of communication (Berkson & Wettersten, 1984). In other words, perspectives are a core of learning to update our "mental map".

Because the world around us and our lives changes rapidly and that this is something that has to be accommodated for, most of what we learn is the result of problem-solving (Mezirow, 1990). But not all learning involves "learning to do", of even more significance is understanding the meaning of what others communicate. Communicative learning focuses on achieving coherence by searching for themes to interpret the new perspective and construct an understanding of something. An important part of this is the reflection on the problem-solving process, this is done by challenging the established definition of a problem. It's a process analogous to the *paradigm shift* which is characterized as how revolutions occur in science (Popper, 1970). Which in another way is exactly that, challenging the established definition, expanding perspectives and one's mental map of the world.

3.3. Active learning and flipped classroom

"In a flipped classroom, students' initial exposure to content is shifted outside of the classroom via readings, instructional videos, individual or collaborative activities, or a combination of these. Then during class, rather than lecturing, all or a significant portion of the time is used for practice, application exercises, discussion-based activities, team-based learning,

or other active learning techniques. Some preliminary assessment, such as an online quiz or brief assignment, may be used to gauge student understanding and tailor instructional plans prior to class. (Harrel, et al., 2016)”

3.4. Motivation

To facilitate learning, motivation is a key concept. The main motivational framework of this thesis is that from Daniel Pink's *Drive: The Surprising Truth About What Motivates Us*. It's a model of motivation built on empirical data and it shows that extrinsic motivation, carrots and sticks, like salary, grades or awards and punishment, is somewhat useful when it comes to simple repetitive work. When it comes to more complex problem-solving or trying to get a deeper understanding of a subject, extrinsic motivation can actually hamper creativity. In such situations intrinsic motivation, doing a task because you find it exiting, fun or rewarding for its own sake, is much more effective. People are more motivated by internal factors than by external drivers.

To achieve intrinsic motivation (Pink, 2009) describes three major factors. A desire for mastery, a sense of autonomy and a sense of purpose. Mastery is the intrinsic motivation to get better at something that matters. Autonomy is the desire to direct our lives on our own. Purpose is the desire to serve something bigger than ourselves. In education it is therefore important to let the students have the knowledge of why the things they learn are of importance (purpose), to let them do the exercises or homework when and how they want to (autonomy) and by letting the students challenge themselves and not just repeat what has been learned.

3.5. Global citizenship

One of the main goals of the collaborative global exercise was that the students would practice taking new perspectives as this one of the main processes for learning (Mezirow, 1990). These new perspectives are an important part of learning as they provide principles for interpreting but there are also other aspects of this that can be seen as success factors and/or barriers. The global context could contribute to a feeling of global citizenship, by providing perspectives on other people's and country's contexts, but also prejudices and stereotypes (Skald & Park, 2016). Skald and Park continues that a decategorization processes of out-group members critical reflection how these are an embedded part of a particular perception of the world in combination with a sense of social responsibility is the core of the concept of global citizenship. Something that is of importance as a combination of international cooperation and concerned citizen action is the core of resolving future international challenges (Friedman, et al., 2015).

4. METHODOLOGY

In this section the methodology used in this study is explained and the validity of it is regarded. Starting with an overview of the research design and the delimitations made, followed by the data collection methods and the applied data analysis.

4.1. Research design

The main goal of this study is to explore the perceived success factors and barriers of a collaborative exercise and eventual differences between those perceptions between two universities, one in Sweden and one in Costa Rica. In order to do this, a qualitative study was conducted. A qualitative study is focused on the participant's own points of view and is preferable when aiming for a nuanced and deeper understanding of people's perceptions (Bryman, 2015). Since there haven't been any in depth research about this collaborative exercise before and the student's perceptions aren't well known, a qualitative study with interviews is useful as it provides complex and detailed representation of the perceptions experiences and opinions (Braun & Clarke, 2006). Also, observations were being conducted during the exercises and lectures to investigate how they were carried out in practice in Costa Rica.

The study was divided into three phases. First an initial and exploratory phase where two group interviews were conducted, one with Swedish students who participated in a sort of preliminary version of the exercise 2017, and one with the Costa Rican students early on in their course to explore their expectations about the exercise. A literature study was also conducted to investigate the vision and development of the future glocal program, to develop a theoretical framework and to develop a research strategy. The literature study was also carried out to develop a basic understanding of the program, the exercise and to develop a project planning report.

In phase two, a more thorough interview study was conducted with individual in-depth interviews, including a tentative test interview. In total, four students in Costa Rica and two in Sweden were interviewed and two teachers in Costa Rica and one in Sweden as well. This as mentioned to get a deep and nuanced image of the experiences of the exercise and also to investigate the rather broad research question of perceived barriers and success factors and possibly finding more specific questions.

Finally, in part three, the data was analysed, and another literature study was conducted to find relevant information about the areas studied, these included a theoretical framework for motivation and the concept of global citizenship. A conceptualisation of the research design can be found in *Figure 1*.

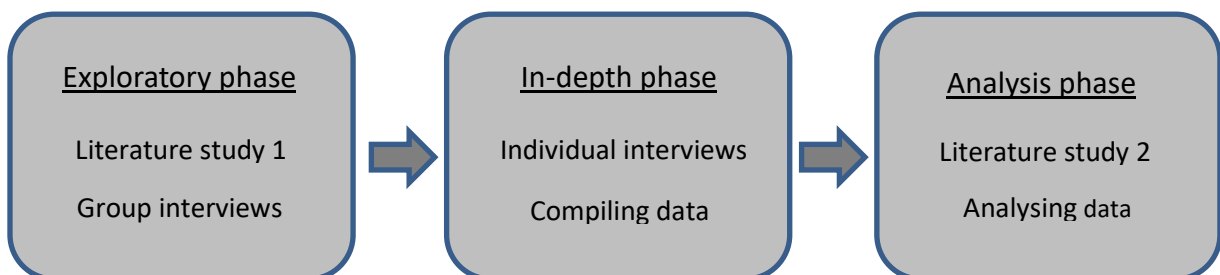


Figure 1. The research process in three phases, an exploratory phase, an in-depth phase and an analysis phase.

4.2. Data collection methods

Here the methods used to collect the data in this study are presented. Starting with how the two group interviews were conducted, followed by the seven semi structured individual interviews and lastly observations. For each method the validity of the particular method is regarded as well.

4.2.1. Group interviews

The first phase of the study aimed to get a clearer understanding of the exercise, but also to investigate the experiences and expectations of two student groups from their perspectives. The first group interview was conducted with four Swedish students who completed a preliminary version of the exercise 2017, the year before this study was conducted. This is to get a clearer picture of how the exercise was going to be carried out and how it developed into its second version. Also, to get a picture from students about how they experienced the exercise and to produce concrete advice to keep in mind in the new updated version of the exercise (their answers were sent to the exercise designer in Sweden). The interview was transcribed afterwards, and the comments were sorted according to what they experienced as success factors and barriers that needed improvement. No account was taken to the number of students who had agreed on the various pros and cons. What was mentioned was included, since qualitative initial studies with a small number of respondents should not take number into account (at least not to a greater extent) (Esaiasson, et al., 2017).

The second group interview was conducted with five Costa Rican students (everyone that participated in the collaborative exercise) after the first part of the exercise had taken place (where students in groups negotiated the emission rights for different world regions) but before the second part of the exercise (where the students compared their answers and estimated other countries answers). It examined what the experiences the students had from part one of the exercise and what they had for expectations of the next part of the exercise. As in the first group interview, all views were taken into account and summarized, this time into success factors, barriers and expectations for the second part.

4.2.2. Validity of the group interviews

Group interviews are about mapping the occurrence of different approaches and add to the knowledge of different reasoning (Esaiasson, et al., 2017). Further, the aim of a group interview is that no one dominates in the group. It's the interviewer's role to make sure this doesn't happen by for example asking quiet persons directly or by asking if anyone else wants to speak. It is also important to remind the group that there are no right or wrong answers and that everyone's experiences are of interest. To avoid respondents becoming too influenced by the first person speaking, respondents wrote down their initial thoughts on notes before discussion (Kahneman, 2011). *"This procedure makes good use of the value of the diversity of knowledge and opinion in the group"*.

The interview template was structured to encourage students to discuss among each other with only a few questions to guide the discussion when it drifted astray or came to a halt. Esaiasson, et al. (2017) recommends group interviews in combination with other types of methods. The group interview with the Swedish students were not followed up with more interviews, as the

main aim was to get a clearer picture of the exercise rather than producing unique research results. Group interviews with Costa Rica students were followed up with individual interviews and questionnaires after part two of the exercise was completed.

4.2.3. Semi structured interviews

The second phase of this study went in to depth of the success factors and barriers of the collaborative learning activities from the student's perspectives. This with semi-structured individual interviews that focused on three main aspects:

- **What was the result in relation to their expectations?** Did the exercise spark discussion? Did the students feel as if they had enough information to participate in the exercise? Did they experience any pros or cons of having the exercise in a global perspective instead on a local level?
- **Did the students experience learning?** Did they acquire new insights? Did they change their perspectives?
- **Where there any other unforeseen success factors or barriers?** What was the general impression of the exercise?

A qualitative interview could be described as: *"An interview which purpose is to obtain descriptions of the respondent's lifeworld in the purpose of interpreting the meaning of the described phenomenon"* (Kvale, 1997). A semi structured qualitative interview was chosen in order to enable further questioning of any perceived barrier or success factor, either with questions such as *"Could you elaborate?"* or just general new questions if the respondent had a perspective not expected beforehand that seemed to be of interest for the study. This in contrast to a structured interview that doesn't ask any new questions not in the interview template. The role undertaken during the interviewed could be described as "an explorer", that registers opinions, but also tries to dig deeper to get to the inner layers of the interviewee's world experience (Kvale & Brinkmann, 2014).

4.2.4. Selection of interviewees

There were five students in Costa Rica and ten students in Sweden that participated in both the first and the second part of the exercise. All were asked to be interviewed and everyone who could in the allotted time span and who wanted to be interviewed, a total of four students in Costa Rica and two in Sweden. The Swedish students were contacted via email while the Costa Rican students and all teachers (in both countries) were personally asked. The Costa Rican students and teachers were interviewed within two weeks of the completion of the second part of the exercise and the Swedish within eight weeks. The interviews varied in time between about 40-70 minutes. The interview with the Swedish teacher was used both as an informant interview and respondent interview, while all the other interviews were seen as respondents. This were a respondent is a person that contributes with a subjective picture of reality from their point of view while an informant is used as a source for how things actually are (Esaiaasson, et al., 2017). In other words, the Swedish teacher was seen as an informant for how the exercise was carried out in Sweden and as a respondent for how the exercise was experienced.

4.2.5. Devising the interview template

The questions follow the theoretical framework of being as short, clear and as specific as possible to try to get long spontaneous answers based on experience from the respondents. Questions of a more analytical approach were left to the last part of the interview. As it is important to be as clear as possible to avoid misconceptions, the course syllabus and key-words in the questions were translated to Spanish and brought to the interview and referenced to (due to the respondents in Costa Rica all having Spanish as their first language). The interview template in its entirety can be found in Appendix B.

Initially the interview started with a few warm up questions to create a setting where the respondents felt relaxed and talkative. Much of this information was not included in the analysis as it wasn't of relevance for the research questions.

Secondly, the interview aimed at investigating the personal experiences from the respondents. Both with open questions, not steering the conversation in any way with questions such as *"Could you describe your summarized impression of the collaborative exercise?"*. But also, with more specific questions to get perceptions about how different parts of the exercise worked such as *"How did you come up with your own answers in the first exercise? What reasoning did you use?"*.

Further, the interview went into what the students felt that they have learned from the exercise and what perspectives they have taken with them. This with questions such as *"What have you learned from the global collaborative exercise?"* and *"Were there any arguments from other countries that you found reasonable/not reasonable?"*.

Lastly, the interview goes into questions of more analytic and general nature. This with questions such as *"What do you think were the benefits of having this exercise globally instead of locally?"*.

The interview was recorded for transcription afterwards, but short notes were taken as well during the interview. This to capture initial thoughts during the interview but also as an excuse to take pauses. It's an easy mistake to advance too fast during the interview and give too little time for reflection (Esaïasson, et al., 2017). Further, it's easier to look preoccupied without the silence feeling awkward.

4.2.6. Validity of the semi structured individual interviews

To have a high degree of validity the interviews were set up with a few guidelines in mind. As Esaïasson, et al. described the main aspect of qualitative interviews: *"The main rule is that all the questions in an interview template should be easy to understand, short and free from academic jargon"* (Esaïasson, et al., 2017). This as the researcher shouldn't have to use much of the interview time to explain what she or he wants to know. Also, this should be done in order to obtain a comfortable atmosphere and avoiding biasing the interviewees answers (Kvale & Brinkmann, 2014).

The template should include as few why-questions as possible to avoid a feeling of interrogation (Esaïasson, et al., 2017). Why-questions is, strictly speaking, more of the researcher's part in

the study. It is also important to keep in mind that it is perceptions that the interview is trying to form an understanding of, therefore there are no right or wrong answers.

Questions of a more analytical approach should be left to the last part of the interview. This as these types of questions normally are more difficult to answer and also could influence the more spontaneous view of the remaining interview (Esaiasson, et al., 2017).

4.2.7. Observations

Observations were used to investigate how the exercise was conducted. This both to observe how the exercise was conducted in relation to the guidelines and vision of the exercise but also to see if there were any social structures that might not be mentioned in the interviews. Direct observations can be useful when investigating processes or structures that can be hard to put into words (Esaiasson, et al., 2017).

All the parts of the exercise and lectures related to the exercise in Costa Rica were observed. Notes were written down during the observation and a summary of the notes and initial reflections was written down immediately afterwards. The observations focused on the interaction between students and teachers and notes were taken of what could be observed, not about what was said (or for that matter intentions). Instead, the interviews focused on what was actually said and experienced during the exercise. One of the reasons for this was that most of the exercises and discussion were conducted in Spanish, although most of the material that the students took part of was in English. As the observer had very basic skills in Spanish, it was therefore natural to focus on social interaction. The direct notes of the observations and some reflective notes written down immediately afterwards can be found in *Appendix E*.

4.2.8. Validity of the observations

The role in observing was to not interact too much with the environment and instead take a passive observing role, something that was done in this study to the extent that it was possible. But everyone involved were still aware of being observed and the participants also knew that they would be asked to be interviewed sometime in the near future. This may have influenced the students and teachers observed. By the time the collaborative exercise was observed, seven other lectures had been observed to make the students more used to being observed.

4.3. Analysis

A compilation and analysis of qualitative interviews is not about "counting percentages", it is about finding a systematic approach to the respondent's answers and then generalizing this (Esaiasson, et al., 2017). Esaiasson, et al. further describes that different interview studies need to be compiled in different ways but one of the common factors is to try to use short and easy to read notes or memos. The memos can be parts of the interviews or summaries of different sections. The purpose is to create a basis for comparing and drawing conclusions from the interviews.

To create these memos there are several different techniques (Esaiasson, et al., 2017). One that Esaiasson, et al. describes and that is used in this study is *categorisation*, where different categories or themes are created, and every interview is marked if it is mentioned or not mentioned that

category. Everything that is relevant to a category is then sorted into subcategories, for example if an interviewee is pro, against or indifferent to a phenomenon.

To create these memos every interview in this study was recorded and then transcribed. The transcribed interviews were then printed, anonymised (given numbers so it would be possible to backtrack, this to minimize researcher bias) and then the answers were cut out and then sorted into categories. The categories emerged from the interviews, in other words, if a memo didn't fit into a category a new one was created. This in contrast to having a fixed set of categories made beforehand. When the categorisation was done a general summarization could be carried out to identify themes and potential associations between themes.

A full description of the steps of the analysis which follow the guidelines by Esaiasson, et al.:

1. Familiarizing with the data by reading it and taking notes.
2. Transcribing and anonymising the interviews.
3. Identifying themes and cutting the transcribed interviews in memos.
4. Creating categories for the memos and labelling segments.
5. Creating potential subcategories.
6. Explaining and speculating about the categories and describing relations between categories.

4.3.1. Validity of the analysis

When analysing data, it is important to let the data speak for itself and to avoid adding any other perceptions that not might be there (Braun & Clarke, 2006). To achieve this and avoid researcher bias every theme and sub-theme developed is backed up by quotes. Also, the themes and sub-themes that emerged were developed twice to minimize researcher bias and to make the themes emerge from the data and not from the researcher. In other word the analysis was done twice differences between the analyses revised.

To give a valid review of the results from the analysis visualisations were created as well as and each theme described in detail backed up by relevant quotes.

5. RESULTS

This chapter presents the results from the data gathering and analysis done as described in the method section. It tries to answer the first and second research question in depth: What were the perceived benefits and barriers of collaborative learning activities for teachers and master-level students in a course about environmental policy at two different sites? And What were the differences and similarities in the experienced benefits for the students from performing the collaborative learning activities in the course for the different sites? The student's and teacher's experiences are divided into success factors and barriers which in turn are divided into sub-themes. Lastly, the differences between the sites are presented.

As stated in RQ1, the aim is finding success factors and barriers for the learning activities, mainly the collaborative exercise. So, observations or experiences from the respondents that might facilitate the processes for learning in a social constructivistic sense, such as discussion, collaborative problem solving, the changing of perspectives, but also just making information more available, are considered success factors. And vice versa, obstruction of those processes, are considered barriers.

Through analysis of the key themes of the data collected as described in the method section [4.5], four main themes of success factors emerged. These themes, the subthemes and their connection to each other can be found in *figure 2*.

1. **Fun and motivating.** Words used to describe the exercise where *fun*, *motivating* and *interesting*.
2. **Perceived learning** through the exercise. The student experienced that they were able to practice different skills and learn different concepts.
3. **Making the world a smaller place.** Closely related to what made the exercise fun and motivating was a theme that the exercise brought the world together in some sense.
4. **Tools enhancing learning.** Both students and teachers perceived the different technical tools used as something that facilitated learning.



Figure 2. A graphical representation of the emerging themes of success factors and in what context they were mentioned.

The experienced barriers were also divided into four categories and are described below. The themes, the subthemes and their connection can be found in *figure 3*.

1. **Problems with the collaborative work and discussion.** Even though the students experienced the discussion held as something positive, they wanted more. There were also a few factors that hindered further discussion.
2. **Technical problems.** Some experienced problems with the technical tools and some were not used to their full potential.
3. **Generalisations.** Some students made very broad remarks about different countries and cultures from a very small data set.
4. **Practical problems.** Problems more practical in nature and all suggestions to improve the collaborative exercise that were a bit more specific, like changing one of the regions in the exercise or adding subtitles to the videos, are presented here.

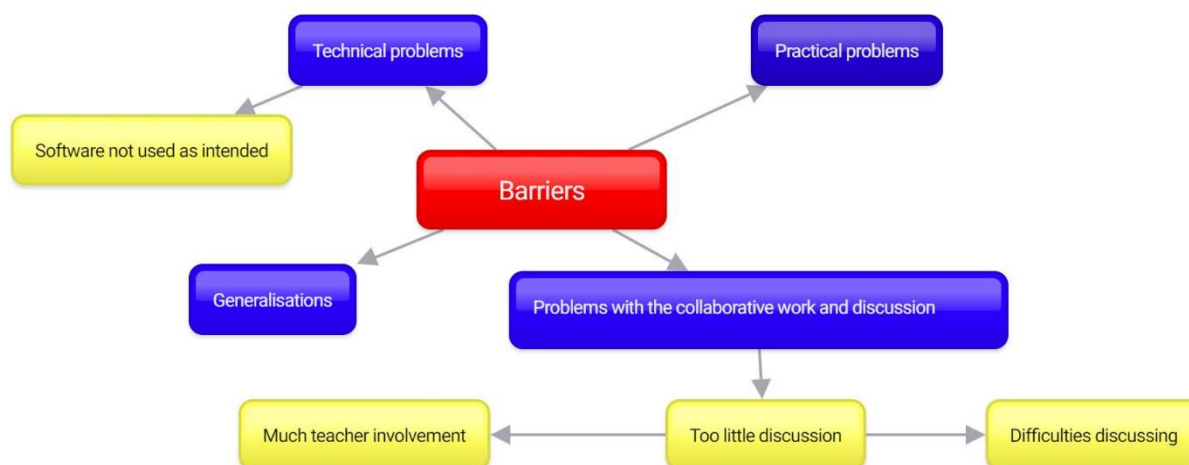


Figure 3. A graphical representation of the emerging themes of barriers and in what context they were mentioned.

The data is rendered mainly through the individual interviews, but also the group interviews and observations of the exercise to some extent. In the following, each category will be presented in further detail with exemplary quotes from the interviews.

To keep the respondents anonymous, they have been assigned letters, student A-D participated in Costa Rica and Student E and F in Sweden. All the students that participated in Costa Rica were from central and south America. Student E was from Sweden and student F were from another European country. The teachers A and B taught in Costa Rica and teacher C taught in Sweden. An overview can be found in table 1.

5.1. Theme 1 – Fun and motivating

Several important sub-factors were mentioned that contributed to the perception that the exercise was fun and motivating: it was unique, it was interesting to see what other perspectives countries had, it was fun negotiating and felt like it was “for real”.

A success factor that emerged from the interviews early on from the more general questions about the respondent’s general impression of the exercise, was that both students and teachers liked the exercise and thought that it was motivating and fun. This can be a success factor as motivation can enhance and contribute to students learning. (A side note: the words *interesting*, *fun* and *motivating* are treated interchangeably as they portray a similar feeling. Also, because something that is perceived as interesting and fun is also motivating (Pink, 2009).) This partly because the exercise was seen as something new and unique, and that variation in itself was perceived as something positive, but also because it was interesting to work across national borders. Other factors that were mentioned in conjunction with that the exercise was fun and motivating were that it was fun negotiating, that it was interesting to see what other perspectives countries had, that felt like it was “for real”. *“It was fun! It makes you motivated and you work a bit more [About having the exercise globally].”* – Student E. *“The students seemed to enjoy the exercise, and so did I.”* – Teacher B.

This was partly because the exercise was seen as something new and unique, and that variation in itself was perceived as something positive. *“This was very interesting because it was*

something really different. – Student B. *“Well it is something you don’t do often, which was fun.”* – Student D. To do something different and new seems to be perceived a motivator in its own way by several students.

Another theme mentioned in the context of what made the exercise more motivating (and also in the context of what the students felt that they had learned) was the new perspectives provided. *“I want to have experiences with other countries and it made me more motivated.”* – Student A. *“I was motivated to know other points of view, to realise how other countries are thinking.”* – Student B. Or as student F put it when asked about the general impression of the second part of the exercise: *“I thought this was the best part. I was surprised that I was very wrong sometimes. [...] It’s really cool that we would have an international exercise, I told my parents even.”* There seems that there is a positive view on sharing perspectives, although it is hard to pinpoint it to just the sharing of perspectives or how big part the global context is part of it.

Despite the fact that a few students had mixed opinions about the exercise overall it still seems like the general opinion is that the exercise, was at least in some aspects, either fun, interesting or motivating or some combination of those perceptions. The reasons for this differ from student to student but mentioned is the uniqueness, the global context (it’s real, makes the world smaller) and the learning method with negotiation and taking different perspectives.

5.2. Theme 2 – Perceived student learning

The students did experience learning, and the following themes presents those perceptions, and also the teacher’s perceptions of learning. They have been divided into three subthemes that the students perceived that they learned: new perspectives, facts and principles and negotiation/collaborating. Lastly, a theme that the teacher felt that it was a learning experience for them as well.

Something that was an important goal of the collaborative exercise, to make the students take new perspectives, seems to have been achieved to a large extent. Both when asked what they felt that they had learned, but also when asked which new arguments and perspectives they agreed with, that they had not agreed with before the part of the exercise were new perspectives were shared, almost all the students (one exception) could name a new argument or a perspective. *“I have learned to take different perspectives but also to reflect on other countries potential arguments.”* – Student E. *“Well, it [having the exercise globally] provides a broader view of how other people think. It is helpful to understand other people’s points of view”* – Student B. The teachers were also of the perception that the students had learned to take new perspectives *“My impression is that the exercise made the students better analyse their responses and justifications and that they changed their minds.”* – Teacher B. But, it should be noted that not everyone changed their perspectives. When asked *“Did you find any arguments reasonable, except those that you agreed with since before?”* Student D answered *“No, only the arguments I said.”*

It was not a major goal of the exercise, but the students did feel that they had learned different facts and statistics, both about different ways to distribute emissions and statistics about countries/regions of the world. They could also mention some of the new information they had

acquired. *“I have more information about statistics and the different principles you can use.”* – Student C. *“I read some about different principles to distribute emission and applied that. [...] Like per capita, per GDP and keeping the percentages”* – Student D. There was also a feeling that this was something useful to learn. *“It feels like common knowledge if you work with sustainability, to know some general facts about which countries have the most citizens and emits the most greenhouse gasses and such.”* – Student E

There was also a feeling of being able to practice negotiating and collaboration, or simply but, coming to an agreement. *“I think I have developed competences in negotiation.”* – Student A. It was also mentioned that agreeing was something that was difficult, but worthwhile. *“It was difficult agreeing with each other, we were different in how we justified why, but in the end, we could find a way to agree. I think it gave me experiences in negotiating and coming to an agreement.”* – Student B. *“I always have trouble expressing my opinion and, in this exercise, you have to do this a lot and you have explain to everyone what and how you are thinking, it is not always that easy. I learned a lot doing that.”* – Student F

The teachers involved did not only perceive student learning but also that they themselves learned from the experience. *“It was also a personal experience in teaching.”* – Teacher A *“I think, that we managed to show that there is an interest from different teachers and that we managed with a first attempt in a good way to create an interest among teachers.”* – Teacher C.

5.3. Theme 3 – Making the world a smaller place

Another theme that emerged, much related to the first theme as it was contributed to the feeling of motivation, was that the interaction with students from over the world, as Student A expressed it, *“Makes the world feel like a smaller place”*. Also expressed as: *“There is a great distance between us and we make ourselves closer in this kind of exercise. This was interesting because it was really different.”* – Student B (the second sentence, that it was different and interesting, refers to the whole answer of the general impression of the exercise.)

It was also mentioned that the exercise felt like *“it was for real”* and that this made it more exiting. *“It's like a real exercise because we worked with real statistics, a real problem and real people. [...] This makes the exercise exciting.”* – Student D. Other similar perceptions were also stated, Student A mentioned that you have to work on an international scale when it comes to policy instruments sooner or later and that she would rather do it sooner. The teachers were of a similar opinion *“It made the exercise more real [to have it globally] enabling the students to reason in other ways.”* – Teacher A. It seems to be a general opinion that exercises should mirror reality as much as possible.

5.4. Theme 4 – Technical tools

There was also a positive view on how technology was being used to facilitate learning, especially from the teachers. *“The platform was very useful as well, it seemed user friendly and I think that it was great and one of the strengths of the exercise. I think basing a master's programme around this model of teaching is a very good idea.”* – Teacher B. It was also mentioned that there could have been some technical problems without the assistance that was provided,

this is explored more in section 5.6. *Technical Problems*. “*The common technical tools were very useful, it was very helpful for us as teachers, but it would have been a bit more difficult without you here.*” – Teacher A. Where you refer to the researcher that provided technical assistance during the exercise. But the tools were also appreciated by the students. “*It was easy to give our responses on mentimeter, it made it easy to explain our own points of view.*” – Student A

5.5. Theme 5 – Problems with the collaborative work and discussion

Another theme for the collaborative exercise was that the collaboration did not always go smoothly. This is of course a major barrier for the learning activity, as is something that is of great importance for learning (Mezirow, 1990). Collaborative parts that did not always work was the discussion, but the barriers took different forms in different countries and different contexts. Here the Costa Rican results from the parts with discussion is presented first, followed by potential reasons for this as proposed by students and teachers, that the exercise was too difficult for some, that there was a language barrier and that some of the students were not prepared well enough. After this the experienced problems in Sweden are presented.

Already from direct observation it became clear that the collaborative work in groups, the discussion and negotiation did not follow the initial plan in Costa Rica. The conclusion from observing the first part of the exercise, which can be found in its entirety in Appendix E, was that: “*From the observation it is clear that the exercise did not follow the suggested guidelines of the collaborative exercise. Especially in that the students didn’t discuss the topic amongst themselves and that a large part of the exercise went to explaining the principles that the students should have understood and used before the exercise.*” This is something that reappears in the interviews as well “*I wanted more discussion in real time, I couldn’t totally understand the logic behind other principles. [...] There could have been more discussion and less professor guidance.*” – Student A. “*I really felt that we didn’t have an agreement, this was very frustrating to me. Because I saw the teacher doing the exercise again. And we were losing time. And I guess that the agreement would be more rich, if discussed between us. I would like to hear more of the others reasoning and then have the agreement.*” - Student B.

That the teacher was very involved in the discussion and agreeing part of the exercise was noted during the observation. “*The decision-part of the process seemed heavily influenced by the teacher. The teacher comes with questions to the students and delegates who answers.*” This is something that appeared during the group interview as well. Student D: “*And I felt like the final agreement was made by the teacher and not by us. But I would like to have experimented more with the agreement process than we had in the class.*” Student C: “*It was kind of a rush I think.*” Student D: “*Yes, I felt like we had to decide.*”

Interesting to note, in the proposed exercise procedure it was proposed that the students should “*Divide into equally sized small groups (2-5 students in each)*” accompanied by discussion guidelines, were the first suggestion were that the students should shortly present the principles they agreed with. But as Student D proposed “*We needed more time to discuss, maybe we could have discussed in pairs or have had small presentations for each other.*” In other words, the

student suggested the exact same thing as the guidelines for the exercise that was not carried out.

The potential reasons for some of the difficulty was presented as well. One of the potential reasons was that the exercise was too difficult for some of the students without enough background to carry out the exercise. The opinion that it was probably easier with a background in economics was also presented. *“The exercise was very new for me. It was like being a kid and don’t knowing what to do. In that sense there was a lot of background that I didn’t understand. You needed to know a lot of what you needed to do and how to justify it, especially in terms of the calculations in using the GDP.”* – Student C. Student D offering an explanation *“Well I understand that not all of us are economists, so maybe it could be difficult. But as for me it was not so difficult to do.”*

That the exercise was carried out differently than the proposed guidelines was something that the teachers mentioned. One explained it by that the students had problems with the language and that some of the exercise had to be different due to other factors *“We took the guidelines into consideration, it doesn’t mean we did it like that, the number of students here were lower for example, but we used some of it. [...] Some of the material was translated as well. [...] You should check the student’s English level beforehand.”* – Teacher A. Teacher B also named the English level during the interview, but the teacher also mentioned the change outside the official interview. Shortly after the first part of the exercise was completed it was mentioned in private that one of the students had not understood the concepts, and that it was the reason for the added teacher involvement. Why this was not mentioned in the recorded interview can only be speculated about. One student also had a similar suggestion for the reason there were so little discussion *“One person had a problem understanding the exercise. That could have been the reason [for there being so much teacher guidance]”* – Student A.

There were some suggestions for how to make it easier to carry out, especially more information on the principles behind the exercise but also some more information about the different regions and countries. *“I liked the videos, but for the exercise it was not so useful.”* – Student A. *“I think that the video could explain more about the different principles. For that reason, the video was not enough of what you had to do in the exercise. [...] I didn’t really understand how to use the principles.”* – Student C. Also, the suggestion of putting the different regions of the world into “context”. It should be noted that some basic data (the population, their emissions) about the regions were presented in a table on the learning platform and there was also a file from the World Bank with even more information about the different regions. *“I think you have to include the context of the country to know the reality of the country, for example if they are doing something to reduce their emissions.”* – Student D.

In Sweden there were also some experienced problems with the discussion and collaboration, even though of other nature as the exercise followed the guidelines in there. One experience was that there was difficult to understand if the exercise was supposed to be realistic or fair and that made the discussion come to a halt. *“The exercise came to an early halt. Everyone was basically agreeing the per capita was the fairest, but some said that that wasn’t realistic. It was unclear what should be discussed. [...] Should the answer be fair or realistic?”* – Student E. There was also a wish for even more discussion. *“There was a lot of calculation and too little*

discussion. [...] I think it would be better if we discussed more and were in contact for longer [with students from other countries].” – Student F. Student F also wished for even more contact and discussion with other countries.

Overall some problems with the collaborative part, although different in nature in the different sites. In Costa Rica there were too little discussion, the teacher took much of the time instead. The suggested reasons for this was that one student did not know enough to participate and language barriers made the students not being able to participate in all of the material. Also, some suggestions to fix this, all from including more information beforehand to having subtitles to the videos.

5.6. Theme 6 – Technical problems

New technology could facilitate learning but it has to be used correctly, some of the technical tools were not used as intended. For example, *Mentimeter*, an online interactive presentation software, where students can answer questions and their answers are displayed in real time on a projector. This is a tool that can facilitate discussion by students and makes it easier for quieter students to make their voices heard. But as was observed and noted during the second part of the exercise *“Noteworthy is that the comments from the students are not displayed on the projector, instead Mentimeter is used as a sort of self-reflecting tool.”* This is a typical example where the technology is not used as intended by the designer of the exercise that recommended the tool to facilitate discussion.

The teachers in Costa Rica emphasised that the technological possibilities are different in developing countries, as the internet connection at the university was not always working. *“It’s good to emphasise that not everyone has the same technical standards. Maybe you reason that everyone will have internet-connection, we solved this issue twenty years ago, but it’s not true.”* – Teacher B. But the teachers also pointed out that this is a minor detail, both in the sense that there was helping to get, both from student but also their colleagues in other countries. *“There was very quick response on questions on the exercise was good.”* and *“The problems were just details. It was a well-prepared exercise and it will be easier next year. The good parts will be enhanced.”* – Teacher B

5.7. Theme 7 – Generalisations

This is a difficult topic, but something that was noticed during the interviews and emerged from the analysis was how prejudices and stereotypes played a role in the student’s analysis of the different answers. Mezirow, 1990, writes on social constructivism that stereotypes are often unintentionally learned from cultural assimilation and that such sociocultural concepts can be an important part of taking new perspectives for critical reflection, something that is crucial for learning. However, the following are statements from students after the exercise was completed, and some draw some broad conclusions from a rather small sample of student’s answers.

When asking about how the respondent interpreted the results from the exercise by asking what they found surprising and not surprising from the other countries answers, some had some rather broad conclusions from the other countries answers. *“India and China, they are a bit competitive, so they don’t give much to each other. And Costa Rica doesn’t really like USA.”* – Student

F. *“Because we are students under an ethical principle of sustainability, but they [the Chinese students] are working on the principle of the market and that makes different results with the same information. [...] Our ethical systems are totally different.”* – Student A. As Student E pointed out, it was easy to confuse stereotypes and reasoning of another country with what a group of students from that country had answered: *“It almost feels like we got the task of estimating what India think as a people and then we compared that to a small classroom. We thought of the whole country and only saw a few numbers, it’s important not to confuse those two concepts.”*

5.8. Theme 8 – Practical problems

Some students felt that some more practical parts of the exercise could be improved. Things that were mentioned shortly, often by a single student. Those opinions are presented here.

To make the exercise easier to conduct both students and teachers suggested an introduction to the exercise to make it easier for the students to understand what was expected of them. *“I think that a bit more detailed information could have helped, it was a bit difficult to understand [what they were supposed to do] in the beginning.”* – Student B. *“There should probably be some practice or simulation of the exercise beforehand.”* – Teacher A.

Similar was the opinion that the instructions for the exercise could have been clearer. *“I don’t think we had enough information [from the instructions], especially about how to use the different principles and their consequences”* – Student C.

Student D expressed that the language was difficult, when asked about the disadvantages of having the exercise globally the answer was *“Only the language. Maybe the videos for example, for another course there could be subtitles for the videos.”*. The Costa Rican teachers also mentioned that some students had problems with language *“In general, they understood the questions and that we had the discussions in Spanish, it’s just the writing part.”* – Teacher A.

Some of the questions were difficult to reason about. *“The questions about how sure you were about your guesses, that question didn’t make sense to me, I don’t know if it’s 30% or 70%.”* – Student D. Further the student added: *“Also, I think it’s problematic to include Africa and Russia in the same region as they are very different.”*

In conclusion, these concerns could perhaps be considered and improved upon for the next edition of the collaborative exercise, for example subtitles and somewhat more thorough instructions. But there could also be a point to be made that it should not be too easy either, for example a part of the exercise is to, on your own, explore the different principles provided and reflect on their consequences. And as Mezirow, 1990 points out *“most of what we learn is the result of our efforts to solve problems.”*. However, these suggestions are straight forward and will not be discussed in further detail in the discussion section.

5.9. Differences in the experienced differences between the sites

Breaking down the themes above, the similarities and differences between the countries can be summarized. Themes 1, 2 and 3 were both the same between the universities, no major

differences in how the students expressed this. When it came to the fourth success factor, only the teachers and students of Costa Rica expressed themselves in positive terms, it was not mentioned by anyone in Sweden.

Perhaps the biggest difference between the universities was in how the exercise was carried out, which is mentioned in appendix E: *“From the observation it is clear that the exercise did not follow the suggested guidelines of the collaborative exercise. Especially in that the students didn’t discuss the topic amongst themselves and that a large part of the exercise went to explaining the principles that the students should have understood and used before the exercise.”*. This is evident in theme 5 where the students point out different barriers in each country. Costa Rica focused a lot on the difficulties in having a rewarding discussion because of teacher involvement and guidance and they wanted to discuss more. This while the students in Sweden focused more on other parts of the collaboration, such as how the exercise would be fair or realistic and what the decision-making process looked like, where there was instead a desire for more involvement from the teacher.

The differences in technical challenges varied between the seats. It seemed to be because the teachers in Costa Rica had not used the technical tools before but also such that the internet could not always be used.

The differences between the sites in the seventh and eighth themes are judged to be too small and unique for different students to find something relevant to point out about their possible differences and similarities.

6. DISCUSSION

In this section the results are discussed. It is divided into discussion of themes, discussion of research methodology and limitations and discussion of future development of the exercise.

6.1. Discussion of themes

In summary, the main result of the study is that the exercise was, in general, appreciated by both students and teachers in both Sweden and Costa Rica. It was perceived as fun and motivating, created the feeling of making the world a smaller place, the technical tools enhanced learning and the students perceived learning. But, there was also development potential in the areas of the collaborative work, utilizing the technical tools and some generalisations from the student may need to be addressed. It follows the same structure as the result, starting with the three themes of the success factors followed by the barriers.

Firstly, one of the central themes, that the exercise was perceived as fun, motivating, interesting or something thereof, is something that is a clear success factor for the exercise. This because, among other things, motivated people don't just work more productively, they perform better on problem-solving tasks than non-motivated (Pink, 2009).

The experienced factors made the students feel motivated that was mentioned were that the exercise was unique, that it felt like it was for real, that it was fun collaborating and that it was fun negotiating.

The feeling that the exercise was “for real” and that it was a good thing that it was similar to reality is something that could have contributed to a feeling of purpose. That there really was someone on the other side and “not just on paper”. These are a part of what can make something more motivating according to Pink, 2009, as purpose is one of the three major factors for motivation. The other two factors, mastery and autonomy could arguably have been fulfilled as well. Mastery as there is not really any limitations to what you could learn, both in the field of environmental policy as there are countless factors that could be taken into account nor to the skill of collaborating and negotiating. Autonomy is something that was rather enabled as well, and there were criticisms when autonomous parts, such as discussion and taking decisions by the students themselves, were infringed upon. Rather enabled meaning that, speculatively, many educational processes rules what should be learned and how it will be tested. This in contrast to this exercise with many active learning activities and a focus on presenting arguments and perspectives rather than facts or having to come up with a correct answer. In conclusion the feeling of motivation that the students expressed fits into the theory from Pink, 2009. To further improve the motivation from the students the exercise could perhaps be even more similar to reality. What this could be is difficult to say, but from the students there was suggested in theme 8 – practical problems that there could be more of an introduction of the different background of the different countries and regions. Or perhaps there could have been more negotiating between countries as one student mentioned, this as negotiating was seen as something fun and motivating in itself and to add to the realism of the exercise.

That it was fun negotiating and collaborating is also related to learning, not only motivation, as negotiation and discussion is an important part of learning (Mezirow, 1990). This is a success factor in two ways in other words.

As student E mentioned when interviewed, that the exercise was fun and felt motivational made the student like the exercise and also wanted it to be successful. But the feeling of motivation is of course not the only important thing, you have to learn useful material as well. This is after all, the core of education. Even though the student perceived learning there is the possibility that just by liking the exercise a feeling of wanting the learning to be of importance could arise. Something that could influence the result. Speculatively, there could be of importance of the future development of the exercise and the capacity building program that the learning was measured quantitatively, but here lies the problem of the difficult task of measuring how students developed skills such as discussion and gaining new perspectives.

This is followed by the consequence that the pedagogical format, flipped classroom, was not used optimally. The format is supposed to enhance active student learning by moving some of the classic lecture type of learning taking place before the lecture and enabling more active learning activities, such as discussion (Adawi & Stöhr, 2018). By making the students take part of the material beforehand, and then also taking up a large part of the lecture repeating the same material, a lot of time is used sub-optimally. The teacher defended this by saying that some of the students did not know enough beforehand and did not understand the concepts. But this is of course problematic as this takes up a lot of time from the students that had prepared. One solution could be to simply let the students that did not take part of the material learn from the other students, or perhaps let the students that did prepare discuss among themselves and having a private lecture with the students that did not.

It should be noted that this was a reoccurring theme, during the other seven lectures observed, the students did not discuss much among themselves, even though they still were encouraged to ask the teacher questions about the videos.

6.2. Discussion of the contributions of this study

The fact that the students experience this exercise as fun and motivating does not mean that it is possible to say something about other global collaboration exercises - unless they are very similar - but what can be said is that this particular exercise achieved the various parts needed to for making someone feeling motivated (autonomy, purpose, mastery (Pink, 2009)). Previous research has been done pointing out that learning in a global context can contribute to a feeling of relevance and purpose, thus enhancing motivation.

As previous research has shown, a global exercise could provide new perspectives (the foundation for learning in general) and making the world seem like a smaller place. Something previous research has shown as well. Although this study did not focus on this in more detail, the learning tools turned out to be appreciated (although there were some technical difficulties with some parts). There is much previous research on this but there is nothing that this study delves into.

As previously mentioned, there are often unforeseen problems and this collaboration exercise is no exception. There are many unforeseen variables that make big differences between what is planned and what happens. For example, the teachers in both countries took the study of very different roles in when the students discussed and in some cases the students could make broad generalizations.

In summary, the uniqueness of this study is not necessarily new general discoveries of global collaborative learning - although the study may contribute to a clearer picture of the area and strengthen previous research. Rather, this study highlights unique challenges and successes for a first variant of a specific global emissions rights exercise. Something that hopefully can be used and built upon for future variants of this exercise and similar exercises that can expand based on it.

6.3. Discussion of research methodology and limitations

My role and involvement in the exercise may have influenced the exercise. Perhaps my presence at the exercises in Costa Rica and the knowledge that I was researching the exercise could have influenced the student's results and attitude towards it. This is a well-known effect in both teaching and organizational theory. For example, the Hawthorne experiments showed that people that are being observed increase their productivity as they feel noticed (also known as the observer effect) (McCarney, et al., 2007).

Eventually, the respondent's knowledge of that they would be interviewed after the exercise might make them feel more motivated. Thus, it could be one possible reason behind the students responding that they felt more motivated during the exercise. This as either a direct consequence of the observation, in other words that they felt that their performance was of importance for the observer. Alternatively, as an indirect consequence, the students were more productive because of the observer effect and that led to increased understanding and mastery of the exercise, which is perceived as motivating (Pink, 2009).

Another possible problem with my presence at the lectures might be that I helped with for example technology and helped both the students and the teachers at the site to navigate the learning platform. It could have seemed that I was associated with the exercise to an extent that I had been involved in creating the exercise. Or at least was part of an organization that had developed the exercise. It could, possibly, in turn have created a feeling that criticism of the exercise is criticism of "my work" in some way, leading to a more positive response during the interviews.

However, this bias from the students should not have affected the students in Sweden to the same extent (or at all). Although there was information on the common learning platform that a student would write a masters thesis about the exercise, there was no information that there would be interviews and the exercise was not observed in Sweden.

It should be added, that in Sweden, all ten of the participants of the exercise were asked for an interview. Of those asked, three answered and two of them were interviewed. This is nothing strange, the response rate is lower via email than being asked personally (Esaiasson, et al., 2017), and part of this was also the fact that the email in question was sent several weeks after

the second part of the exercise was completed. At a time when several students already had started other courses. One consequence of this might be that those with strongest opinions feel more motivated to respond. This would probably not apply in Costa Rica in the same way when four out of five participants were interviewed.

7. CONCLUSION

This chapter presents the conclusion of the study.

The aim of the study was to find the success factors and barriers for the active learning activities for the glocal collaborative course through a qualitative method. On the basis of two group interviews, six student interviews and three teacher interviews followed analysis found eight different themes, four success factors and four barriers.

The success factors were that exercise seems to have fulfilled its main goal, making the students change their perspectives, but both the students and teachers also perceived other forms of learning. The students specified that they had practiced negotiation and collaboration and they could mention new arguments and perspectives they perceived as reasonable from other countries. There was also a feeling that the exercise was fun and motivating, something that is crucial to learning and that it “made the world a smaller place”. The technical tools were also mentioned as enabling learning, both the learning platform and the videos and information provided there, and the technical tools used in the classroom.

The barriers were some problems with the collaborative work, here the main difference between the two countries that participated was found. In Costa Rica there were much teacher involvement in the discussion part while in Swede other factors hindered the discussion to some extent. There were also some practical problems and some technical problems, for example the software was not always used as intended. There were also some broad generalisations from some students, something that potentially could be an interesting learning experience by itself if addressed and discussed appropriately.

All in all, there seems to be a solid foundation to expand upon the course and there was also a wish from the students that the interaction between countries would expand. In other words, to expand the exercise or having similar ones seems to be something that could enable learning. But the barriers should also be addressed during the next run of the exercise.

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APPENDIXES

A list of material and data used in the study.

Appendix A – Group interview template

Questions of the character "Can you give an example?" or "Could you elaborate?" are not printed in the template. "-" indicates that it is a follow-up question. Between questions the answers are summarized by the interviewer for confirmation. More about how the template has been developed can be found in the method section.

Thank you so much for agreeing to this interview! As you may know, I am writing my master's thesis about the collaborative project in the course environmental policy instruments. The goal with this study is to map what the success factors and barriers for this collaborative exercise were. Your opinions are of great value for this.

The interview will be anonymous to the extent that it is possible. In other words, I will not write your name in the report, I will only write that this was said by a student who took the course at CATIE. If I would like to use a direct quote, I will send it to you first for approval.

If it's ok with you, I will record this interview, the file will be saved on an encrypted USB and will only be used by me. After this project is over I will delete the file.

Warm up

How did you reason during this exercise?

How did you come up with an answer?

What are your general thoughts about the exercise?

Expectations

What are your expectations for the second exercise?

- How do you think the students from other countries will reason? (Sweden, Kenya, China, India and Colombia)

Ending

These were my questions, is there something any of you would like to add?

Thank you again for agreeing to this interview, I'll tell you if there are any quote I would like to use in my report. If you would be interested in the final results of this study I would be happy to send you the end report (in May). Would it be ok to contact you again if I have more questions?

Appendix B – Interview template for semi-structured interviews with students

Questions of the character "Can you give an example?" or "Could you elaborate?" are not printed in the template. "-" indicates that it is a follow-up question. Questions of "why-character" are avoided to avoid a feeling of interrogation. Between questions the answers are summarized by the interviewer for confirmation. More about how the template has been developed can be found in the method section.

Thank you so much for agreeing to this interview! As you may know, I am writing my master's thesis about the collaborative project in the course environmental policy instruments. The goal with this study is to map what the success factors and barriers for this collaborative exercise were. And, what the perceived benefits and barriers where for the collaborative learning activities. Your opinions are of great value for this.

The interview will be anonymous to the extent that it is possible. In other words, I will not write your name in the report, I will only write that this was said by a student who took the course at CATIE.

If it's ok with you, I will record this interview, the file will be saved on an encrypted USB and will only be used by me. After this project is over I will delete the file.

Warm up

What programme are you taking?

How come you are taking this course?

What have you studied before this course?

Personal experience

Could you describe your summarized impression of the collaborative exercise?

How did you come up with your own answers in the first exercise? What reasoning did you use?

- How did you do to agree with each other in the group?

[If similar negative response as during the group interview] - What do think could be done to improve the agreement process?

What did you think about the instructions before the exercise? [If they thought the instructions to be unclear] What do you think could be done to improve this?

How did you reason in the second exercise? How did you reason when you tried to reason like someone from another country?

How was the result in contrast to your expectations?

- Was there anything that surprised you?
- What worked better in general during the exercise? What was easy?
- What worked worse in general during exercise? What was difficult?

Gained experiences

What have you learned from the global collaborative exercise? What skills do you feel that you have been able to practice?

- Is there anything you think that you would be better at doing now after the exercise than before?

Now I will ask you about which arguments you found reasonable and not reasonable from other countries. Let's start with the arguments you found reasonable, except those that you agreed with since before?

- Were there any arguments from other countries that you did not find reasonable?

More general

Now I will ask you about what you think might be the benefits and disadvantages with having the exercise globally instead of locally. What did you think are the benefits?

- What do you think are the disadvantages?

Do you think that having the exercise in collaboration with other countries have had any effect on your motivation? If yes, in what way?

What do you think should be changed next year, if anything, to improve the collaborative exercise?

Ending

These were my questions, is there something you would like to add?

Thank you again for agreeing to this interview! If you would be interested in the final results of this study I would be happy to send you the end report (in June). Would it be ok to contact you again if I have more questions?

Appendix C – List of material brought to the semi structured interviews with students

- Course syllabus. Used to early on to remind the interviewee that the interview is about the collaborative project, not the entire course.
- The student's answer for the first exercise. Used to remind the interviewee of their results for the question "*How did you come up with your own answers in the first exercise? What reasoning did you use?*"
- The group answer for the first exercise. Used to remind the interviewee of what the results when they agreed in the group for the question "*How did you do to agree with each other in the group?*"
- The total results from all the countries on how to relocate emissions. Used to remind the interviewee of the other countries results for the question "*How was the result in contrast to your expectations?*"

Appendix D – Interview template for the interviews with teachers

Questions of the character "Can you give an example?" or "Could you elaborate?" are not printed in the template. "-" indicates that it is a follow-up question. Questions of "why-character" are avoided to avoid a feeling of interrogation. Between questions the answers are summarized by the interviewer for confirmation. More about how the template has been developed can be found in the method section.

Thank you so much for agreeing to this interview! As you may know, I am writing my master's thesis about the collaborative project in the course environmental policy instruments. The goal with this study is to map what the success factors and barriers for this collaborative exercise were. And, what the perceived benefits and barriers were for the collaborative learning activities. Your opinions are of great value for this.

The interview will be anonymous to the extent that it is possible. In other words, I will not write your name in the report, I will only write that this was said by a teacher involved in the course at CATIE.

If it's ok with you, I will record this interview, the file will be saved on an encrypted USB and will only be used by me. After this project is over I will delete the file.

Warm up

For how long have you been teaching?

Personal experience

Could you describe your summarized impression of the collaborative exercise?

- What worked better and what worked worse?

How did the collaboration between teachers in different countries work?

How was it to get guidelines on how the exercise could be carried out?

- To what extent did you follow the guidelines?

What did you think about using the common technical tools? For example, Mentimeter, edX and the common excel sheets?

More general

Now I will ask you about what you think might be the benefits and disadvantages with having the exercise globally instead of locally. What did you think are the benefits?

- What do you think are the disadvantages?

- [Anything else that you feel that the students have been able to practice?] What do you feel that the students have been able to practice?

What do you think should be changed next year, if anything, to improve the collaborative exercise?

Ending

These were my questions, is there something you would like to add?

Thank you again for agreeing to this interview! If you would be interested in the final results of this study I would be happy to send you the end report (in June). Would it be ok to contact you again if I have more questions?

Appendix E – Observations

Observations of the execution of the collaborative exercise in Costa Rica. The data below is notes taken during or immediately after the different parts of the exercise was conducted and is the basis for the observation data presented in the results.

Part one of the exercise – coming to an agreement

Even without understanding the language, a few observations could be made from the first part of the exercise. The focus of the observations was on group dynamics and general observation of how the lecture was carried out. The lecture session took about two and a half hours and was without pauses.

- The exercise took far longer than planned, two and a half hours instead of one.
- The exercise started with the students presenting their answers and motivation behind the answers. There was practically no discussion between students, instead the students seemed more focused on motivating their answers to the teacher.
- One student didn't seem to have come prepared, in other words, didn't have an answer with her.
- A large part of the exercise, about forty minutes, was spent on what seemed to be an explanation about the three different methods that the students should have read about in preparation. This included calculating the global emissions for the different methods in an excel-sheet.
- The decision-part of the process seemed heavily influenced by the teacher. The teacher comes with questions to the students and delegates who answers.
- During the exercise the alertness seemed to vary between the students, some of them seemed distracted for longer periods.

In conclusion, from the observation it is clear that the exercise did not follow the suggested guidelines of the collaborative exercise. Especially in that the students didn't discuss the topic amongst themselves and that a large part of the exercise went to explaining the principles that the students should have understood and used before the exercise.

The second part of the exercise – shifting perspectives

The second part of the collaborative exercise was divided into two lectures, both an hour long. By sitting in the back of the classroom I could observe the students and what they did on their computers, this exercise also differed somewhat from the original plan.

- After a short recap the teacher translated the questions for the students to Spanish.
- Some of the students seem quite distracted from the task, especially when they are done with the exercise.
- Instead of using the results from menti on the projector one question at a time the students answer all the questions for how they think the other countries answered. This is done in under 15 minutes, still faster for some.
- The other half of the hour-long lecture is used for checking the results and the student seem to motivate their reasoning for the other students.

Once again, the lecture did not follow the proposed plan.

The other half of the second part of the exercise

The last part of the exercise, at least that took place in Costa Rica.

- Here the teacher made a PowerPoint-presentation with the answers from the other countries on the emission-relocation in comparison with what the students of Costa Rica thought how the other countries would reason. This is followed by what the other countries thought how the Costa Rican students would answer. The results are commented on by both the students and the two teachers.
- After about 25 minutes the students start answering the questions on menti. Noteworthy is that the comments from the students are not displayed on the projector, instead menti is used as a sort of self-reflecting tool.

The last part of the exercise didn't follow the guidelines very well either, especially that the menti wasn't used at all as intended!