

# DIDACTICAL DILEMMAS WHILE TEACHING CONTROVERSIAL SOCIO-SCIENTIFIC ISSUES – AN INTERNATIONAL COMPARISON

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*This study followed groups of teachers within an Erasmus+-partnership, in which the teachers conducted an intended reflexive and interdisciplinary teaching about complex and controversial issues, including socio-scientific issues. Five schools, with students aged 12-16 years, in five different countries (Croatia, Poland, Italy, Sweden and Turkey) were involved. The overall research design was inspired by research models where researchers and practitioners cooperate and share responsibility. Iterative systematic investigations have been done, when teachers with support of a teaching model created interdisciplinary arenas in their respective context. Through focus groups and participant observation, the study aims to explore potential tensions that emerge during the enactment of the interdisciplinary teaching. Preliminary results show a variety of emerging tensions that might cause didactical dilemmas. The tensions are anchored both at macro level, concerning different types of curriculum goals and related to politics and religion, as well as those at the classroom level and at levels in between.*

**Keywords:** socio-scientific issues, interdisciplinary teaching, environmental education, education for sustainability, teacher professional development

## INTRODUCTION

This paper was presented in the symposium “The challenge of teachers to teach complex socio-scientific issues in science class” at the ESERA conference 2017 in Dublin. The symposium consisted of four papers from four different countries, this one from Sweden (Rydberg, Olander & Sjöström, 2017) and the other three from Denmark (Tidemand & Nielsen, 2017), Germany (Eilks & Affeldt, 2017) and Israel (Mamlok-Naaman & Hofstein, 2017). It was chaired by one of us (Sjöström) and professor Mehmet Fatih Tasar from Turkey was discussant.

The symposium both pointed at the challenges for the teachers, as well as showed that there are challenges for science education research and for teacher education regarding these issues. There is clearly a need for further research and development to better understand the challenges as well as to develop practices in pre- and in-service teacher education of how to overcome the challenges.

The main emphasis of science education in compulsory school is to educate all students to become scientifically literate and critical citizens (Stuckey, Hofstein, Mamlok-Naaman & Eilks, 2013) and modern science education should therefore be structured to contribute to general educational skills and to take the future citizen into account, not only the future specialist (Sjöström & Eilks, 2018). The use of complex and controversial socio-scientific

issues (SSIs), which are societal issues that are authentic, relevant, open and debatable, in the classroom is a promising way to do this (Sjöström, Frerichs, Zuin & Eilks, 2017). . Teaching with SSIs are however not only challenging for the students, they also present challenges for the teachers.

## **DIDACTICAL DILEMMAS IN INTERDISCIPLINARY TEACHING**

In this study, we have followed groups of teachers who conducted an intended reflexive and interdisciplinary teaching about complex and controversial issues in line with Sjöström's and Eilks's (2018) *Vision III* for an eco-reflexive science education (Sjöström, Eilks & Zuin, 2016). Such teaching is *Bildung*-oriented and holistic, and ethical and political aspects of science are foregrounded (Sjöström et al., 2017). An important objective is to give all students the opportunity to develop as independent political subjects, by giving them chances to both challenge the existing views in society, examine their own stance on societal issues, as well as to enable them to take their own position (Hasslöf & Malmberg, 2015).

This study has followed groups of teachers from five schools, with students aged 12-16 years, in five different countries (Croatia, Poland, Italy, Sweden and Turkey). The schools participated in an Erasmus+-partnership with the objective to test and implement an interdisciplinary teaching about complex and controversial issues, including socio-scientific issues. The sociodilemmas (complex SSIs) the schools worked with in the study contained content from several different school subjects. This kind of teaching ought to have an important role in both natural and social sciences classrooms, as well as in technology and sustainability education (Crick, 1998; Zeidler & Keefer, 2003; Englund, Öhman, & Östman, 2008; Keirl, 2012).

This study is thus inspired by research from different fields of educational research with the ambition to induce interdisciplinary teaching about controversial issues on a structural and socio-political level at the involved schools. The development of students' abilities for critical thinking and decision making were highlighted as well as oral discussions between students. The teaching was furthermore also supposed to create room for the students to form their own opinions about the issues. In this study, the teaching in line with these intentions were labelled "reflexive teaching".

The study aims to explore potential tensions that emerge during the enactment of the interdisciplinary teaching when the schools implemented the kind of teaching mentioned above. Through focus groups and participant observation in all participating countries, we ask firstly, which tensions are discernible across the different classrooms? Secondly, we make a reduction of the data and focus the Swedish teachers in the light of the international pattern. We ask "which tensions are most salient for the Swedish teachers"? These two questions are theoretically elevated and clustered in the discussion to "which didactical dilemmas may emerge during interdisciplinary teaching". In this paper, we will primarily focus on the first question.

## **THEORETICAL FRAMEWORK**

The international setting of this study opens opportunities for cross-cultural comparisons and analyses that could generate knowledge about teaching, teaching content, learning and socialization. Almqvist (2014) describes that teachers constantly must make judgment about which educational content to include and which methods should be used. These decisions are generally based on previous experiences. Almqvist states that it is vital for teachers to occasionally visualize and problematize what has been taken for granted in the teaching. This is the basis of “comparative didactics”, which is about making the taken for granted visible and critically reflected on, and thus acquires knowledge for teaching and learning.

Comparative didactics can be about comparing teaching within the same subjects or between different subjects as well as studying similarities and differences in teaching in different socio-cultural contexts. This can lead to more precise descriptions of the teaching and thus generate new knowledge (Almqvist, 2015). Analysis is often done in two steps, where a first step is about describing teachers’ actions in a teaching practice (Almqvist, 2008; 2014). In a second step, this description is compared with alternative descriptions followed by a critical discussion about the relation between the taken for granted didactical choices and alternative didactical choices.

This study originally presupposed an activity theory perspective on the collective and complex activity systems of the schools to examine how participants’ actions and operations are influenced and affected by both internal and external factors (Leontiev, 1978; Engeström, 1987). Different didactical contradictions and dilemmas that occur in the complexity of everyday teaching may be viewed as obstacles for successful teaching and learning, but by identifying such dilemmas and then discussing them among the teachers, this may instead be a starting point for a permanent transformation and a spark for school and professional development (Sannino & Nocon, 2008).

To gain a deeper understanding of teachers' challenges and dilemmas, the study assumed a complementary theoretical perspective by considering this form of teaching as a “dilemmatic space” (Fransson & Grannäs, 2013) in which the dilemmas are ever-present. The dilemmas are the result of social constructions, but the dilemmatic space is constantly in a dynamic process, where everyday positions and negotiations both redefine the dilemmas and the actors. Fransson and Grannäs described that teachers in their daily work often end up in dilemma situations. The teacher must deal with formal laws and regulations as well as more informal work routines. Furthermore, the teacher must balance different purposes of teaching towards each other, focusing on the three different functions that the education should meet: qualification, socialization and subjectification (Biesta, 2009). All this should be done at the same time and the teacher must deal with a variety of social relationships and contexts with different norms, values and expectations. This is also done in a complex and changing activity where decisions need to be taken quickly in the dynamic interactions of the classroom.

Dilemmas are sometimes regarded as individual and disconnected situations, but Fransson and Grannäs (2013) argue that dilemmas constantly are present in our lives because of the social constructions created by everyday positions and negotiations. Fransson and Grannäs

use the theoretical perspective dilemmatic space (Honig, 1994) to describe this in an educational setting. Honig describes a dilemmatic space as a complex, moving and mutable system with different actors and different positions. Honig states that we should consider dilemmas as if they are always present in our life where one position oneself, and are being positioned, in various dilemmas. These positions then create peoples' identity and action space.

## RESEARCH METHODS

The study followed five European lower secondary schools working together over a two-year period within an EU-funded Erasmus+-partnership. With the help of a teaching model, they designed their own teaching set up based on their own school context. To support the teachers, the model did not just include student tasks; it also included a theoretical framework on how the teachers could implement an inquiry-based approach of this intended reflexive and interdisciplinary teaching (Rydberg, 2015). This framework was based on methodological models from Bybee et al. (2006) and Presley et al. (2013). Inspiration and ideas concerning teaching about controversial and socio-scientific issues were also provided from e.g. Ekborg, Ideland and Malmberg (2009), Zeidler and Kahn (2014) and Eilks (2015).

Teachers and students worked on different controversial issues containing both scientific, technical and social science content, as well as socio-political and ethical aspects. The student tasks were inspired by the Storyline method (Bell, 2008) in which the students were placed in a scenario where they landed on an imaginary, and newly colonized, planet named PromethEUs. On this imaginary planet, students should together create a new society, which meant that the issues were mainly at a structural level. A companion meaning (Roberts & Östman, 1998) of the teaching was that students would gain insight into the fact that political decisions on complex issues like these – with both scientific, social, economic, political and ethical aspects – is not about "right or wrong". Rather, it's about weighing the advantages against the disadvantages and in this process, try to make reasonable and acceptable decisions.

The issues were deliberately chosen to be complex and controversial. They are sociodilemmas where no definite answer exist; instead all possible solutions have both positive and negative consequences. The design of the student task strove to develop students' critical thinking abilities, which obviously are prerequisite abilities in order to be able to independently make decisions and express ethical and political standpoints. Students would also be given opportunities to take their own position in the issues and do it in a European context. The students would base their position on knowledge of human rights and fundamental democratic values, on their personal experience as well as on acquired factual knowledge regarding the issue.

The work at the schools was done in three cycles, where each of these ended with a transnational meeting with both teachers and students. In conjunction with these, data collection was done, primarily using focus group interviews. Furthermore, during a third cycle, when the schools were working on issues related to the use of robotics and

biotechnology in the future, participant observations were carried out. This study applied a flexible research design and it was during the process of the research that the research questions emerged.

First, the didactical dilemmas which participants at the five schools experienced in the work with the intended reflexive teaching were studied. Focus group interviews were transcribed using the computer program f4transkript (Edu-Version v5.70.2) and the different tensions the teachers experienced were put in themes. After analyzing the data from the first cycle results was brought back to the focus group discussions in the following cycle. With this data, the preliminary themes and categories of tensions were refined. Four themes and eighteen tensions that could create didactical dilemmas emerged from the thematic analysis after the third and last cycle. The teachers' descriptions created basis for a comparative didactic analysis where what is "taken for granted" in the teaching was made visible when both researchers and teachers studied the similarities and differences of the teaching in the various cultural contexts.

## **PRELIMINARY RESULTS**

The study is still ongoing, but in the data from the international focus groups different didactical dilemmas have been identified, analyzed and grouped. The purpose of the study was at a first stage to investigate and identify the tensions teachers experienced when working with the intended reflexive teaching. In a second stage, the study aims to further explore teacher dilemmas that arise from these tensions, focusing on the dilemmas that were considered most relevant from a Swedish context. This paper will primarily focus on the first stage of the study while results from the second stage will be presented in forthcoming publications.

In the dilemmatic spaces of the intended reflexive teaching the teachers described different tensions. These tensions can cause concrete didactical dilemmas for the teachers as they plan, conduct and evaluate the teaching in the study. However, this study doesn't intend to describe all the tensions that may exist in this form of teaching. Instead a selection was made based on the empirical evidence.

In the data from the study 18 tensions were revealed which may cause didactical dilemmas for the teacher (see further below). It should be stressed that tensions and dilemmas in a dilemmatic space never are separated from the context. Depending on one's positioning in a didactical dilemma this will affect positions in other dilemmas. Furthermore, a didactical dilemma that from one perspective can be interpreted as a single dilemma, could in fact consists of several related dilemmas.

Below are the eighteen tensions listed. It is not easy to describe them clearly in just a single sentence and the naming should be seen more as an orientation of the tension and the character of the intrinsic didactical dilemma. A tension that causes a didactical dilemma in daily classroom teaching usually has links with other levels of education. To understand the different tensions better, and the didactical dilemmas, the eighteen were divided into the following four themes:

**Theme 1: Tensions linked to curriculum, national tests and assessment**

1. What primarily governs the planning of teaching – the social, democratic and character development goals or the overall educational goals.
2. The impact of national tests on the teaching - big or small.
3. Assessment of students during the theme day - collect evidence for future grading or not.
4. Room for teachers to choose methods and content on their own - large or limited.
5. Room to discuss controversial topics that not relate to the curriculum's core content - large or limited.

**Theme 2: Tensions linked to prevailing religious values and political views in society**

6. The influence of prevailing religious values in society on the teacher's choice of methods and content - significant or slight.
7. The influence of current political views in society on the teacher's choice of methods and content - significant or slight.

**Theme 3: Tensions linked to teachers' interdisciplinary cooperation**

8. Socio-economic challenges in relation to teachers' joint planning of new teaching methods - tangible or insignificant.
9. Potential staff meeting opportunities at school for teachers to co-plan their teaching - large or small.
10. Coordinated training of students' basic skills for a reflexive teaching between the school subjects - comprehensive or non-existent.
11. Opportunities to temporary change the regular school schedule in order to work thematically and interdisciplinary - large or limited.

**Theme 4: Tensions linked to the implementation of the teaching in the classroom**

12. The amount of time the teacher uses for self-studies of the subject matter from beyond the field of his or her domain-specific expertise - large or small.
13. The dominant work form for the discussions in the reflexive teaching – whole class or group discussions.
14. The prioritized method for pupils to retrieve relevant information regarding the current issue - through teacher mediation or through the students looking for it themselves.
15. Grouping of students for group discussions in reflexive teaching – ability grouping or homogeneous groups.
16. Adaptations for “silent” students in oral discussions in a reflexive teaching - adaptation for these or no adaptation.
17. Weather the teacher should express different viewpoint in the discussions - strong objectivity or weak objectivity.
18. Weather the teachers should express their own opinions and beliefs regarding the issue - strong neutrality or weak neutrality.

Not all the eighteen tensions will be covered below. Instead, a selection of the tensions will be discussed. These will be exemplified by didactical dilemmas that the different groups of teachers experienced that were caused by the tension.

**Tensions linked to curriculum, national tests and assessment**

The five first tensions had an emphasis on a macro level in terms of contradictions, primary between working toward the educational goals in the curriculum, or putting more emphasis on social, democratic and character development goals. This is also linked to tensions and didactical dilemmas concerning assessment, national tests and teacher autonomy. Ways that the national curricula should be interpreted, and the significance of national tests for the everyday teaching is also regulated at the school level, depending on the emphasis the school leadership puts on them. Curricula and other national control systems are in turn influenced by internationally formulated education policies and international knowledge surveys.

For example, the Polish teachers in the study felt steered towards teaching that focuses on the educational goals, mainly on facts. The teachers described that they have syllabi with a

comprehensive core content and national examinations that mostly test factual knowledge. Since they perceived that the individual teacher is accountable for poor student results, this creates limited space for teaching in line with reflexive teaching outside this project. They also expressed that it wasn't really feasible for them to address content that isn't explicit in the subject's syllabus.

All teacher groups experienced didactical dilemmas related to the national steering documents and assessment systems when they used the reflexive teaching methods. They all agreed that this kind of teaching offered knowledge that would be very valuable for the students in their future lives. Still, subject content, knowledge or abilities in this weren't always something that traditionally is stressed in either their curriculum or national tests, at least not the ways the teachers in the study interpret these.

The Swedish teachers expressed that they used to have more teacher autonomy, but during the last years they felt that their lesson planning was more and more affected by the national syllabuses and the national tests. A major difference between the Swedish teachers and the others regarding this matter was that while the teaching in the other schools had a more fact-based focus, the focus in the Swedish school was on developing students' abilities.

The Italian teachers described that they as teachers have a freedom to choose both teaching methods and content (even if the latter was contradicted by the school's principal). They meant that both their curriculum and their national examinations promoted teaching that not just are fact-based, but traditions and teachers' perceived autonomy slow down the rate of change. This teacher autonomy had as consequence that the teachers feel free to continue using more traditional and fact oriented teaching methods.

### **Tensions linked to prevailing religious values and political views in society**

Teachers also experienced didactical dilemmas that can be related to tensions due to the prevailing political forces in the country or to religious values in society. The teachers at the Italian school described that some staff members held strong religious values and these also existed in the local community. When a controversial issue included an aspect that was contradicting the Catholic values, this created tensions for some of the participating teachers. As for issues about abortion and homosexuality some single teachers choose not to discuss these in their classroom. However, the other participating teachers at the Italian school did not experience any influence from religion that would stop them from discussing subjects like these in their classroom.

The teachers at the Turkish school in the study described that both the prevailing political viewpoints in the country and the religious values of society create didactical dilemmas for the teachers. If any issue had aspects that are in contradiction to strong beliefs in society, the teachers often avoided to discuss these aspects. The teachers stated that if they addressed aspects of a controversial issue not included in the syllabus, it may cause problems for them as teachers. This could lead to parents reacting and proceeding with the matter to the school authorities. As for the Polish teachers, they didn't experience any didactical dilemmas due to influence of prevailing religious values, however they felt that the current dominating political views in their country affected them when they discussed some issues.

### **Tensions linked to teachers' interdisciplinary cooperation**

The teachers described also didactical dilemmas on intermediate levels, which among other things had to do with the teachers working interdisciplinary and how to organize this. These dilemmas were caused by more practical tensions concerning parts of the school's organization, for example regulation about working hours and scheduling. These aspects aren't easy for an individual school to influence and change on their own. However, these can create great resistance in a transformation process at the school since this requires joint actions. As for the prerequisite for cooperation and co-planning the Swedish school stood out. Here the teachers had a couple of staff meetings each week, they had work places at the school as well as public childcare for teachers with younger children. This allowed the teachers to plan and evaluate lessons at school and they had good conditions for joint development activities.

The teachers at other schools in the study didn't have the same possibilities. At the Turkish school, they had two shifts which meant that there wasn't any actual space for the teachers at school when the shift was over. The Turkish teachers described that it was a challenge to work with school development since teachers were forced to work with this to a large extent individually since the teachers' lesson planning wasn't done at school. Furthermore, the relatively young Turkish teachers who participated expressed that the lack of childcare meant that they had to prepare lessons at home at the same time as they were taking care of their children. They described that they and their spouse synchronized their working hours and combined work at home with caretaking of the children, while their spouse went to work.

In the same way as in Turkish schools, many Croatian schools have teaching shifts and thus short school days for students, with just short breaks. This means that there are basically no opportunities for the teacher to plan or meet colleagues during the school day. The time for planning was in the afternoon, since the school building was locked after lunch time and the teachers had to do the planning at home. The Croatian teachers described that a large part of the teachers at the school felt forced, for economic reasons, to have another job aside and the short school day made this possible. This obviously affects the potential time that teachers put on preparing lessons and developing the teaching. It was described that this dilemma led to the teachers sometimes regarding the job as a teacher's as "the second job". They of course understood that this meant that they put less time on planning and developing the teaching than they ought to.

### **Tensions linked to the implementation of the teaching in the classroom**

Dilemmas also arose in the classroom teaching. For example, whether the fact-finding primarily should be done by letting the students work individually using computers, or if the teacher would present relevant facts and information about the issues through more traditional methods. Other didactical dilemmas originated from tensions regarding whether the teacher should choose a whole class or group work approaches, as well as tensions related to the teacher's objectivity and neutrality.

The Swedish teachers had a taken-for-granted position that it should be students themselves who find the information needed in order to take a stand in an issue. In the study, the Swedish

students mainly discussed in small groups and during these discussions most of the time there were no teacher acting as discussion leader. Instead it was the students that handled the discussions themselves. Occasionally the Swedish teacher participated in the group's dissociation.

This differed from the teaching the other teacher groups conducted. Here, the teacher took a more active role and was primarily responsible for finding and highlighting the various aspects of the controversial issue. At these schools, the teacher mostly organized whole-class discussions about the issues, even if also group discussion was used. During the student-centered teaching at the Swedish school the main focus was on having the students develop their critical thinking abilities in practice. During the more teacher-centered teaching at the other schools it was the content of the issues that was put in the foreground. The teachers encountered a didactical dilemma regarding to what degree the student should be active in the information finding and discussions. A related dilemma for the teacher was how to balance learning of subject content and the development of general critical thinking abilities. The common conclusion of the teachers was that the Swedish students generally had better argumentation skills but often rather shallow knowledge about the content of the controversial issues.

During the discussions about the different controversial issues the Swedish teachers remained neutral and didn't reveal their own opinions. However, the teachers at the other involved schools didn't stay neutral in the same way as the Swedish teachers. Instead these teachers rather saw it as important to share their own opinions, at the same time as they pointed out that their opinion should be treated as one opinion among others. During the discussions with the students, the Swedish teachers often took the opposite view to the students. This opinion wasn't necessarily their personal opinion; instead it was a professional standpoint in order to challenge the students' reasoning and argumentation abilities. This approach was rarely used at the other schools during the study. Either the teachers stated his or hers view and stood by this or the teacher had a more objective and balanced role and presented a wide range of alternative views for the students.

Some of the didactical dilemma teachers described was regarded to be more relevant to focus from a Swedish point of view. In these dilemmas, the Swedish positioning were sometimes other than the positions of the rest of the teachers' groups in the study. The positions of the Swedish teachers in some dilemmas were strongly related to tensions about the curriculum's different goals, the influence of the national tests on the teaching and tensions around assessment. Some selected didactical dilemmas from a Swedish point of view will be examined deeper. This will be done using data from the in-depth focus group interview with the Swedish teachers, but also using empirical data from the Erasmus+-partnership. This aims to describe the essence of these didactical dilemmas, both in terms of underlying causes, as well as possible consequences, according to various positions in the dilemmatic space of this form of teaching.

## PRELIMINARY DISCUSSION

When it comes to carrying out an interdisciplinary and intended reflexive teaching with discussions about complex and controversial issues the teacher needs to move beyond the traditional teacher role. Engeström (2008) describes that the deep social structures of an activity system are found in three different parts. It is first the rules, regulations and traditions, secondly the community that have an interest in the teaching and finally the division of labor in the classroom and at the school. These parts give the educational system an inertia that creates tensions when the teaching practice is changed; as it was in this study.

In an altered form of teaching with a partly new motive, the teacher need to be aware that previously taken for granted and operationalized actions might not be valid anymore (Almqvist, 2014). The teachers have to renegotiate their positions in the various didactical dilemmas they constantly experience in their everyday teaching. This study aimed to highlight the dilemmatic space of this form of teaching and showed didactical dilemmas that arise.

The results from this study shows that this kind of teaching is complex and the teacher needs to take many different aspects in considerations. Biesta (2015) points out that the teacher's different forms of judgement are extremely important for good teaching. He says that the teacher first needs to identify what the purposes might be for the forthcoming lesson sequence, then identify possible conflicts between the purposes and finally prioritize between the purposes.

This study shows that to handle the didactical dilemmas in the dilemmatic space of an intended reflexive teaching, it is crucial for the teachers to relate to the main purposes of education as well as other purposes in school activities. Teachers need to analyse how the different purposes are related to the goal-oriented actions that they perform daily in the teaching practice (Biesta, 2015). This way, one can discover that different purposes may sometimes conflict each other and that the different performed actions in the classroom teaching, even if they are done with good intentions, may counteract each other.

This could be illustrated by the position that the Swedish teachers took regarding to what degree the teaching would be student-centered. When the students themselves were responsible for finding and evaluating information this created opportunity for the students to develop their critical thinking abilities in practice. This in turn was because these students had a lot of training about how to search for and evaluate information, how to reason and how to discuss. However, with this position there is a risk that the students only will obtain shallow knowledge about the content of the controversial issues since it is hard for students at this age to find relevant information on their own. If the teacher takes more responsibility for providing relevant information about different aspects of the issues, the chances for the students to get the full picture of the sociodilemma is greater. However, if the teacher takes *too much* responsibility the student may miss opportunities to develop his or her abilities to search for information about society from the media, the Internet and other sources.

What position the teacher should take in this specific didactical dilemma depends on the main purpose. If it is to develop critical thinking abilities in order to take well-informed

standpoints in the future, then it's wise to let the students practice the abilities and it's ok that the student misses some content related aspects. Is the main purpose with the issue instead that the students should get knowledge and insight about different aspects of the controversial issue the teacher needs to make sure that the content of the issue is foregrounded. If the main purpose is providing an opportunity for the student to take an own stance in a current sociodilemma, then both critical thinking abilities as well as knowledge about the content of the issue is important, as well as knowledge about other aspects concerning the issue. Then the teacher needs to balance the different purposes.

As a teacher, you position yourself in the didactical dilemmas according to prior experience, current rules and norms and the surrounding social context. This is creating the dilemmatic space where different norms, values, action, decisions and roles all stand in relation to each other (Fransson, 2012). As for some of the didactical dilemmas, the teacher has actual leeway to make judgement about different didactical choice. However, the teachers' possibility to take positions in a didactical dilemma could sometimes be limited by education policy and by the surrounding community.

Even if teaching about these issues is regarded as valuable for the students in their future lives, the subject content of the issues, as well as the abilities that are developed, are not always what is valued in grading and testing students. If a teacher feels that this type of teaching may risk students achieving a poorer result in a national test or equivalent, it becomes a didactical dilemma for the teacher. Even if the teacher agrees that a reflexive teaching about controversial issues is good for the students, he or she still needs to consider if it is worth the risk of lower scores at a traditional test. This especially if the teacher is held accountable for the results of the tests.

The results from this international study shows that prevailing religious values and dominating political views in the society could affect the teachers when working with controversial issues. Some teachers expressed that they avoided certain aspects to prevent conflicts with parents and local authorities. This highlight that some of these issues not only are challenging to deal with for the students in the classroom, but also could be challenging for the teacher in real life.

This study also points out that it requires time and discussions between teachers to transform teaching practices, especially if it is interdisciplinary teaching with controversial issues. In the frame of this EU-funded Erasmus+-projects the teachers had this, and all involved teacher teams succeeded with their reflexive teaching. Still, the teachers expressed that outside this project there is a lack of prerequisites for joint and long-term transformation processes of their practice. This is for example due to organizational factors as lack of joint teacher training and socio-economic factors that make it hard for the teachers to find time and places to co-plan and develop the teaching together with colleagues.

The reflexive teaching that was used in this study is a complex and challenging endeavour where you inevitably encounter didactical dilemmas were the teachers old teaching habits needs to be questioned. Sannino and Nocon (2008) explain that it may appear that the educational system has become "multiresistant", but by making challenges and didactical dilemmas visible and exploring solutions to these, transformation of the teaching could be

possible. Through reflection and discussion, the taken for granted can be visible and this increases the prerequisites for a successful transformation of the teaching.

## CONCLUDING REMARKS

A purpose of this study was also to contribute to pre- and in-service teacher training and the results will form a basis for a discussion tool. This tool aims to provide support for teachers to develop their shared teaching knowledge. It could contribute to the development of teachers' action competence and expand their repertoire of strategies for dealing with the didactical dilemmas that could occur in this form of teaching. The discussion tool aims to raise awareness about both possibilities and potential negative consequences with different positions in different didactical dilemmas. It will also support teachers to question what is taken for granted in their own practice.

This tool builds upon the discussion guide used during the concluding focus group interview with the Swedish teacher group. To provide a basis for the discussion a four-quadrant matrix was used to illustrate the positions of the different groups of teachers. During the focus group interview the Swedish teachers critically reflected on their own positions in the reflexive teaching by comparing their didactical choices to the positions and choices the other teacher groups made in the didactical dilemmas. During these discussions, the Swedish teachers could see both pros and cons with the different positions and they could then reflect on the underlying factors that makes a teacher taking one position or another. This discussion tool will be described in detail in forthcoming publications.

A theme of this ESERA symposium was to give insight into research that aim to understand the challenges teachers are facing when they teach complex SSIs. The results from this study shows that it is not just the SSIs that are complex and holds dilemmas; the teaching about these issues are itself complex and puts the teachers in didactical dilemmas. The symposium also aimed to exemplify how continuous professional development can be structured to help teachers coping with these challenges. This study contributes by developing a basis for a discussion tool that will support teachers in discussions about both possibilities and potential negative consequences with different positions in the didactical dilemmas.

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