Cross-border Collaboration in History among Nordic Students:
A Case Study about Creating Innovative ICT-didactic Models

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Abstract

The larger Nordic project (GNU) aims at developing innovative cross-border teaching models in different subject domains i.e. math, language, science and social studies/history. This paper provides an in-depth description and analysis of how four social science/history teachers and their 70 students (5th-7th grade) worked together between November 2011 and December 2012. Previous research regarding use of ICT in history education in primary schools is limited (Haydn 2001, Lipscomb 2002) thus calling for contemporary investigations in this particular subject domain.

The TPACK model, enhancing the combination of teachers pedagogical, content and technical competence (Koehler & Mishra 2006 and 2009) , was used as analytical framework together with nation specific curriculum and EU recommendations regarding students skills for lifelong learning (Recommendation 2006/962/EC).

A range of empirical material was analyzed such as classroom observations, students video productions, texts and photos distributed and shared on a mutual blog, real time interaction (Adobe Connect) and teachers' communication (e-mail, Google docs, wikis).

The teachers tried out two ICT didactic models. In the asynchronous model, the major focus was on form and content of the video productions being shared whereas working with the synchronous model the major focus was on content and quality of the communication. Notwithstanding obstacles, cross-border collaboration provided added value. The nation specific differences triggered curiosity and motivation to produce digital presentations of history content to be understood by the students in the three nations and facilitating goal fulfillment in communication skills and digital competence. However, reaching subject specific goals in history persisted challenging.

Keywords: E-learning; collaborative learning; cross-border; TPACK

Background
The GNU-project, an abbreviation for Cross Border Nordic Education [Gränsöverskridande Nordisk Undervisning/Utdanelse] is an EU-funded project related to cross-border collaborations for educational purposes supported by information and communication technologies (ICT) between Danish, Norwegian and Swedish schools. The project began in 2011 and extends to 2014. The aim of the project is to develop innovative cross-border teaching models by means of user-driven, practice-based co-design processes between practitioners and researchers (Lundh-Snis et. al. 2012). All project participants, students, teachers and researchers are required to communicate in their own Nordic mother tongue since the three languages are each other language neighbors and in the various Nordic curricula there is an emphasis to be trained in the Nordic languages. In the first year, 18 classes from 13 schools in Denmark, Norway and Sweden in the Öresund-Kattegatt-Skagerak region participated. The teachers and students were organized in Nordic class-match groups (consisting of students and teachers from one class in each country). In these class-match groups, new cross-border teaching models were co-created, tested and evaluated using iterative processes as pointed out in Design Based Research (Kali 2008) in several subject domains, i.e. math, language, science and social studies/history. This article deals with history.

Previous research on the use of digital tools in history classes
This paper focus on project activities linked to the subject of history in Nordic cross-border settings, including a range of new learning situations and challenges. Recent research shows that the subject of history is often one of many students least favorite subject (Turan 2010). Many students find history "simple, irrelevant, and boring" (Turan 2010) but studies have found that the use of ICT increases the students motivation regarding active participation, recall rate and achievement (Haydn 2001, Turan 2010). Different studies show that the use of technologies in history has a positive effect on students' historical and critical thinking and their understanding of various historical subject (Brown, 2001; Haydn, 2002; Taylor, 2003). However, problematic issues has also been identified such as finding out how to improve history education when using ICT (Hayden 2001) as well as difficulties to plan for and use suitable ICT-tools to support rather than distract students learning goal achievement in history (Lipscomb 2002, Hofer & Swan 2008). Questions remain regarding when and how to use which types of digital technologies to support and enhance students learning in history. Thus, teachers competence becomes essential to focus on since previous research has shown that didactic situations becomes even more complex when digital tools are used in history classes (Hofer & Swan 2008, Swan & Locascio 2008) and when teachers and students are working together in a cross-border setting the complexity increases further. Cross-border collaboration in educational practice has been regarded as one of the major shifts that will permeate educational institutions in the near future (Lee 2012) highlighting need for research in actual cross-border teaching situations.

Purpose
This paper describes and analyses how four social science/history teachers and their 70 students (5th-7th grade) worked together during November 2011 and December 2012. The purpose was detecting how to didactically work with and improve history education via cross-border collaboration using various digital technologies. We wanted to find out the specific challenges the Nordic history class-match groups encountered during the different activities they were engaged in while trying to reach specific goals for history learning. A Nordic class-match group consists of students from all three countries.

Theoretical framework: The TPCK-model

The TPCK-model, enhancing the combination of pedagogical content and technical knowledge of teachers in learning situations (Koehler & Mishra 2006, Koehler & Mishra 2009), was used as an analytical framework in order to position the teacher teams' activities with the students detecting where ICT didactic strengths as well as difficulties could be found. This model has been successfully used in previous studies in history education (Hofer & Swan 2008, Swan & Locascio 2008, Schul 2010). The TPCK model separates three specific skills among teachers linked to pedagogical- (PK), content- (CK) and technical knowledge (TK) in learning situations within given contexts. These three specific skills can be combined in various ways such as pedagogical and content knowledge (PCK), pedagogical and technical knowledge (PTK) and so forth.
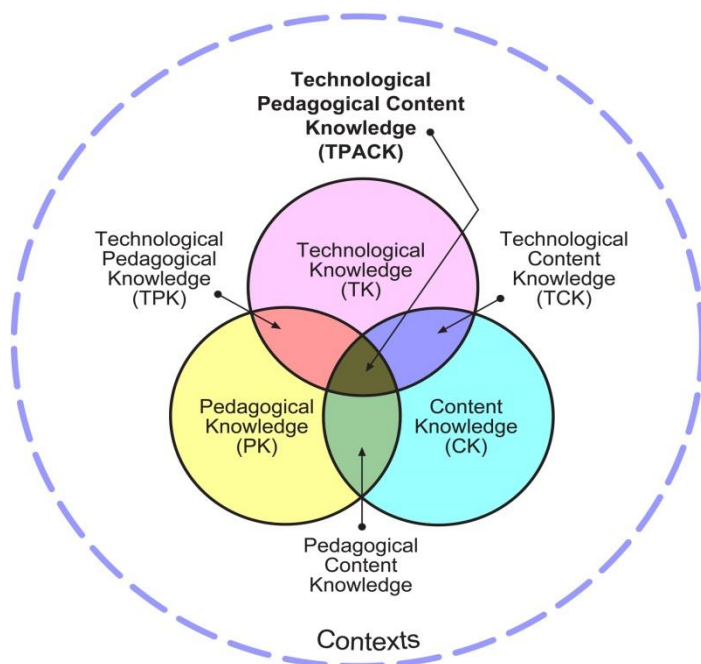

Fig. 1: The TPCK-model (Koehler & Mishra 2006)

When a combination of all three skills is present, the TPCK combination is present in a given learning situation. TPCK is a complex competence to achieve but possible to develop. In combination with the analytical model, we also used nation specific curriculum from the three countries and the EU recommendations regarding students' skills for lifelong learning enhancing digital competence, collaboration, collaboration and analytical skills (Recommendation 2006/962/EC).

Methodology

Aiming for sustainability in novel teaching models (Wang & Hannafin 2005) the combination of design-based research (Kali 2008) and action-research, as a methodology for stimulation and support of innovation in learning and teaching models, has shown to be a strength (Majgaard et. al. 2011). During this collaborative process a range of actions and documentations emerged. The empirical material consists of students productions of videos texts and photos distributed and shared on a mutual blog, teachers' communication via e-mail and google docs documents as well as wikis, video uptakes from students real time interaction on a digital system supporting video, voice and texts (AdobeConnect). In addition, there were documentations from classroom observations by the researchers as well as interviews with teachers and students from the three Nordic nations. The material was analyzed by all

researchers and focused on the activities of the teachers and the actions of the students and their expressed experiences.

Didactical models planned for and used by the history teachers in the GNU- project
A series of activities went on during this specific period of time and the activities are presented linked to the two general models the teachers arranged for i.e. the asynchronous model and the synchronous model.

The asynchronous model
The overall aim of the project is to improve history education through cross-border collaboration and work out new didactic ways of teaching history. The asynchronous work consisted of three forms of activities.

In the first activity the Nordic teachers collaboratively planned to let the students produce a film organized in national student groups with the purpose of mainly saying hello to the students in the two other countries. Each video was then placed on a shared blog and the students from the other countries posted comments about the produced videos. This was done so that the students could start out in a safe environment (as the teachers put it) and get the chance to get to know each other and read texts presented in the three different Nordic languages.

The second activity was to make a video presentation of their school, their town and the specific part of the country they lived in.

During the third activity, they were going to answer questions they got from the other countries about local historical, persons, buildings etc. The answer had to be in the form of a video.

This last activity was carried out in a way, where the students composed questions to each other - and then made the answer in a filmic language in order to awaken an interest not only in a presentation of their own country and culture but also in the neighboring countries. Danish students made questions to Swedish students to answer via video production. Swedish students made questions to Norwegian students to answer via video production, and Norwegian students made questions to Danish students via video production.

The students were encouraged to reflect on the historical aspect and cultural identity in their well-known surroundings and were confronted with (missing) knowledge about their Nordic neighbors (Nortvig & Christiansen 2013).
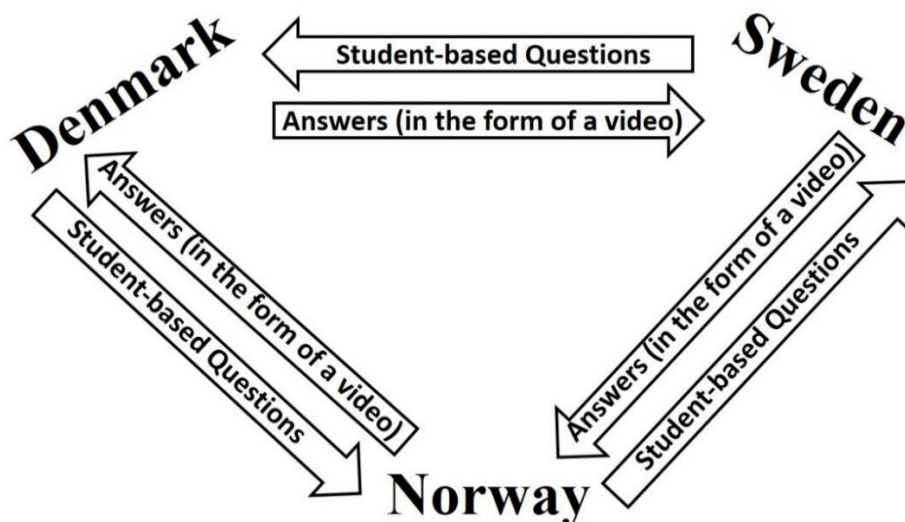
Fig. 2: Model for exchanging questions and video answers in the Nordic collaborative work.

The students worked in groups in their respective schools planning for and producing the videos later to be shared on the common blog. Some of the student-based questions that was going to be answers as a video were;

Tell us about one important historical person from your town?
Tell us about an important historical building?
Tell us about an important historical person, the most important king in Norway?
What did Denmark do in the Second World War?

During classroom observations it was observed that the students worked concentrated to prepare the videos. The videos - alongside the questions - were then placed on the common blog, so that the teachers and students were able to comment on the questions and the video as a result.

Technology
Technological skills are important when a task require the making of a video. A lot of the students already knew and liked to use Microsoft MovieMaker or iMovie to make the video and they used the schools' digital cameras to produce photos. Even though many students were familiar with different types of digital tool and information and communication systems it was still needed for the teachers to guide and support the students during their production activities such as how to save pictures and how to make videos with MovieMaker/iMovie, how to use Audacity and Wikipedia etc.

The group of teachers had planned to let the students discuss and make comments on the video in Skype. But that proved too difficult because of technical problems primarily because the school in Norway was not allowed to download and use Skype due to restricted rules in that particular municipality. The students got a bit frustrated about that because they wanted to talk and collaborate with each other in real time and they wanted to see their peer students and they asked several times if we could solve these problems. Our observations told us that their motivation to collaborate over national borders was on a high level. An asynchronous way of working did not to a full extent fulfill this need.

Content and Pedagogy
In this part of the asynchronous period the plan was that the students should discuss the content in the videos regarding the historical focus. This discussion took place between their respective classmates in each nation. However, we observed in the students' feedback to each other was that they were more focused on how they generally experienced the video and how they understood each other's spoken language than the history related content of the videos. A few of the students statements read:

"You talked very distinctly, we understood what you said! The videos were good!»

"It is hard to catch what you are saying, but the videos are great!"

"A lot of good facts, but please speak more slowly! You have done a good job, but speak a bit louder too, please!"

Our empirical work showed that the students had difficulties in understanding what was said in the videos. They became aware of the importance of speaking slowly and clear which could be a help for them in the synchronous meetings to come. The asynchronous period made them ask for a closer encounter with students from the other two countries, which eventually led to a synchronous period, where the students could interact in real-time.

TPCK and the asynchronous model
In the first phase of the Gnu project, the collaborative activities planned for and executed by teachers and students were all organized according to various asynchronous set ups. These activities will be positioned in relation to the analytical framework of the TPCK model presented by Koehler and Mishra (2006 and 2009).

Technology
In the asynchronous model the use of a range of technologies was involved. In particular technologies linked to tools and systems needed for video production. In general, the four Nordic teachers demonstrated skillfulness regarding use of these various tools and systems while guiding their students in their work. Accordingly, we argue that the involved teachers could be described as very competent regarding technology knowledge (TK) following the TPCK model (Koehler & Mishra 2006, Koehler & Mishra 2009).

Content and Pedagogy
The strong focus on student driven question formulation and video presentation working in groups were evaluated as activities following the recommendations regarding development of collaborative and communicative skills found both in national curricula (Denmark: Fælles Mål 2009 Samfundsfag (Faghæfte 5), Sweden: Kursplan i samhällskunskap för gundskolan, Norway: Læreplan i Samfunnsfag) and EU recommendations (Recommendation 2006/962/EC). The focus on group work in the assignments was also evaluated as a sign of teachers being highly competent regarding PK (pedagogical knowledge) facilitating and supporting project based learning (Grant 2002). However, the rather superficial presentation of the historical content in the videos as well as the lack of focus on the history content in the discussion of the videos were interpreted as a sign of a rather low score for the teachers in this particular activity linked to the CK (content knowledge). However, important to note is that this critical evaluation is only based on the actual content in the videos produced in this situation and says nothing about the general content knowledge. The teachers also said in follow up interviews that the time devoted to the specific GNU assignment became more of a technical focus when they were helping the students rather than guiding them towards a more

insightful historical content focus, thus highlighting the necessity for content focus in the next phase of the GNU project.

The synchronous model
The teachers wanted more focus on history content in the cross-border collaboration after working with local history and the asynchronous set up. They also wanted to address the students' wishes to work in real time situations with each other.

Technology
Due to different municipality regulation in the three nations as well as varying school IT policies (Lundh-Snis et.al. 2012), finding an accepted real-time communication system proved to be a tricky task. In order to be able to work synchronously at all, AdobeConnect (AC) turned out to be the only option since the overall GNU project could guarantee a secure and free access to the particular program.

AC allows users to communicate via chat, voice and video. It is possible to present PowerPoint and PDF documents, pictures, movies and cooperate with common notes and whiteboard. Additionally, users can share a common view of screens and programs. It is also possible to divide students into different breakout rooms and make recordings of meetings.

Content and Pedagogy
The four teachers collaborated on the basis of their national curriculum to find a common denominator to work with. Children's conditions in the 20th century was part of each country's curriculum in the subject and became the content focus. The teachers focused their planning on these questions: How did the children live their lives in the previous century? What similarities and differences could be identified in the three Nordic countries during this period? What events have been significant in improving children's lives during the 20th century in the Nordic countries?

The three classes worked on these issues with the idea that cross-border cooperation would help the students to connect major historical events with children's everyday conditions during the 20th century with special focus on the conditions for children in the school. Students worked in class match teams of a number of students from each school. Each group consisted of students from Norway, Denmark and Sweden. The idea was that students would present and compare their findings to learn from each other, and to draw conclusions based on each other's presentations. Each group consisted of a total of about 12 students (about four from each country with some variation) and there were 6 groups in total, two groups for each assigned time period i.e. early, middle and late 1900s. The ambition was to work actively with the understanding that history is not just about a number of events without connections but also linked to experience and everyday life.

The three Nordic teachers designed the task for the student in a three step sequential model:

Task 1) students should find out how it was in their own country, with emphasis on schooling. Inspired by the flipped classroom model, teachers placed presentations about parts of the content on the common blog where students could take part of each country's presentation.

Task 2) students would connect in AC to share what they found in their respective class-match group in different breakout rooms in AC.

Task 3) students should identify similarities and differences based on the information they

received.

Students' activities
Before the students met in AC, they prepared their work in their respective nation classrooms with their group members. Then they teamed up in their breakout room in AC to start to share and discuss their findings.

First AC meeting
The first time in the AC setup it was apparent that the students had gotten different instructions on what the task would involve and how they should have prepared the first meeting. The Danish students had prepared to talk about their own school day today. The Norwegian students had prepared PowerPoint's with statements regarding the conditions of children in each part of the 20th century, and the Swedish students had prepared to have a conversation about what they have investigated linked to their designated time period having handwritten notes as a reminder what to say to the other students. This variation was difficult for the students to deal with. Despite the variation, they made a good effort and tried to do the best they could to work with their task struggling with echo problems in the systems as well as having problems of managing how to organize their online turn taking so that they could talk one at the time instead of all at once.

Second AC meeting
The second time, all groups had prepared PowerPoint presentations about the conditions for children in schools in each country during the designated period of time to be shared in AC. In spite of the improved and combined activities various problems continued for the students. All groups experienced difficulties how to present and share written text in AC. Due to this lack of knowledge how to present text material in AC it became almost impossible for them to read each other's presentation. The echo problem from the first time was still a big issue and the difficulties to have a well-functioning turn taking model while communicating was also this time hard to achieve. The students tried to overcome echo problem as well as turn taking difficulties by using the chat function in AC instead. However, their enthusiasm to be in contact with each other seemed to have diminished compared to the first time in the AC meetings when the enthusiasm was interpreted as high despite of the obstacles.

Third AC meeting
The third time they tried again to present the same pre-prepared presentation as the second time. They still encountered difficulties when trying to share the presentations and now there were clear signs among the students that their patience was challenged. They were now loudly complaining about sound quality and how their fellow students were moving their text on the screen in AC. They paid more attention to their classmates in their school rather than paying attention to those they worked with in the Nordic class match group setting, yet still trying though, but seemingly more driven by duty than motivation.

TPCK and the synchronous model
The lessons learnt from this synchronous phase and the model of synchronous cross-border cooperation was that the assignment ended up being too difficult for the students. There were too many (technological, communicative and language-based) obstacles to overcome.

Technology
The selected real time communication and collaboration tool was not really suitable to support the complex task the students was about to do. Relating that analysis to the TPCK model (Koehler & Mishra 2006, Koehler & Mishra 2009), we claim that the TPK (techno-

pedagogical knowledge) using AdobeConnect was evaluated as fairly inaccurate and give room for further improvements for all involved parties in the coming project activities.

Content and Pedagogy
The idea to have students work in groups, to be given themes to work in relation to, selecting relevant information as well as the idea of trying to diagnose differences and similarities in the historical events and impact for children in the 20th century is very much in line with parts of the national curriculum in each country calling for the development of communication, collaboration and analytical skills (Denmark: Fælles Mål 2009 Samfundsfag (Faghæfte 5), Sweden: Kursplan i samhällskunskap för gundskolan, Norway: Læreplan i Samfunnsfag). However, what looked like a structured yet creative plan turned out in reality to be far too complex in execution. Additional burden to work alongside with the pedagogical plan was the teachers' initial misunderstanding regarding what the task really was about. This came as a total surprise for all involved parties, teachers as well as researchers, since the three teachers had established good relations, experienced previous co-planning sessions before and were all keen on having a communication going using mail, google docs and wikis to plan for and agree upon what to do and when to do it. In relation to this we suggest that the pedagogical-content knowledge, PCK following TPCK (Koehler & Mishra 2006, Koehler & Mishra 2009), was evaluated as fairly high while planning but turned out to be too difficult for the students in the cross-border setting. Talking to the teachers after the performed activities in the synchronous model they all said that they were too ambitious and really learnt the importance of designing tasks that challenge their students more moderately, still keeping the idea of communication, collaboration and analysis, but perhaps not necessarily in real time set ups for all activities in AC.

Combining technology-pedagogy-content knowledge
Judging from the experiences from the synchronous model set up in this cross-border collaboration setting, we can see that so called TPCK competence (Koehler & Mishra 2006, Koehler & Mishra 2009) proved to be quite a challenge for the teachers. The challenge was linked to successfully combine pedagogical planning with technical affordance and subject content. The added complexity of the synchronous model planned for and used here suggests that the level of ambition needs to be carefully managed. In this case, the learning content was defined but still not supported with a pedagogical model that ensured that cross-borders collaboration could provide structure and guidance in the learning process. It has become clear that the importance of investing time to carefully prepare is essential regarding what content to present and how to present it as well as finding out a collaborative model that supports rather that distracts focus of the subject.

Discussion
The question remains how our understanding of technological pedagogical content knowledge can support collaborative work in history? How can we think about the connections and interactions between the knowledge of content, pedagogy, and technology with respect to teaching history? And how can technology tools help scaffolding the students' development in historical consciousness with cross-border collaboration? It is important to emphasize that the use of ICT in education needs an understanding and reflection about what is good teaching in relation to both pedagogy and content. The pedagogical knowledge is also about being able to see how ICT can support the content and improve the learning outcome, following the arguments presented in the TPCK model calling for an integrated competence among teachers combining skillful use of ICT, pedagogy and subject content.

Digital technology plays a role as multimodal facilitator of the students' communication and collaboration. When the neighboring languages - even if they are very close both phonetically and grammatically - are difficult to understand, the students find it a bit easier if "the neighbors" express themselves e.g. both orally and in writing.

On the other hand, the digital technology plays the role of obstacle too because the students often experience very bad sound like echoes, noise or silenced microphones. We see that the students are extremely patient with these technical challenges but when the sound is bad and the neighboring languages are hard to understand, they start addressing their classmates instead of the students in the other countries, and the added value of cross-border collaboration is then fading away.

Conclusion

We see different challenges to be addressed in the asynchronous and synchronous model. Starting with the asynchronous model we conclude that since video production became in focus, students needed teachers guidance to implement content into their productions. When productions are made and shared, the historical content need to really be discussed and analyzed in order to support learning otherwise they risk paying more attention to form than content. Students seem eager to have real time communication, thus the asynchronous model needs to be clearly argued for and motivated as a cross-border collaboration model. Since it was hard to understand each other's spoken languages, it is good for the communication and future collaboration to use text in combination with voice in video productions.

Turning to the synchronous model, based on the observed activities and the outcome, tasks in a synchronous set-up need strict preparation and sharp limitations in order to give added value to the learning situation. The number of students working together should preferably be quite limited when dealing with complex tasks and all involved users need to know how to use the chosen technological tool to support communication and collaboration.

Notwithstanding obstacles, the major conclusion is that added value was located with cross-border collaboration because the differences triggered curiosity and motivation to produce presentations to and work with 'the neighbors'. Thus, we can see clear indications of goals being reached regarding both communication skills and digital competence as they are written in the three nations curricula as well as formulated in EU recommendations. However, there are more work to be done to more clearly reach the subject specific goals in cross-border collaboration. We find that the Nordic team of teachers was technical, pedagogical and content competent but had difficulties to combine these competences with the history content, following the TPCK model (Koehler & Mishra 2006, Koehler & Mishra 2009) in the cross-border setting. The collaboration between the three classes could not be possible if technology was not involved but at the same time difficulties with technology alongside with occasional language problems sometimes dominated the scene more than pedagogy and history did. More effort is required to pin down in what way technology can be used to support history teaching when it is carried out in both asynchronous and synchronous learning environments.

Additionally, cross-border collaboration provides added workload. Therefore, it becomes of uttermost importance to provide supporting actions to both students and teachers so that technical and organizational issues do not overshadow the added value that cross-border collaboration provides. However, it becomes highly important to work actively *with* the obstacles that emerges, i.e. to actively enhance the obstacles as a learning situation. We can also see how these obstacle reveals differences that makes learning about 'the other' possible

in a more rich and real situations compared to reading about these differences in textbooks or other types of material used for learning purposes in history education.

Acknowledgements

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