# Cross-border collaboration in history among Nordic students: A case study about creating innovative ICT didactic models

Maria Spante, Asgjerd Vea Karlsen, Anne-Mette Nortvig, Rene B. Christiansen

**Abstract**

Gränsöverskridande Nordisk Undervisning/Utdanelse (GNU, meaning Cross-Border Nordic Education), the larger Nordic project, under which this case study was carried out, aims at developing innovative, cross-border teaching models in different subject domains in elementary school, including mathematics, language, science, social studies and history. This paper provides an in-depth description and analysis of how four social science and history elementary school teachers and their 70 students (5th–7th grades) worked together between November 2011 and December 2012. Previous research regarding the use of information and communication technology (ICT) in history education in elementary schools is limited, thus calling for contemporary investigations in this particular subject domain.

The Technological Pedagogical Content Knowledge (TPACK) model, enhancing the combination of teachers' pedagogical, content and technical competence, was used as the analytical framework, together with nation-specific curricula and the European Union's recommendations regarding students' skills for lifelong learning. A range of empirical materials was analyzed, such as classroom observations, students' video productions, texts and photos distributed and shared on a mutual blog, real-time interaction and teachers' communication. The teachers tried out two ICT didactic models. In the asynchronous model, the major focus was on the form and content of the video productions being shared, whereas work with the synchronous model concentrated on the 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, facilitating goal fulfillment in communication skills and digital competence. However, achieving subject-specific goals in history remained challenging. Keywords: E-learning; Collaborative learning; Cross-border; TPACK.

**Introduction**

The need for educational innovations in several Nordic countries in Europe has become increasingly pressing, since a number of studies have shown unsatisfying performance rates among Scandinavian students (Programme for International Student Assessment [PISA] 2012). Various voices have called for institutional changes, control over the curricula and increased documentation of students' performances. At the same time, there is a need for local innovations and experiments in the classroom, where the teachers create learning designs that are close to the requirements of their own students and local contexts. Such dual challenges at different levels, institutional as well as local, created the backbone for the Scandinavian collaborative project named Gränsöverskridande Nordisk Undervisning/Utdanelse (GNU, which means Cross-Border Nordic Education). It is a European Union (EU)-funded undertaking that involves cross-border collaborations for educational purposes, supported by information and communication technology (ICT), among Danish, Norwegian and Swedish schools dealing with similar problems of unsatisfying performance rates among students, according to international comparative studies (PISA 2012).

The project began in 2011 and extends to 2014. It aims to develop innovative, cross-border teaching models in a range of subjects by means of user-driven, practice-based, co-design processes between practitioners and researchers (Johansson-Svensson, Rustand, Steffensen, & Sofkova Hashemi, 2013; Pareto, Gynther, Lindhart, Vejbæk, & Wølner, 2013; Spante, Karlsen, Nortvig, & Christiansen, 2013; Svedäng & Spante, 2014) in order to create supportive learning models suitable for local school contexts, as well as cross-border collaboration situations in the Nordic countries. The research question that drove the initiative was: *In what way and form could cross-border collaboration models, supported by information and communication technology, enhance motivation and learning for students as well as teachers in the Nordic countries?*

One key feature in the GNU initiative is that all project participants (students, teachers and researchers) are required to communicate in their own Nordic mother tongue, since the three languages are related, and the various Nordic curricula emphasize training in the Nordic languages. Therefore, communicating in the mother tongue has become an important prerequisite for driving the project that aims to enhance learning. This situation has quite a unique setting, suggesting that these neighboring languages, different but still related, can be used to collaborate due to communicative prerequisites that are absent in other settings, when foreign languages become crucial for communication.

In the first year of the project, the participants comprised 18 classes from 13 schools in the Öresund-Kattegatt-Skagerak region of Denmark, Norway and Sweden. The teachers and students were organized into 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). Several subject domains, namely, mathematics, language, science, social studies and history, were selected, since students in the three countries have shown their need for improvement in these areas, and mutual efforts in the search for new learning models were set in motion by the GNU project initiative. In this paper, we report findings from the work with the subject of history, covering studies not only about past events and ideas but also how these historical events might influence actions and ideas in the present time.

The structure and content of the paper are presented in the following manner. First, we discuss issues related to the subject domain of history in general and the use of ICT for motivation in such learning situations, then present the aim of the work reported in this paper. This is followed by the theoretical

framework that has guided the analysis of the activities performed by teachers and students during the project period. Next, we provide the project methodology and how the empirical material was collected and interpreted.

In the result and discussion section, we present the empirical material that has been structured and analyzed in relation to the theoretical framework, that is, the TPACK model by Mishra and Koehler (2006), together with our findings and the problems in the cross-border setup. Finally, we offer the conclusion and suggest some benefits of cross-border collaboration (notwithstanding its difficulties) that could be generalized to a broader spectrum beyond dealing with Nordic cross-border settings in the subject of history.

## Literature Review

**Previous research on the use of digital tools in history classes**

This paper focuses 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 history is often among the least favorite subjects of many students (Turan, 2010). They find history simple, irrelevant and boring (Turan, 2010), but studies have found that the use of ICT increases student motivation in active participation, recall rate and achievement (Haydn, 2001; Turan, 2010).

Different studies show that the use of technologies in history education in elementary school has a positive effect on students' historical and critical thinking and their understanding of various historical subjects (Brown, 2001; Haydn, 2001; Taylor, 2003). However, problematic issues have also been identified, such as finding out how to improve the subject of history when using ICT (Hayden, 2001), as well as difficulties in planning for and using suitable ICT tools to support rather than distract students' learning goal achievements in the subject (Hofer & Swan, 2008; Lipscomb, 2002).

Questions remain regarding when and how to use which types of digital technologies to support and enhance students' learning in the subject of history in elementary schools. It becomes essential to focus on teacher competence, since previous research has shown that didactic situations become even more complex when digital tools are used in elementary history classes (Hofer & Swan, 2008), and when teachers and students work 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 the need for research in actual cross-border teaching situations. Such research becomes crucial because potential promises of a new pedagogical setup do not necessarily reflect the actual possibilities and particularly so when ICT is used; previous research has demonstrated that access and use are often problematic in learning situations in schools (Cuban, 2009; Jedeskog, 2007).

**Purpose**

This paper describes and analyses how four social science and history elementary school teachers and their 70 students (5th–7th grades) worked together from November 2011 to December 2012. The research question was how to didactically work with and improve history education via cross-border collaboration using various digital technologies. The purpose was to find solutions to the specific challenges the Nordic history class-match groups encountered during the different activities in which they were engaged while trying to reach specific goals for historical learning.

Within the framework of the research question, we present the learning designs that were created and evaluated in the GNU project and linked to activities in history classes. We discuss the findings concerning technology and language that shift attention from content to technology as such. Moreover, in the project, we found a need to specifically focus on not only the teachers' technological, pedagogical and content knowledge, but also on their ability to create clear learning

designs in order to inform the students more precisely than in the traditional classroom how their collaboration and individual work are supposed to take place. The work contributes to the knowledge about what possibilities and constraints teachers need to consider in cross-border learning situations, where group work and student participation are major concerns for the pedagogical setup, before spending time and effort to arrange for such learning models. The paper provides empirically grounded information about important issues to address, linked to the new pedagogical landscape of increased collaboration among students and teachers across national borders for mutual learning and enhanced understanding.

**Theoretical framework**

The teachers' role is crucial for learning (Hattie, 2008) to be successful, they would have to confront and combine both content and pedagogy simultaneously (Shulman, 1986). For didactic innovations and evaluations of their pedagogical benefits, it becomes imperative to address different perspectives. When the didactic situation has added complexities such as collaboration with external partners and communication via technical systems, models for such a complex analysis are needed. One such analytical model initiative has been proposed by Mishra and Koehler (2006), who expanded on the Shulman (1986) framework and presented the TPACK model that incorporates technology, pedagogy and content knowledge into a coherent whole. The TPACK framework has been extensively used in a range of subject domains. Since all aspects of the model are present in the actual situations in the GNU project among the history teachers, the model has become a sense-making analytical framework in which to analyze the complex, cross-border collaboration in pedagogical settings in order to present suggestions for cross-border educational setups. Enhancing the combination of pedagogical content and technical knowledge of teachers in learning situations, the Technological Pedagogical Content Knowledge (TPACK) model (see Figure 1) was used as an

analytical framework to position the teacher teams' activities with the students, detecting where ICT

didactic strengths and difficulties could be found. This model has been successfully used in previous

studies in the subject of history in elementary schools (Hofer & Swan, 2008; Schul, 2010; Swan &

Locascio, 2008). The TPACK model separates three specific skills of 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

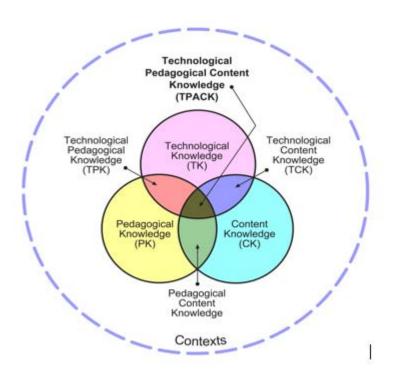(PCK), pedagogical and technical knowledge (PTK) and so forth.



Figure 1. The TPACK model (Koehler & Mishra, 2006)

When all three skills are present in a given learning situation, they reflect the TPACK combination.

The TPACK is a complex competence to achieve but possible to develop. In combination with the

analytical model, we also used nation-specific curricula from the three countries and the EU

recommendations regarding students' skills for lifelong learning, enhancing digital competence,

collaboration, and collaborative and analytical skills (Recommendation 2006/962/EC) (EU, 2006).

## 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 proven to be robust (Majgaard, Misfeldt, & Nielsen, 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' communications 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 (Adobe Connect [AC]). There were also documentations of 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 students and their expressed experiences.

## Results and Discussion

A series of activities were conducted during the 2011– 2012 period. For each specific activity that the teachers planned and performed with their students, the researchers were also involved, following the process from planning through performance and evaluations. The close collaboration with and participation of these diverse actors (teachers, students and researchers) provided deep insights into the various complex processes of collaboration in the cross-border setup for learning.

The activities presented in this paper are linked to the two general models put forward by the teachers – the asynchronous and the synchronous types. These models built on the teachers' insights into their restrictions and possibilities in each school such as schedules and availability of technology, as well as in the curriculum in each Nordic country. We present the learning models in relation to the

timeline of each activity performed by the teachers and students. First, the asynchronous models are discussed and analyzed in relation to the TPACK framework, followed by the synchronous model.

**The asynchronous model**

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

The second activity involved making a video presentation of their school, their town and the specific part of the country where they lived. During the third activity, they were supposed to answer questions from the students of the other countries about local historical persons, buildings, etc. The answers had to be in the form of a video. This last activity was carried out such that the students posed questions to one another and then responded in filmic language in order to awaken interest not only in the presentation of their own country and culture, but also in the neighboring countries.

Danish students addressed their queries to Swedish students, who did the same to Norwegian students, who in turn posed questions to their Danish counterparts. Each group provided their responses via video production (see Figure 2). The students were encouraged to reflect on the historical aspect and cultural identity of their familiar surroundings and were confronted with (missing) knowledge about their Nordic neighbors (Nortvig & Christiansen, 2013).
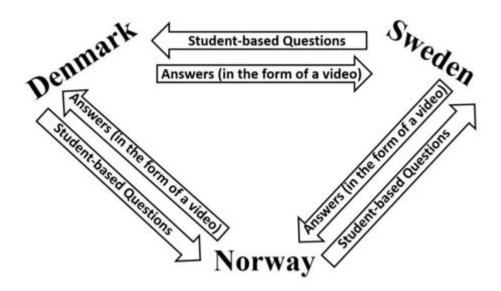
Figure 2. Model for exchanging questions and video answers in the Nordic collaborative work

The students worked in groups in their respective schools, planning and producing the videos to be shared later on the common blog. Some of the students' questions that would be answered as videos 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 the classroom observations, it was noted that the students concentrated on preparing the videos. The videos – alongside the questions – were uploaded on the common blog so that the teachers and students were able to comment on them. Classroom activities were also shared on the mutual blog where they presented activities linked to the GNU project. Below is a written sample blog post of the Swedish participants about the questions from Denmark, how they first translated

these questions from Danish to Swedish and reflected on how to answer them and organize the work of presenting the answers in video format:

"*Hello everybody, Mölndal calling*
*Today we started to work with the questions from Roskilde. We translated the questions to Swedish and worked in groups in order to answer the questions and figuring out how to move on to the next stage. How can we make videos of our answers?:)*"

Typically, the students made an oral presentation and showed some still pictures of a historical person. Some ambitious work was also created, such as one student group that used the local museum's historical interior as a scene for the dramatized setup that answered the question of how the city got its current name. For a presentation about a historical building, the students usually found a local building and shot the video on-site. (for the blog where their content is uploaded in Swedish, Danish and Norwegian, visit http://gnu-historia.blogspot.se/p/glasbergsskolan.html). The students searched for information about historical persons and buildings, primarily from open-source online sites such as Wikipedia.

One key component of the asynchronous learning model was to have the students comment on one another's work. Typically, the students made general remarks about the videos, as well as how they experienced the language and presentation, for example:

"*You speak quite quietly and not so clear, but the video was otherwise good.*"

"*You talked very clearly, and we understood everything you said. Good pictures and videos too :)*"

"*Hello, just talk more clearly; all the rest is good.*"

*"We received very good answers on the third video, and it was very nice. You also talked*

*very clearly!"*

In the first phase of the GNU project, the collaborative activities that were planned and executed by the teachers and students were all organized according to various asynchronous setups. These activities are positioned in this case study in relation to the analytical framework of the TPACK model presented by Mishra and Koehler (2006) and Koehler and Mishra (2009).

Technological skills are important when a task requires creating a video. A lot of the students already knew and liked to use Microsoft Movie Maker or iMovie to produce the video, and they used the schools' digital cameras to take photos. Even though many students were familiar with different types of digital tools and information and communication systems, others still needed their teachers to guide and support them during their production activities, such as how to save pictures, make videos with Movie Maker/iMovie, use Audacity and Wikipedia, etc. Nonetheless, the students' overall competence in using these types of technical tools for video production was high at each Scandinavian school involving the particular class-match groups.

The group of teachers had initially planned to let the students discuss and comment on the videos via Skype. However, it proved too difficult because of technical problems, primarily because the school in Norway was not allowed to download and use Skype due to restrictive rules in that particular municipality. The students were a bit frustrated because they wanted to talk and collaborate with one another in real time and see their peers; they asked several times if we could solve these problems. Our observations revealed their high level of motivation to collaborate across national borders. An asynchronous way of working did not fulfill this need to a full extent. Nonetheless, the asynchronous model involved the use of a range of technologies, particularly those linked to the tools and systems

needed for video production. Generally, the four Nordic teachers demonstrated skillfulness in using these various tools and systems while guiding their students in their work. Accordingly, we describe the participant teachers as very competent in TK, following the TPACK model (Mishra and Koehler, 2006; Koehler and Mishra, 2009).

In this part of the asynchronous period, the plan was that the students should discuss the videos' historical content. This discussion took place among their respective classmates in each nation. However, we observed in the students' feedback to one another that they were more focused on how they generally experienced the videos and understood (or not) one another's spoken language than on the relevant content of the videos (see citations above).

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 clearly, which could help them in the synchronous meetings that would follow. The asynchronous period made them ask for a closer encounter with the students from the other two countries, which eventually led to a synchronous period where the students could interact in real time. The strong focus on student-driven question formulation and video presentation as group work was evaluated as activities, following the recommendations on the development of collaborative and communicative skills that are found in both 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) (EU, 2006). The focus on group work in the assignments was also evaluated as a sign of the teachers' high competence in PK, 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 content in the discussion of the videos (i.e., students commented on language and their general opinions of the pictures rather than the local historical content that each video supposedly presented), were interpreted as signifying a rather low score for the teachers in this particular activity linked to CK. However, it is noteworthy that this critical evaluation is only based on the actual content of the videos produced in this situation and says nothing about the general CK. 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 the content in the cross-border collaboration after working with local history in the asynchronous setup. They also wanted to address the students' wishes to work in real-time situations with one another.

Due to different municipality regulations in the three nations, as well as varying school IT policies (Lundh-Snis et al., 2012), finding an acceptable, real-time communication system proved to be a challenging task. In order to work synchronously at all, AC turned out to be the only option, since the overall GNU project could guarantee secure and free access to this particular program. The AC system allows users to communicate via chat, voice and video. It is possible to present PowerPoint and PDF documents, pictures and movies, as well as cooperate with common notes and the whiteboard. Additionally, users can share a common view of screens and programs. It is also possible to divide students into different breakout rooms and to record meetings.

The four teachers collaborated on the basis of their respective national curricula to find a common denominator with which to work together. Children's conditions in the 20th century were 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 had been significant in improving children's lives in the Nordic countries during the 20th century?*

The three classes worked on these issues with the idea that cross-border cooperation would help the students connect major historical events with children's everyday conditions during the 20th century, with special focus on the conditions for children in school. Students worked in class-match teams, comprising 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 one another and draw conclusions based on one another's presentations. Each group consisted of about 12 students (approximately 4 from each country, with some variations), and there were 6 groups in total, with 2 groups for each assigned time period – early, middle and late 1900s. The ambition was to work actively with the understanding that the subject of 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 tasks for the students in a three-step sequential model:

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

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

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 doing task 1. Then they teamed up in their respective breakout rooms in AC to share and discuss their findings for tasks 2 and 3.

**First AC meeting**

During the first time in the AC setup, it was apparent that the students had received different instructions on what the task would involve and how they should have prepared for the first meeting. The Danish students had prepared to talk about their own school day at the present time. The Norwegian students had prepared PowerPoint presentations with statements regarding the conditions of children in each period of the 20th century. The Swedish students had prepared for a conversation on their investigation about their designated time period, with handwritten notes as reminders of what to say to the other students. Although the students found it difficult to deal with these variations, they made their best efforts to work with their tasks, while struggling with echo problems in the system and managing their online turn taking, so they could talk one at a time instead of all at once.

> "*We have not made a presentation, but we would like to tell you about it, if it's okay with you.*"

The preceding quote illustrates that they had received different instructions on how to prepare for the task of presenting and sharing their information. So does another example below:

*"We will tell you about the skammekroken," say the students in Norway.*

*"What it that?" the Swedish students ask.*

*The Norwegian students start telling about the disciplinary method where disobedient students were put in a corner of the classroom. In explaining the method, the Norwegian word 'slemme' is used, which is unfamiliar to the Swedish students, who immediately ask, "What does 'slemme' mean?"*

*"It means mean," the Norwegian students reply.*

*While the two student groups in Sweden and Norway are having this conversation, the Danish students are posting in the chat, "We have mathematics, Danish, English, domestic science, sports."*

The preceding quote implies that the Danish students had prepared to share information about their own day at school, as well as how they dealt with a sound problem in the AC system by using chat instead of voice communication. They also had trouble following the line of conversation between the Norwegian and Swedish students who were talking about a special disciplinary method that was used in 1950, as well as providing language clarification when the Swedish students heard a Norwegian word they did not understand. The students demonstrated both patience and motivation to connect as best as they could and share the information they had prepared, despite troubles with the communication channels in AC.

*"Now let's write what we have learnt about the schools in the beginning of the 20th century."*

The preceding quote indicates how they needed to deal with the sound problem and find new ways to share information, turning to the chat function in the AC system and still focusing on the task at hand.

The students also commented afterwards about their misunderstanding of the task:

> "*Denmark did not understand the task. They thought they should write about when we started and what subjects they had.*"

> "*Denmark talked about their schedule in school today, and Norway talked about the school, how it was before.*"

> "*Denmark did not say much, but Norway made a Keynote presentation, but Denmark could not get in, or rather, they did but said nothing.*"

> "*I thought we should discuss what we had to say and not make PowerPoints.*"

> "*I think we should be allowed to speak English because it is so hard to understand each other.*"

**Second AC meeting**

The second time, all groups had prepared PowerPoint presentations about the conditions for the school children in each country during the designated time period, to be shared in AC. In spite of the improved and combined activities, various problems continued for the students. All groups experienced difficulties in how to present and share written text in AC. Due to this lack of knowledge, it became almost impossible for them to read one another's presentations. They were loudly complaining about how their fellow students were moving their text on screen in AC. The echo problem from the first time was still a major issue, and the difficulties in having a well-functioning, turn-taking model for communicating were also hard to surmount this time. The students tried to overcome the echo problem and the turn-taking issues by using the chat function in AC instead. For example, they commanded one another, as indicated in the chat: *"One country*

*speaks at a time."* They also tried to guide the focus to the task at hand, involving each group in each country to participate and contribute with comments such as: *"Can you from Denmark tell something about what happened in the 50s?"* However, their enthusiasm to be in contact with one another seemed to have diminished, compared to their first AC meeting, when the enthusiasm was interpreted as high despite the obstacles.

Below are some examples about how they struggled in the AC system to upload and share their prepared documents, making them lose focus on the content about children's conditions at school during the 20th century. At 11 minutes and 14 seconds in the video, the following series of actions happen:

> *Norway uploads their document, it disappears, it then comes back but is taken away again.*
>
> *The correct presentation is uploaded.*
>
> *The Swedish and the Danish students are reading the document. The Swedish students are struggling with the text. Their teacher assists them.*
>
> *Norway repeats the question, "What should we talk about?"*
>
> *One Danish boy tries on the headset but quickly returns it to his classmate.*
>
> *The uploaded document is scrolled up and down the screen, so it becomes very hard to read.*
>
> *All student groups seem to concentrate on the activities at their respective ends; no extensive collaboration is going on.*
>
> *The Norwegian document is taken away; the Swedish document is uploaded and starts to be scrolled up and down the screen.*

The above sequence from an AC meeting was quite typical. Students were struggling with turn taking, language issues and how to share prepared documents, but they tried to overcome these obstacles. However, since they became more and more oriented towards the activities in their respective classrooms rather than collaborating in the AC system, we interpreted these observations as decreasing enthusiasm for cross-border collaboration in the real-time setting due to the problems with technology and rules for collaboration across borders.

**Third AC meeting**

The third time, they tried again to present the same prepared presentation as that of the second meeting. They still encountered difficulties when trying to share the presentations, and this time there were clear signs that the students' patience was being challenged. They paid more attention to their classmates than to those they worked with in the Nordic class-match group setting, yet still trying, but seemingly more driven by duty than by motivation. Below is a typical situation in this third AC meeting, which manifests their difficulties and signs of diminishing motivation (their focus is drifting away from the actual task by doing other things; they are increasingly disconnected but still in sight of one another in the AC system, with video, sound and chat channels running):

*The Danish students are asking why it is not possible to paste text into the document.*

*In the background, a Norwegian student is writing on the blackboard with big letters.*

*The Norwegian students reply that they do not know how to copy and paste text into the document. Meanwhile, there is a constant echo sound in the system.*

*"Isn't Justin Bieber just great!" the Norwegian student says. 'Justin Bieber' is written with big letters on the blackboard. The Danish students are gesturing with their thumbs down, and the Norwegian girl cannot believe her eyes.*

*The Norwegian students write in the chat, "We love him!!"*

*The Swedish students log on and wave to the other participants.*

*"Are you longing for Christmas?" the Norwegian students ask.*

*The Swedish students upload their presentation. The Norwegian presentation is uploaded again.*

*"It's William's birthday today!" a Swedish student says and points to a classmate.*

*"Congratulations" is written in the chat.*

*The Swedish students start to sing to their classmate.*

The lessons learnt from this synchronous phase and the model of synchronous cross-border cooperation demonstrated that the assignment ended up being too difficult for the students. There were too many (technological, communicative and language-based) obstacles to overcome, so instead of working with their common assignment, they started chatting and trying to get to know one another in a different way than the one the teachers had planned.

The selected real-time communication and collaboration tool was not really suitable to support the complex task that was supposed to be accomplished by the students. Relating such analysis to the TPACK model, we claim that the techno-pedagogical knowledge (TPK) using AC was evaluated as

fairly inaccurate and revealed areas for improvement of all involved parties in future project activities.

The idea to have students work in groups, be given themes to work with, select relevant information, as well as try to diagnose differences and similarities in the historical events and impacts for children in the 20th century, closely aligns with parts of the national curriculum in each country calling for the development of communication, collaboration and analytical skills. However, what looked like a structured yet creative plan turned out in reality to be far too complex in execution. An additional burden in working with the pedagogical plan was the teachers' initial misunderstanding of what the task was really about. This situation 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 communicating using e-mail, Google Docs and wikis to plan and agree on the activities and schedules. In this regard, we suggest that PCK that followed TPACK (Mishra and Koehler, 2006; Koehler and Mishra, 2009) was evaluated as fairly high, but planning turned out to be too difficult for the students in the cross-border setting. In the interview with the teachers after the performed activities in the synchronous model, they all admitted being too ambitious and learning the importance of designing tasks that challenge their students more moderately, while retaining the idea of communication, collaboration and analysis, but perhaps not necessarily in real-time setups for all activities in AC.

Judging from the experiences in both the asynchronous and synchronous models in this cross-border collaboration setting, we realize that the so-called TPACK proved to be quite a challenge for the teachers. The challenge entailed successfully combining pedagogical planning with technical affordance and subject content.

Regarding the synchronous mode, the added complexity planned for and used in this particular setup 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-border collaboration could provide structure and guidance in the learning process. It has become clear that it is essential to invest time in carefully preparing what content to present and how to present it, as well as identifying a collaborative model that supports rather than distracts from the focus of the subject. The aim to enhance motivation and learning with cross-border collaborative efforts was difficult to achieve despite hard work from all involved actors (teachers and students); thus, they departed from the history content and became preoccupied with or distracted by technology in the didactic situation, as reported in previous research (Hofer & Swan, 2008; Swan & Locascio, 2008).

These questions remain: "*How can our understanding of TPACK support collaborative work in the subject of history? How can we think about the connections and interactions among the knowledge of content, pedagogy and technology with respect to teaching history in elementary school? How can technological tools help scaffold 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 sound teaching in relation to both pedagogy and content. Pedagogical knowledge also refers to the ability to determine how ICT can support content and improve the learning outcome, based on the TPACK model that calls for an integrated competence among teachers, combining the skilful use of ICT, pedagogy and subject content.

Digital technology plays a role as a multimodal facilitator of the students' communication and collaboration. When the neighboring languages – even if they are both phonetically and grammatically close – are difficult to understand, the students find it a bit easier if 'the neighbors'

express themselves both orally and in writing. On the other hand, digital technology poses obstacles too; the students often experience sound issues, such as echoes, noise or silenced microphones. The students are extremely patient with these technical challenges, but when the sound is poor 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 then diminishes as a formal learning approach. However, in the midst of technological and linguistic challenges, we also find that cross-border learning is flourishing, although in a more informal manner.

## Conclusion

Different challenges should be addressed in the asynchronous and synchronous models. Starting with the asynchronous model, we conclude that since video production has become a focus, the students need their teachers' guidance to integrate content into their productions. When productions are made and shared, the historical content needs to really be discussed and analyzed in order to support learning; otherwise, they pose the risk of students paying more attention to form than content. Students seem eager to engage in real-time communication; thus, the asynchronous model needs to be clearly promoted and encouraged as a complementary cross-border collaboration model. Due to the students' difficulties in understanding one another's spoken languages, it is good for 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 such a setup need thorough preparation and explicit limitations in order to provide 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 the obstacles, the major conclusion is that added value has been identified with cross-border collaboration, because the differences have triggered curiosity and motivation to produce presentations for and work with 'the neighbors'. Thus, we perceive clear indications of goals being attained in both communication skills and digital competence, as written in the three nations' respective curricula and formulated in EU recommendations. However, further work remains in order to achieve the subject-specific goals more precisely in cross-border collaboration. We note the Nordic teacher team's competency in technical, pedagogical and content knowledge, despite difficulties in combining these skills with the specific content in the subject of history, according to the TPACK model in the cross-border setting. The collaboration among the three classes could not have been possible without technology, although technology issues and occasional language problems sometimes dominate the scene over pedagogy and the subject of history. Increased efforts are required to determine how technology can be used to support teaching history in elementary schools when it is carried out in both asynchronous and synchronous learning environments. Our study has contributed with some detailed, empirically driven recommendations, but these examples are still limited and strongly connected to the collaborative efforts among the Nordic teacher and student participants in the cross-border, co-design project.

Additionally, cross-border collaboration imposes an extra workload. Therefore, it becomes of utmost importance to provide support to both students and teachers so that technical and organizational issues do not overshadow the added value offered by cross-border collaboration. However, it becomes crucial to work actively *with* the emerging obstacles, that is, to engage vigorously in overcoming the barriers as a learning experience. We can also observe how these hurdles reveal differences that make learning about 'the other' possible in richer and real situations, providing

authentic learning, compared to reading about these disparities in textbooks or other types of material used for learning purposes in the subject of history.

## Acknowledgements

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